CONNECTING THE DOTS IN THE ADRIATIC-IONIAN AREA. LONG-DISTANCE NETWORKS IN THE 3RD MILLENNIUM BC.

Maja Gori*, Andrea Di Renzoni**, Elena Carletti***

Abstract – The so-called Cetina culture can be described as a widespread pattern of interconnections traceable through a particular ceramic style that spread in the Adriatic-Ionian area in the second half of the 3rd millennium BC. The diffusion of Cetina ceramic types across the central Mediterranean is the material evidence reflecting the movement of small groups of seafarers and testifying to recurrent contacts. In this paper we attempt to provide further explanation for these patterns by adopting a community of practice approach in the analysis of networks, and focusing mainly on the ritual and ideological sphere. By applying modularity analysis, we then attempt the reconstruction of the Cetina network structure by singling out different smaller clusters interacting within the same larger network.

Keywords – *Adriatic-Ionian area, Network Analysis, Community of Practice, Rituality*

Riassunto – *La cosiddetta cultura di Cetina può essere descritta come un modello di interconnessioni rintracciabili attraverso un particolare stile ceramico diffuso nell'area adriatico-ionica nella seconda metà del terzo millennio a.C. La diffusione dei tipi ceramici Cetina nel Mediterraneo centrale è l'evidenza materiale del movimento di piccoli gruppi di navigatori e testimonia contatti ricorrenti. In questo articolo tentiamo di fornire ulteriori spiegazioni per questo pattern adottando un approccio basato sulle communities of practice nell'analisi dei network, concentrandoci principalmente sulla sfera rituale e ideologica. Applicando la modularità nell'analisi del grafo, si tenta di ricostruire la struttura della rete Cetina individuando diversi clusters più piccoli che interagiscono all'interno dello stesso, ampio network.*

Parole chiave – Area adriatico-ionica, Network Analysis, Community of practice, ritualità

INTRODUCTION

What is known in the literature as the 'Cetina culture' can be described as a widespread pattern of interconnections that can be traced through a particular ceramic style that spread from the western Balkans to the Peloponnese, peninsular Italy, eastern Sicily, Malta and the Aeolian Islands in a timeframe spanning the second half of the 3rd millennium BC. It is now widely rec-

* MAD-Lab | Modelling Archaeological Data. Laboratory for Behavioural and Computational Archaeology of the Ancient Mediterranean. CNR-ISPC Consiglio Nazionale delle Ricerche - Istituto di Scienze del Patrimonio Culturale. Area della Ricerca di Roma 1 – Montelibretti. Strada della neve - via Salaria Km 29,300. 00010 Montelibretti (Roma) - Italia +39 06-90672-582 maja.gori@cnr.it

** MAD-Lab | Modelling Archaeological Data. Laboratory for Behavioural and Computational Archaeology of the Ancient Mediterranean. CNR-ISPC Consiglio Nazionale delle Ricerche - Istituto di Scienze del Patrimonio Culturale. Area della Ricerca di Roma 1 – Montelibretti. Strada della neve - via Salaria Km 29,300. 00010 Montelibretti (Roma) - Italia +39 06-90672-585 andrea.direnzoni@cnr.it

*** Dipartimento di Scienze dell'Antichità, "La Sapienza" Università di Roma – Piazzale Aldo Moro 5, 00185 Roma, Italia. Carletti.1666756@studenti.uniroma1.it

ognised that the diffusion of Cetina ceramic types across the central Mediterranean is the material evidence of a vast network of interconnections, reflecting the movement of small groups of seafarers and testifying to recurrent contacts. This pattern in material culture has been explained in rather generic terms of connectivity (Cazzella *et alii* 2020), or by proposing an economistic explanation focussing on resources procurement (Maran 2007; Broodbank 2013). In this paper we attempt to provide further explanation for these patterns by adopting a community of practice approach in the analysis of the networks. The basic definition of "community of practice" is a collection of people who engage in an ongoing basis in some common endeavour; the phenomenon emerges in response to common interests or position. Based on the available archaeological record, we singled out three different and intertwined cultural domains based on different communities of practices (hereafter CoP) for the Cetina culture: (a) craft (pottery), (b) ritual (funerary structures, special objects), and (c) resources. By applying modularity analysis, we attempt a reconstruction of the Cetina network structure based on different CoPs, involving relationships with neighbouring cultural macro-groups (e.g. Bell Beakers). Modularity analysis has received a considerable amount of attention as it detects and characterizes community structures in networks, identifying densely connected groups of vertices, with lesser existing connections between groups (Newman 2006). Finally, we evaluate the role of geography in network formation and structure. The data utilized in this work derive from the site gazetteer published by Forenbaher (2018a), which has been complemented with data presented or revised in Pacciarelli, Crispino and Scarano (2015), Gori (2020), and Recchia (2021). The present article stems from a paper given by M. Gori and A. Di Renzoni at the 5th European Conference on Social Networks (Naples 6-10 September 2021).

SCALES OF INTERACTION IN THE MEDITERRANEAN DURING THE 3RD MILLENNIUM BC

The 3rd millennium BC is a crucial moment for European prehistory. It is an epoch characterized by the presence of large-scale and ideologically-motivated interactive networks that spread over Europe – namely the Corded Ware and, later, the Bell Beaker phenomena. The Bell Beaker phenomenon involved social, economic, ideological, and material features, forming connections between regions and landscapes that were previously culturally separated. Unlike the Corded Ware, the Bell Beakers were a supra-regional expansionistic cultural phenomenon that involved the Mediterranean area as well. Recent genomic-based research (Olalde *et alii* 2018) connected the spread of these features with mobility triggered by Yamnaya pastoralist groups from the steppe. The Yamnaya migration was the most important event of its type after the introduction of farming (c.ca 6000 cal BC). It re-shaped Prehistoric Europe around 3050/3000 cal BC, modifying its economy, society, and ideological foundations.

Research on the rise in complexity of the social-economic Mediterranean systems has traditionally targeted the Aegean, with attempts to compare Aegean-East Mediterranean spheres of interaction to the Bell Beaker networks (e.g. Rahmstorf 2006). Within this web of connections western Balkans and Italy have been defined as "new peripheries" of the circum-Aegean exchange and trade networks, holding a key position in linking Aegean and Eastern Mediterranean societies to the central European Bell Beaker network systems (Heyd 2007; Turek 2012b). However, despite being described as a key to understanding long-distance in-

teraction between different cultural areas, research on connectivity has not flourished much in the Adriatic-Ionian Mediterranean subzone.

In the early 3rd millennium BC rich tumuli along the eastern Adriatic seaboard attested to the rise of scattered metal-rich elites (Primas 1996). In wide areas of the western Balkans gold and silver objects, and other prestige goods and exotic finds appeared, testifying to connection between local and Aegean-east Mediterranean elites (Maran 2007). At least part of this system remained in place during the second half of the 3rd millennium BC, but the socio-cultural background of the area changed markedly. The extended Vučedol complex that spread in most part of the western Balkans fell apart shortly after the middle of the 3rd millennium BC. The earliest indication of plague in Europe appeared in present Croatia coinciding with the arrival of the Yamnaya "steppe ancestry" (Spyrou *et alii* 2018) and it may have played a role in the collapse of the Vučedol system. In the second half of the 3rd millennium BC more regional groups (Gori 2015: 187-244) appeared in the western Balkans: Cetina in the Ionian-Adriatic, Armenochori in Macedonia, Belotić-Bela Crkva and Bubanj-Hum III in the central and southern Balkans. The so-called Cetina culture emerged in the Adriatic Balkans following the so-called Ljubljana culture, which is described as the Adriatic variant of the Vučedol complex. While in the whole Balkans the only two examples of Bell Beaker ceramics are from Petrovaradin and Ostrikovac (Gori 2020), both located along the Danube River in present-day Serbia, there is no Bell Beaker pottery known in the eastern Adriatic to date. On the other hand, Bell Beaker stone elements such as wrist-guards and arrowheads are well attested in Cetina contexts. Apparently, eastern Adriatic communities that made use of Cetina pottery style had a different social structure in respect to the Vučedol-Ljubljana ones, as is suggested on the one hand by the conspicuous absence of prestige goods in form of metals, the proliferation of stone tumuli, and by the group's drive to expand (Heyd 2013).

Together with the typical pottery types, the Cetina culture is characterized by the emergence of different cultural landscapes, which were expressed materially through the diffusion of burial and ritual mounds, grouped in clusters or, more rarely, standing alone. Other salient characteristics are the mobilization of raw materials and prestige objects by means of seaborne routes, and the phenomena of transculturation and hybridization with other Balkan communities as recognized in pottery production (Gori 2020). The cross-over of the Cetina network expansion with the surviving Aegean network can be traced in a trail of bossed bone plaques possibly made in Sicily that is found not only in Apulia and in Malta, but also at Lerna in the Peloponnese and as far as Troy (Broodbank 2013). Recent research on Palagruža has interpreted this remote Adriatic Island as one outpost in the process of raw material procurement. The assemblage recovered on this tiny island devoid itself of resources points to the existence of a symbolic prestige sphere connected to voyages and resources. Besides significant quantity of chert from the Gargano, a large number of Bell Beakers wrist-guards together with flint arrowheads and abundant Cetina pottery were recovered (Forenbaher 2018b).

The 3rd millennium BC is believed to represent a period of transition from an economy based on ownership and mobilization of agro-pastoral resources to a "market economy" based on the long-distance exchange of metals, both as raw material and as finished products (e.g. Kristiansen and Earle 2014; Earle *et alii* 2015). Several scholars have emphasized the metal trade as the stimulus for the emergence of social

stratification based on control over these commodity flows (see for example Kristiansen, Suchowska Ducke 2015; Vandkilde 2016). This Bronze Age socioeconomic narrative has faced several critics, as e.g. Kienlin (2012; 2015). The paradigm that sees the Bronze Age dominated by elite-controlled long-distance trade networks (see for example Kristiansen, Larsson, 2005; Kristiansen, Earle, 2014) appears to be in contrast to models emphasizing instead local processes and smaller-scale tribal, or even lesser, levels of interaction (Harding 2000; Kienlin 2012). Lately Furholt (2021) has pointed to the birth of the early state as a triggering factor for 3rd millennium BC European large-scale mobility. The emerging state systems in Mesopotamia, indeed, would have created a vast and unprecedented demand for resources (raw materials, goods, human labour) that affected not only the immediate vicinity but also communities in neighbouring ecological zones with different economies. In other words, a chain-reaction, "a general stirring up of previously less mobile communities", would have led to the "rising level of mobility, which facilitated the transregional spread of technological innovations in the late fourth millennium but also the increased intercommunity mobility we see especially in the third millennium in Europe" (Furholt 2021: 518).

So far, most of the research focusing on the Cetina phenomenon has adopted a large-scale approach, which whilst it reflects the need to cross regional boundaries and produce an explanation that fits into the 'big history' of the Mediterranean (Knodel, Leppard 2018: 184-185), yet fails to grasp the complexity and multifaceted aspects existing at smaller scales. Strategies for gaining access to resources and a commerce connected to metal are generally thought to be the main driving forces behind the Cetina expansion, the so-called "Argonaut of the Balkans" model (Maran 2007: 16, Broodbank 2013). It is beyond any doubt that long-distance networks were crucial for the emergence of the Cetina phenomenon, but any depiction of Cetina as a unitary pattern of connectivity driven primarily or only by the metal economy downplays other aspects, such as the significance of smaller scales of interaction and the key role of other type of resources – both physical, e.g. Gargano chert (Forenbaher, Perhoč 2017) and social, e.g. ritual aspects connected to mobility (Gori 2020) – and their transformative potential as triggers for social change. By applying modularity and community structure analysis in network to our dataset we attempt to trace and understand connections also at a smaller scale within the Adriatic-Ionian Cetina network.

FROM MATERIAL CULTURE TO COMMUNITIES OF PRACTICE

The recognition of knowledge-based social structures and groupings of people, who interact through their practices over a large area, can be utilized to trace and understand connections between distant communities in contexts like the Adriatic-Ionian ones, in which the most abundant archaeological source is represented by ceramics and funerary evidence. The question of connectivity patterns in which human movement plays a crucial role – as well as the problem in choosing the appropriate archaeological proxies for movement – can be investigated from a practice-centred perspective through research in different but intertwined cultural domains aimed at reconstructing different CoPs and their learning systems (Blackmore 2010; Wenger 1998; 2000; Wendrich 2013). The community of practice plays an important role in forming their members' participation in, and orientation to, the world around them. It provides an accountable link, therefore, between the

individual, the group, and place in the broader social order. It provides a setting in which practice emerges as a function of this link (Wendrich 2013; Klabunde *et alii* 2017). Within the Cetina culture, three different and intertwined cultural domains can be considered in the attempt of tracing and understanding connections, taking as proxy the networks based on different communities of practices: (a) craft (proxy: pottery), (b) ritual (proxy: funerary/ritual structures and "special" objects), and (c) resources (proxy: raw materials).

Given the nature of Cetina far-reaching seaborne connectivity, a key aspect to consider is the importance of networks based on kin, friendship, and community ties in the study of human mobility dynamics. This need is widely accepted, as networks link sending and receiving communities and provide a coherent structure for populations of migrants (Fawcett 1989; Gurak, Caces 1992). Key to the study of CoPs and their relation to migration is the concept of boundary. In the last 30 years a key intellectual shift known as "cultural turn" has produced profound changes within the social sciences, adding a new dimension to the more explicitly spatial approach of mainstream population geographers who had held sway until the 1990s. Progressing beyond the linear push-pull model, the traditional definition of migration as a space-time phenomenon defined by thresholds of distance has been challenged and replaced by the definition of migrant as anyone who moves across cultural divides. If we accept the definition that someone migrates when s/he crosses a boundary, which can be cultural, or even social (Cabana, Clark 2011), it is mandatory to understand the nature of such boundaries. Prehistoric communities from eastern Adriatic crossed several boundaries, physical as well as cultural ones. Shared practices like e.g. seafaring, pottery production, and most of all types of rituality by their very nature create boundaries dividing those who practise from those who do not. These boundaries are rather fluid, but of key importance to understand learning systems, types of cultural transmission (vertical and horizontal), associated identities and how and why networks can be created, maintained and dismantled (Wenger 2010).

The use of different CoPs to trace networks enhances our understanding of cultural transmission and past identities by overcoming the inadequate notion of "archaeological culture", often regarded as a fixed analytical category and the ethnic equivalent for "populations".

(*a*) *Craft*

Craft production is deeply socially embedded and conditioned by both unconscious expectations about the proper operation and goals of craft making, and conscious choices, innovation, and actions. Both aspects can be traced along the *chaîne opératoire*, from the acquisition and processing of raw materials, to forming and finishing techniques, to uses and final discharge. Such an approach is geared to an anthropological interpretation of archaeological objects, that is both cultural and sociological, as techniques are the visible expression of cultural and social groups (Dobres, Hoffman 1994; Dobres 2000). Techniques refer to the notion of "groupness" (Brubaker, Cooper 2000), where the group is defined through the practice of a same technical tradition, regardless of the links between the individuals forming the group (Roux 2019). As technical practice necessarily results from a learning process based on the observation of actions in a social group, learning and transmission processes explain that technical traditions reflect social boundaries; they are transmitted from one generation to another within social groups, thereby becoming the expression of these social groups (Lave, Wenger

1991). In the case of pottery production, for example, technical practice is based on the mastering of skills through a learning process that implies the vertical or horizontal transmission of a culturally accepted standard in manufacturing the elements of a pot that are perceived as meaningful for a given tradition. The first CoP is based on ceramic craft. We used the classification of pottery proposed in Forenbaher (2018a) supplemented by Recchia (2021) to distinguish between pottery with clearly recognisable Cetina formal features and pottery that in which these characteristics are less marked.

(*b*) *Rituality*

Burial structures form funerary landscapes, which are cultural products and arenas of presumably repetitive social activities. These are usually seen as involving specific types of ritual and are often to be associated with some level of religious beliefs. Rituals often include seemingly costly actions that operate as reliable signals to convey commitment to the group, which in turn can promote trust and affiliation among group members (Sosis, Alcorta 2003). Participation in ritual activities can be a significant component in the creation and maintenance of social and communal identity. Religion is here intended in terms of communication, coalitional perspective, and culturally transmitted ritual sequences rather than internal beliefs, and as such it can be approached as a CoP. The ritual performance comprises a specific sequence of actions that is compelling (one must perform them, given particular circumstances), rigidly scripted (one must perform them in the precise manner described), divorced from goals (specific actions are performed without connection to the usual empirical goals) and often internally redundant (the actions are reiterated, often a prescribed number of times) (Liénard, Boyer 2006). Most activity of this kind is both public and formalized, so that individual commitments to the local ritual system are observable by all (Sosis 2003). Religious thought and behaviour mobilizes cognitive resources away from survival and reproduction, being focused on nonphysical imagined agency (Boyer, Bergstrom 2008). It has been observed that religious groups that require a greater investment in costly rituals tend to remain more cohesive (Sosis, Bressler 2003).

In the Balkans of the 3rd millennium BC barrows are often grouped together to form clusters. The best-known ones are those located along the upper course of the Cetina River, in Central Dalmatia (Marović 1991). Eastern Adriatic structures and associated funerary practices consist of inhumations and/or cremations under stone tumuli, sometimes in a stone cist, mostly as single burials, although multiple burials do occur. Cremation is the most widespread body treatment. Characteristic Cetina pottery is in most cases scattered throughout the tumulus, or more rarely laid down as grave goods. Funerary habits tend to be rather standardized along the eastern Adriatic, while in the eastern Ionian area more variability is observed: cist graves constructed of stone slabs, rock-cut tombs, and tumulus tombs, the last sort concentrated in western Peloponnese. Throughout the Italian Peninsula, funerary habits have high regional variation, comprising rock cut tombs, dolmens, hypogea, and more rarely tumuli. Unlike in Dalmatia, Cetina and Cetina-like vessels from Italian funerary contexts are not fragmented. In this work we preliminarily group together all the archaeological evidence that can be connected to rituality as shared practices, including two categories of objects with highly symbolic value as the Bell Beaker wrist-guards (Forenbaher 2018a) and the bossed bone plaques (Pacciarelli *et alii* 2015).

(*c*) *Resources*

Lithic procurement testifies to persistent trans-Adriatic connections throughout post-Mesolithic prehistory, as it is shown by research on lithic collection from Pelješac, a peninsula on the eastern Adriatic seaboard of southern Croatia, where virtually the entire assemblage is made of chert imported both in form of blades and chunks from the Gargano Peninsula (Forenbaher, Perhoč 2015; 2017). Data from Palagruža suggest that this procurement revived with particular intensity in the 3rd millennium BC. Obsidian from Lipari and Palmarola is also recorded in the Adriatic. The four obsidian artefacts from Palagruža come from Lipari-Gabellotto and from Melos-Sta Nychia. These last currently represent the only finds of Melian obsidian anywhere to the west of Greece (Tykot 2011). The contemporaneity of chert and obsidian circulation in the 3rd millennium BC is suggested by the obsidian flake (of unknown provenience) collected from the burial mound 1 at Mali Mosor (Dalmatia), a context marked by Cetina style pottery. Ground stone wrist-guards recovered in Dalmatia currently represent the only Bell Beaker element present in the western Balkans. Unfortunately, research on Gargano chert imported into the eastern Adriatic is still too limited to be used as proxy. For this reason for this work we decided to include only obsidian.

THE DATASET

To explore networks and their structure in the Adriatic-Ionian area, meaningful characteristics such as craft production and architectural features from Cetina and Cetina-related contexts have been considered as proxies to establish linkages between sites. Based on a literature review, the elements considered meaningful to trace CoPs were classified as follows: a1) Cetina type ceramics; a2) ceramics echoing Cetina types (pseudo-Cetina); a3) ceramics echoing Cetina types with regional specificities (Olympia type); b) Bell Beaker wrist-guards; c) bossed bone plaques; d) obsidian from the Lipari and Melos islands: e) funerary / ritual mounds (table 3).

The dataset consists of 204 sites mainly distributed among the Balkans, Italy, and Greece (fig. 1, table 1), and having different functions (table 2). Not surprisingly, Cetina pottery represents the most abundant archaeological evidence. It is recorded at 119 sites, while funerary or ritual architecture (mounds) is recorded at 66 sites, with wrist-guards attested at 50 sites.

The highest concentration of sites is along the eastern Adriatic coast, in the south-eastern edge of the Italian peninsula (Apulia) and in Sicily. More than 40% consists of funerary contests, 30% are classified as settlements or hillforts, while caves make up 15% of the total.

Region	Number of sites
Balkans	102
Caput Adriae	16
Northern Italy	31
Adriatic Italy	18
Tyrrhenian Italy	6
Sicily	21
Peloponnese	8
Other	2

Table 1. - Regional distribution of the sites considered in this paper (refer to figure 1).

Site type	Number of sites
Settlements	53
Hillforts	10
Cemeteries	12
Rock-cut tombs	5
Mounds	67
Rock shelter	1
Caves	32
Hoards	1
Indeterminable	12
Isolated finds	11

Table 2. Site typology.

Proxy	Incidence
a) Cetina pottery	79
b) Pseudo-Cetina pottery	40
c) Olympia type pottery	10
d) Wrist-guards	50
e) Bossed bone plaques	20
f) Obsidian-Lipari + Melos	5 + 1
g) Architecture (mounds)	66

Table 3. Elements considered in tracing different CoPs.

The number of proxies in each site is generally low. With 4 out of the 7 proxies Lerna represents an exception; 10 sites have 3 proxies (ca 5%); 44 sites 2 proxies (ca 21%) and 149 count just one proxy (ca 73% of the total). It is highly probable that the quality and intensity of research carried out in different sites has strongly influenced this distribution. For this reason, the following analysis and interpretation have to be considered by taking into account that in our analysis what is considered absence is actually a null data (tab. 4).

The link between pairs of sites is established by the presence of the same proxy in both contexts. A higher number of shared proxies establish stronger connections. The same value was assigned to each proxy (value = 1), except for Cetina ceramics, which were, and in accordance with the literature, classified into two distinct macro groups: Cetina-type and Olympia-type ceramics, which were both assigned the value 1 and pseudo-Cetina-type ceramics to which the value of 0.5 was assigned (pseudo-Cetina). This means that the CoPs that manufactured Cetina-type ceramics were more cohesive that the ones that manufactured the second group. On the basis of this consideration, the connections that were traced on the basis of Cetina or pseudo-Cetina ceramics vary in three ways: 1) "Cetina – Cetina", where the presence of properly Cetina types is recorded in both sites; 2) "Cetina – pseudo-Cetina", where the presence of Cetina ceramics is recorded in only one context while in the other there are pseudo-Cetina ceramics; 3) "pseudo-Cetina – pseudo-Cetina", in which only the presence of pseudo-Cetina ceramics is recorded at both sites. The weight attributed to the three types of bonds was calculated by dividing by 2 the sum of the values between pairs of sites, the bond created in case 1) thus assumes the value 1, that of case 2) the value of 0.75, while in case 3) it has the value of 0.5.

MODULAR NETWORK ANALYSIS

We applied network science to the study of the presented dataset (Brandes *et alii* 2013) focussing on its representation as networks, in order to characterize and analyze its structural features, and empirically test theories regarding the relationships between network structure and attributes.

A matrix was created in which rows and columns correspond to the archaeological contexts and the sum of the values obtained for each single element was inserted at the intersection between rows and columns. This matrix was used as adjacency matrix and imported into the Gephi software (ver. 0.9.2) to create and visualise the graph.

The algorithm chosen was ForceAtlas2, a fast algorithm for creating force-directed, weighted, non-directional graphs. Its very essence is to turn structural proximities into visual proximities, facilitating the analysis and in particular the analysis of social networks.

The resulting graph has a high density (0.47) – meaning that the linkage quantity almost amounts to half of all the possible linkages – and a short diameter (3), meaning that, generally, nodes are well connected to each other. Betweenness centrality – that indicates the nodes centrality in a network, and is measured by the number of shortest paths from all ver-

tices to all others that pass through a single node – varies over a huge range. The most central node appears to be Lerna (1150), followed by Castelluccio (849) and a group of 10 sites with a degree ranging between 700 and 500. On the other hand, 73% of the nodes scored 0.

Not surprisingly, a strong correspondence between the graph and geographic distribution of sites can be noticed (fig. 2). The "core" of the graph is occupied by Balkan sites, which are connected to other clusters by the sites with high centrality that act as hubs. These clusters mainly group together sites from the same geographical areas: a group composed by Sicilian sites, with the significant presence of Troy and a more heterogeneous cluster composed by Italian sites (Northern, Tyrrhenian and Sicilian sites). At the opposite end are placed the largest part of the sites located on the west Adriatic coast, strongly connected with the core of the graph, and the sites from the Istrian Area, connected with other Balkan sites.

The possibility of subdividing the graph into sub-networks can be further formalized using modularity statistics. Modularity is a measure of the structure of networks or graphs which measures the strength of division of a network into modules (also called groups, clusters or communities). We utilised the Louvain method for calculating modularity, which is the one adopted by Gephi. Four classes have been recognized, largely confirming the former considerations. When plotting modularity classes on a geographical map (fig. 4) the emerging pattern appears even clearer: the Balkans area shows a mixture of classes 0, 2 and 3 with the only exception being the Drinovci mound characterised by the presence of solely Olympia type pottery; Italian sites are geographically divided: the northern sites are placed mainly in class 3, while the southern Italian ones in class 2, and sites from Sicily in class 1 and 3. On the other hand, the Peloponnese appears as a mixture of classes 0, 1 and 2. That Apulia shows 3 sites classified in class 1 and one in class 0 has significance too.

After considering the Betweenness Centrality together with modularity classes indicating the geographical distribution of sites, a further hypothesis can be put forward. In the Balkan area most central sites appear to be those pertaining to class 3 while in the southern part of the considered area (Apulia, Sicily and Malta and the Peloponnese) most central sites belong to class 1 (Casal Sabini in Apulia, Tarxien in the Maltese Archipelago, Lerna in the Peloponnese). The Castelluccio cemetery pertains to class 3 because of the presence of a Bell Beaker wristguard alongside other items.

Northern Italy does not have high score sites, as the connections with the Cetina area rely here basically only on one proxy. We are aware that there are few pottery fragments of possible Cetina type in the area, but for the present work we decide to not include them, as future work will provide a more detailed characterisation and classification of CoPs.

This picture led to the definition of two main networks traced on the basis of different CoPs: one centred in the Balkans and another in the central-eastern Mediterranean. The possible co-presence of different overlapping networks has been already suggested (see e.g. Cazzella *et alii* 2020 with references).

What can however be emphasized is first the meaning of these networks, that seem to be rather based on social and ideological aspects instead of being created with a solely economic motivation as push factor. On the other hand, the role of "ritual hubs" of some sites emerges. These indeed occupy a central position within these networks and indeed belong all to the same class (see fig. 4).

Bypassing the limitations of the traditional models that focus on binary expla-

nation for mobility and cultural transmission in terms of foreign/domestic material culture, in this paper we are challenging the assumption that to trace and understand the creation of networks it is enough to look at the spread of a type of material culture and look at its start and endpoints. We also rely on recent methods and approaches adopted in migration studies and human geography. By putting social relations into travel and by connecting different forms of transport and movement with complex patterns of social experience conducted through communications at-a-distance, the New Mobility Paradigm (Sheller, Urry 2006) challenges the ways in which much social science research has been a-mobile. Its importance for archaeology lies in the criticism of sedentarist theories, with sedentarism treating stability, meaning, and place as normal, and on the other hand treating as abnormal distance, change, and placelessness (Sheller, Urry 2006: 208).

Our approach and analysis suggest that the ritual sphere has a primary role in understanding the creation of long-distance networks in the second half of the 3rd millennium BC. Journeys and movements of people in the ancient Mediterranean can be approached from different points of motivation and understanding, but traditionally long-distance travel has been attributed to raw material procurement and trade. It has however been suggested that travelling itself had a social and symbolic meaning too, one that could transform and define a person's social identity (Cummings, Johnston 2007). If we consider the elements that we considered as proxies for different CoPs connected to rituality, this can be inferred for Cetina and Cetina-related networks as most of the known elements connecting different and distant cultural zones belong to some kind of ritual sphere, like e.g. the Bell Beaker paraphernalia such as wrist-guards. Wrist-guards are attributes for power and prestige connected to the 3rd millennium BC martial symbolism, which during this period became important in acquiring social power. Likewise, bossed bone plaques may also have been used as tokens testifying the accomplishment of long-distant journeys (Gori 2020) in which different types of motivation – e.g. reciprocity, rituality, commerce – coexisted and overlapped (Carlà, Gori 2014: 7-49).

FROM MODULAR NETWORKS TO CULTURAL LANDSCAPE

Landscape, and in our case especially seascape,[1] is constituted as a signification of place by individual or collective projections upon it, where the positioning, movement, and interaction of bodies in space have primal importance (Ingold 1993). Rockman (2003) argues that environmental knowledge can be locational, limitational and social. While the locational knowledge includes information regarding location and physical characteristics of necessary source, limitational knowledge focuses on the boundaries and the costs of these resources. Social knowledge on the other hand includes attribution of meanings and patterns to natural features and allows for the transformation of physical environment into a human land- or seascape. Landscapes are created by people "through their experience and engagement with the world around them [...] The landscape is never inert, people engage with it, appropriate and contest it. It is part of

1 The concept of seascape in archaeology is not limited to islands. It includes the coastal landscape and adjoining areas of open water, including views from land to sea, from sea to land and along the coastline. A seascape is a landscape at the confluence of sea and land, an area of inter-visibility between land and sea, with three defined components: sea, coastline and land (Pugnetti 2012: 52).

the way in which identities are created and disputed" (Bender 1993 quoted in Förster *et alii* 2012: 171). Landscapes and seascapes are the arenas for all of a community's activities and are dynamic constructions, with each community and each generation imposing its own cognitive map on an anthropogenic world of interconnected morphology, arrangement, and coherent meaning (Anschuetz *et alii* 2001: 160–161).

As already mentioned, the most abundant and visible archaeological items in the landscape pertaining to the so-called Cetina culture consists of barrows. Daróczi (Daróczi 2012: 200) reminded us that the sum of archaeological funerary finds placed in their natural environment does not constitute a funerary landscape but rather a burial landscape, i.e. one of burial habits. A funerary landscape is rather a cultural product and arena of presumably repetitive social activities, which are usually seen as involving specific types of ritual and often to be associated with some level of religious beliefs. We can thus regard the eastern Adriatic barrows as places of cultural significance, in which physical structures, features, and landscapes served as a stimulus for collective and individual memory and associations. Geography, in terms of environmental knowledge, is a relevant aspect in network formation, and as already noted it played a crucial role in shaping connectivity in the Adriatic-Ionian area (Iacono 2018). Our analysis showed that, self-evidently, geography played a crucial role in shaping networks. However, it points also at the relevance of landscape creation by prehistoric communities that interacted in the Adriatic-Ionian area in the 3rd millennium BC.

CONCLUSIONS

In this paper we adopt two novel approaches to the study of the distribution patterns of Cetina and Cetina-related material culture. By adopting a CoP approach to trace long-distance networks, and by acknowledging the role of rituality in the creation and maintenance of these networks, we emphasized the socializing role of space (Dawson, Iacono 2021: 9-14). On the other hand, the application of modularity analysis allowed a better understanding of the network structure and detection of relevant hubs in the creation of these networks. In this way it is possible to detect different groups of networks within a larger one and thus understand the analyzed phenomenon at different scales. The one presented here is a preliminary analysis, further research will provide better characterization of different CoPs and thus a deeper understanding of Mediterranean connectivity in the 3rd millennium BC.

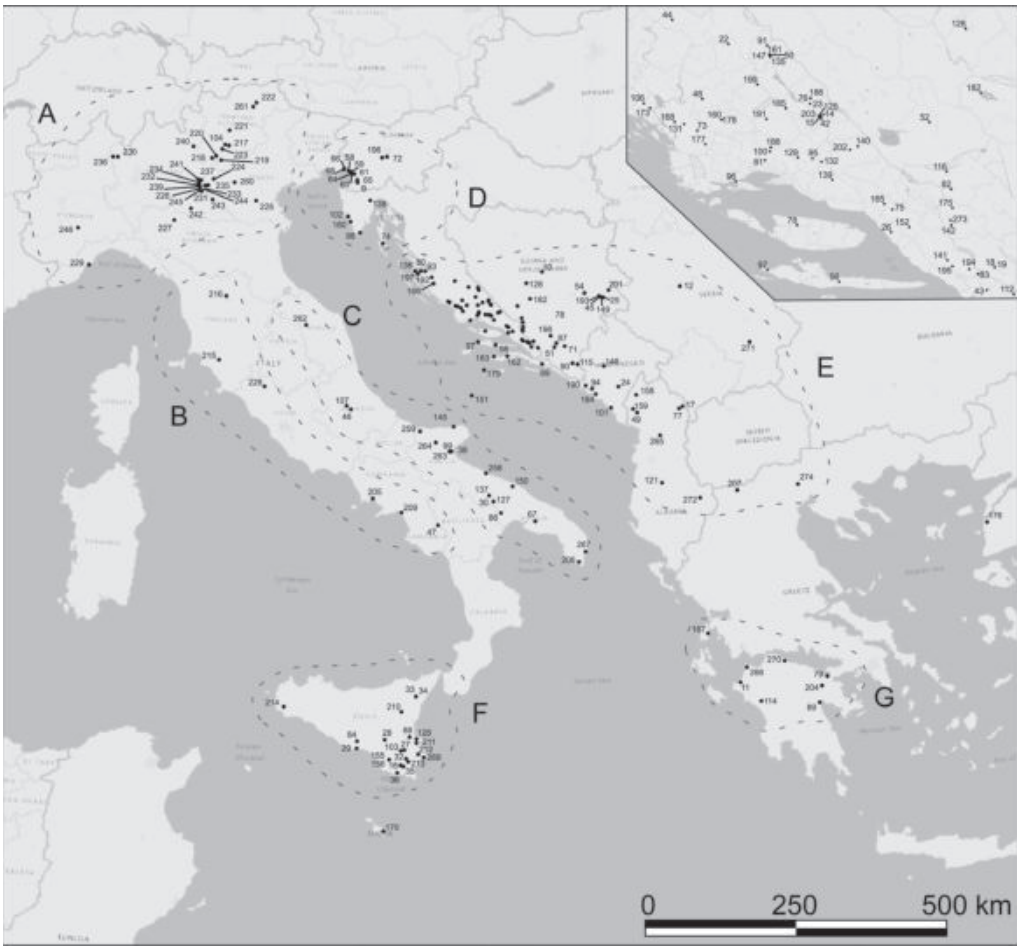

Fig. 1. - Geographical distribution of the sites considered. Dashed lines indicate the geographical distinction proposed (author A. Di Renzoni)

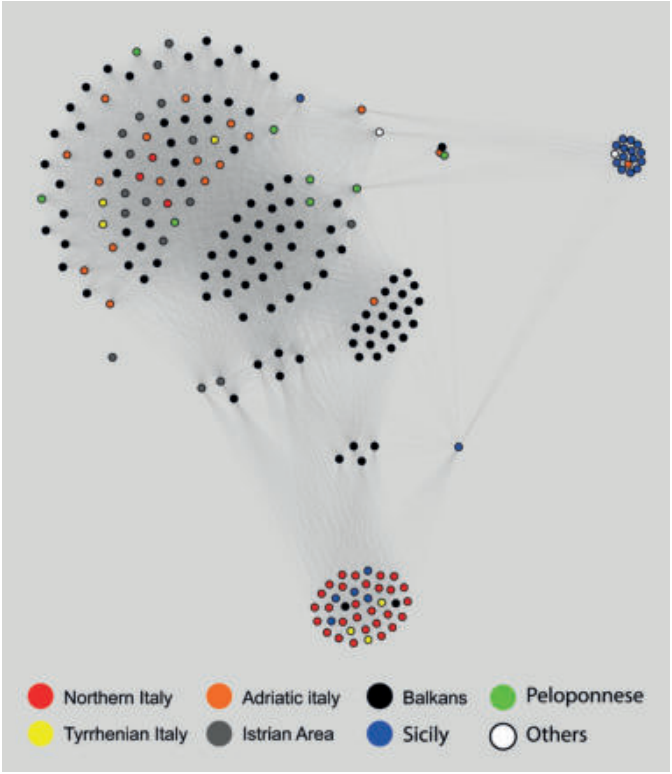

Fig. 2. - Graph of the networks, colours of the nodes refer to the geographical areas defined (author A. Di Renzoni)

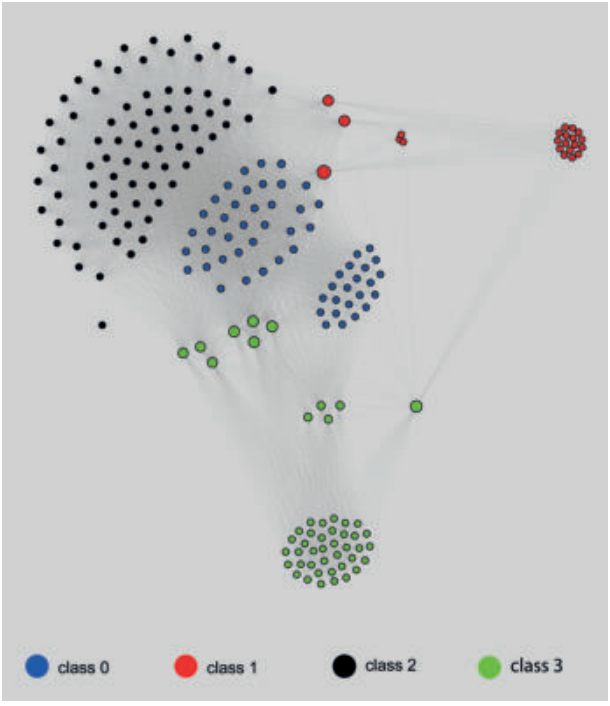

Fig. 3. - Graph of the network, colours of the nodes refer to modularity classes, nodes size refers to the Betweenness Centrality value (author A. Di Renzoni).

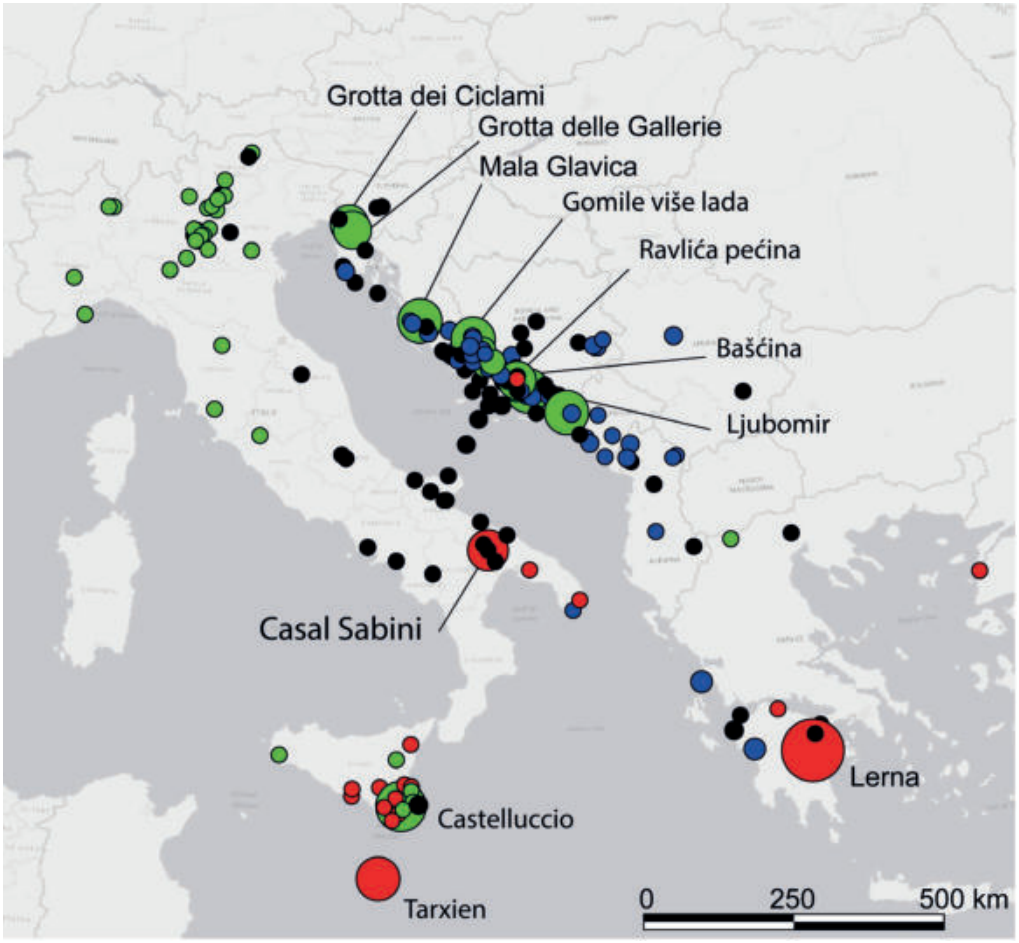

Fig. 4. - Distribution map of the sites classified according to their modularity class and Betweenness Centrality value (author A. Di Renzoni).

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
9	Acijev Spodmol	1						
10	Alihodže	0,5						
11	Andravida-Lechaina	1	1					
12	Anište	0,5						1
14	Bajagić	1						1
15	Balajića gomila	1						1
16	Baravitalla-Cava d'Ispica				1			
17	Bardhoc							1
18	Bašćina	0,5						1
19	Begovići	1		1				1
22	Biskupija	1						
23	Bitelić			1				
24	Boljevića gruda							1
25	Borci	1						1
26	Bubnjavača	1						
27	Buscemi				1			
28	Caltagirone				1			
29	Canticaglione				1			
30	Casal Sabini	0,5			1			
32	Castelluccio		1	1	1			
33	Castiglione abitato				1			
34	Castiglione necropoli				1			
35	Cava Lazzaro				1			
36	Cava Labbisi Petraro				1			
38	Coppa Nevigata	0,5						
42	Efendići	1						
43	Eraci							1
44	Ervenik	1						1
45	Ferizovići	1						1

Table 4. List of the sites and of the elements present in each site. The numbering starts from 9 because the table is part of a larger database.

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
46	Fonti S. Callisto-Popoli	0,5						
47	Fossa Aimone-Atena Lucana	1						
48	Gaj (Brnjica)	1						1
49	Gajtan	0,5						
50	Gomile više lada	1		1				1
51	Gornje Banje							1
52	Grabovica	0,5						1
54	Gradac-Kotorac	1						
56	Grapčeva spilja	0,5						
58	Grotta Caterina	1						
59	Grotta Cotariova	1						
60	Grotta degli Zingari	1						
61	Grotta dei Ciclami	1		1				
64	Grotta della tartaruga	1						
65	Grotta delle Gallerie	1		1				
66	Grotta del Mitreo	1						
67	Grotta Pipistrello Solitario				1			
68	Grotta Teresiana	1						
69	Gudnja	1						
71	Hateljska pećina	1						
72	Ig	0,5						
73	Ivankovača							1
74	Jami na sredi	1						
75	Jukića gomile	1						1
76	Kekezova gomila			1				1
77	Këneta							1
78	Kopačina	0,5						
79	Korakou	0,5						
80	Kosa kod mula							1
81	Kovačina	0,5						
82	Krstina	0,5						

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
83	Kruške	1						1
84	La Muculufa				1			
86	Laterza	1						
87	Lazaruša	0,5						
88	Lentini				1			
89	Lerna	1	1		1			1
90	Ljubomir	1		1				1
91	Lukovača	1						1
93	Mala glavica	1		1				1
94	Mala gruda							1
95	Mali Mosor	0,5				1		1
96	Marina-Trogir	0,5						
97	Markova spilja	1						
98	Marlera	1						
99	Masseria Fontanarossa	1						
100	Matijin dolac - Vučevica	1						1
101	Mogila na rake							1
102	Monkodonja	1						
103	Monte Casale				1			
104	Monte di Mezzana	1						
106	Mrdakovica	0,5						
107	Navelli	1						
112	Ograđe	1						1
114	Olympia	1	1					1
115	Orah	0,5						1
116	Orlov kuk	0,5						
121	Pazhok							1
125	Penića njivice							1
126	Petraro				1			
127	Pisciulo-Casal Sabini	1						
128	Pod (Čipuljić) Bugojno	0,5						

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
129	Podi-Dugopolje	1						1
131	Poljakuše	1						1
132	Poljanice			1				1
135	Preočanska kosa	1						1
136	Privlaka							1
137	Pulo di Altamura	0,5						
138	Pupićina peć					1		
139	Radović							1
140	Rarina gomila							1
141	Ravča			1				1
142	Ravlića pećina	1		1				
145	Rodi Garganico	0,5						
146	Rubež							1
147	Rudine	1						1
149	Rusanovići	1						1
150	Rutigliano	1						
151	Salamandrija	1				1	1	
152	Samogorska špilja	1						
155	Sante Croci-abitato				1			
156	Sante Croci-necropoli				1			
158	Shkrel	1						1
159	Shtoj	1						1
160	Škarin samograd	1						
161	Šparevine	1						1
162	Spila-Nakovana	1				1		
165	Sridnja gora	0,5						1
166	Stanine	0,5						1
167	Steno	1	1					1
168	Stubica	1						
170	Tarxien	0,5	1		1			
173	Tradanj	1						

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
175	Trostruka gradina	1						
176	Troy				1			
177	Ulnovac							1
178	Unešić	1						
179	Uvala Duga-Sušac	1				1		
180	Uvala Marić	0,5						1
182	Varvara	0,5						
183	Vela spila-Korcula	0,5						
184	Velika gruda	1						1
185	Velike gomile							1
186	Veliki Rumin							1
188	Vlake	1						1
190	Vranjaj	0,5						
191	Vrba	0,5						1
192	Vreline	1						
193	Vrtanjak	1						1
194	Vukosavi							1
195	Zagomilje 2	0,5						
196	Založnica	0,5						
197	Zaton	0,5						1
198	Zelena pećina	0,5						
199	Zelenovića ogradice	1						1
201	Živaljevići							1
202	Živalji			1				1
203	Župna kuća							1
204	Zygouries	0,5						
205	Unknown (Naples)	1						
206	Salve							1
207	Armenochori			1				
209	Oliva Torricella	1						
210	Grotta Pietralunga di Adrano			1				

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
211	Cava Bernardini di Melilli			1				
212	Grotta della Chiusazza str. 2			1				
213	Grotta Sbriulia			1				
214	Contrada Gattolo			1				
215	Grotta del Fontino			1				
216	Bulimacco - Sesto Fiorentino			1				
217	Dos Trento			1				
218	Ledro			1				
219	Circolo preistorico di Rovereto			1				
220	S. Bartolomeo di Ceole a Riva del Garda			1				
221	Doss Ciaslir di Vervò			1				
222	Elvas-Prop. Ferretti			1				
223	Riparo il Santuario di Lasino			1				
224	Rocca di Rivoli			1				
225	Arquà			1				
226	Cattaragna			1				
227	Castione Marchesi			1				
228	Fosso Conicchio			1				
229	Arene Candide			1				
230	Bodio centrale			1				
231	Cavriana			1				
232	Polada			1				
233	Maraschina			1				
234	Corno di Sotto - Desenzano			1				
235	Porto Pacengo			1				
236	Lago di Monate			1				
237	Gabbiano di Manerba			1				
239	Lavagnone			1				
240	Dos dell'Arca			1				
241	Lucone di Polpenazze			1				
242	Piadena Cà di Cioss			1				

ID	SITE	Cetina and Cetina type pottery	Olimpia pottery	Wristguards	Bossed Bone Plaques	Obsidian-Lipari	Obsidian-Melos	Mound
243	Prestinari			1				
244	Peschiera del Garda			1				
245	Barche di Solferino			1				
246	Alba			1				
258	Bisceglie – Lama Macina	1						
259	Serracapriola – Chiantinelle	1						
260	Monte Madarosa	1						
261	Velturno – Tanzgasse	1						
262	Sassoferrato – Area artigianale	1						
263	Fontanarossa Catselletta	1						
264	Pedegarganica km 12 – Pescorosso	1						
265	Blazi	1						
266	Teycos Dymaion	1						
267	Zinzulusa		1					
269	Ognina	0,5	1					
270	Keryneia		1					
271	Hisar, Leskovac	0,5						
272	Sovjan	0,5						
273	Drinovci		1					
274	Kastanas	0,5						

BIBLIOGRAPHY

ANSCHUETZ K.F., WILSHUSEN R. H., SCHEICK C. L. 2001 - An Archaeology of Landscapes: Perspectives and Directions, *Journal of Archaeological Research* 9/2: 157–211.

BENDER B. 1993 - *Landscape, Politics and Perspectives*, Routledge, Providence (RI) & Oxford: Berg. doi:10.1017/S0003598X00047360.

BLACKMORE C. 2010 - *Social Learning Systems and Communities of Practice*, Springer, London.

BOYER P., BERGSTROM B. 2008 - Evolutionary Perspectives on Religion, *Annual Review of Anthropol*ogy 37: 111–130.

BRANDES U., ROBINS G., McCRANIE A., WASSERMAN S. 2013 - What is network science?, *Network Science* 1,1: 1–15. doi:10.1017/nws.2013.2

BROODBANK C. 2013 - *The making of the Middle Sea: a history of the Mediterranean from the beginning to the emergence of the classical world*, Thames and Hudson, London.

BRUBAKER R., COOPER F. 2000 - Beyond identity, *Theory and Society* 29, 1: 1–47.

CARLÀ F., GORI M. 2014 - Introduction, in *Gift giving and the "embedded" economy in the ancient world*, F. Carlà, M. Gori eds., Heidelberg, Universitätsverlag Winter: 7–47.

CAZZELLA A., GORI M., PACCIARELLI M., RECCHIA G. 2020 - 2500-2000 BC: connectivity phenomena between the Balkans, Greece, Southern Italy, Eastern Sicily, the Aeolian Islands and Malta, *Rivista di Scienze Preistoriche*, LXX: 181–197.

CUMMINGS V., JOHNSTON R. 2007 - *Leaving place: an introduction to prehistoric journeys*, in *Prehistoric Journeys*, V. Cummings, R. Johnston eds., Oxbow Books Oxford: 1–7.

DARÓCZI T. T. 2012 - *Death, Disposal and Social Memory – Towards a Definition of Funerary Landscapes*, in *Landscape Archaeology*, Proceedings of the International Conference Held in Berlin, 6th – 8th June 2012, *eTopoi, Journal for Ancient Studies*, Special Volume 3: 199–207.

DAWSON H., IACONO F. – 2021 - *Bridging Social and Geographical Space through Networks*, Sidestone Press, Leiden: 9–14.

DOBRES M. A. 2000 - *Technology and social agency*, Blackwell Publishers, Oxford.

DOBRES M. A., HOFFMAN C. R, 1994 - Social agency and the dynamics of prehistoric technology, *Journal of Archaeological Method and Theory* 1: 211–258.

EARLE T., LING J., UHNER C., STOS-GALE Z., MELHEIM L. 2015 - The Political Economy and Metal Trade in Bronze Age Europe: Understanding Regional Variability in Terms of Comparative Advantages and Articulations, *European Journal of Archaeology* 18, 4: 1–25.

FAWCETT J. T. 1989 - Networks, Linkages, and Migration Systems, *International Migration Review* 23, 3: 671–680. doi:10.1177/019791838902300314.

FORENBAHER S. 2018a - *Special Place, Interesting Times. The island of Palagruža and transitional periods in Adriatic prehistory*, Archaeopress, Oxford.

- 2018b - Ljubljana and Cetina: Pottery Styles of the Third Millennium BC in the Eastern Adriatic, *Prilozi Instituta za arheologiju u Zagrebu* 35: 113–158.

FORENBAHER S., PERHOČ Z. 2015 - Lithic Artifacts from Nakovana (Pelješac): Continuity and Change from Early Neolithic until the End of Prehistory, *Prilozi Instituta za arheologiju u Zagrebu* 32: 135–204.

- 2017 - Lithic Assemblages from Nakovana (Croatia): Raw Material Procurement and Reduction Technology from Early Neolithic until the End of Prehistory, *Journal of Mediterranean Archaeology* 30: 189–211.

FÖRSTER F., GROßMANN R., IWE K., KINKEL H., LARSEN A., LUNGERSHAUSEN U., MATARESE C., MEURER P., NELLE O., ROBIN V., TEICHMANN M. 2012 - What is Landscape? Towards a Common Concept within an Interdisciplinary Research Environment, in *Landscape Archaeology*, Proceedings of the International Conference Held in Berlin, 6th – 8th June 2012, *eTopoi, Journal for Ancient Studies*, Special Volume 3: 169–179.

FURHOLT M. 2021 - Mobility and Social Change: Understanding the European Neolithic Period after the Archaeogenetic Revolution, *Journal of Archaeological Research* 29: 481–535.

GORI M. 2015 - *Along the Rivers and Through the Mountains. A reviewed chrono-cultural framework for the south-western Balkans during the late 3rd and early 2nd millennium BCE*, Universitätsforschungen zur Prähistorischen Archäologie, Bonn: Habelt.

- 2020 - Κατὰ γῆν καὶ κατὰ θάλασσαν. Cetina communities on the move across the Central Mediterranean and the Balkans in the 3rd millennium BC, in *Objects, Ideas and Travelers. Contacts between the Balkans, the Aegean and Western Anatolia during the Bronze and Early Iron Age, Proc. Conf. to the memory of A. Vulpe*, R. Bajenaru, J. Maran, S.C. Alincai, S. Hansen, D. Popescu eds., Bonn, Habelt: 65–83.

CABANA G. S., CLARK J. J. 2011 - *Rethinking anthropological perspectives on migration,* University Press of Florida, Gainesville.

GURAK D., CACES F. 1992 - International Migration Systems: A Global Approach, in Migration Networks and the Shaping of Migration Systems, Kritz M., Lim L.L., Zlotnik H. eds., Clarendon Press, Oxford: 150–176.

HARDING A. 2000 - *European Societies in the Bronze Age*, Cambridge University Press, Cambridge.

HEYD V. 2007 - When the West meets the East: The Eastern Periphery of the Bell Beaker Phenomenon and its relation with the Aegean Early Bronze Age, in *Between the Aegean and Baltic Seas. Prehistory across Borders*, Galanaki, I., Tomas, H., Galanakis, Y., Laffineur, R. eds., Aegaeum 27, Liège: 91–107.

- 2013 - Europe 2500 to 2200 BC: Between Expiring Ideologies and Emerging Complexity, in *The Oxford Handbook of the European Bronze Age*, H. Fokkens, A. Harding eds., University Press, Oxford: 47–67.

IACONO F. 2018 - *The Archaeology of Late Bronze Age Interaction and Mobility at the Gates of Europe: People, Things and Networks around the Southern Adriatic Sea*, Bloomsbury Academic, New York.

INGOLD T. 1993 - The temporality of the landscape, *World Archaeology* 25, 2: 74–152.

KIENLIN T.L. 2012 - Patterns of Change, or Perceptions Deceived? Comments on the Interpretation of Late Neolithic and Bronze Age Tell Settlement in the Carpathian Basin, in *Beyond Elites. Alternatives to Hierarchical Systems in Modelling Social Formations*, T.L. Kienlin, A. Zimmermann eds., Teil 1, Habelt, Bonn: 251–310.

- 2015 - All Heroes in their Armour Bright and Shining? Comments on the Bronze Age 'Other', in *Fremdheit: Perspektiven auf das Andere*, T.L. Kienlin ed., Kölner Beiträge zu Archäologie und Kulturwissenschaften, Habelt, Bonn.

KLABUNDE A., ZINN S., WILLENKENS F., LEUCHTER M. 2017 - Multistate modelling extended by behavioural rules: An application to migration, *Population studies* 71: 51–67.

KNODEL A. R., LEPPARD T. P. 2018 - Regional Approaches to Society and Complexity: Setting an Agenda, in *Regional Approaches to Society and Complexity*, A. R. Knodel, T. P. Leppard eds., Equinox, Sheffield: 1–22.

KRISTIANSEN K., EARLE T. 2014 - Neolithic Versus Bronze Age Social Formations. A Political Economy Approach, in *Paradigm Found: Archaeological Theory – Present, Past and Future. Essays in Honour of Evžen Neustupný*, K. Kristiansen, L. Šmejda, J. Turek eds., Oxbow Books, Oxford: 236–249.

KRISTIANSEN K., LARRSON T.B. 2005 - *The Rise of Bronze Age Society. Travels, Transmissions and Transformations*, Cambridge University Press, Cambridge.

KRISTIANSEN K., SUCHOWSKA DUCKE P. 2015 - Connected Histories: The Dynamics of Bronze Age Interaction and Trade 1500-1100, *Proceedings of the Prehistoric Society* 81: 361–92.

LAVE J., WENGER E. 1991 - *Situated learning: Legitimate peripheral participation,* Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511815355.

LIÉNARD P., BOYER P. 2003 - Whence Collective Rituals? A Cultural Selection Model of Ritualized Behavior, *American Anthropology* 108, 4: 814–827.

MARAN J. 2007 - Seaborne Contacts between the Aegean, the Balkans and the Central Mediterranean in the 3rd Millennium BC: The Unfolding of the Mediterranean World, in *Between the Aegean and Baltic Seas. Prehistory across Borders*, Galanaki, I., Tomas, H., Galanakis, Y., Laffineur, R. eds., Aegaeum 27, Liège: 3–25.

MAROVIĆ I. 1991 - Istrazivanja kamenih gomila cetinske culture u srednjoj Dalmaciji, *Vjesnik za arheologiju i historiju dalmatinsku* 84: 15–214.

NEWMAN M. E. J. 2006 - Modularity and community structure in networks, *Proceedings of the National Academy of Sciences*, Jun 2006, 103: 8577-8582; DOI: 10.1073/pnas.0601602103.

OLALDE I., *et alii* 2018 - The Beaker phenomenon and the genomic transformation of northwest Europe, *Nature*, Mar 8, 555(7695): 190–196. doi: 10.1038/nature25738.

PACCIARELLI M., CRISPINO A., SCARANO T. 2015 - The transition between the Copper and Bronze Ages in Southern Italy and Sicily, in *2200 BC - A climatic breakdown as a cause for the collapse of the old world?*, 7th Archaeological Conference of Central Germany, H. H. Meller , R. Risch, R. Jung, H. W. Arz eds.,

Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Halle: 253–281.

PUGNETTI G. 2012 Islands, culture, landscape and seascape, *Journal of Marine and Island Cultures* 1: 51–54.

PRIMAS M. 1996 - *Hügelgräber des frühen 3. Jahrtausends v. Chr. im Adriagebiet: Velika Gruda, Mala Gruda und ihr Kontext*, Habelt, Bonn.

RAHMSTORF L. 2006 - The Bell Beaker Phenomenon and the interaction spheres of the Early Bronze Age East Mediterranean: similarities and differences, in *Construire le temps. Histoire et méthodes des chronologies et calendriers des derniers millénaires avant notre ère en Europe occidentale*, Actes du XXXe colloque international de Halma-Ipel, UMR 8164: 7–9.

RECCHIA G. 2021 - Reaching across the Adriatic: northern and western interactions of the Cetina phenomenon (25th–20th centuries BC), *Godišnjak Centra za balkanološka ispitivanja* 49: 5–28.

ROCKMAN M. 2003 - Knowledge and learning in the archaeology of colonization, in *The Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation*, M. Rockman, J. Steele eds., Routledge, London & New York: 3–24.

ROUX V. 2019 - *Ceramics and Society: A Technological Approach to Archaeological Assemblages*, Springer. DOI: 10.1007/978-3-030-03973-8.

SHELLER M., URRY J. 2006 - The New Mobilities Paradigm, *Environment and Planning A: Economy and Space* 38, 2: 207–226.

SOSIS R. 2003 - Why aren't we all Hutterites?, *Human nature* 14.2: 91–127.

SOSIS R., ALCORTA C. 2003 - Signaling, solidarity, and the sacred: The evolution of religious behavior, *Evolutionary Anthropology* 12, 6: 264–274.

SOSIS R., BRESSLER E. R. 2003 - Cooperation and Commune Longevity: A Test of the Costly Signaling Theory of Religion, *Cross-Cultural Research* 37, 2: 211–239. doi:10.1177/1069397103037002003.

SPYROU M.A., TUKHBATOVA R.I., WANG C.C., VALTUENA A.A., LANKAPALLI A.K., KONDRASHIN V.V., TSYBIN V.A., KHOKHLOV A., KUNHERT D., HERBIG A., BOS K.I., KRAUSE J. 2018 - Analysis of 3800-year-old Yersinia pestis genomes suggests Bronze Age origin for bubonic plague, *Nature Communications* 9, 2234. https://doi.org/10.1038/s41467-018-04550-9.

TUREK J. 2012b - Periferie fenoménu zvoncovitých pohárů, Periphery of the Bell Beaker Phenomenon, *Archeologie ve středních Čechách* 16: 183–193.

TYKOT R. H. 2011 - Obsidian Finds on the Fringes of the Central Mediterranean, in *Exotica in the Prehistoric Mediterranean*, A. Vianello ed., Oxbow Books, Oxford: 33–44.

VANDKILDE H. 2016 - Bronzization: The Bronze Age as Pre-Modern Globalization, *Praehistorische Zeitschrift* 91: 103–23.

WENDRICH W. 2013 - *Archaeology and apprenticeship: body knowledge, identity, and communities of practice*, University of Arizona Press, Tucson.

WENGER E. 1998 - *Communities of practice: learning, meaning, and identity,* Cambridge University Press, Cambridge.

- 2000 - Communities of Practice and Social Learning Systems, *Organization* 7, 2 :225–246. doi:10.1177/1350508400720002.

WENGER E. 2010 - Communities of Practice and Social Learning Systems: the Career of a Concept, in *Social Learning Systems and Communities of Practice*, C. Blackmore eds., Springer, London. https://doi.org/10.1007/978-1-84996-133-2_11.