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RETHINKING MOBILITY IN THE ANCIENT HISTORIES OF THE MEDITERRANEAN AND AMAZONIA

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RENAN FALCHETI PEIXOTO

Rethinking mobility in the ancient histories of the Mediterranean and Amazonia

Revised Version

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Renan Falcheti Peixoto

São Paulo
2025

RENAN FALCHETI PEIXOTO

Rethinking mobility in ancient histories of the Mediterranean and Amazonia

Tese de Doutorado apresentada ao Programa de Pós-Graduação em Arqueologia do Museu de Arqueologia e Etnologia, da Universidade de São Paulo ao *Dipartimento di Storia Culture* Civiltà da *Università di Bologna*, como parte dos requisitos para obtenção do título de Doutor em Arqueologia e em *Scienze Storiche e Archeologiche. Memoria, Civiltà e Patrimonio*.

Orientador: Maria Beatriz Borba Florenzano
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"[...] (I) get very angry if people tell me that it's dangerous to sail at sea and remark that one might drown; I don't get angry because I think they're wrong in saying so, but because they seem to forget 'that there is safety in the very heart of danger'."

(Vincent to Theo, Etten, Thursday, 10 or Friday, 11 November 1881)

To the Memory of Colin Renfrew.

ABSTRACT

The aim of this thesis is to explore migration and mobility through relational theories in an intercultural analysis of the ancient Mediterranean and Amazonia history. The underlying analogy for this comparison is of fractal geometry and network theory coalesced in the environmental studies of Mediterranean history. Over the past 20 years or so, post-Braudelian approaches have argued that the Mediterranean should not be defined solely by trait-lists of fixed geophysical characteristics. Instead, it should be understood as a complex system of interrelationships and multiple temporalities involving human and nonhuman components. This perspective opens new horizons for comparisons that extend beyond a shoestring definition of inland spaces. The case studies illustrate situations of cultural change and long-distance associations, such as the diffusion of bronze swords of the Naue II type in the Mediterranean basin at the end of the 2nd millennium BC and of polychrome ceramics in the Amazon basin throughout the 1st millennium AD. What representations of mobility have been reiterated in the social history of the respective regional archaeologies? Is it possible to define robust analytical parameters and concepts to unravel the complexities of social interaction? This thesis of uncanonical Ancient History seeks to make of the perspective of historical ecology 'good to think with,' critically engaged in in geopolitically complex debates of the present, on the route of a decolonial thinking from the South to the North in archaeology. The ecological realities of the ancient Mediterranean and Amazonia present basic attributes, such as the fragmentation, diversification, and intercultural interconnectivity. Close and distant localities may be recursively interconnected and supra local identities continually reconfigured into contingent structures of the political landscape without necessarily involve transmission in the biological-genetic sense or single events of migration.

Key-words: migration and mobility; network science; ecological; Naue II type bronze swords; polychrome ceramics in Amazonia

RESUMO

O objetivo da presente tese é explorar migração e mobilidade com modelos de teorias relacionais a partir de uma análise intercultural das histórias antigas do Mediterrâneo e da Amazônia. A analogia subjacente para essa comparação envolve a geometria fractal e teoria de redes coalescidas nos estudos ambientais da história do Mediterrâneo. Abordagens pós-braudelianos vem propondo nos últimos 20 anos que a definição do Mar Mediterrâneo não deve se ater apenas às características geofísicas, mas à complexa inter-relação e múltiplas temporalidades entre os componentes humanos e não humanos em um grande sistema. Um dos novos horizontes abertos com tais modelos é de vislumbrar aproximações de socio-ecologias para além de uma definição de "mar entre terras." Os exemplos de caso que serão abordados ilustram situações de mudança cultural e associações de longa distância, como a difusão de espadas de bronze de tipo Naue II na bacia mediterrânica do final do 2º milênio a.C. e das cerâmicas polícromas na bacia amazônica ao longo do 1º milênio d.C. Quais representações de mobilidade vêm sendo recapituladas na história social das respectivas arqueologias regionais? É possível definir parâmetros e conceitos analíticos para desenredar as realidades de mobilidade e interação social? Esta tese não canônica de História Antiga busca fazer da perspectiva da ecologia histórica 'boa para pensar', engajada criticamente em debates geopoliticamente complexos do presente, na rota do pensamento decolonial do Sul para o Norte em arqueologia. As realidades ecológicas do Mediterrâneo e a Amazônia antigas apresentam atributos básicos da fragmentação, diversificação e interconectividade intercultural. Localidades próximas e distantes podem vir a ser continuamente atraídas e identidades culturais supralocais reconfiguradas em estruturas contingentes da paisagem política sem envolver, necessariamente, a transmissão no sentido biológico-genético ou ou migração de povos.

Palavras-chave: migração e mobilidade; teorias de rede; teoria ecológica; espadas de bronze Naue tipo II; cerâmica polícroma da Amazônia.

RIASSUNTO

L'obiettivo di questo studio è esplorare della migrazione e della mobilità attraverso modelli teorici relazionali a partire di un'analisi interculturale della storia antica del Mediterraneo e dell'Amazzonia. L'analogia sottostante per questa comparazione interculturale coinvolge la geometria frattale e teoria delle reti coalescenti negli studi ambientali della storia del Mediterraneo. Gli approcci post-braudeliani degli ultimi 20 anni suggeriscono che la definizione del Mar Mediterraneo non debba limitarsi alle caratteristiche geografiche, ma includa la complessa interrelazione e molteplici temporalità tra i componenti umani e non umani di un sistema più ampio. Uno dei nuovi orizzonti con questi perspettive è quello di approssimazioni socio-ecologiche oltre una definizione di 'mare tra-terre.' I casi studio, fenomeni particolari nella cornice più ampia di interconnessione culturale, representano situazioni di cambiamento culturale e associazioni di lunga distanza, come la diffusione di spade di bronzo di tipo Naue II nel bacio mediterraneo della fine del secondo millennio a.C. e le ceramiche policrome nel bacio amazzonico durante il primo millennio d.C. Quali rappresentazioni della mobilità sono state riprese nella storia sociale delle rispettive archaeologie regionali? È possibile definire parametri e concetti analitici per scoprire le realtà dell a mobilità e dell'interazione sociale? Questa tesi non canonica de storia antica cerca fare la prospettiva dell'ecologia storica 'buona da pensare,' impegnata criticamente nei dibattiti geopoliticamente complessi del presente, sula rota del pensiero decoloniale del Sul al Nord in archeologia. Le realtà ecologiche del Mediterraneo e dell'Amazzonia antichi presentano attributi fondamentali di frammentazione, diversificazione e interconnectività interculturali. Località vicine e lontane possono essere continuamente attirate insieme e identità culturale sovralocale riconfigurate in strutture contingenti del panorama politico senza necessariamente implicare la trasmissione in senso biologico-genetico o o migrazione dei popoli.

Parole-chiave: migrazione e mobilità; teorie di rede; teoria ecologica; espadas de bronze Naue tipo II; ceramica policroma dell'Amazzonia.

SUMMARY

LIST OF FIGURES

LIST OF TABLES

NOTE ON TRANSLITERATION

In this work, I have not adopted a system of transliteration of Greek into Latin alphabet, except for abbreviations of Greek periodicals. Readers will find the Latinized version of Greek names, provided the original language of publication and the personal choice of each author.

LIST OF ABBREVIATIONS

Periodicals and Series

AAA	Αρχαιολογικά Ανάλεκτα εξ Αθηνών
Archaeol. Anthropol. Sci.	Archaeological and Anthropological Sciences
ABSA	Annual of the British School at Athens
AE	Αρχαιολογική Εφημερίς
AEA	Aegean Archaeology
ΑΕΑΛ	*Αρχαιολογικό Έργο στην Αιτωλοακαρνανία και τη Λευκάδα*
AHL	Archaeology and History in Lebanon
Arch. Korr.	*Archäologisches Korrespondenzblatt*
Am. Antiq.	American Antiquity
Am. Anthropol.	American Anthropologist
Annu. Rev. Anthropol.	Annual Review of Anthropology
AJA	American Journal of Archaeology
Archaeol. Dialog.	Archaeological Dialogues
AK	*Archäologisches Korrespondenzblatt*
AR	Archaeological Reports
ARC	Archaeological Review from Cambridge
Arch. Delt.	Αρχαιολογικόν Δελτίον
ASAA	*Annuario della Scuola Archeologica di Atene*
Atti Taranto	*Atti del Convegno di Studi sulla Magna Grecia*
BAE	*Βιβλιοθήκη της εν Αθήναις Αρχαιολογικής Εταιρείας*
BAR	British Archaeological Reports
Ber. RGK	*Bericht der Römisch-Germanischen Kommission*
BCH	*Bulletin de correspondance hellénique*
Bol. Mus. Para. Emílio Goeldi. Cienc. Hum.	*Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas*
BPI	*Bullettino di Paletnologia Italiana*
BICS	Bulletin of the Institute of Classical Studies
CAJ	Cambridge Archaeological Journal
CBMW	Cypriot bronzework in the Mycenaean world
CPAG	*Cuadernos de Prehistoria y Arqueología de la Universidad de Granada*
Curr. Anthropol.	Current Anthropology
Curr. Swed. Archaeol.	Current Swedish Archaeology
Dial. Arch.	*Dialoghi di archeologia*
EJA/JEA	European Journal of Archaeology/Journal of European Archaeology
Ethnogr.-Archäol. Z.	*Ethnographisch-Archäologische Zeitschrift*
JRGZM	*Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*
J. Anthropol. Archaeol.	Journal of Anthropological Archaeology
J. Archaeol. Sci.	Journal of Archaeological Science
J. Archaeol. Method Theory	Journal of Archaeological Method and Theory
J. Archaeol. Res.	Journal of Archaeological Research
JDAI	*Jahrbuch des deutschen archäologischen Instituts*

JRGZM	*Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz abbreviation*
JEA	Journal of European Archaeology
JHS	Journal of Hellenic Studies
JMA	Journal of Mediterranean Archaeology
JIES	Journal of Indo-European Studies
JLAL	Journal of Latin American Lore
J. Soc. Archaeol.	Journal of Social Archaeology
IPCC	Intergovernmental Panel on Climate Change
KCh.	Κρητικά Χρονικά [*Kretika Chronika*]
MAA	Mediterranean Archaeology and Archaeometry
MAL	*Memorie dell'Accademia dei Lincei*
MHR	Mediterranean Historical Review
Mitt. DAI Athen.	*Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung*
Nature Communications	Nat. Commun.
Nor. Archaeol. Rev.	Norwegian Archaeological Review
NSA	*Notizie degli scavi di antichità*
OJA	Oxford Journal of Archaeology
Op. Ath.	*Opuscula Atheniensia*
Past & Present	P&P
PAE	Πρακτικά της εν Αθήναις Αρχαιολογικής Εταιρείας
PBF	*Prähistorische Bronzefunde*
PCPS	Proceedings of the Cambridge Philological Society
PNAS	Proceedings of the National Academy of Sciences
PPS	Proceedings of the Prehistoric Society
Proc. R. Soc. B	Proceedings of the Royal Society B: Biological Sciences
PZ	*Prähistorische Zeitschrift*
QdAV	*Quaderni di Archeologia del Veneto*
RAMAGE	*Revue d'archéologie moderne et archéologie générale*
Rev. Antropol.	*Revista de Antropologia*
Rev. Mus. Arqueol. Etnol.	*Revista do Museu de Arqueologia e Etnologia*
RSP	*Rivista di scienze preistoriche*
Sc. Ant.	*Scienze dell'antichità*
Sci. Rep.	Scientific Reports
SEDUUME	*Associação Wanasseduume Ye'kwana*
SIMA	Studies in Mediterranean Archaeology
World Archaeol.	World Archaeology
ZfE	*Zeitschrift für Ethnologie*

Others

AM	National Archaeological Museum of Athens
AMH	Archaeological Museum of Heraklion
AMI	Archaeological Museum of Ioannina
Ash.	Ashmolean Museum
BA	Bronze Age

BM	British Museum
CM	Cyprus Museum
EIA	Early Iron Age
EPG	Early Protogeometric
FBA	Final Bronze Age
FOIRN	*Federação das Organizações Indígenas do Rio Negro*
FUNAI	*Fundação Nacional dos Povos Indígenas*
HAY	*Hutukara Associação Yanomami*
IBGE	*Instituto Brasileiro de Geografia e Estatística*
IOM	International Organization for Migration
ISA	*Instituto Sociambiental*
LBA	Late Bronze Age
LH	Late Helladic
MANU	National Archeological Museum of Umbria
MArTA	National Archaeological Museum of Taranto
MBA	Middle Bronze Age
MN	Archaeological Museum of Naxos
MPEG	*Museu Paraense Emílio Goeldi*
PM	Patras Museum
RAISG	*Red Amazónica de Información Socioambiental Georreferenciada*
RBA	Recent Bronze Age
SEDUUME	*Associação Wanasseduume Ye'kwana*
SM	Submycenaean/Suminoan
United Nations High Commissioner for Refugees	UNHCR

INTRODUCTION

> What if, instead of telling a story about how our species fell from some idyllic state of equality, we ask how we came to be trapped in such tight conceptual shackles that we can no longer even imagine the possibility of reinventing ourselves?
> (Graeber & Wengrow, *The dawn of everything*, 2021, p. 9)

The southern gates of Mediterranean Europe are in shambles. Refugees were engulfed by the Middle Sea, with insiders and domestic players bolstering border security and control. There are hundreds of metaphors of mass immigration and invasion 'flooding' general population as notions of threats to the livelihood of ample segments of populations might guarantee the next round of far-right wins in Western liberal democracies. The Amazonian rainforest, a key piece for the balance of global climate, is under flames. The Solimões, the world's largest river, dries up and turns into a desert bed. The plight endured by indigenous people emblematic of Earth about to reach a tipping-point of an ecological catastrophe. Long-running affairs of colonialism, slavery, and racism are reiterated in the barriers between Global North and South as the two words are drawn together, as ever, in resource draining, environmental load displacement and political struggles for sustainable land use, socio-ecological justice, citizenship and mobility rights. AD 2024? Yes. But it was also the modernity of the ancients, when the Bronze Age Mediterranean civilizations were put to an end and pre-Columbian Amazonia reached a peak in inter-societal connections? Understanding the way things differed in the past and how they have changed is vital to the debates of today's challenges. The examples that I will explore in this thesis belong to phenomena of unrelated historical contexts of very big worlds indeed, not yet intermingled by the fracture of modern colonialism.

Of course, there is no easy answer when addressing different fields of research from a historical perspective, as diverse as you may wish to make of them. At the very heart of a viable answer, however, lies the perception there is not a straightforward method to approach it. As we draw closer to the problem in our magnification glasses and change scale accordingly in the human histories of the Mediterranean and Amazonian, the more an infinite universe of complexities of relationships and themes to be explored wide open. This architecture of complexity stands out across different planes of theoretical imagination and real-world archaeological contexts. This explains why the overall organization of this work operates in a fractal manner that replicates the imagery of the environements studied. In the distinct themes, critical research, and social history, scales and patterns nearly infinite emerge.

The original project of this doctoral research was designed to comparatively investigate the historiographies of the 'arrival of the Greeks' in the Aegean – one aspect of the Indo-European problem – and the Tupian people expansion across the lowland South America. While broad as it may seem, it instilled in the writer a drive not only of reading widely and interdisciplinary but also dealing critically with the bedrock of theories and methods of migrationism in archaeology. The alignment with contemporary migration theory, mobility research, network science, post-colonial, and learning theories, as well as the means to test hypotheses in a system based on sociological regularities and logic, is derived from these bibliographical explorations. As time went on, the identity of the comparison, framed in terms of networks, changed substantially.

The aim of this thesis, in a nutshell, is to make the case that an approach between Amazonia and Mediterranean ecological histories is not only possible through the lens and millennial-scale scales of archaeology, but actually good for rethinking the *longue durée* histories of physical landscapes and mobility patterns that result from similar recurring structural fetures. The model for comparison pursued in this work is predicated on networks because complexity is framed in terms of relations, nodes and links, in lieu of traditional stable identities of places, hierarchical constructs of neo-evolutionist typologies, or ethnic modelling of identity and interaction. It also allows to elaborate upon testable expressions of network sciences through packages softwares of social network analysis. It should be borne in mind, however, that far rather than denying the differences entailed in local and regional trajectories of interconnectedness, I desire to expand on a broader vision of ecological history of these regions, 'zooming in' on specific problems and contexts, thereby contributing to a more comprehensive and nuanced understanding of cultural change dynamics in the past. As we shall see, this gives a unit of purpose acoss interrelated levels of analysis, connecting a higher-level metaphor of networks whose nodes and links go through different directions, spatialities, and temporalities to the real-word explanation of archaeological phenomena through network science tools.

The salient features of fragmentation and connectdeness outlined by network-based approaches founded upon post-Braudelian lines of investigation of the Mediterranean Sea offer important insights to Amazonian human environmental history. It will be argued that each environment exhibits, to varying degrees of intensity, fractal qualities of fragmentation and diversity that operate in zones without great geographical barriers linked by liquid media of connectivity. In addressing these topics, I intend to illuminate the place – and thereby importance – not only of Mediterranean history and archaeology in the neotropical periphery,

in the tradition of classical scholarship in Brazil, but also to explore, in turn, the key conceptual juncture of the Amazonian archaeology to the epicenters of Mediterranean studies.

In facing of these multiple routes, I chart a new course that will allow me to deal not only with the historical reconstruction of networks of interaction and exchange in the past, but also with a critical review of previous and current ideas of migration and mobility, which extend to many issues of contemporary society. This approach to social history is not without implications for archaeologists' widely contrasting views on culture change, prejudices of time, and the steps in the inference process, with what assumptions they go and upon which evidence they rest. It matches the unfolding of mobility, echoing human geography perspectives, in dimensions of empirical reality, culturally encoded phenomenon, and humanly situated practice. Archaeology is an outgrowth of the cross-fertilization of scientific and humanistic disciplines, and a holistic, systematic understanding of processes must adhere to the same interdisciplinary standards. This approach is essential to explore anthropological and historical models, as well as disputing the scientific validity of interpretations, bearing on critical self-reflexivity.

In CHAPTER 1, I set the guidelines of my theoretical perspective, exploring how to compare distinct physical geographies and traditions of research of New and Old-World archaeologies. To name only a few possibilities, linguistic and cultural expansion, models of historical ecology and recurrent patterns of interaction and mobility will be outlined. To proceed, however, first an adjustment of scales must be done, and a chorographic description of both regions is offered. A big chunk of the chapter is devoted to wide-ranging topics of culture, mobility, and interaction in archaeology in order to introduce debates of concepts and definitions. Under the perspective of polythetic classification of artifact trait distribution advocated in this work, I hone a stylistic theory as a viable method for tracking migration, mobility, and social interaction in the past. The grassroots of intra-typological variation constitute useful intellectual tools for understanding complex material patterns and geographies of practice here and there in non-population-centered perspectives of social process.

In CHAPTER 2, a panorama of the research history of the Indo-European search is offered, updated with the state of our knowledge brought to the molecular level with ancient DNA research. The historiographical quest of the Indo-European peoples re-directs our attention to a reflexive mode of perception of the disciplinary constitution. We can see in it then a paradigmatic epistemological issues to unpack the black box of language, identity, and migration that may serve as a cautionary tale to similar questions such as the Tupi expansion in the lowland South America. CHAPTER 3, interdisciplinary in scope, synthetizes the main

theoretical and methodological framework of the thesis in light of the most recent debates of materiality and relationality. It develops on the archaeological network research for bridging multiple scales of analysis of material connections and social processes of interaction.

CHAPTER 4 and CHAPTER 5, the core of this thesis, are mirrored in structure and tackle two case studies applying the principles of social network analysis with Pajek. The first, deals with the so-called Urnfield Italian Bronze material in Late Bronze Age Mediterranean (13-11th cents. BC) and, tangentially, the purported Sea People movements in the eastern Mediterranean. In essence, it examines the potential processes of mobility evinced in the material pattern of connections that underwrite the dissemination of Naue II swords in the Aegean. The second, is related to the polychrome ceramic distribution in the 1st millennium (5-7th cents.) AD in Central Amazonia and the Upper Madeira. The latter discussion is particularly biased toward a critical engagement with the research history of the 'archaeology of the Tupis,' routes and expansion and the reiterated normative conceptions in Amazonian archaeology. Each of these chapters presents an in-depth discussion of empirical data in the footsteps of *chaîne opératoires* approaches.

The CONCLUSION closes this work with a brief exposition of the main insights of the comparison, the resemblances, differences and the differences which resemble each other, to put it in a Levi-Straussian overtones.

CHAPTER 1. ARCHAEOLOGY, CULTURE AND IDENTITY

> A antropofagia foi a única contribuição realmente anticolonialista que geramos, contribuição que anacronizou completa e antecipadamente o célebre clichê sobre as idéias fora de lugar. Ela jogava os índios para o futuro e para o ecúmeno; não era uma teoria do nacionalismo, da volta às raízes, do indianismo. A antropofagia era e é uma teoria realmente revolucionária.
> (Viveiros de Castro, *Encontros*, p. 167).

Anthropofagism in classics

The socio-ecology of the Mediterranean and Amazonian environments are truly examples of fractal structures as those of different sort of phenomena in nature studied by the mathematician Benoît Mandelbrot (1967; [1977] 1983 see also Malkin, 2005; 2011: 45). A larger world of complex relations is reflected in its smaller sections and as long one zoom in, more complex and variable the picture gets and instruments, scales and units of precision define widely different perceptions. Says Mandelbrot, ([1977] 1983: 26) that "when a bay or peninsula noticed on a map scaled to 1/100,000 is reexamined on a map at 1/10,000, subbays and subpeninsulas become visible. On a 1/1,000 scale map, sub-subbays and sub-subpeninsulas appear, and so forth. Each adds to the measured length."

The ancient histories of Mediterranean and Amazon basins are multi-level fractal networks of human-environment relationships over millennia of history (Horden; Pucell, 2000; Broodbank, 2014; Neves, 2012; 2022; Le Tourneau, 2019; Balée; Erickson, 2006b; Erickson, 2008; Iriarte, 2024). This is the central thesis that I will try to substantiate with wide brushstrokes and thick description of archaeological phenomena linked to major debates on mobility and migration in the regions.

There are many possibilities to envisage a cross-cultural comparison between the human history of the Mediterranean and Amazonia. The archaeological histories of the Mediterranean and the lowlands of Amazonia are approached here mainly through a *longue durée* perspective. The long-term duration established by the work of the historian of the Annales School, Fernand Braudel ([1949] 2016; [1969] 2011), considers primarily the importance of geological and geographical factors in shaping human behavior as a whole (Horden; Purcell, 2000; Broodbank, 2013; see also Concannon; Mazurek, 2016b). In the context of Amazonian archaeology, this concept has been recently appropriated for proponents of an 'indigenous *longue durée* history' and the deep connection of geography and human agency in the making of ecologies as the Amazon forest (Balée, 1994; Balée; Erickson, 2006b; Kater; Lopes, 2021; see Silva, 2024: 143).

This *longue durée* history is located through many strategies of presentation and lines of investigation, combining multiscalar (spatial and temporal) analysis and study fields that extend our look well beyond the physical geographies of the Mediterraenan and Amazonia, or specific time periods. Altogether, these areas of interest might be unified under varied conceptions of network science and how relationality, as a heuristic device, might recast conceptions of migration and mobility in archaeology. First and foremost, we observe, within these specific geographic spaces, mosaics of ecologies and frontiers of movement, structuring conditions–leitmotifs of deep histories of connectivity and mobility. By centering mobility as a key object of inquiry, we aim to explore the full range of human interaction in past social networks. The case studies develop the concepts and definitions of mobility and migration through archaeological network research theories and methods (chiefly Social Network Analysis or SNA with Pajek (de Nooy; Mrvar; Batagelj, 2005; see also CHAPTER 3 with full bibliography).

The selection of two, in at first sight, unrelated physical spaces to compare raise the question if we are 'comparing apples and oranges,' in which ground to set this analogy with two sets of objects and the reasons for excluding other candidates.

Analogy is a fundamental principle of theorization and interpretation in archaeology (Hodder, [1982d] 2012; Schnapp, [1993] 2020; Gosden, 1999; Silva, 2024; but see Hamilakis, 2011; 2016; Hamilakis; Anagnostopoulos, 2009). In the positivism trend of archaeological thought, logicists have been keen to observe that historical or anthropological analogy is inevitable and serve the purposes of interpretation of archaeological facts (Gardin; Lagrange, 1975; Gardin, 1974; 1979; Gallay, 1986; 1989; 2011; Roux, 2007). Every analogy is an act of interpretation. Examples of such transference of meaning and working back in time of specific parallels are legions since the conceptual challenge represented by the 'discovery' of the Other from the New World hemisphere (Fabian, 1983) and of pre-history itself in the lands of the 'old continent' (Trigger, [1989] 1996; Schnapp, [1993] 2020; Gosden, 1999; Silva, 2024: ch. 3; Ferreira, 2010). The 1724's *Moeurs des Sauvages Americains Comparees aux Moeurs des Premiers temps* by the French Jesuit Lafitau is plain on that logic that borne fruit in ethnographic ethnology (cf. Trigger, [1989] 1996: 111; Schnapp, [1993] 2020: 263).[1]

[1] Other examples worth mentioning are the lake dwellings in Switzerland found by F. Keller (1800-1881) depicted against the model of a village of the New Guinea provided by the explorer D. d'Urville (Gallay, 1986: 165-167; 2011: 138). The direct-historical approach of North American archaeology of the early twentieth century consisted in the drawing of past-present parallels of the archaeological and ethnographic records (Willey; Sabloff, [1974] 1980). Leroi-Gourhan seemed to had constructed the game of symbolic oppositions bison/horse:female/male in the Paleolithic parietal art figures bearing in mind the Eskimoan symbolic oppositions (Gallay, 1986: 168). The collecting of anthropological data and its systematic use for building on meaningful correlations are one of the

It is clear even with this cursory exposition that researchers have been carrying meanings from one actualistic (not necessarily ethnographic) dimension into another via 'retrodiction.' This is illustrated by one of logicists' oft-cited example, the iconographic inference "large bird carried on gloved hand" of a carved stele equals "falcony" (the formula "if Pi then Pi+1) (Gardin; Lagrange, 1975: 10-54; 10, fig. 1a; Gardin, 1979: fig. 24; 185-202; Gardin, 1986: 116-117; 113, fig. 23; 1989: 37, fig. 4; 2011: 81-82; 82, fig. 3.1) (**Fig. 1.1**). According to this school of thought, any statement linking material resultants (Pi) and behavioral process (Pi+1) should be submitted to a critical examination of the degree of generality and scientific validation (falsifiability) of the analogy (domain of reference).

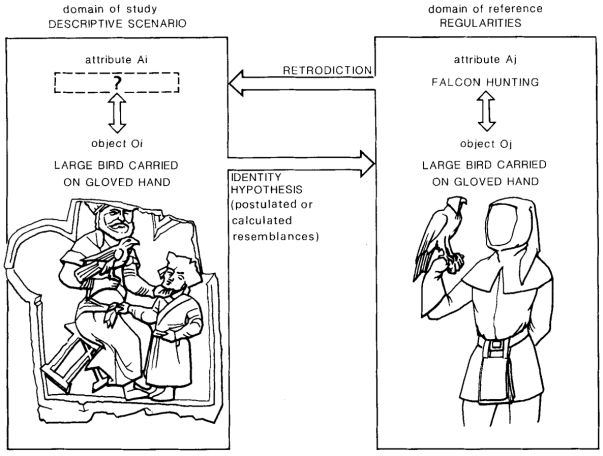

Fig. 1.1. Stele today in the Konya Museum (c. 12th-13th century AD) (left) and the Turkish-Mongolian cultural context in Central Asia (right), key to interpreting the scene carved). In: Gallay, 1989: 37, fig. 4 (Gallay, 1986: 113, fig. 23).

Amazonia is not a space in-between lands – i.e., a *mediterraneus* – but can it be compared with the Mediterranean? However, the question impinges more on one inside-out theoretical concern to historians and archaeologists over the last couple of decades: how to define and what is distinctive about the Mediterranean? (Horden; Pucell, 2000; Abulafia, 2003a; 2011; Malkin, 2005; Harris, 2005b; Broodbank, 2013; Concannon; Mazurek 2016b). What are the constructed filiations to non-Mediterranean contexts? In this work, we are not aiming for slight physical resemblances to pair unlikely couples together but to develop a human history of the Middle Sea and Amazonia. In order to so, we take up current views of Amazonian human ecology, culture and history (see references below) to develop Amazonian conceptual unity at the core of the conception of fragmentation and diversity. Summing up: we argue a critical and post-Braudelian 'Mediterranism' approach (Horden; Purcell, 2000; 2019; Fentress; Fentress 2001; Morris, 2003; Harris, 2005b; Concannon; Mazurek 2016b; Woolf, 2016; Wallace, 2018) may prove of contribution to think metaphorically the deep Amazonian

major concerns of the nomothetic orientation held by New Archaeology (Willey; Sabloff, [1974] 1980: 205-207; Courbin, 1982; Trigger, [1989] 1996: 392 ff.). In the neo-evolutionary orientation of Binford ([1983] 1992) among the Nunamiut Eskimos of Alaska and others parallels with living cultures, the correlation of behavior and material traits of the archaeological record were of broader significance to the explanatory power of the discipline. Brochado (1977) provides an archaeological and ethnographic analogy of ceramic paraphernalia for manioc preparation of Tupinambás and Guaranis (cf. Silva, 2024: 110-143 for other examples in the history of Brazilian archaeology).

ecological history as a "virtual sea" (Horden; Purcell, 2006: 723), an analytical unit comparable in kind (if not in scale) to a unorthodox comparative 'thalassology' (*thálassa* in Greek 'sea') (Peters, 2003; Horden; Purcell, 2006; Broodbank, 2013; 2016).

The first point to make here is that we dispense with the view of Mediterranean space centered on its dictionarized quality "amid lands," the vision of space through "the hole in the doughnut" (Fentress; Fentress, 2001; see also Purcell, 2003: 17-18; Horden; Purcell, 2005: 361 for responses). As defines *The Oxford Dictionary*, Mediterranean is a body of water "nearly or entirely surrounded or enclosed by dry land; landlocked" (cf. Güthenke, 2006). For some scholars, this basic definition provides the metaphor of a closed space unified by trade and intercultural contacts that have been enabling the mapping of many other Mediterraneans around the world (Abulafia, 2005; 2011; Bresson, 2005: 108-114). We subscribe fully to Purcell's (2003: 23) words: "Mediterraneans […] do not have to be very 'Mediterranean' in any aspect except complexity. A Mediterranean […] is a paroxysm – a really marked intensification of factors which are by no means unique to it […]".

As regards the Mediterranean's definition, however, an initial characterization of the core may seem less trouble than its outward perimeters (Horden; Purcell, 2000: 10-15; Broodbank, 2013: 2013: 54-60). In the present state, "the Mediterranean Sea extends some 3,800 km (2350 miles) east to west and between 750 and 400 km (460 and 250 miles) north to south. At 2.5 million sq. km (965,000 sq. miles), it makes up less than one per cent of the world's marine space" (ibid., 55); and inclosed by a rugged mountainscape range in the geological eras of the basin (ibid., 63-71).

The portrait of Mediterranean geography is of paramount importance for comparison and contrast (Horden; Purcell, 2000: ch. 1; Rackham, 2003; Abulafia, 2011: xvii ff.; Broodbank, 2013: ch. 2; 2016 for good overviews) (

Fig. *1.2*). The Mediterranean is often defined in terms of 'mediterraneoid' climate created by weather systems: hot and dry summers and warm and wet winters, which is also found in regions of California, Chile, Astralia, South Africa (see Broodbank, 2013: 61, fig. 2.2). But generalizations of the like does unjustice to the range of situations that moisture rainfall, bedrock, root penetration and erosion process combine to create in varied forms semideserts, forests (chiefly in mountainous areas), maquis (shrubs), phrygana (undershrubs), steppe and savannas well illustrated in the contrast of the driest and the wettest places of Europe within the Mediterranean basin, Almería, Spain and Crkvice in Montenegro, respectively (Rackham, 2003: 33). The variety of climates, geologies, and vegetation in the Mediterranean

lands is commensurate to the diversity of human cultures that waned and waxe over millennia within the basin.

Fig. 1.2. Topographic map of the Mediterranean. In: Broodbank, 2013: 8-9.

The saly waters of the Mediterranean are part of a longer history going back 70 million million of years ago in the Thetys Ocean, that linked the Atlantic and Indian ocean waters. The movement and shock of plates after the Dinossaurs is significant to the physical definition of the Mediterranean Sea. Geologically, the Mediterranean lies at the encounter of the European and African crustal plates. The history of this continuous monumental clash is told in the Alpine belt and the effects of mountain-building from a great arc from Morroco through Turkey. The fractal properties conferred by the uplifting of the Mediterranean's outline cofer to it multiple lines of sight on land (cf. Horden; Purcell, 2000: 127, map 9; see Fig. 1.2). Five million of years ago it becomes linked to the Atlantic through the Straits of Gibraltar, an outlet that guarantees the flux of ocean waters that balances the water loss through evaporation (and more that the flow of rivers than compensate). Pollen record and seabed cores support that the present climate, drier and markedly seasonal, is set more than 5,000 years ago (Broodbank, 2013: 262-264 with references; Rackham, 2003: 34; 59-60).

Winds and currents are the heart of navigability in the waters of the Mediterranean. The major currents of the Atlantic injection flow eastwards along the African coast through the Levant (see Fig. 1.2) and the winds, according to the seasonal weather systems of the Atlantic subtropical high and north Atlantic, as well (Abulafia, 2011: xxviii-xxix; Broodbank, 2013: 74-75).

The Amazon region is one of the world greatest ecosystems. Even though size is not everything, if there is a geographical area in the word whose latitudes and longitudes of comparison do not disappoint this is certainly Amazonia. Among around 10% of humid tropics of the planet surface, Amazonia takes the share of 1/3 (Morán, 1990: 126; 127, fig. 5.2; Iriarte, 2024: 18). As the water is central for describing the physical Mediterranean as "[…] an inside-out geography in which the world of the sea is 'normal' (the interior), and the land is the fringe, its marginality increasing with its distance from the water." (Horden; Purcell, 2000: 133), so is for the Amazon region, "[…] *indiscutablement la region de l'eau* […]" (Le Tourneau, 2019: 16) (if not solely because of the gigantic hydrographic system of the Amazon River with more than 11,000 watercourses). The Amazon basin comprises an area crisscrossed by a dense network of more than 100 main channels of water converging only in the Amazon River and 1000 tributary over the entire drainage basin, making of it a major artery for movement and communication (Le Tourneau, 2019: 16) (**Fig. 1.3**).

Fig. 1.3. Hydrography of the Amazon basin. In: SRTM-NASA.

The capillarity of its hydraulic drainage system of the Amazon River is remarkable. Springs and tributaries connect dots around and trends toward the long axis of the main branch of the Amazon River, the "*rio-mar*" of the tropics of the New World (Holanda, [1959] 2010: 31). The Amazon River pours around 200 million liters of fresh water – "[…] [that] could fill more than 7.2 million Olympic swimming pools every second" (Iriarte, 2024: 18-19) – and sediments per second into the Atlantic Ocean and 18 billion by day, 5 and 12 times greater that the water flow of the Congo and Mississippi rivers, 100 times than the Nile, 1 day equals 2 years of the water flow of the Seine River in Paris, around 1/5 (or 18%) of all fresh water poured into the ocean in the whole planet (cf. Hornborg, 2005: 593; Neves, 2006: 12; Rostain, 2016: 40; 42; Le Tourneau, 2019: 16; 35; Iriarte, 2024: 18).

The Amazon River funnels from its multiple headwater in the arc of the Andes Mountains to its mouth in the coast of the Atlantic, near Belém, taking on seven different names

in different sections of it and according to different countries – Apurímac, Ene, Tambo, Ucayali, Amazonas, Solimões, and Amazon (Rostain, 2016: 40) – across an "unravelled like the intestine of a blue whale […]" (Broodbank, 2013: 75) 6,600-800 km in length (Rostain, 2016: 42; Iriarte, 2024: 18). In Brazil's Legal Amazon, 1,000000 km², half of Brazilian territory (Morán, 1990: 24) there is over than 25,000 km of navigable stretch (Porro, 1995: 12).[2] Amazon's headwaters are in Peruvian (Central) Andes and the river forms where Marañón and Ucayali rivers join. In topographical terms, the Amazon valley and hydrographic basin form a great plain of an overall low relief with slight slope variation in the order of 26 and 82 mamsl in Manaus and Tabatingathe capital of the state of Amazonas and border region of Brazil, Colombia and Peru (Le Tourneau, 2019: 35), respectively. This brings particularly into relief the extensive inundated areas or *várzeas* in Portuguese created by the rise of the Amazon River up to 10 meters over raining season (Le Tourneau, 2019: 41) and that take up 5% of Legal Amazonia and 1/10 of the surface of overall Amazonia.

Amazonia is bordered in the West by the Andean highlands, of recent geological formation. The rise of the Andes at the end of the Cretaceous created a middle sea called "Pebas" at the eastern foothill of the mountains later buried by the sediment of the erosion over the next millions of years and redirecting the West-East direction of the rivers (cf. Lathrap, 1970: 25-26; Hecht; Cockburn, [1990] 2022: 42; Le Tourneau, 2019: 29-31). In the North and South, it is bordered by the Guiana and Brazilian central highlands, much older geologically. In total, the area of Amazonia embraces territories of 9 South American countries. The area of dense rainforest, world's largest, known as "Greater Amazonia" comprises a 7-million-square meter South American lowlands – including also the Orinoco basin which delimits it in the North. It passes through the modern national territories of Brazil and, moving clockwise from it, Brazilian neighboring countries of Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, Suriname, and French Guiana in a total area

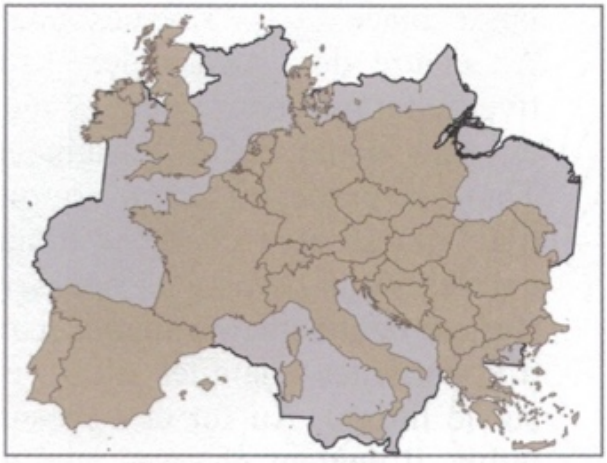

Fig. 1.4. If one takes the the Brazilian Amazonia as a backdrop to the European continent, it would resemble a puzzle mat. Modified from Le Tourneau, 2019: 21, fig. 1.3.

[2] In major rivers of the river, the current of water are of 2km/h and 5km/h in dry and flood seasons (Le Tourneau, 2019: 35).

amounting more than 1/3 of South America, more than 2/3 of the area of the Europe and roughly the area of the United States (**Fig. 1.4**). In comparison to area of the Mediterranean Sea, Amazonia has an area almost three times higher.

In Amazonia, there is not a uniform distribution of environments and resources. Strait-jacket divisions of long are no longer tenable for Amazonia: between yearly-round inundated and fertile riverine areas (*várzeas*) and upland and less yielding interfluvial areas (*terras firmes*) or between white and black rivers, nutrient-rich and poor in alluvial deposition originating in the erosion process of Amazon's headwaters in the Andes Mountains and of its tributaries in geologically recent and old highlands formations, respectively.

Diversity, therefore, is the key-world in Amazonia (hence Amazonias, see Le Tourneau, 2019: 15) and not the unproductive terms of old and nutrient-poor rivers and white waters, poor soils or green desert expanses (Morán, 1990; 1995; Hecht; Cockburn, [1990] 2022; Roosevelt, 1991; 1992; 1994a; Viveiros de Castro, [1996] 2002; Whithead, 1996; Stahl, 2002; Neves, 2006; 2012; 2022; Erickson, 2008; Rostain, 2016; Le Tourneau, 2019; Iriarte, 2024). Amazonian diversity, however, is not really a matter of diversity *per se*. The colossal proportions involved when it comes to Amazonia cover the fact it is the extremities of diversity that should retain our attention across different geographical and biological scales, that is, the specificity of climates, relief, soil composition, fauna and flora species distribution, but the dynamic variability over time arising from the millennial palimpsest of landscape management by native activities (Rostain, 2016: 39-47).

Despite a common Western myth representing Amazonia and precontact Americas as a tangled mass of primeval forest or as an environment dominated by a homogenous forest-type biome poor in nutrients ('humid tropical forest' see **Introduction: two men on a boat**), the nature of soils and vegetal formations of rainforest include a mosaic of composition of acid, poor and highly nutrient-rich soils, savannas, wetlands, forest islands to name a few (Morán, 1990: ch. 5; Hecht; Cockburn, [1990] 2022: ch. 2; Roosevelt, 1991: 108-113; 1992: 55-57; 1994a: 2-3; Erickson, 2008: 157; Le Tourneau, 2019: 35-48; Iriarte, 2024: 21-34). This paradoxically complexity of biodiversity is illustrated by one example typical of the humid tropics that may help us to 'see the wood for the trees.' In Amazonia, there is a highly sporadic occurrence of most plant species *vis-à-vis* an incredible overall diversity that may hold true for the past as well (Lathrap, 1970: 32; 1973: 170-171; Meggers, 1971: 15-16; Morán, 1990: 131-134; Le Tourneau, 2019: 34). Under the treetops of a conceptual photography of around 16,000 of tree species current in the Amazonia Forest – the "broccoli champ" of ombrophilous forest

canopy (Le Tourneau, 2019: 40; 53) – there is a patchwork made by less than 2% of individuals of the same species, 227 tree species, computing half of the total (Ter Steege, 2013).[3]

This latitude of Amazonian biodiversity has attracted since long the interest of biographers in the paleoclimate of the region. The "refuge theory" by Jürgen Haffer (1969 cf. also Morán, 1990: 141-142; Le Tourneau, 2019: 28-29, Hecht; Cockburn, [1990] 2022: 53-54; Iriarte, 2024: 56) posited climatic oscillation and speciation of bird species over the Pleistocene in forest patches interspersed in savannas that proved of much contribution to the linguistic correlation and long-range emigration in pre-Colombian Amazonia (Meggers; Evans, 1973; see CHAPTER 5). Explanations are far from simple, but what should remain constant is the interaction of multiple factors over a broader geological timescale that seem to ontologically realize the Amazonia.

> *À toutes les étapes de l'evolution de la region amazonienne depuis la fin du Mésozoïque, la diversité apparaît comme une caractéristique omniprésente. Elle se décline dans tous les domaines. Sur le plan écologique par exemple, non seulement les marécages du Pebas on pu constituer une marqueterie extrêmement complexe d'écotones, caractérisées par l'intensité des inondations ou influences par d'éventuelles entrées d'eau salée, mais la progressive surrection des Andes, imméditatement à l'ouest, a créé un gradient de milieux en function de l'altitude, entraînant des processus d'adaptation ou de diversification. La diversité des milieux est aussi favorisée par l'étagement de la forêt elle-même, qui propose plusieurs gradients d'humidité, de lumière, de chaleur, etc. en function de la hauteur des arbres.*
> […]
> *La diversité semble avoir aussi induit des processus complexes d'adaptation et de rétroactions entre les organismes. Ainsi la plupart des herbivores d'Amazonie, animaux mais aussi insectes, se sont-ils spécialisés dans la consommation d'espèces végétales très précises, dont ils se nourrissent exclusivement, ce qui rend plus complexe la reproduction des espèces en question, car tous les rejets apparaissant à proximité d'un individu adulte sont immédiatement consommés par les colonies qui l'infestent. Ce point peut expliquer en partie la grande dispersion de la plupart des arbres amazoniens (sauf ceux dont le développement est intentionnellement favorisé par les humains…) et, en conséquence, la diversité des parcelles. Les végétaux eux-mêmes semblent aussi souvent se spécialiser dans des gammes très particulières de nutriments, ce qui leur permet de se développer malgré la quantité des concurrents autour d'eux. La forte densité végétale serait donc un autre élément explicatif de la diversité amazonienne globale.*
> *Les arbres et végétaux isolés subissent par ailleurs les attaques de très nombreux micro-organismes et pathogènes, dont les processus d'infection sont très rapides, ce qui menace les zones de végétation homogènes* […] *Cela renforce la nécessité de la dispersion. Chaque individu développant au fur et à mesure des adaptations propres à ces agressions, on peut ainsi expliquer*

[3] The structure of 'hyperdominance' of tree flora of Amazonian Forest, majority of which constituted by domesticated species, may be a result of active ancient indigenous management practices, so this figure should not be statically projected onto the past (Levis *et al.* 2017; Fausto; Neves, 2018: 1609; Furquim et al 2021; Iriarte, 2024: 81-83).

> *l'intense processus de spéciation caractéristique de l'Amazonie et le fait que la plupart des espèces d'arbres n'y comptent que très peu d'individus. Chaque parcelle de forêt est donc unique, et un hectare de forêt dans une région donnée sera très différent d'un autre hectare à quelques dizaines ou centaines de kilomètres de distance.* (Le Tourneau, 2019: 32-35).

As far as I can note, since Meggers (1971: 35-38) there is a parallel between floristic and faunal speciation and the linguistic and cultural variability of Amazonian human past because of past climate fluctuations. It is hard to precise the environmental causes responsible for this biodiversity *in toto*, but in this regard, the 'human ecology' (Morán, 1990) and 'historical ecology' paradigms (Balée, 1994; Balée; Erickson, 2006a; 2006b; Erickson, 2008), theoretical revision of Americanist ecological anthropology of the late 1940s, has been stressing the answer to recent periods of the region's time scale lies in a symbiotic relationship between human and their non-human environment in microecological terms of diversity. Amazonia is a *locus* of plant management and domestication going back since the early Holocene (Clement *et al.* 2015; Neves, 2012; 2022; Neves; Rostain, 2012; Rostain, 2016; Iriarte, 2024). An emblematic sign of the long-term effects between societies and biotic world is the extremely fertile anthropogenic, the "black Indian soils" (*terra preta de índio*) or "Amazonian dark earths" (ADE), a sought-after spot for contemporary practices of plant cultivation. *Terra preta* formation is the outcome of accumulation of organic material deposition and domestic waste of sedentary practices of food production that growth in the Brazilian Amazonian past of the late prehistory (1st millennium AD) (Petersen; Neves; Heckenberger, 2001; Neves, 2006; Neves *et al.* 2014; Neves, 2012; cf. Clement *et al.* 2015: 4, fig. 2; Arroyo-Kalin, 2021; Iriarte, 2024: 112-118).

Therefore, it can be said that a multiple rhythm human history of Amazonia gave rise to a point-to-point variability and regional cultural history in a fractal geometry Amazonian ecology – not a single Amazonia (Neves; Petersen, 2006: 280-281; see also Neves; Rostain, 2012: 121-122; Neves, 2011; 2012: 180; Moraes; Neves, 2012; Neves *et al.* 2014: 137). In a word, Amazonia can be framed as a "[…] 'mosaic' of fluctuating landscapes and societies characterized by great variability, hybridity, and opportunism" (Heckenberger, 2008: 958). The dynamic interaction of humans and non-humans in the productive landscape of Amazonia is very complex indeed and poses a conceptual challenge to ingrained ontological categories of scientific knowledge. The ethnography of indigenous cosmologies in Amazonia have been received special attention in the 'ontological turn' in anthropology (see CHAPTER 3). New

models by Amazonian anthropologists have been casting to blur the nature-culture boundary of Western cultural representations.[4]

Many of these anthropological insights have been taken aboard in fruitful directions in a struggle to come to terms with the chronological framework set for the Old-World experience and establish a distinctive Neolithic trajectory for the region (Fausto; Neves, 2018: 1607; see also Rostain, 2016). The risk of projecting such perspectives onto the pre-Columbian past is of overlooking the socio-political relations on which they are inscribed and that may result in vague theoretical suggestions for a discipline grounded on the material aspects of historic dynamics and long-term trends. To archaeologists of human-environmental relationship this mean to navigate between the Scylla of evolutionary determinism by cultural ecology and the Charybdis of relativism of constructivism (cf. Hornborg, 2016: 95-99 for the precedence of political economy over culture-specific worldview).

Over the past half century, the ecology of the pre-Columbian Amazonia has received considerable attention and from different theoretical angles scholars have started to look at culture history trajectories and socio-economic processes in a broad regional scope (Lathrap, 1970; Meggers, 1971; Roosevelt, 1992; 1994a; Prous, 1992; McEwan; Barreto; Neves, 2001; Neves, 2006; 2012; 2022; Silverman; Isbell, 2008; Pereira; Guapindaia, 2010a; 2010b; Hill; Hornborg, 2011b; Lima; Barreto, 2016; Rostain, 2016; Iriarte, 2024 *inter alia*). More than 90 years after *L'Archéologie du Bassin de l'Amazone* (1930) by the Swedish explorer E. Nordenskiöld, the coming of age of Amazonian archaeology allows for comparisons beyond the neighboring zones or way beyond a minute check-list of ecological determinants or technological limitations (e.g., "tropical rainforest" cultural area of cultural ecology) constituting the core of the culture-area concept (e.g., Tropical Forest culture) or evolutionary cultural stages of generic sociopolitical development (e.g., Tribe-Bands-Chiefdom-State) towards "relational analogies" (Hodder, [1982d] 2012).

Naturally enough the proposition of analogy is not straightforward and relies mostly in structural metaphors, figurative use and qualitative observations that go from the macroscopic to the microscopic levels in a way reminiscent of fractals. And, as we work our way down and travel scales of analysis, the model of ecological variability and structural connectivity is envisaged beyond abstraction. The measure of complexity adopted by this study is a figurative

[4] Examples of such perspectives is the Amerindian *perspectivism* of Viveiros de Castro ([1998] 2002), the relational position of subjectivities, and Descola's (2005: ch. 6) animism among a world's history account of different ontologies structuring the practice and the system of relations between different beings – humans, plants, and animals.

sense of the network patterns and signatures of temporalities displayed by material relationships.

Below, I outline overarching similarities and structuring principles between the Mediterranean Sea and Amazonian Forest, not fewer than:

1) kaleidoscopic landscapes of production, complex regions profoundly modified by millennia of human activities in an interactive process co-involving human and nonhuman agents in the development process (ontology of socio biodiverse ecologies);
2) environments with plenty of sufficient (but not necessary) conditions for the emergence of political hierarchies and dense urban settlements, but embedded in power-diffusing and risk-buffering exploitative strategies which, in the long run, have a transformative impact in the mobilization of centralized social formations and hyper specialized systems (centrifugal push and centripetal pull energies);
3) heterogeneous ecosystems with diverging historical trajectories generated by the dialectic relationship of mosaic pattern of ecological variability and behavioral opportunism in a broader continuum of human adaptative plasticity in terms of strategies of resource management;
4) densely fragmented ecologies in physical, topographic and environmental terms, with complex relationships between past archaeological indicators and present-day diversity. This make of the exercise of work back in history of migrations (or episodes thereof) a one-to-one juxtaposition of distribution maps of social and modern or contemporary ethno-linguistic groups, genetic variation a problematic assumption.
5) highly connected topographies in different directions by the sort of random 'Brownian motion' of people and exchange networks. Zones without great physical or biogeographical barriers for interaction and ease of movement through liquid mobilities within which close and distant localities were draw together; and

To be sure, certainly these are different degrees of **variability**, but maybe not necessarily of **kind**. In the ancient Mediterranean, the variability within/between localities is multiplied by the rate/frequency of rainfall, temperature and the like, resulting in chronicle unpredictability and disequilibrium between neighboring areas (microecologies) in a dynamic interplay that seems to extend into the protohistory of the 2nd millennium BC (Horden; Purcell, 2000; Suano, 2003; Broodbank, 2013 see **The kaleidoscope of connections**). In ancient Amazonia, variability is incessantly recombined in varied localities in one of the world's most

rich anagram of environmental opportunities for past human groups. And far from being an immaculate environment, a pristine forest or green slate discovered by white settlers, Amazonia is a highly modified landscape and cultural artifact by millennia of economic activities by native people (Morán, 1990; 1995; Balée, 1994; 2008; Denevan, 1992; Heckenberger *et al.* 2003; Balée; Erickson, 2006b; Erickson, 2008; Neves, 2006; 2012; 2022; Clement *et al.* 2015; Rostain, 2016; Le Tourneau, 2019; Furquim et al 2021). "*Tudo foi possível na Amazônia antiga, dizem os arqueólogos*" (Neves, 2014: 77; 2021: 214).

The general hypothesis of this work, as far as behavior patterns of mobility and connectivity go, is that physical movement is an emergent phenomenon of the interactive properties of heterarchical resource distribution of ecological settings and the configurations of networks of social, political and economical relations over time. The socio-ecologically diversified landscapes of the Mediterranean and Amazonia constituted a matrix for interconnectivity in which mobility and interaction were integral elements. It follows from all this that movement of people and things along the basins' network were not uniquely determined by imperatives of glut and dearth of natural milieux or means of mobility but interact with mutually influencing parameters of accidents and contingencies of history and environment.

The archaeological realities of the Mediterranean and Amazonian pose many problems to human history presented as a spiral of increasingly upward evolutionary trajectory (Graeber; Wengrow, 2020) or as a condensed ensemble of events in the terms of debunked conceptions of outward population movement and diffusion (cf., on Amazonia, Hornborg, 2005; Hornborg; Hill, 2011a). Instead of picturing the dispersal of languages, genes and cultures as either fast or drawn-out wave of out-migrants, ecological models for both areas invite readers to meet head-on relational approaches and multiscalar nature of data and phenomena in analysis. The terms of interaction across locations are constantly re-shuffled by natural dispersion (localized availability of resources), microregion network clusters, regional convergence areas and, on the 'thalassic' level, long-distance associations across highly connected topographies. Whereas long-range connection is a generalizable human fact (Östborn; Gerding, 2014: 77-78), the network-fractal properties of the physical environment and the ease of movement within and across the Mediterranean and Amazon basins favor entanglements of people and goods (see "meshworks" in Ingold, 2007; cf. Horden; Purcell, 2019: 72-83).

The Mediterranean's environment and history should not fit squarely in a conceptual mold of dry archipelago punctuated by 'islands' of fertile lands to serve as a sharp contrast to the ecological variety of lowland tropical landscapes (see Neves, 2020: 212). This is, however,

an otherwise thoughtful proposition of an accumulated decentralized process of agricultural and resource management practices on the Amazonia Forest that underwrite high linguistic liversity of Amazonia, i.e., lack of political force to pull tight the strings of a beadlike pattern of the ecological *milieu* (Neves, 2006: 41; 2011: 36; 2016: 36; cf. Neves; Rostain, 2012: 131-133; Rostain, 2016: 62-63; Neves, 2020: 213-214). Contrary to common ideas of "the coming of the Neolithic era" in the form of a tightly set of economic practices and lifestyle from a core zone, Amazonian prehistory in special poses big challenges to the revolutionary character of the Agriculture Invention (Fausto; Neves, 2018) and, as consequence, of a progressive immobilization of human peasantry communities with the historical trajectories of neolithization/sedentarization.

But less than an invention whose paternity is sheer environmental or Malthusian 'necessity' or part and parcel of a teleological tale of humanity's technological (and cognitive) evolution out of Africa to the outer space (Graeber; Wengrow, 2020; see **Epilogue: on ants, humans and pyramids**), the history of agricultural practices in ancients Mediterranean and Amazonia are interwoven with mixed economical strategies. Wild and cultivated resources form a diverse portfolio of environmental opportunities, a myriad of ecosystem variability matched by myriads of sociocultural formations over trajectories of time. In the deep history Mediterranean and Amazonia basins, the situation is of a constant symbiosis of ecological (other-than-human), anthropogenic and human agents in long-term pattern of relationships, wide latitude of resource exploitation and risk-buffering strategies of diversification, product specialization and multiscalar exchange.

Here, we envision a holistic Mediterranean archaeology that is not under the habitual banner of classical Antiquity (Horden; Purcell, 2000; Harris, 2005a: 2; Knapp; Blake, 2005: 4; Knapp; van Dommelen, 2010: 1) or, for that matter, Eurocentric perceptions rooted in the political 'we'/'they' game of oppositions, common heritage and foundational myths of ideology (Renfrew, 1980; Bernal, [1987] 2020; Morris, 1994; Herzfeld, 2005; Jones; Gamble, 1996; Jones, 1997; Demoule, 2014). The Aryans'/Indo-European critical historiography re-ignated by ancient molecular analysis brings to the fore long-held dispute around the nature of the pathway of the Indo-Europeans, with special emphasis to the late prehistoric Eurasia migrations of East-European archaeological communities as the so-called Yamanaya/Corded Ware culture complexes and the initial formation of 'global' inter-regional interaction across the Bronze Age length and breadth (Harrison; Heyd, 2007; Heyd; Kulcsár; Preda-Bălănică, 2021; Fernández-Götz *et al.* 2023b; Kristiansen; Kroonen; Willerslev, 2023). The widening of the reach of transregional exchange networks of early BA history and the cycle of ideological

change, increased long-distance mobility and all-rounded connectivity between regions often held apart broke the ground for the uptake and intellectual dissent thereon of mobility and network-inspired paradigms as we shall see presently (Morris, 2003; Sheller; Urry, 2006; Urry, 2007, Cresswell, 2010; 2011; 2012; Sorge; Roddick, 2012; Aslaksen, 2013a; Beaudry; Parno, 2013a; Kristiansen, 2014; Gonzáles-Ruibal, 2014; Sørensen, 2015; Vandkilde, 2016; Hodos, 2017; Aldred, 2021).

Indo-European studies is approached above all as model of how archaeologists use to proceed in linking language, archaeology, and genes to determine geographical origins and migration (i.e., the "*paradigme kossinnien*" Demoule, 2014: 181; 554; 2017: 36; also Furholt, 2019b: 56-58; see CHAPTER 2). This is done with the the aim of exposing the "[...] simplified culture-historical trope of prehistoric peoples and their mass movement" (Furholt, 2019b: 63), and how Amazonian archaeology, under the banner of the 'Tupian expansion,' could benefit from a different approach (see **Archaeological answers to linguistic questions**). The network concept is integrated into a critique of 'arborism' (Malkin, 2003b: 57) and correlated chain of assumptions and relationships of linguistic theories grafted onto the archaeological cultures.

In view of the yawning chasm between classics/pre- and proto-history as mnemonic legacy of the late eighteenth and nineteenth centuries historiographies, the interface of Late Bronze Age connections is mapped onto a strategic crossroad where Europe meets Mediterranean in a "*barbarian* history" (Broodbank, 2013: 25, author's italics; cf. Concannon; Mazurek, 2016a: 10) of the Middle Sea. The history of Bronze Age communities of Europe (Kristiansen, 1998; Kristiansen; Larsson, 2005; Kristiansen; Suchowska-Ducke, 2015; Kristiansen, 2018b; 2018c) and the Middle Sea (Broodbank, 2011; 2013) are bond together in the end of the 2nd millennium BC. The case study in the LBA Mediterranean sits on the troubled end of the BA era and the ideological-charged image of an unleashing of an "age of migration" (cf. Vermeule, 1964: 274; Middleton, 2018b: 117) in the Mediterranean Sea. It will be argued that the debate is not only relevant for a social history of earlier archaeologists and ideas of long-distance connections and transfer but also to the challenge of oft reiterated ideas of mobility and cultural change in the archaeological record of the period that reflect the colonial phobias of our current times (see **The 'refugee crisis'** with bibliography).

The case study on pre-Columbian Amazonia deal heads on with traditional images on the neotropical *milieu* and indigenous people, developing on an "Ancient History of the Amazonia" (Neves, 2006: 10; 2012: 279; 2022) with relational theory and network analytical techniques. At the core of this discussion is a counter-narrative to normative history of peoples, blocks of time and the limits of overarching comparisons rooted on romanticized notions of

'identities' of types or cultural spaces and tropes of population movement and cultural change in Amazonian archaeology. I invite the reader to suspend these direct ethnohistoric references or linguistic associations that allow us instead to renew questions and models for the history of people's materiality and mobility in ancient Amazonia.

With "anthropophagism in classics" I expand the argument of "*tropicalismo* in classics" (Pappa, 2020: 364) of a hybrid cultural approach to classical scholarship in the post-colonial experience of Third World countries inspired by the Indianist movement of Brazil in the nineteenth century (cf. Treece, 2000). Tropicalism is rooted in imagined essences of tropical lattitudes (see Hecht, 2013: 422-423; **Introduction: two men on a boat**). The anthropophagic movement, instead, is a broader movement of artists and intellectuals of São Paulo of the 1920s that re-interpreted the cannibalism, "[...] the very concept that had, in colonial discourse, most defined the Latin American 'Other' as primitive and barbaric […]" (Treece, 2000: 247), as a strategy of cultural 'consummation' of exogenous elements in a hybrid national art identity. The "anthropophagism in classics" should be understood here as a de-centered decolonial perspective of "*barbarian* history" to hegemonic discourses and narratives freight with moral value about the Mediterranean and 'un-Mediterranean' milieux.

In studying Mediterranean and Classical civilizations from the edge, students are in a double peripheral position. To Brazilian archaeologists and laymen in general, the study of the classical world and places may look a distant and extraneous endeavor to indulge in (Funari, 1997: 143; Pappa, 2020). And it goes without saying that in terms of archaeology production and as far as the 'classical' subfield in Brazil is largely a periphery as compared to much of the hierarchies of power in the Western academic establishment. At the risk of sounding simplistic, I think this perspective in a field burdened by a *Great* colonial *Tradition* (developing on one of Renfrew's (1980) ideas) is potentially 'revolutionary' to archaeological concepts in view of the long exposure to different contexts of archaeological praxis and post-colonial experience in the intersection of Third World periphery (Funari, 1989: 64; 1997; 1995; 2002; Pappa, 2020).

Archaeological answers to linguistic questions

In this work, I also argue an archaeological comparison can be made through two broad similar linguistic questions with implications of continental scale beyond Mediterranean and Amazonia basins. **How can the research history in archaeology of the Indo-European debate inform the debate on Tupian homeland and expansion and vice versa? What can we learn about it?** The Indo-European question will serve as paradigmatic case study

centuries-old impasse and long-held assumptions that fueled concerns about migration, heritage, and identity politics in contemporary archaeology.

> This quest for the origins of the Indo-Europeans has all the fascination of an electric light in the open air on a summer light: it tends to attract every species of scholar or would-be savant who can take pen to hand. It also shows a remarkable ability to mesmerize even scholars of outstanding ability to wander far beyond the realm of reasonable speculation to provide yet another example of academic lunacy. (Mallory, 1989: 143).

A lot of things can be learned through this prolonged scholarly interest, as the matter seems to remain much alive for years to come, rekindled from time to time with breakthroughs scientific advances or just new interpretation of old facts. But before anything, it is fundamental to recognize with the magnitude of the problems themselves, linguistically and archaeologically speaking. A comparison of the different theoretical and methodological assumptions that produced different interpretations in different periods/generations could be done, and one might learn something useful from this.

There are many purported archaeological solutions to the problem of the origins and routes of expansion of the ancestral speakers of the Indo-European languages (Renfrew, 1987a; Mallory, 1989; Anthony, 2007; Demoule, 2014; see CHAPTER 2). The farming-language hypothesis dispersal (**Farming/language dispersal hypothesis**), oftenly evoked as a model for comparison in the neotropics (see below), is only one and minor hypothesis among Indo-Europeanists (Villar, [1991] 1996; Mallory; Adams, 1997; Fortson, [2004] 2010). The Mediterranean is an appendix of Eurasian landmass as far as the Indo-European connection goes. At the other point of our comparison, the Tupian languages form a stock with several language families in large sections of lowland South America within or without Amazonia in large tracts of Brazillian coastline from North-East regions to the South (see CHAPTER 5). As a matter of fact, it would be more appropriate to compare it with a deeper level of the linguistic continuum. Or, inversely, to compare the Tupi-Guarani linguistic family with the Indo-European. Tupi is only one of four linguistic stocks and other dozens of linguistic families in the Amazon basin ("[…] with a density of distinct genetic groupings – some fifty families and isolates [...]" (Epps; Michael, 2017: 934; cf. Rodrigues, 2000; Epps, 2009; Heggarty; Renfrew, 2014 for good introductions in Amazonian linguistics).

Before Portuguese colonizers had set sail the Atlantic and carried out the process of élite dominance[5] that characterizes the colonial expansion of the Indo-European languages in the Americas, Africa and Australia,[6] there were several groups distributed along the Brazilian East Atlantic coast façade. These groups are linguistically classified as belonging to another linguistic family, the Tupi-Guarani, which in its turn is genetically related in supra-family level to many other Tupian languages scattered in Amazonia. In 1500, the geographical distribution of the Tupi-Guarani languages is estimated to have embraced the Atlantic Forest and adjacent regions in the eastern coast of today Brazil, roughly a lower minimum 1/4 of the today country's total area and over 1/3 of Brazilian Atlantic coast outside Amazonia.[7]

Certainly, this high **linguistic variability** and wide **expansions of language families** of Amazonia entails the working of multi-layered processes which must be accounted for as in many other areas of the world (Heggarty; Renfrew, 2014: 1330; Heggarty, 2014: 598). To be sure, in the 'old continent' today there are "[…] deserts of linguistic diversity […]" (Heggarty, 2014: 598) in that many groups of daughter languages of Indo-European branches prevail (e.g., Germanic, Italic, Slavic, etc. cf. see Fig. 2.1), besides small pockets of isolated languages such as Basque and Finno-Ugric languages. With such bewildering polyglot history in mind, the episodic cases of wider expansion of language families in and outside Amazonia have compelled scholars to search for long-term and large-scale models (Lathrap, 1970; Brochado, 1984; Noelli, 1996a; 1998; 2008a) remarkably similar to "the coming of the farmers" paradigm of processualism (Renfrew, 1987a; Bellwood, 2005; cf. Hornborg, 2005: 595; Hornborg; Hill, 2011b: 8; Neves, 2007: 120; 2011: 34; 2012: 153; Neves *et al.* 2014: 152; Iriarte, 2024: 40). The more one explore this question further on the side of the archaeology of the Tupis over these years, however, the more one may perceive uncertainties regarding the hierarchical levels involved in the discussion of the origins and expansion of people in terms as 'stock' and 'family.' The problem seems the reification of constructs to think mobility and interaction of

[5] Élite dominance is one of the processes of language change in Renfrew's model (1987a: 271; 1992b: 31) on which a small and organized group imposes their rule in a foreigner territory by military means. Examples in prehistory are highly debatable as to the direction of the linguistic change involved in this process (Heggarty, 2014: 617-618; Demoule, 2014: 556-558).

[6] Today, the distribution of the Indo-European languages is the world's widest, extending in all Earth's continents. Living Indo-European languages are spoken now for almost half of the world population and at least one among the living IE languages is the official language of state nations covering nearly to 3/4 of the earth's land surface (see Mallory, 1989: 264, fig. 146).

[7] One of its daughter languages, the Guarani, is today one of the official languages of Paraguay, and speakers of the family count today are in the order of thousand, indigenous and non-indigenous, in South America. Many of Tupinambá fauna vocabulary were incorporated to Portuguese as a consequence of the intense contact of indigenous people and settlers. Linguists estimates 1/3 of 1000 bird names and almost 1/2 out of 550 fish names current in Brazilian Portuguese derive from Tupinambá (Rodrigues, 1986: 21).

groups and if archaeologists are to think identity with building blocks of culture history, they will always be forced to work out new genetic-based relations coalescing archaeological cultures and linguistic phylogenetics

That being said, I suggest that we should embrace the "polyglot history" and network of interactions blossomed in the early Mediterranean (Broodbank, 2013: 25) as a major lesson to be taken here against isolationist narratives or monothetic concepts of identity in archaeological interpretation. That is, instead of halting the discussion around this general linguistic discussiom, I propose we should probe deeper into the epistemological bedrock of archaeology to get at new approaches towards mobility. And when it comes to go beyond essentialist or territorializing concepts of identity and movement, the idea of an interconnect Mediterranean is "good to think with" in Lévi-Straussian terms (Morris, 2003: 32 To aim at "the origins of" cannot be but a moot point and the whole question should be approached as a point of departure for an ideological critique of history of scholarship on the narrative of origins and the intellectual procees of the reifications of identities (see recent seminal overviews in Arvidsson, [2000] 2006; Demoule, 2014).

Archaeology of mobilities

Over the last couple of decades, networks have become buzzwordsd for the connectivity and mobility of people and things at different scales in the social world, economy and sciences (Barabási, 2002), much as relational thinking gained ground in the social sciences in general (Selg; Ventsel, 2020 with bibliography). In archaeological theory, insights of network thinking have been applied in a suit of colloquial (Horden; Purcell, 2000; Malkin, 2011; Wilkinson; Sherratt; Bennet, 2011; Hodder, 2012a; Kristiansen; Lindkvist; Myrdal, 2018) and formalized representations through graph constructs of intercultural and long-distance interaction and economic exchange (Knappett, 2011a; 2013b; Alberti; Sabatini, 2013; Collar *et al.* 2015; Brughamns; Collar; Coward, 2016b; Dawson; Iacono, 2021; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024; see Brughmans, 2010; 2013; Östborn; Gerding, 2014; Mills, 2017; Peeples, 2019 for history and reviews).

This trend goes also in parallel line with the "new mobilities paradigm" in an array of social sciences and humanities in the last 20 years or so with a general perception of the importance of the field of relationships over bounded conceptions of cultures, territories and differentiated production of mobility in contemporary life (Friedman, 2002; Sheller; Urry, 2006, Cresswell, 2010; 2011; 2012; Sorge; Roddick, 2012). Contributing to this renewed

scholarly research, as remind Garcia & Le Bras (2017: 16), there are major concurring forces of modern experience of belonging and bordes that have transformed the 20th-century pattern of local migrations in neighboring regions spread across the whole globe with the shrinking of distances by technologies of transport and communication. The vectors of flights joining lines in airspace, the blur image of motion in airports and drift movement of crowd fishing boats are emblematic images of the social imaginary nowadays. Archaeology did not lag behind related disciplines, as the archaeo-historiographic relationship of academics with socio-political trends played a significant role in mobility emerge as a major research theme (van Dommelen; Knapp, 2010; Cabana; Clark, 2011b; Beaudry; Parno, 2013b; Hahn; Weis, 2013b; van Dommelen, 2014; Leary, 2014b; Baker; Tsuda, 2015b; Aslaksen, 2016b; Molloy, 2016c; Kiriatzi; Knappett, 2016; Garcia; Heitz; Stapfer, 2017b; Le Bras, 2017b; Meller *et al.* 2017; Hamilakis, 2018c; Gori; Pintucci; Revello Lami, 2018b; Driessen, 2018b; McSparron *et al.* 2020; Fernández-Götz *et al.* 2023b; Wallace, 2018; Duwe; Preucel, 2019; Gibson; Cleary; Frieman, 2021; Aldred, 2021; Piezonka; Käppel; Ricci, 2023; Daniels, 2022a *inter alia*).

New sourcing methods coming from biogeochemistry and molecular genetics have also a significant contribution in the indentification of mobility of past individuals and social networks whereby they interact. They have scaled down the levels of analysis in archaeology to levels not expected before (cf. Adams; Van Gerven; Levy, 1978: 488-489), producing a so-called Third Science Revolution (Kristiansen, 2014; 2022a; 2022b) (**Fig. 1.5**). As of now, it is possible to make use of evidence extracted from bones to prove spatial mobility of individuals as well to provide, as in the case of aDNA, the backbone of 'journeys' of modern humans, imagined communities, etc. (Wells, 2002; Pickrell; Reich, 2014; Der Sarkissian *et al.*, 2015; Jones, 2001; 2016; Bojs, 2017; Reich, 2018a; 2018b; Krause; Trappe 2021).

	Archaeology	**Paleogenetics**	**Isotopy**
Data	material culture	aDNA	teeth, bones
Focus	culture group	biological group/ individual person	individual person
Level of integration	group	group/individual person	individual person
Subject	social practice	cognation	nutrition
Migration	no proof/ indirect proof	indirect proof/direct proof	direct proof
Interpretation	contact/migration (indirect)	migration (indertermined)	migration (direct)

Fig. 1.5. Archaeology in relation to genetics and isotopy on inferences concerning migration. Modified from: Burmeister, 2017: 65, tabl. 1.

Archaeometric techniques such as radiogenic and stable isotope are valuable resources to identify past mobility patterns and dietary practices. Strontium isotopes ratios ($^{87}Sr/^{86}Sr$) derive from the presence in similar proportions of a radiogenic and non-radiogenic isotopes in bedrocks and they change accordingly to different geological contexts. These isotopes are commonly found in the soil and water in soluble form and by this way they enter the food

chain. In humans, strontium isotopes are mineralized in hard tissues such as bones and teeth enamel. The formation of these tissues occurs in different phases of the life cycle. The difference between the strontium ratios in each of these tissues and locally bioavailable sources can potentially inform a change of residence of any sample individual (cf. Cavazutti, 2019). The pioneering of this method in archaeology is of a project conceived to estimate mobility on the Bell-Beaker-related individuals form Central Europe (Price, Grupe, Schröter, 1994; 1998; Price *et al.* 2004; see also Vander Linden, 2007).[8]

Before DNA code sequencing/whole genome sequencing, molecular geneticists used to infer past processes of cultural transmission through the data of enzyme coding genes and proteins in present-day populations (Cavalli-Sforza, [1996] 2000). From the late 1990s and mid-2000, mitochondrial DNA (mtDNA) and Y-chromosome analyses started to retrieve information related to major genetic shifts and world migration of our species (Jones, 2001; Wells, 2002; Reich, 2018a; Krause; Trappe, 2021 for accessible reviews). The genome-wide sequencing of human remains, the very material exhumed by archaeologists, is a more recent phenomenon. Paleogenomics or archaeogenomics is the field that studies ancient genomes taken form long-gone individuals, a branch of molecular genetics, which in its interdisciplinary interface with archaeology, was named archaeogenetics (Renfrew, 2000c: 3).

The sequencing of DNA extracted from skeletal remains is a significant development in our knowledge of past relatedness (Der Sarkissan *et al.* 2015; Reich, 2018a; Piscitelli, 2019; Krause; Trappe 2021). Dawkins ([1976] 2016: 27-28; see also Mukherjee, 2016) pictures the DNA as a cabinet full of books standing in every room of a multi-story building. In the shelves of each cabinet, there are 46 books of a collection written with 3 billion nucleotide-letters containing a blueprint of the building itself. The copy and hand on of this plan is not 100 per cent error-free. Manuscript copying could be a tiresome task, and monks do frequently fall asleep after a while. The switching of letters is a common event in nature in the form of a mechanism of variation known as 'descent with modification.' Ancient genomics is about retrieving and sequencing DNA fragments of an organism for asserting biological kinship ties, past events of mixture and population movement through the statistical accumulation of thousands of single-letter positions of one's written 'plan.'

These new techniques of archaeometry and archaeogenetics provide more reliable access to information about migration from an evidence-based perspective compared to

[8] Over the past few years there has been a considerable increase in strontium isotope analyses within the 3rd and 2nd millennium BC Europe (see CHAPTER 2 for references).

'cultures' in an archaeological sense of the word. The high resolution achieved in some cases, depending on both conditions of preservation of organic tissues and methods employed, is particularly impressive.[9] An overemphasis on the significance of new technologies, however, would de-emphasize the stagnation or, for that matter, retreat of migration theory in the 2015 DNA studies (see **Ancient-DNA and Indo-European research**).[10] An equally alternative comparison of breakthrough might be with the synechdocic inferences in the earliest stages of the discipline, when the archaeological record of many world regions was ordered into types in 'unmixed' categories and 'breaks' in chrono-cultural sequences interpreted as whole culture displacements (Adams; Van Gerven; Levy, 1978: 499-500).

However, this change of direction in the weathervane of archaeology with regard to mobility and migration comes earlier and unevenly in many of its subfields to which these scientific advances are somewhat a late comer. The suit of relational approaches taps into a long tradition of regional and transregional models that would range from the idea of maritime networks in 3rd millennium Aegean (Renfrew, 1964; [1972] 2011; Broodbank, 2000), peer polity interaction (PPI),[11] center-periphery dynamics (Rowlands; Larsen; Kristiansen, 1987; Sherratt, 1993; Sherratt; Sherratt, 1991; 1993) and inter contextual interaction (Kristiansen, 2004; Kristiansen; Larsson, 2005; Kristiansen, 2015; 2018) in the context of Wallerstein's world-system theory and, least but not lest, network-inspired versions of globalizing perspectives inspired by Braudelian pan-Mediterranean scope (Braudel, [1949] 2016; [1969] 2011; Horden; Purcell, 2000; Malkin, 2011; Broodbank, 2013) (see below).

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[9] The best examples that come to mind, at individual level individual, is the study of Frei *et al.* (2015) with the organic remains of the body and dress of the Egtved Girl, a sixteen-to-eighteen-years-old female buried three thousand years ago in an oak coffin in today Denmark and, at the group level, Sjögren (*et al.* 2020) with two Bell Beakers cemeteries in Bavaria, Germany.

[10] To Kristiansen (2014: 14-15; 2022a: 32, fig. 2.1; 2022b: 2, fig. 1; cf. id., 1998: 37, fig. 14; 2008: 12, fig. 2; 2021: 17, fig. 2.4), the transformative impact of the Third Science Revolution in social disciplines writ large is akin to the consolidation of the scientific fields of enquiry of archaeology and cultural, biological, and geological evolution in the mid-nineetenth century and the radiocarbon dating in the mid of the next century. The rationale behind this paradigmatic turning-point follows much the same line of the periodically shift of balance between universalistic and particularistic orientations in a binary rendering of the archaeological thought (e.g., Trigger [1989] 2004 *contra* Díaz-Andreu, 2007: 368-369). The model is proposed in a self-legitimizing fashion (cf. Kohl, 2008: 32; González-Ruibal, 2014: 44), and many have not failed to note that this conceptualization the theoretical history of archaeology is biased toward Western European archaeology (Meier, 2008: 34; Novaković, 2008: 42), and that it even distorts the full complexity of the scholarly work of archaeologists as Childe (Pearce, 2008: 52; cf. Sherratt, 1989: 162).

[11] Renfrew; Cherry, 1986 and papers therein, e.g., Renfrew's (1986a; see also Renfrew; Bahn, [1991] 2020: 381-382; 384) model for the emergence of Greek ethnicity *in* the Aegean of the 1st millennium BC or later. See also Renfrew (1999b), for a context in much of Gimbutas's Balkan Old Europe, between 5000 BC to 3000 BC, envisioned to support his claim of a linguistic continuum of Indo-European languages after the splitting off of the Anatolian branch. The PPI sees in the network cemented between autonomous polities (peers), circuits of material and information exchange a system that give raise to structural homologies of language, systems of belief, and political organization in a regional level.

But usefulf as they may be, the adoption of relational ideas and integrative frameworks of ranges of interaction does not always come translated into sharply defined – or basically limited as it may be – concepts and archaeological correlates. Below, the reader will find definitions for important concept used in this work such as interaction, connectivity, movement, mobility, trade, diffusion, and migration.

To start with, interaction. **Interaction** is the process set in motion by the 'encounter' and exchange of energies between entities or *interactors* (Schiffer, 1999: 13). Among individuals, it is largely a function of congruence in space and/or organization of social space that ranged from society to society. Whereas interaction of some sort is a pre-requisite of transmission or transfer of knowledge exchange, the inverse is not true since the latter requires above all cultural choice of adoption. **Connectivity** is the general description of a tissue of 'connectors' linking entities together. As for movement and mobility, a good starting point is the dictionary as to dispel confusion. *The Oxford Dictionary* has "movement" as "the act or process of moving" and mobility as "the quality or state of being mobile or movable."[12] Along slightly different lines, henceforth the state is taken for cutting the process into sharply defined chunks.[13] **Movement** is thus an abstract and positivist short-cut of a process where entities are framed as temporally mobile and change location from A to B, i.e., motility.

Mobility can be defined in archaeology as a *multi-scalar social process* actively involved in identity formation and change, *(the movement of) people and things getting from point A to B*, which can be assessed at different levels and through countless scientific methods with variable degrees of validity of the empirical 'proofs.' Mobility is a catch-all term for a multidimensional phenomenon that must be telescoped upon a wide-reaching vision. It is a immanent totality of humanity that should never be reduced into specific scales and size of groups within each of its modalities that must be bracket in its range, migratory or not. Mobility has been a long topic of interest in contemporary migration and mobility studies in sociology and human geography (de Haas; Castles; Miller, [1993] 2020; Brettell; Hollefield, [2000] 2023b; Manning, [2004] 2020; Le Bras, 2017; Sheller; Urry, 2006; Cresswell, 2010; Cresswell, 2010, 2011; 2012) and in the last decades there is an increasing contribution of material approaches in migrations and mobilities of the pre- and proto-historic (Driessen, 2018b), early

[12] See Cresswell, 2006: 20 for meanings in natural and social sciences and popular thought since the 17th century AD.

[13] *Contra* Aldred, 2021: 39, author's italics: "[...] movement is concerned with the active present tense, i.e. […] the *materialized* form of movement […] mobility […] with movement's potential, or future tense, […] i.e. the ability to move or to be moved as the *materializing* form of movement […]".

modern (McSparron *et al.* 2020) and migrations of the recent past (Beaudry; Parno, 2013b; De Léon, 2012; 2013; 2015; Baker; Tsuda, 2015a; 2015b; Tsuda *et al.* 2015; Hamilakis, 2018c).

The material signature of movement surely is a chief interest of archaeological research. Movement is not an exclusive thing assigned to human beings. Material culture can move, but not caused by its own properties, even if it has the power to move people around "[…] [out of] a desire for material culture" (Gosden 2004b: 153). Indeed, this is a two-way street in which material culture depends on human actions to be moved around through daily activities, systems of trade, or migrations. Likewise, humans depend on material culture to perform any of these activities (see **Hybrid collectives**). Humans do not travel freely in time and space as this relationship is mutually constitutive and engender humanity, rendering the shape of networks of people and things a socio-political field of physical possibilities and constraints, desires, preferences and unevenly distributed resources.

The set of perspectives inspired by phenomenology of Bergson ([1896] 2011), Merleau-Ponty ([1945] 2011) and Heidegger as well as practice theory by Bourdieu ([1972] 2000) in anthropology (Ingold, 1993; 2007; 2011) and archaeology (Tilley, 1994; Gosden, 1994; Thomas, 1996; [2001] 2012) goes down that road in exploring the dwelt-in and relational space between the cumulative effects of movement of humans performing daily tasks around the landscape and of the landscape in forming humans temporally and spatially. The "dwelling perspective" (Ingold, 1993; 2000) anchored in the situated action and thought lies in stark contrast with a Euclidean conception of space filled up of places and mobility results as a direct response of socio-economic organizations to resource distribution in space.[14] Philosopher E. Casey (1996: 24; see also Ingold, 2011: 145-155) questions the precedence of space over place as indeed the inverse relation is true in people's fabric of place-making traditions. This is a crucial difference of metaphysical conception and visual props matching the change of focus from region and settlement archaeology to the monument biography (Knappett, 2011a: 25; Molloy, 2016a: 6), from subsistence identities (e.g., sedentary or non-sedentary groups) to the scale of bodies encountering landscapes on-the-move. Yet collectively they may still constitute communicable approaches under a "spatial archaeology" heading (Ashmore, 2002: 1173 *contra* Ingold, 2011: 145-155).

In general terms, human displacements involve parameters coextensive with spatial distance and the "means of locomotion" (Ravenstein 1889: 288) or means of transport available

[14] E.g., "[…] mobility is a 'positioning' strategy […]" (Binford, [1980] 1983: 349; also id., [1982] 1983b; cf. Gosden, 1999: 96; Aldred, 2021: 16-21.

for – accessed by – a given time or social group (Leary, 2014b: 11-13; Iacono, 2019: 26-28). For instance, domesticated equine species such as donkeys, camels and horses, transport by horseback or animal traction such as carts and carriages, and vessels – small canoes, long rowing and sailing vessels (cf., on seafaring within the Cyclades and maritime technologies in the Mediterranean history, Broodbank, 2000: 101-106; 345-347; 2013: 596-597; 2016: 24-28). They all together constitute means of connectivity across land and water that exceeds the multi-dimensional scale velocity × range × time the human body is capable on the endurance of its own feet. Since real space is not a homogeneous mass, physical variables also influence the calibration of any of these absolute measurements. Space is also a social construct of alliances within which groups articulate and interact, *move*. *To be in relations with* far-flung locations and people or the knowledge of traveling also brings power prestige and determines one's social *position* in the home region (Helms, 1988; cf. Renfrew, 1993: 9-10; Broodbank, 2000: 94; 290; Kristiansen, Larsson, 2005: 39-41; Iacono, 2019: 22). Technologies of movement are thus entwined to social strategies of power, *to whom* it is available or not to move long-distance (Woolf, 2016) in the context of social relations that make them possible be produced and reproduced in the first place.

Finally, the recto and verso sides of mobility, that is the reasons which weight the scales in the decision-making process of migration, defined in top-down functionalist and historical-structural approaches in migration studies as 'push-pull' factors (de Haas; Castles; Miller, [1993] 2020: 45-46; reflect on Anthony's (1990) discussion of migration). These factors play their part in individual's calculation of mobility costs thereof, including the short-range day-by-day comings and goings in neighbours, the randomly "Brownian motion" (Horden; Purcell, 2000; 2019; cf. Broodbank, 2013) of individuals on foot or on means of locomotion inside a catchment area or local system of interaction in networks of Proximal Point Analysis (PPA) (Broodbank, 2000).[15] This is a theoretical assumption not averse to materialist (biological and economical) principles and predictions of optimization models (cost-benefit considerations taking into account), even though one's control of movement is not free of many sorts of structural constraints (Cameron, 1995b: 111-113; 2013: 219; Tsuda, *et al.* 2015: 17-19). And beyond the self-interest couched in such rational terms, we can attempt to redress the balance of sensory experience of the ingrained movement to include the routinized "micro-movements" of skilled individuals in daily routines both embodied *in* and performed *by* the human body –

[15] PPA networks show the connections of each context of a node with others according to parameters of spatial proximity (Brughmans; Peeples, 2023: 250-251).

i.e., the body as a *factum* of "[…] *montages physio-psycho-sociologiques de séries d'actes*" (Mauss, 1936: 21; cf. Lemonnier, 1992: 26) fasten together by the "habitus" (cf. Bourdieu, [1972] 2000; cf. Leary, 2014a: 3; 8), the social memory *incorporated* as affective behavior of remembrance of habit-memories (Connerton, 1989: 72-104).

The way "how societies remember" (Connerton, 1989) speak against any approach singly concerned with the body as a single repository of knowledge. By the reverse path of tangible vestiges, archaeologists are constrained to access the actual performance of past bodies. This sort of absent presence of material recollection then takes on non-representational substance of body and memory. As exteriorized forms of movement knowledge broadly speaking, however, things can be translated into and hence shape subsequent performances – e.g., material things acting as Connerton's (1989: 73) *inscribing* practices of external devices, sort of memory 'chips' because the gesture of the tool activate bodily remembrance (Olsen, 2010: 121-124). To the last aspect notions as "coreography" (Pearson; Shanks, 2001) and sensorial or "kinaesthetic experience" (Hamilakis, 2018b: 7; cf. De Léon, 2012; 2013; 2015) enhance our understanding of what is to be like to be on-the-move within and across inhabited landscapes, production process (postures, gestures and movement of craftsmanship), or the global stage of contemporary forced migration. The movement that interdigitates scales and make bodies, things, space, time and l andscapes closely knitted (Aldred, 2014; 2021).

Fig. 1.6. From left to right: music studio at the ghost city of Pyramiden (photograph © B. Olsen) and light study – bedroom, Krastra, Elbasan, Central Albania (photograph © F. Bachmeier). In: Andreassen; Bjerck; Olsen, 2010: 172; Pistrick; Bachmeier, 2018: 103, fig. 7.1.

Memory is intertwined with movement in and out places and the activities that distributed across elements of the environment. Memory is embedded within shared spaces of co-presence and activity, movement along "taskscapes" (Ingold, 1993; 2000: 142). In the absence of bodies, archaeological traces recall contexts of emergence and incorporation of agency. Neurons, body and material are intertwined in the warp and weft of action inasmuch as memory is not constituted in 'inner' dimensions of life. Migration involves the material memory of what remains for those who were left behind by those who have gone (Pistrick; Bachmeier, 2018) and never returned since (**Fig. 1.6**). The leftover along the journey is also the silent material testimony and sort of thingly

'heritage' of flows of bodies in the current biopolitics of mobility (De Léon, 2012; 2013; 2015; Hamilakis, 2016; 2018c; 2021; 2023; Real Archaeology, 2017).

To wrap up the interactionist approach advocated here, even though mobility is not exclusive to any theoretical paradigms, its downsizing in scale into specific forms surely is. "Migration writ large we can frequently do without, but the movement of people about the historical landscape is always with us" (Ehret, 1988: 573). Despite having been always central to archaeological interpretations, it seems that mobility and migration has not been up to now fully developed as a topic of scientific research *per se* (Adams; van Gerven; Levy, 1978: 523; Lightfoot, 2008a: 1; Beaudry; Parno, 2013b: 5; Leary, 2014a: 4; Burmeister, 2016: 42; 2017: 57; 2019a: 229; Aldred, 2021: 1). In view of this shortcoming, I shall propose an unified approach towards mobility that accounts for the variability of a many-sided phenomenon – even though this comprehensive typology of mobilities would not provide von Däniken with a yardstick for his "[…] ultimate case of migrationism, […] extraterrestrial invaders […]" (Champion, 1990: 216).

The balance between endogenous and exogenous causes of cultural change has been a perennial tension of the archaeological thought. Mobility and interaction are intrinsically related to archaeologist's "methodological trilemma" (Burmeister, 2000: 540): is that **trade, migration, or diffusion** that should be read in the archaeological record? The way these phenomena have been differently schematized and the alternative hypotheses archaeologists in general choose to go on and explain stability and change is revelatory of the ambiguity and arbitrarity involved. *Invasion, diffusion, evolution* (Adams, 1968) or *convergence, influence, or descendance* (Gardin, 1979: 160-167), for instance. What is the borderline between invasion and diffusion (or influence) if we take into account, for instance, that the dissemination of cultural marks of any sort can be exerted by people in contexts of commerce or mobility broadly speaking in a range of of modality of processes (some of which that would even exclude the commonsensical definition of an 'invasion'). Besides, it should be noted that diffusion can even mean spatial displacement of small populational sectors, so there is a good reason to see human movement of different kinds – and not only migratory – also on this, after all institutions or technological ways-of-doing things do not travel alone. To complicate matters even further, sometimes convergence and influence (but not commerce) come together to characterize mechanisms in which groups maintain type and style over time or horizontal diffusion of these elements and across other cultural segments of society (e.g., Bruneau; Balut, 1997: 142).

Putting it differently, any of these processes point at some form of mobility and interaction, scales and modes thereof. The Anglo-American generation of processualists of the

1960-70s quickly sought to investigate the social processes underlying material culture distributions in space and time in a cybernetic conception of society as a tightly knotted network system of information (Binford, 1962; 1965; Flannery, [1967] 1973; 1968; 1972; Clarke, 1968; 1973; Renfrew, 1969a; [1972] 2011; 1975 among others). This approach can be taken here as a theoretical point of departure to bring into sharp focus our trilemma mainly because of two main reasons. Firstly, the shift of emphasis toward the study of functionally integrated systems instead of the 'collection' of elements of social organization alongside others cultural attributes (Trigger, 1968: 14-15; 92; 1978: 115). Secondly, the dynamic interplay in cultural change process brought about by the redistribution of variability within systems in general. Under this perspective, artifacts are thought in multiple webs of interactions, exchange of matter, energy, and information with the environment. That is, social archaeology fully fledged, anticipated well in advance by the holistic and systemic approaches provided both by functionalism though and Marxist theory in the work of G. Childe ([1935] 2004a; 1936; cf. Green, 1981; Trigger, [1989] 1996: 344-353; McNairn, 1980; Sherratt, 1989; 1994c: 122; Patterson; Orser, 2004a; Hirata, 2021 *inter alia*). As we shall see further ahead, however, when it comes to migration, ideological constraints endowed it with an anti-systemic explanatory role and delayed a full appreciation of migration as mobility forethought by Trigger (1968: 39-46) and Clarke's (1968: 411-413). That is, processualists in general failed to recognize that "[…] l*'interprétation n'est* […] *qu'une paraphrase* […] *et presque toujours* une parmi d'autres […]" (Gardin, 1979: 161, author's italics; cf. Schiffer, 1976: 2; cf. Courbin, 1982: 116-117).

To begin with, **trade**, or exchange if we were to put together the embeddedness of reciprocal obligations in the form of gift exchange in premodern societies (Mauss, [1925] 2003b), involves contact, direct or mediated through a chain of trading parties in view of bilateral transfer of goods and/or services. A focus placed on physical things that last coupled with the logics of interchange and value creation between human vectors is a good way to discern it from diffusion (see bellow). Through interpersonal channels, one thing may be given or traded for another, for instance, goods or bulk staples, through different scales and ranges, circuits of value, modalities and consequential types of spatial distribution (Renfrew, 1975; 1993d; Gallay, 1986: 183-188; Roux, 2016: 332-338).

Exchange is not an imperative of the allocation of scarce resources across space, of *A* trading *a'* with *B* due to the lack of *b'*. Meanings and tastes within system of symbols of prestige and consumption are *motivators* to 'push away' people towards the sphere of broader physical networks. The weight of the social relation involved is also important. Sahlins's (1972: 199,

fig. 5; see also Nakassis *et al.* 2016) modes of reciprocities co-vary with the spatial range of human interaction and the terms of exchange carried out within each sphere. It can be usefully understood through commercial (economic) and noncommercial circuits of exchange and movement, depending on the situation of relations (social, political and religious), and nature of the items exchanged (Testart, 2001; Gallay, 2013; see Fig. 3.6). Exchange links mean, therefore, a give-and-take, or for that matter, taking without giving bringing about prejudice for one of the partners, movement and a locus for the conceptual operation of notions of exchangeability and value judgment. Gosden (2004a: 39, tab. 3.1; 2004b: 33-40) anchored his notion of colonialism in expansive networks of people and things creating new conceptual fields of value, power and display of things as objects.

For earlier time periods of human history, the relative importance of market concerns for resource allocation and distribution has been widely debated. In view of the fact supply and demand mechanisms can be conceptualized as different "'registers' of consumption" (Appadurai, 1986a: 38) created by the same cultural logic of exchangeability, there is not necessity to force an opposition.

Exceptional examples of commercial relations in ancient economies belong to 2nd millennium BC Mediterranean. The language of royal gift exchange of the Amarna Letters (Cline, 2014: 51-60) and Cape Gelidonya and Uluburun shipwrecks (Monroe, 2009: 11-12 for the cargo inventory) are fortuitous archaeological grasps of the heterogeneous cargo of finished and raw materials. Exchange networks of raw material and manufacture products were common throughout precolonial Amazonia (e.g., Shipibo-Conibo ceramic industry: DeBoer; Latrap, 1979; Belaunde, 2019: 11; see also Lathrap, 1973; Roosevelt, 1991: 120-121; Hornborg, 2005: 594-595; cf. Rostain, 2016: 181: "[…] *certains reseaux pouvaient s'étendre sur près de 20000 kilomètres*"). Chroniclers of the sixteenth and seventeenth centuries amply attested far-reaching inter-community commercial routes and specialized production system among Amazonian indigenous groups (Porro, 1992; 1995: chs. 5-6). Among the scarce archaeological evidence recovered in the moist tropical environment, there were green stone amulets (*muiraquitãs*) (Boomert, 1987) and shell beads (*quiripá*), the last also an exchange currency (Gassón, 2000) linking areas of Andes, Orinoco *llanos*, Caribe and lower Amazon.

Following the path of this information exchange communication, there is **diffusion**. It is a form of intercommunication not necessarily external to sociocultural systems as it characterizes information circuits involved in the transmission from individual to individual of transferable technologies, techniques, cultural traits or prototypes for local emulation. In recent literature in archaeology and anthropology, the understanding of *how* rather than *what*

questions rose to dominance as object of inquiry in contexts of learning and practice (Stark; Bowser; Horne, 2008a; 2008b; Wendrich, 2012a; 2012b; Roddick; Stahl, 2016a; 2016b).

For the sake of conceptual simplicity, it would be appropriate to distinguish diffusion and adoption from independent invention or innovation (after Renfrew, 1978), although systematic attempts to mark these differences happen to be difficult (see Deetz, 1967: 93-101; Trigger, 1968: 27-39 on this point). It may be also useful to differentiate diffusion to its particular forms. Examples are many and include "idea-diffusion" or "stimulus diffusion" of particular elements of a larger package (Kroeber, 1940). Protracted diffusion – i.e., transmission not involving necessarily face-to-face contact (things *traveling* through space and across time by the agency of natural or post-depositional forces, events of lost and found, *archaism* of styles (Willey *et al.* 1956: 24). Also, the movement of artifacts through production, consumption and re-use during its use-life history within systemic contexts (Schiffer, 1972: 158-159; 1976: 28-40) and the 'life' of things, its ongoing presence and meaningful constituency (Kopytoff, 1986; Holtorf, 1998; 2002; Shanks, 1998; Gosden; Marshall, 1999; Olivier, 2008; Hahn; Weis, 2013b; cf. Leary, 2014a: 6-7; Aldred, 2021: 6-12; cf. Olsen, 2003: 101, n. 4; Dománska, 2006 for a critique on constructivism of many of these views). Finally, one should include the borrowing of easily recognizable and reproducible elements of *chaînes opératoires* (see e.g., Gosselain, 2000; Roux, 2015).

Upon closer inspection, although there is a heuristic value in differentiate diffusion in different types, it boils down to a sort of mechanisms of interaction and modalities of transmission underlying trait areal distribution of varius sorts. This is precisely the case of many of the iconological approach known as "ceramic sociology" popular in the 1960s and 70s among North Americanists (Sackett, 1982: 80-94; Hegmon, 1992: 526; 1998: 266). In it, design elements of pottery are taken as a proxy to infer alternative models of interaction and social organization behind the distributional phenomena of material similarity, e.g., movement of partners upon marriage in kinship residential patterns (cf. Schiffer, 1976; Plog, 1980; Trigger, [1989] 1996 on the assumption of the sex of potters), travelling professional potters or diverse possibilities of inter-village exchange mechanisms (see e.g., Gallay, 1986: 183-188; 2013; Roux, 2016: 332-338).

Systems theory combines many of these insights in a structuralist-type conception of the working cycle of machines, living organisms and socio-political organizations. In processual archaeology, culture was framed as a network of exchange of matter and energy in the dynamics of human ecosystems and the habitual interactions among the individuals and between individuals plus environment over time. The evolutionary concern of the school

strapped the tenets of complex systems to explanations of political complexity and rise of hierarchy (aka civilization) and collapse through self-regulating mechanisms counteracting negative inputs (a bad harvest, a bad season and so on) or amplifying positive ones in a feedback loop (Flannery, 1968; 1972; Renfrew, 1969; [1972] 2011; 1975; 1979; cf. Trigger, [1989] 1996; Kohler, 2012). The recent fueling of interest in network and complexity approaches, however, highlightes the analytical gain and wide applicability of the perception of the cultural dynamics as inter-related component parts instead of the sum of its parts (Barabási, 2002; Kohler, 2012: 93; Malkin, 2011; Knappett, 2013a: 7; Brughmans; Peeples, 2023: 19-20; Brughmans; Mills; Peeples, 2024).

Finally, to end with, the most contentious form of mobility, *the inference of migrations from anthropological evidence* (Rouse, 1958), where New Archaeology is most faulty. Here, as far as pots and stones are concerned there will be always ambiguity surrounding migrationist claims (Rouse, 1958: 67; Trigger, 1968: 29-31; 39-46; Anthony, 1990: 897; 2021: 56; Chapman, 1997: 13; Burmeister, 2000: 553; 2016: 43; 2017: 58; Clark, 2001: 2). By and large, there is a general agreement among archaeologists that the phenomenon of migration could apply to two kinds of clear-cut 'breaks' in the material record: 1) initial colonization ("the first settlers" as migration across the Bering Strait or of remote islands) of a previously uninhabited area or for long uninhabited; 2) settled territories experiencing U-turn changes in subsistence strategies, technological inventories (e.g. pottery), burial customs or physical types of the human remains and settlements patterns (Childe, 1950a: 8-9; Willey *et al.* 1956: 7; Haury, 1958: 1; Rouse, 1958: 63; Deetz, 1967: 98; Trigger, 1968: 29; Neustupný, 1982: 279; 1988: 457; Adams; van Gerven; Levy, 1978: 487; Anthony, 1990; Clark, 2001: 6; cf. Cameron, 1995b: 106; Cabana, 2011: 16; Roberts; Vander Linden, 2011: 5-6; Demoule, 2014: 429-430; Baker, Tsuda, 2015a: 3; Tsuda; Baker, 2015: 305-306; 308; 316-317; Garcia, D.; Le Bras, 2017a: 16-17; McSparron *et al.* 2020: 219-220). In the latter case, migration is oftenly conceived as the arrival of a new of population as in "the coming of the People" paradigm as in the Indo-Europeanist research (Demoule, 2014: ch. 15; see CHAPTER 2).

Migration is defined here, according to one of its most basic definirion as the physical journey undertaken by individuals, segments of society, or, more rarely, entire populations across a great range of distances or familiar space resulting in change of residence, planed beforehand or not. As a sub-category of human mobility, it involves "[…] *a one-way residential relocation to a different 'environment' by at least one individual*" (Cabana; Clark, 2011a: 5, authors' italics; cf. Prien, 2005: 9; Manning, 2006: 27-28; [2004] 2020: 6; Tsuda *et al.* 2015: 19; Burmeister, 2017: 58; Garcia, D.; Le Bras, 2017a: 9-10; Furholt, 2018a: 306;

Knapp, 2021: 6; cf. de Haas; Castles; Miller, [1993] 2020: 23; Fernández-Götz *et al.* 2023a: 3-4).

As archaeologists got back on track of migration studies in the last two decades next side to other social science disciplines, 'off track' ideas of early migrationism seem hopefully to have moved past archaeological research landscape (Cameron, 2013; Ligthfoot, 2008a; Yasur-Landau, 2010; Cabana; Clark, 2011b; van Dommelen, 2012; 2014; Baker; Tsuda, 2015; Garcia; Le Bras, 2017b; Meller *et al.* 2017; Hamilakis, 2018c; Driessen, 2018b; McSparron *et al.* 2020; Daniels, 2022a; Demoule, 2022; Fernández-Götz *et al.* 2023b but compare Prien, 2005; Dzięgielewski; Przybyła; Gawlik, 2010a; 2010b for discussions rooted in culture-historical approaches of the Central European academia). As of today, it is possible to frame the complexity of human migration and exchange activities in different modality processes of mobility (Cameron, 2013: 219; Burmeister, 2017: 58). Yet, what kinds of material similarities archaeologists should rely on for identifying migrations in the material record remain unclear, as scholar continue to offer *ad hoc* explanations for perceived breaks instead that the mechanisms of social production and reproduction of material culture and the cultural memory it embodies. While interregional exchange network entails some form of mobility of peoples, things and ideas, explicit methodologies to identify types of mobility and, eventually migration, still needs theorizing (Lightfoot, 2008a: 1). If the shift away from migration as *explanandum* rather than *explanans* or 'reasons' of sociocultural change has done much to the treatment of the phenomenon produced and reproduced on the back of interconnected structure of relations, much of systemic large-scale perspectives in archaeology also lead to an essentialization of the phenomenon, as we shall explore.

Origins and migrations

The source or the geographical place of origin and the movement between locations is essential to the conception of the routes and channels of information exchange. This theoretical line of connection between places constitutes a basic signifier used in traditional migration research and transport geography's accounts. Archaeologists have long been ingeniously displaying these connections between areas and cultures, pigeonholed in assumptions of temporal and spatial relations.

In the early 20th century, East-to-West links hinged, regional chronologies in intercontinental frameworks as the directional Mycenae-Wessex influences or the hyper-diffusionism of megalithic architecture in western Europe in Perry and Grafton Elliot Smith's

"Children of the Sun" prospectors from Summery and Egypt. Such conclusions could have been arrived at even in the base of horizon styles of pottery, art motifs, but also general categories of burial rites. West-to-East connections were also enabled by the idea of detached cultural traits diffusing from the Andean *altiplanos* into the Amazon basin (Meggers; Evans, 1958; 1961) or trans-Pacific migrations through the *muiraquitãs* (e.g., Barbosa Rodrigues' posited Asiatic migratory influx, cf. Ferreira, 2010: ch. 1) or the Ecuadorian Valdivia pottery (Willey; Sabloff, [1974] 1980: 172-173). It is not far fledged to imagine, by this logic, future archaeologists of a hypothetical year of 4012 d.C. taking as token of migrationism stray findings of "Levi Strauss" buttons (**Fig. 1.7**).

Fig. 1.7. "Levi Strauss" buttons distribution map. In: Flutsch, 2002: 98.

Since the late 19th century and the rise of modern nation-states, different frames of meaning interacted with the conceptual toolkit of social scientists to translate ethnic and national ideas into the concrete sovereignty of territory and genealogies of common descent and destiny (Anderson, [1983] 2008). In archaeology, inventories of artifactual association, chronologies, and frequency seriation provided the analytical categories to naturalize constructs of reality in nationalist, colonialist, and imperialist hegemonies (Trigger, [1989] 1996; [1984] 2003; Shennan, 1989a; 1991; Jones, 1997; Moro-Abadía, 2006; Diáz-Andreu, 2007; Noelli; Ferreira, 2007; Ferreira, 2010; Gonzáles-Ruibal, 2010).[16] The lumping together of things in classes as to isolate space-time segments coeval with single occupations meaningful in terms of "phases" or "cultures" was a fairly widespread method of the Classificatory-Historical period or culture-history approach over the first half of the twentieth century in Europe and the US (Childe, 1925; 1926; 1950a; Willey *et al.* 1956; Willey; Phillips, 1958; Rouse, 1955; 1958; Gifford, 1960; Deetz, 1967; Trigger, 1968; Willey; Sabloff, [1974] 1980: 34-180). The main tenet of "pots equal people" paradigm is the one-to-one

[16] Cf. also national case studies in Germany (Veit, 1989), Greece (Clogg, [1992] 2017; Hamilakis, 2007; Greenberg; Hamilakis, 2022), France and England (Vander Linden; Roberts, 2011), Middle East (Silberman, 1989) United States (Willey; Sabloff, [1974] 1980; Trigger, [1980] 2003; 1986; Patterson, 1995; Lyman; O'Brien; Dunnell, 1997a; 1997b; McGuire, 1992).

correspondence between material vestiges and past identities, in many cases associated with historical ethnicities, "tribes," languages or physical types.

The mapping of artifacts in geographical and chronological coordinates provided for a long time the material footprints for the movement of people in chronicles of folk migration of people without written records. The following quotation, Childe's (1958: 70) self-assessment of one his late 1920s works neatly encapsulates it:

> […] *The Dawn* aimed at distilling from archaeological remains a preliterate substitute for the conventional politico-military history, with cultures instead of statesmen as actors, and migration in place of battles.

And even later Marxist Childe (1950a: 2) still thought to be able to derive a seemingly neuter taxonomic unit from the fossilized remains of sanctioned cultural behavior as

> […] an assemblage of artifacts that recur repeatedly associated together in dwellings of the same kind and with burials by the same rite. The arbitrary peculiarities of implements, weapons, ornaments, houses, burial rites and ritual objects are assumed to be the concrete expressions of the common social traditions that bind together a people.[17]

It goes without saying that underwriting this construct inevitable lie assumptions about unity and common linguistic and social identity which were very strong in his earlier writings (Trigger, 1968: 20; 1978: 116; cf. McNairn, 1980: 46-73). Aware of the trouble of direct correspondence between archaeological and societal units (Willey; Phillips, 1958: 48-49) and the arbitrariness of descriptive analysis, or ideational (Dunnell, [1971] 2007: 159-166) character they wanted to equip units it with, many archaeologists opted after the WW2 to move down the scales of spatial units to the site-level. By so doing, they expected to better detect the network of social relations of a single *people* during a *single* episode of settlement.[18]

[17] A definition adopted by many American archaeologists of the period (Phillips and Willey, 1953: 617; Willey; Phillips, 1958: 14; Rouse, 1955: 713).

[18] In the first category, there are "complex" and "stye" (Howard, 1947: 14-15), "site-unit" (Willey *et al.* 1956: 7-8), "*fase*" (Chmyz, [1966] 1976; Meggers; Evans, 1970: 87-94; Simões, 1972), "component" (Rouse, 1955: 713-714; Willey; Phillips, 1958), "community" (Trigger, 1968: 20-23), and "occupation" (Dunnel, [1971] 2007: 195). By building bottom-up the time-spatial coordinates, broader typological constructs appear. There are "division" (Howard, 1947: 17), "phase" (*foci* in the Midwestern Taxonomic System) (Rouse, 1955: 713-714; Willey; Phillips, 1958; Willey; Sabloff, [1974] 1980: 106-107), "culture" (Trigger, 1968: 20-23), "horizon" or "horizon style" (Meggers; Evans, 1961) and, finally, "tradition" (Willey; Phillips, 1958; Rouse, 1955: 718-720; Willey: Sabloff, [1974] 1980: 173-175; Chmyz, [1966] 1976; Simões, 1972; cf., Schaan, 2007; Dias, 2007; 2024 for hermeneutical critiques). Occasionally, in Italian archaeology, "culture" and "facies" have been re-casting in debates on the correspondence between taxonomic unities and group identities (for recent perspectives, see Danckers; Cavazutti; Cattani, 2019).

Since the 1950s, American culture historians began to clear the path for a more explicit understanding of the conceptual repertoire and the inference process involved in types of migration and diffusion in "contact situations" (Willey *et al.* 1956; see papers in Thompson, 1958; also Rouse, 1986: 3-13; cf. Trigger, 1968: 39-46; Willey; Sabloff, [1974] 1980: 144-145; Anthony, 1990: 896). Basically, works in this vein emphasized the definition of self-contained cultural units (source area), chronological control (simultaneity), and local cultural sequences (antecedents of tradition) as to typify the form of contact of "Culture A" (resident) with "Culture B" (intruder), e.g., *site-unit* intrusion (by migration) or *trait-unit* intrusion (diffusion) (cf. Willey *et al.* 1956: 9-24). These early forays, however, had fallen short due to a strong normative overtone in the conception of culture as an epiphenomenon of norms amenable to be tracked and plotted in temporal and spatial coordinates. This is made clear in narrow-focused definitions of terms such as "population movement," which in opposition to immigration, is likened to a wave of water, an "[…] overwhelming [presence of a people/culture by means of invasion] that is able to replace or to assimilate the local population" (Rouse, 1986: 12; 176-177; cf. Anthony, 1990: 897; see also id., 2022).

While this circular reasoning of pinpointing cultures and tracking down culture change from these very same cultural units is one of the main reasons for the wholesale rejection of folk migration as an explanatory mechanism among new archaeologists, there was much of an intellectual legacy handed down from the older generation to the next one. The basic system of typological classification and 'basic blocks' of large-sacle archaeological constructs (Dunnell, [1971] 2007: 24; cf; Roberts; Vander Linden, 2011: 4) and publications (Courbin, 1982: 163) remain lasting legacies of the New Archaeology. As a matter of fact, the new generation of iconoclasts of the "[…] *nouvelle religion* […]" (Courbin, 1982: 109) never ceased to deal with, even in its own way and according to its own ideological agendas, trouble issues of cultural *ethnos*, migration and pattern and process of mobility in general. Be as it may, the severe criticism of many Anglo-American archaeologists had some truth on it.

Then, as it is well known, archaeology-as-anthropology moved into the era of the "retreat of migrationism" (Adams; Van Gerven; Levy, 1978), a long standstill over the 1980s and 1990s. This general tendency brought within the paradigm a series of contradictions too, particularly of searching for internal variables and emergent properties leading to change generated by systems over external causes as invasions or migrations. Besides, the association of migration to reductionist conceptions of culture (Kristiansen, 1989: 211) and the refusal to test the very process that migration entails (Chapman; Hamerow, 1997a: 3; Anthony, 1997: 21)

also contributed to push mobility to an either/or position. These things only started to become appreciated in theoretical thinking after a considerable delay (Kristiansen, 1989; Anthony, 1990; Champion, 1990; Cameron, 1995a; Chapman; Hamerow, 1997b; Burmeister, 2000).

Thus, we cannot proceed further in this debate without discussing the concept of archaeological culture, the "ground zero" of waves of influences or migrations, raw materials or goods, "[…] probably the most important single concept in prehistory" (Clarke, 1968: 231; cf. also Roberts and Vander Linden, 2011: 2). It is both the own 'raw material' from which archaeologists produce their explanatory models and the box inside which they learn to explain formal variability.

Culture, ethnicity and style

Over the past 30 years, practitioners in the field have been continuingly problematizing the relationship of the concept culture, identities and social boundaries (Hodder, 1982a; Shennan, 1989a; 1991; Carr; Nietzel, 1995; Jones, 1997; Stark, 1998b; Gosselain, 2000; Stark; Bowser; Horne, 2008b; Roberts; Vander Linden, 2011a; Wendrich, 2012b; 2016b; Ulf, 2014).

But it is not as if Anglo-American archaeology has just opened up this discussion. Underlying the criticism against the 'normative school' in the 1960s is the classification of formal variability in cultural assemblages and the tautological explanation for change in terms of population displacement (Binford, 1962; 1965). As an answer to this, a framework that views systems in general as bounded wholes was consolidated in the definition of culture as an adaptive mediation of a dynamic ecological system of activities geared to cope with the environment. The intellectual climate of processualism can be framed largely by the digital revolution of informatics, data processing and the space travel, the tropes of the digital computer and the moonwalk (Willey; Sabloff [1974] 1980: 185-191; Courbin, 1982: 36).

In archaeology, whereas organic metaphors were largely employed by culture historians, cybernetics is symptomatic of the philosophical view of the processual school. By unveiling inner mechanisms cut out from the wide web of relations many partisans of this approach, however, aggravated the tendency to restrict the analysis to self-governing dynamics in interaction with environmental determinants. Significant in this regard is the fact that White's definition of culture as man's extra somatic means of survival, as sort of exoeskeleton

of human adaptation, was fully adopted both by his pupils Meggers and Binford in the United States and Clarke in England.[19]

To Preucel (2006: 93-95), the leitmotiv of structuralist conceptions can be summarized as a way of understanding a variegate sort of things from living organisms and sociocultural organization as a composite of entities in co-relation in a bounded structure. Although a "structural archaeology" as we know came only later, structuralism in its general form is responsible for the emergence of processual archaeology. It drew on theories developed in systems theory or cybernetics, game theory, set theory, information theory, ecological and evolutionary theory, and so on. As philosopher L. Patrik (1985; cf. also Olivier, 2008: ch. 3) has shown, one way to note a sustained conception of the archaeological record as an undistorted mirror image either of objective mechanisms of social organization or codes and rules of a grammar (e.g., Leroi-Gourhan's "*archives du sol*," Hodder's (1986) *Reading the Past*).

The Binfords ([1966] 1983; Binford, [1973] 1983; [1982] 1983; [1983] 1992: 101-117) interpretation of the multivariate analysis of assemblage variability of the French Middle Paleolithic Mousterian lithic assemblage in terms of performative functions rather than in ethnic parlance express clearly this mood. However, he could not sweep ethnic and migrations issues under the carpet for too long. The new archaeologist posited a stylistic-free zone in all of his three-level functional categorization of artifacts, *technomic*, *socio-technic* and *ideo-technic* (Binford, 1962: 219-220; *contra* Sackett, 1982: 95-99; Hodder, 1982c: 6; Trigger, [1989] 1996: 396; Jones, 1997: 110-111). These classes recur in patterns within cultures defined by style (*tradition*), between cultures linked by inter-societal exchange (*interaction sphere*) and between culture and environment in a fitness-led process (*adaptive sphere*) (Binford, 1965: 207-209) (**Fig. 1.8**). Stylistic questions emerge, in a culture-historical conception, "[…] when

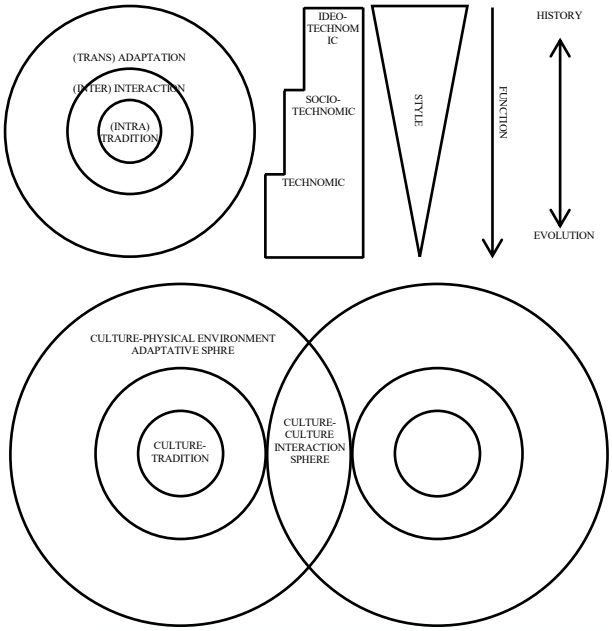

Fig. 1.8. Binfordian view of cultural processes. Drawing author.

[19] As stated by Flannery ([1967] 1973: 105), "the process theorist is not ultimately concerned with 'the Indian behind the artifact' but rather with the system behind both the Indian and the artifact […]".

questions of ethnic origin, migration, and interaction between groups is the subject of explication" (Binford, 1962: 220), because the variability of this aspect of material culture is driven by "cultural drift" similarly to genetic drift (Binford, 1963: 93-94). Both constitute in-built differentiation mechanisms of noninteracting groups developed in Binford's (1963) study of the spatial distribution of Pomranky projectile points of the Michigan area.

Few archaeologists excelled in developing a metalanguage of patterns of material culture and its interconnection with the mechanisms of social transmission. Take the first application of structural linguistics in archaeology by Deetz (1967: 83-101). "Mental templates" rule formal organization and by plotting in space-time coordinates these principles archaeologists could aim at culturally specific grammar of behavior, chains of cultural transmission and movement of people (ibid., 94; see also Lechtman, 1977 for intrinsic 'grammars' encoded in stylistic behavior). As usually happens with these applications in the discipline devised to 'get at' meanings, however, material culture becomes an epiphenomenal of the mind (cf. Patrik, 1985: 40-44; Dietler; Herbich, 1998: 243-244; see CHAPTER 3).

In *Analytical archaeology*, Clarke (1968) provides a well-tied definition of archaeological unities grouped in nested hierarchical level of complexity from attributes through culture assemblages. Clarke networked each entity according to the principles of the polythetic classication, that is a cluster of elements in mutual and recurrent association. In essence, this morphological web of relationship is behind his idea of a 'grammar' of material patterns (Clarke, 1968: 650-651; cf. Renfrew, 1969b: 242). Artifacts crystallize multigenerational information strategies to cope with the environment as well as a group work of these ensembles condition or constrain activities (ibid., 84-85; 135, fig. 19; 399; 659; Gosden, 2005: 194). In fact, they constitute humanity's socio-economic strategies writ small (ibid., 183); and archaeologists can distill from them an ideal template of form, a message of coded behavior sedimented in their brains (ibid., 87; 658; 662; cf. Shennan, 1989c). Against this background, quantitative analysis offers a tool to gauge continuities and ruptures in the pattern regularities of entities which co-vary in complex ways (Clarke, 1968: 162-178; 199-222; 254-270; 331-347). The mechanisms of diffusion, the incorporation (or not) of new attributes "migrating" (ibid., 409) in or from without, whatever the level they are defined, could be pictured as inherently adaptive responses of systems in general for balancing equilibrium states.

Historical relationships are ascertained based on function-style distinction. Clarke (1968: 393) makes the case that in the complex pattern of idiosyncratic attributes that archaeologists could be on better ground to direct connection between groupings as tribes,

families or even ‘peoples.’ To be sure, for Clarke (1968: 411-413; cf. Chapman; Hamerow, 1997a: 3-4), the detection of possible cases of population movements amongst these processes – mass migration, military invasion or migration from specific sectors of society – relies on the properly identification of the patterns (cf. similar remarks on migrationism of Americanist archaeology in Anthony, 1990: 896). Like earlier Childe, more optimistic than the Childe from the 1950s (McNairn, 1980: 64), Clarke (1968: 13; 364) maintained the objectivity of the construct of archaeological culture, “[…] rather than taking the more radical step of recognizing that […] there are no such entities as ‘cultures’, simply the contingent interrelations of different distributions produced by different factors” (Shennan, 1989b: 13; cf. id., 1989c: 833).

The processualist perspectives in general assumes that environmental stimuli always play a major role for cultural variability (Hodder, 1982c: 3; 1985: 2; 1986: 4) but this went differently in behavioral archaeology of 1970s, a branch of processualism. According to their programmatic orientation to approach morphological variability, behavioral archaeologists claim that the analysis must break through the barrier of style and function (Schiffer; Skibo, 1987: 43); and artifact variability cannot be isolated from the working dynamics of the functional characteristics in which any manufacturing choice and element is put to work in performance (Schiffer, 1997: 32). The way thus is open to archaeologists formulate low-level theories or predicatable regularities in human-matter interactions. This major component is well expressed as in the study of patterns of consumption in the contemporary times of Rathje’s (1974) The Garbage Project in Tucson, Arizona and, by a very different philosophical route from New Archaeology, the artifact-focued project of the *Centre d’Archéologie Générale* of Ph. Bruneau and P.-Y. Balut (1997) in France around the *Revue d'archéologie moderne et d'archéologie générale* (*Ramage*) (1981-2001) (see below).

The major contribution of behavioural archaeology is to problematize the social interpretations from spatial patterns (cf. Patrik, 1985). The archaeological record should never be taken as a unique snapshot of the ethnographic present without account for the behavioral activities and natural disturbances (cf., on the “Pompeii premise, Schiffer, 1976: 11-12; 27-28; 1985; Binford, [1981] 1983). Thus, when behavioral archaeologists describe an artifact’s “life history” (Schiffer, 1972: 157; 1976: 46; Schiffer; Skibo, 1997: 28-29; Skibo, 1992; Schiffer, 2010: 22) they are emphasizing the multiple interactions of energy exchange of an artifact in the sequence of activities involved since procurement of raw material to post-depositional

transition as archaeological refuse, a final state every object will meet, even Lenin's corpse (Schiffer, 1976: 40).[20]

The behavioral chains of activities resemble the *chaîne opératoire* or operational chain concept vulgarized by French scholars studying lithic industry and other technologies (Lemonnier, 1992; see CHAPTER 3). The concept of *chaîne opératoire* derivates from the work of Leroi-Gourhan (1965: 9-62; cf. Ingold, 1999 for a seminal analysis), which by its turn drawn on *Les techniques du corps* by Mauss (1936) in that bodily techniques of movement and repose call forth social "habitus." The basic idea is the enchainment of gestures and acts in a sequence of directional steps along manufacture or task accomplishment such as daily tasks, seasonal activities or technological production unfolding in a "[…] *pénombre psychique* […]" (Leroi-Gourhan, 1965: 29). The traditional ethnic repertoire superimposes upon the substratum instinct of the human species, and it comes without surprise that in an analytical plan it is possible to peel off the layers of a given class of artifacts as to disclose a pure form of functional use (ibid., 125-132). Style is narrowed to an aesthetic domain, "[…] *s'insinuant dans la marge étroite que la fonction laisse disponible à la forme*" (ibid., 139).

In a very different philosophical grounding, and almost unheard outside Francophone circles, the *archéologie générale* of Bruneau & Balut's (1997: 138-152) consider style a vernacular language arising as an in-building mechanism of "ethnic" divergence of human species. Style thus is as an "*idiomatism*" (ibid., 126) of universally valid structures of rational capacity, defined by "[…] *l'art et à la façon singulière s'y prendre.*" (ibid., 138). Proponents in archaeology of the theory of mediation of the linguist Jean Gagnepain, Bruneau & Balut (1997: 59-88) unify the scientific object of the discipline as "'[…] *toutes les créations du travail humain*'" (Bruneau; Balut, 1981-1982: 9; 1997: 37 *contra* Boissinot, 2015: 55-57). Artifacts (literally in Latin 'a fact of art') are historically fractured instantiations of a costant feature of human behavior that are indissociable of function which emerges only in a changing system of oppositions. Contrary to the view of Leroi-Gourhan of style, it is illuminating their conception of a fully tool-to-hand and hand-to-tool dialect process in which the artifact implicates the bodily habit as well as, ontologically, the 'technisizing' power to shape the social being (Bruneau; Balut, 1981-1982: 10; 26; 1997: 106-107). The way of seeing thus goes

[20] One may legitimaly ask in the case in point which body will be buried after all. More than 150 years since Lenin's death, Russian scientists of the Center for Scientific Research and Teaching Methods in Biochemical Technologies have been using special embalming techniques, sculpting and replacing biological matter with artificial materials to recreate the anatomical appearance and suppleness of a living body: weight, color and pigmentation, pressure of the skin, flexibility of joints and water balance (Yurchack, 2015; Hsu, 2015). Today it is displayed in Lenin Mausoleum on Red Square, Moscow.

without style/function dichotomy given art and "aesthetic" are not confined to a symbolic leftover without ecological or practical functions (i.e., the aesthetic of Art with capital letter).

A continuous thread which runs through most of these perspectives of materialism picked up more recently by neo-evolutionary Darwian approaches (see below) is encapsulated in Dunnell's (1978) idea of artifact as an extended phenotype. And matter grew more complex when archaeologists became keener to the relationship between morphological variability, technical behavior, group self-identification and social relations writ large. The debate about style and function that ensued in the 1980s and 1990s is embedded in the discussions generated by approaches brought by information exchange theory, theory of practice and structuration, and symbolic ethnoarchaeology espoused by post-processual archaeology and inspired by Lévi-Straussian structuralism and post-structuralism criticism of its Saussurian semiotics basis, critical theory and neo-Marxism (Bourdieu, [1972] 2004; Lechtman, 1977; Wobst, 1977; Giddens, 1979; [1984] 2013; Plog, 1980; Hodder, 1982a; 1982b; 1982c; 1985; 1986; Bentley, 1987; 1991; Wiessner, 1983; 1984; 1985; Sackett, 1982; 1985; Shennan, 1989b: 18-20; Shanks; Tilley, [1987] 1992: ch. 7; 1987; Connerton, 1989; Dietler; Herbich, 1989; Yelvington, 1991; Hegmon, 1992; Lemonnier, 1992: ch. 4; Carr; Nietzel, 1995; Jones, 1997: 112-116; Stark, 1998b and contributions therein; cf. also Preucel, 2006: ch. 6).

Fig. 1.9. Small conference in a Cavalry Post on the Morphological Variability of a Native American Arrow. In: She Wore a Yellow Ribbon (1949) by John Ford.

Where is the line running between stylistic and functional features in a given artifact? How to define meaningful entities in the archaeological record given the Protean nature of form variability? Metaphorically, would archaeologists ever be able to track the dart's flight from the dart and the tribal identity of the shooter behind the bow? "We are all familiar with the stereotyped scene in a Western movie in which the hero pulls an arrow from the side of a burning wagon, looks at it, and announces: 'Sioux'" (Deetz, 1967: 45) (**Fig. 1.9**). With the same cinematographic cliché Wiesnner (1983: 253) begins her ethnoarcheological work on arrowheads of Kalahari San groups. Drawing on Wobst's (1977) "neoclassic ethnocentric neoclassical economic argument" (Dietler, Herbich, 1998: 240) of style as an active element in inter individual communication through its symbolic value, Wiessner defined stylistic behavioral as an active strategy of nonverbal communication. The following Wiessner (1983; 1984; 1985; 1989)

versus Sackett (1982; 1985) debate revolved around symbolic communication and the ethnic translation of form variability. Notions as "emblemic" and "assertive" styles, grounded on, respectively, group and personal aspects of identity meaning invested (even if unspoken, cf. Wiessner, 1985: 161) in attributes of form (id., 1983: 256-259), and isochrestim, "[…] a variety of functionally equivalent means of achieving a given end […]" (Sackett, 1982: 72), became key-notions of two non-exclusionary approaches towards stylistic behavior and ethnicity (Sackett, 1982: 106; 1985: 157; Wiessner, 1985: 160; 1989: 58).

Both perspectives advanced the understanding of the two-way relationship of style and function. However, the difference of focus between both cannot be ignored. On the one hand, for Wiessner, (1984: 195; 229; 1985; cf. Wobst, 1977: 337) as for information exchange partisans in general (Plog, 1980: 134-139), on the social function of style, the question "why did style vary?" tends to favor stylistic attributes invested with non-verbal message content in the social dynamics and strategies of comparison and affiliation. On the other hand, for Sackett (1982: 75), style is an intrinsic to function or "[…] function writ small […]". Another important aspect is that the relationship of artifactual production and its mechanisms of transmission with consciously and unconsciously choices is not easily discernible between each tenet.

The noteworthy contribution of the isochrestic approach is that it has opened up a discussion on ethnicity as something which cannot be isolated (Sackett, 1982: 106), even though still falling into the trap earlier forms of conceptualization of style as a fossilized (hence passve) epiphenomenon of a deep-seated grammar of cultural norms (cf. Wobst, 1977: 318-319; Wiessner, 1985: 161; Shanks; Tilley, 1992: 143-145; Jones, 1997: 119). Contextual or structural archaeology brought as ever into sharp focus the relation of material culture with the constitution of social life and the historical and cultural structures of meaning (Hodder, 1982b; 1985; 1986). Archaeologists are urged to look at structures behind formal patterns in specific cultural groups, to 'read' the symbolic language signifying practice such as as mortuary practices in megalithic burials (e.g., Shanks; Tilley, 1982; [1987] 1992: 155-171). This step beyond environmental constraints allowed Shanks & Tilley (1992: 144) to revert Sacket's words and assert that style is function writ large.

The problem of the relationship of enculturation milieux and cultural boundaries of certain ways of doing things faced anthropologists and archeologists alike when Bourdieu's ([1972] 2000) practice theory found its way to new theories of ethnicity. Drawing on the concept of *habitus*, Bentley (1987: 27; 1991) proposed a "practice theory of ethnicity," a step forward for re-absorbing the primordialists *versus* instrumentalist dichotomy in the notion that "[…] consciousness of affinities of interest and experience embodies subliminal awareness of

objective commonalities in practice." The identity ordeals endured by the young Maranao, Soraya Monap, in Bentley's (1987: 28-40) case study is caused by her experiencing differences between her traditional Muslim background in Malawi and her education in Philippine's capital, Manila. As a person belonging to a religious minority in a major Catholic country living in an urban and cosmopolitan center, Soraya experiences an "[…] objective lack of fit in habitus […]" (Bentley, 1987: 38).

As noted by Shennan (1989b: 20), an archaeologist cannot avoid to associated Bentley's overlap between practice experience and ethnicity with Sackett's (1982: 104) notion of "ethnic idiom" in bounded contexts of practical learning crystallized in form. And as logical corollary of this, habitus and ethnic tradition are "[…] regarded as representing the bedrock explanatory level […]" (Shennan, 1989b: 20; cf. Dietler; Herbich, 1998: 240) where we can lay down at the level of a single common experience intra- and supra-ethnic identities (Yelvington, 1991: 161; 163; 167-168; Jones, 1997: 93-94). Criticizing some of these shortcomings, notably Bentley's sliding from the idea of shared underlying behavior of the habitus to culture and ethnic identity, Jones (1997: 92-100; 122-123; 128; cf. also Yelvington, 1991: 158; Burmeister, 1997: 193-196) defines ethnicity as a psychosocial process of *consciously* perceived differences (objectification) embedded in the matrix of cultural differences, not *something* straightforwardly related to different habitus or material culture.

The more studies on variability revealed the complex ways material culture patterning varies according to different nonverbal communication strategies of group-identification and practical learned behavior in situational political alliances (cf. Bowser, 2000), the less simplistic the relationship of archaeological cultures and past identities become. At the end, all the threads of discussion lead to the basic problem of how to operationalize analytically meaningful cultural boundaries from the material record patterning (Stark, 1998b; Roberts; Vander Linden, 2011: 9-10). Many aspects of this discussion have been developed since the late 1970s, for instance, by neo-Darwinians or evolutionary archaeologists, a blanket covering many different strands inspired by Darwinism such as evolutionary psychology (Mithen, [1996] 2003), optimality theory and behavioral ecology (Shennan, 1989b; 2002; 2009; 2012; Leonard, 2001; O'Brien, 2008; Kristiansen, 2004b for critical reviews). Darwinian archaeology proposes to be a major theoretical framework for backing the discipline after the fragmentation of post-processualism (Shennan, 2002: 10). This tradition of thought resumes many culture-history assumptions about form variability and spatial interactions, focusing on parent-offspring transmission as a basic social unit of behavioral learning.

Within the framework of culture as a phenotypic behavioral passed on along the vertical (hereditary) and horizontal line (synchronic diffusion), cultural threads of traits become amenable to phylogenetic reconstruction, in a mechanism of replication of unities of cultural information termed "memes" as diverse as "[…] tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches" (Dawkins, [1976] 2016: 249). In this vein, vertical transmission offers evolutionary advantage to the functional variation, whereas stylistic features have a quicker (and random) *tempo*. The idea behind analogous and homologous similarities resumes aspects of formal variability changed by convergent behavioral responses to environmental stimulus (function) and inherited cultural transmission (style) already envisioned by culture historians (Dunnell, 1978: 199; Lyman; O'Brien; Dunnell, 1997a: 8-11). This becomes a heuristic tool in artifacts which require a long apprenticeship of technical process in order to identify migrations in terms of a tree model mapping out the relationship of descent, cultural lineages of elements which co-vary at multi-levels according to different evolutionary forces (e.g., adaptive selection, drift process) (Shennan, 2002: 49; 65; 73-78; 125).

According to a more modulated perspective of functional and non-functional aspects of material culture, Burmeister (2000: 542; 2017: 61-63; see also MacSparron *et al.* 2020: 227-230) also tried to find different rhythms of continuity and change in public and private dimensions of material life as to identify migration and agency of the migration group. This is precisely what Burmeister (2000: 541; 2017: 58-59 *contra* Anthony, 2000: 554) have been pointing out with the example of the diffusion of the log cabin in North America colonies. The cabin house is a construction of Fenno-Scandinavian origins, but its spatial distribution in the other side of the Atlantic cannot be taken at its face value. It had an adaptive advantage (fitness-enhancing strategies in objective conditions) among the choices of house and construction types which the immigrants from different origins resorted in New World environment. The interface between inner and inside spaces in the relationship between migrant and host groups equate thus public (economic and social) spheres with function and private domain with style.

In a kindred spirit with the neo-Darwinians, therefore, adaptive traits are caught on through mechanisms of diffusion, while a passive element with ethnic resonance goes with deep-seated habits. In Burmeister's perspective there is an implicit assumption of style as entangled in the semiotics of non-verbal communication and social interaction going back to Wobst's (1977) active/passive split of style mapping onto domestic and public spheres of life. This association is reinforced by his work with headdress in former Yugoslavia and focus on Schaumburger costume, giving prominence to style as *means* of extra-kin (or domestic) visual

signalization (see specially the distinction between "*Alltagstrach*" and "*Festtrachten*" in Burmeister, 1997: 179).

Many of these insights have been further strengthened the relationship of visual information, identity display and deep-seated dimension of unconscious stylistic choices materialized in the archaeological record in different directions by interpretative frameworks of learning and technical mastery by U.S. archaeologists working with pueblo migrations and works borne out in the French ethnoarchaeological tradition (see Roux, 2013).

It is worth noting the ethnographical and experimental work of Roux with potters in New Delhi (India) and material implications in modelling wheel-thrown learning skills and other forming techniques (macro- and/or micro-)archaeologically visible as in contemporary India or the southern Levant of the Late Chalcolithic (Roux; Corbetta, 1990; Roux, 2019a; 2019b; 2020), Hundi and Muslin potters in Rajasthan (India) (id., 2015), stone knapping and long carnelian bead knapping in Khambhat (India) and in the Indus Valley (Harappan civilization) (Bril; Roux; Dietrich, 1995; Roux; Matarasso, 1999; Matarasso; Roux, 2000).

The anthropology of technical choices and behaviors in the West Africa by Gosselain (1992; 1998; 2000; 2002; 2008; 2011; 2018) offfers also good examples of how patterned evidence of pottery manufacture can support hypotheses of practice contexts and intensity of interactions implied in learning specific skills. The anthropologist stresses that the discerning of good indicators of cultural affiliation and/or geographic proximity should rely first and foremost on the practices and learning skills and the interactions network contexts within which these sprung as well as the varied parameters of social strategies of participation in the practices focused on the communities of practice (CoP thereon) concept (Gosselain, 2008; 2011; 2016b; 2018).[21] Gosselain expresses the relationships of this kind into historically valid hypothesis of mobility, juxtaposing the distribution of fashioning techniques and linguistic groups in south Cameroon with the Bantu-speaking expansion (e.g., the drawing a ring-shaped lump technique, see Gosselain, 1998: 92-93; 2000: 204-208; 2018)

The high archaeological visibility of Southwest archaeology allied to anthropologically informed and method-driven also have been inspiring a plurality of perspectives on pueblo migrations over the last decades (Cameron, 1995b; 2013; Clark, 2001; Cabana; Clark, 2011b; Mills, 2013a; 2013b; Duwe; Preucel, 2019). In *Tracking Prehistoric Migration* (Clark, 2001)

[21] The main thrust of the community of practice concept formulated by educational anthropologists is in the reiterated practices of a group as a generative principle of social bounding. It stresses the meaningful process of self-redefinition and lived-in participation in the leaning skill acquisition (see examples in Lave; Wenger, [1991] 2022; Wenger, 1998).

in Tonto Basin Hohokam during the early Classic period in American Southwest (late 13th-early 14th centuries AD), Clark builds on the stylistic theory of artifact design of Clark (1995a: 153; 1995b) (**Fig. 1.10**). Essentially, the model points out the differential potential of attributes to convey a range of processes, from message conveyance of social boundedness, individual style, to enculturation depending on their relative hierarchical position defined by the axis of visibility and sequence order in planning and production. In order to prove "migration beyond reasonable doubt" (Clark, 2001: 70; ch. 4), we must resort to reliable indicators of passive knowledge in the production sequence of technological styles (following Lechtman, 1977).

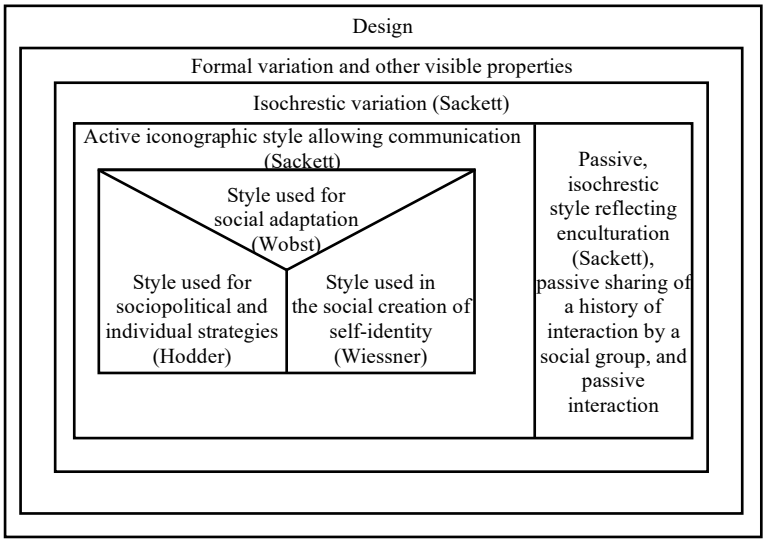

Fig. 1.10. An "unified middle-range theory of artifact design." In: Carr, 1995a: 158, fig. 6.1).

These aspects of artifact design and attribute visibility are stylistic because they represent idiosyncratic choices (cf. Sackett, 1982: 75; Lemonnier, 1992: 51; see also, Clark, 2001: 13). Indeed, the non-technological determination leaves these attributes more prone to stochastic drift (*sensu* Binford, 1963; cf. Carr, 1995b: 195; Clark, 2001: 10). As we shall see below, I adopt a similar position to assess insofar as a conventional archaeological methodology allows cases of migratory mobilities in the past (see CHAPTER 4 and CHAPTER 5).

As we could observe, the scale of stylistic variability brought to the artifact level is a side effect of challenging the correlation of cultural identity and boundaries in cultural provinces *à la* Childe (1925: 306-313, maps 1-4). The theoretical movement beyond the scaffold of the normative view of archaeological cultures is the struggle of many interactionist perspectives in inter-relatable scales and (Shennan, 1989b: 20; Roberts; Vander Linden, 2011: 4; Knappett, 2011a: 11; 2013b). If one acknowledges that polythetic structure of material culture patterns exist across cultural borders of many sorts, the central question should be how

archaeologists could work out social composition and interaction process beyond culture-historical axioms (Furholt, 2018a; 2018b; 2019a; 2019b; 2021).

The kaleidoscope of connections

Studies on colonialism and postcolonialism, the colloquial and formal usage of networks in recent years conspire to make of interconecctdnes and 'connectivity,' a buzzword of electronic and cyberspace, in the Mediterranean archaeology and history the image of contemporary globalization arena (cf. Sherratt, 2003; Malkin, 2003a; Morris, 2003; Harris, 2005a; 2005b; Knapp; van Dommelen 2010: 1; van Dommelen, 2014: 479-480; Gonzáles-Ruibal, 2014: 42; Concannon; Mazurek 2016a; Daniels, 2022a: 9-11; Woolf, 2016; Hodos, 2017). Such broader units of analysis have the merit of scaling up the investigation in matrixes of intersocietal communication and interdependence. Notwithstanding this, some critical regard is in order since a great deal of them have not been always successful in combining different scales or avoiding the reification of analytical categories (cf. Gosden, 2004b: 7-18; Stein, 2005a; 2005b: 8; Dietler, 2005: 58-61; Knappett, 2011a: 26-28; 2013b: 5-6, on world-system theory; Morris, 2003; Harris, 2005a: 23; Bresson, 2005: 97; Concannon; Mazurek 2016a; Woolf, 2016: 442-448; Wallace, 2018: 6-7 on globalized Mediterranean). Also, it is not self-evident that broader conceptual units will dispense with the ethical consequences of the use of archaeological cultures to think with (Kohl; Fawcett, 1995a: 17-18; Roberts; Vander Linden, 2011: 6-7) or or the linkage of these constructs with modern identities and political agendas.

Horden & Purcell's *The Corrupting Sea* (2000; 2019) is one of major references of the last 20 years or so. Horden & Purcell conceptualize the Mediterranean basin as a pointillist pattern of dispersion of locations (microecologies) and productive opportunities reconfigured in an always-changing kaleidoscope of connections, specially by maritime means, where the movement of people and goods was realized along around both close and far places. Drawing on many historical vignettes, their analytical unit of Mediterranean ecology unify in a temporal continuum of more or less 3,000 years of history (ibid., 147). The intellectual field organized under the banner of the Mediterranean history is not the sum of the stories that took place in it (cf. ibid., 9). Its unity is the result of structuring principles of three recursive parametes of climatological fluctuation and other topography of the whole region: diversification, storing, and redistribution (ibid., 178). The uncertainty of the Mediterranean environments, its diverse topography and climatic instability impinges on the ever-changing of economical strategies

made by human groups over history. “The nature of diversity itself is diverse,” proceeds to point out Horden & Purcell (2000: 79). Indeed, the entire Mediterranean landscape is translated as ‘marginal’ due to its extreme variability and its (‘corrputing’) effects in people’s economic behavior (ibid., 179; 197).

But far from a deterministic view of the physical environment, Horden & Purcell (2000: 80; 124; 400) argue that neither the Mediterranean is exhausted by running through a checklist of its fixed natural features, neither its inhabitants are conditioned by the ecological background. The Mediterraneaness is made by the brushes of ever-present and structural interplay of environmental and geological elements causing instability (see also Halstead; O’Shea, 1989: 3). The structures of the Mediterranean *koiné* are deposited is the extreme of these conditions in the interface between shifting mosaic patterns of micro-regions ecology and the plasticity of human behavior to shape and shape time again the range of options of the productive landscape (ibid., ch. 3; Purcell, 2003).

The key Mediterranean features overcome all the divisions of wild/cultured, uncultivated/cultivated, primary production/trade, town/hinterland, autonomy/dependence, and, ultimately, the one created by the debate between primitivists and formalists. The idea of dispersed ecologies and the symbiotic interaction of human and environment blur any social categorical divisions. Nomadism and the agricultural sedentarism are together exploitative strategies of a whole gamut of productive choices that crosscut, e.g., “the nomad” or “the farmer” (Horden; Purcell, 2000: 38-386). The bewildering behavioral latitude could not have been broader than that from Ilya Ilych Oblomov, the lazy Russian nobleman of Goncharov’s ([1859] 2019) novel, trapped in a state of inertia in its family estates, example taken by Moses Finley’s ([1973] 1999: 109-110) to illustrate an ancient economic conservative *mentalité* of engaging partially with the mechanisms of redistribution, as sellers but not buyers.

There is no room for all-of-sudden changes. Technological revolutions or demographic-driven changes, populational growth leading to the exceeding of the limits of the carrying capacities or geological catastrophes have no place in the auto-regulatory ecosystem of the Mediterranean (Horden; Purcell, 2000: 299; ch. 7; ch. 8). In a world of unevenly distribution of staples, redistribution counterbalances the weight through mechanism communication and exchange connection in a broad spectrum of interdependence between microregions encompassing in one end the daily and small-scale Brownian motion in short-range interaction to long-distance association that crisscrossed the Mediterranean Sea (ibid., 120; 142; 224; 273). The microecological approach of Mediterranean ecological history has been commented and developed further by scholars who have acknowledged the importance of historicize the degree

of Mediterranean's connectdness, the yardistick of space against to asses connectivity and distinguish different levels of networks of communication and movement in conjunction with the maritime technological means of transportation involved (cf. e.g., Morris, 2003; Harris, 2005a; Bresson, 2005; Broodbank, 2016; Woolf, 2016; Iacono, 2019). The Mediterranean Sea is not a fixed reality over unrecorded times. *In* the history of the Mediterranean critical transformations can be signaled that contribute to the exploration of marginal ecological niches following suit environmental shifting and the integration of the basin's corners in expanding networks, for instance over the 2nd millennium BC after the adoption of the sailing technology (Sherratt; Sherratt, 1991: 367-375; Broodbank, 2013: chs. 8-9; 2016: 23-28).

In *The Making of the Middle Sea* Broodbank (2013) gives a truly (pre)historical dimension to the emergence of Horden & Purcell's Mediterranean economic specimen, benefitting from the full range of domesticate and non-domesticate resources of plants and animals and secondary produts (Sherrat, 1981). The archaeologist has identified in the 'environmental mediterraneanization' occurred millennia ago (see above) the chief factors for the emergence of the chronicle "[…] regime of risk and opportunity […] decisive to the shaping of later Mediterranean societies" (ibid., 264).[22]

It comes as no surprise to find mobility as a derivative effect of this constant flow of resources, one enduring behavioral regularities of the Mediterranean (Horden; Purcell, 2000: 120; 267; ch. 9). Mobility is part of the resources drawn on by people in the virtual matrix of horizontal networks afforded by the interdependence of microregions, another parameter of the generalized exchange system of commodities, edible or not: it ranges from wandering artisans, physicians (Horden, 2005: 180), pirates, mercenaries, to the agents of transport of goods and the human-commodity (slave) (Horden; Purcell, 2000: 343; 346; 378).

[22] It seems that Horden & Purcell (2005: 363) embrace the idea that the aridization of the period is responsible for shaping a distinguished Mediterranean ecology.

Researchers of the Mediterraneanism approach, however tend to overlook the actual social, political, and economical conditions of their engagement with fluidity and connectedness, namely the forces of contemporary globalization symbolized, international 'free' mobility of people and capital, and construction of supra-national entities of integration (Friedman, 2002; Morris, 2003: 39-40; Jones; Graves-Brown, 1996; Shore, 1996; Malkin, 2003a: 1). The costs and conditions of connectivity and how it occurred in the prehistoric past are the main issues Morris (2003: 33; 42) addresses in his critiques. These points about the historical expanse of connectivity within the basin (Harris, 2005a: 24; Bresson, 2005: 100) and the political implications of the concept, a relic similar to Said's (1978) *Orientalism* (Herzfeld, 2005: 51), were not missed in further criticisms (see recently Concannon; Mazurek 2016a; Woolf, 2016). The conceptual paradox in the Mediterraneanism lays in the fact that it offers a normalizing framework of mobility and change that ties the region down to a static picture of historical process (Fentress; Fentress, 2001: 217; Morris, 2003: 42; Woolf, 2016: 442; Wallace, 2018: ch. 1), as movement programmed in an automata (**Fig. 1.11**).

Fig. 1.11. Mechanism reproducing the movement of boats in the sea by Crevier and Piolaine (around 1880). © Musée des arts et métiers.

It seems that mobility appears a ghostly spectre in that "[…] the further one takes the movement away from the body, or from the actual movement, […] the greater the representation or abstraction is, and the movement under discussion becomes more and more immobile as a result" (Aldred, 2021: 173). The complexity of human mobility past and present must be understood as dialectically intersected with the delineation of social identities and spatial boundaries, not the other way round (Ingold, 2011; Cresswell, 2006; 2010; 2011; cf. Woolf, 2016: 442). The current refugee movements in the Mediterranean Sea reflect stronger as any the paradoxes and contradictions embedded in the metaphor of movement and conception fo mobility.

The 'refugee crisis'

> Some think the legal, political, symbolic, and physical partition of people and spaces can actually be accomplished, humanely or otherwise: with a diplomatic handshake, with surveillance technology, with conditional aid, with militaristic discipline, with brutal fanaticism. However, once set at sea […] it needs to be radically recalibrated, for the sea is something else: it is salt and matter, a vision and a stretch of water, a horizon, a route, gulfs, bays, and shores […] Its liquid mobility exceeds sovereign pretensions, and the law of the sea is hard to breach. (Albahari, 2015: 196-197).

Archaeologists have always been keen to stress the generational effects of colonialism, world wars, political decolonization, cold war, and globalization in Western mainstream archaeology in general and archaeologist's life histories with regard to migration and invasion (e.g., Clark, 1966: 172-173; Rouse, 1986: 16; Kristiansen, 1989: 211; Champion, 1990: 216; Shennan, 1991: 30; Chapman, 1997: 14-18; 1998: 287-288; 301; Härke, 1998: 24; Silberman, 1998: 271; Morris, 2003: 39-40; Gonzáles-Ruibal, 2014: 43). Professionals of the field are no immune to how the theme is presented to public consciousness in the Anglo-Saxon world and mounting anxieties of the Global North middle-class ranks, out of which a growing majority of archaeologists belong since at least the second half of the nineteenth century (Trigger, 1981: 139; [1989] 1996; 1986; Kristiansen, 1981; Patterson, 1995).

Other factors then at least should be considered for the retreat of migrationism, the return to it and how archaeologists continue to approach such topic. Take as example the reciprocal influence of the generational attitude and broader sociopolitical developments in the life of new archaeologists. Kristiansen (1989: 211; 1996: 141-142; 1998: 315) notes that

> […] the prevailing parallelism between social change and peaceful internal development is rooted in post-war decolonization and the development of modern middle class welfare society, international informational exchange and internal social change substituting for international cooperation (United Nations, EC etc) and social reforms. Culture, ethnicity and migrations were thus seen as linked to the political ideology that led to the disasters of two world wars.

Burmeister (2000: 539; cf. id., 230; cf. Dzięgielewski; Przybyła; Gawlik, 2010b: 22) wonders if Kristiansen is right, why migration continued to be a growing topic of discussion in other disciplines? For others, the fixity of the geopolitical landscape in cold war relations can be possibly enrolled in the list of reasons of why *in situ* development persevered in processualist explanations (Shennan, 1991: 30). Finally, one of often forgotten but nevertheless

a crucial circumstance ventilated "[…] was the shared generational experience of those archaeologists who had not lived through the mass movement of peoples during and after two world wars" (Chapman, 1997: 17). The most recent restatement of this come from warfare studies. It has been argued that the intellectual atmosphere after the two wars may have contributed to pacificist attitudes and the reemergence of such issues explained through the disenchantment with the unfulfilled promises of Western liberal democracies, conflagration of ethnic cleansing and conflict in the late 21st cent. (e.g., Kosovo War and Rwanda genocide) (Keeley, 1996; Drews, 2017: 56-58; Lehoërff, 2018; Horn; Kristiansen, 2018a: 5-6; Dolfini *et al.* 2019a: 3-4; see **Whose ancestry?**).

After years of disregard, the re-emergence of migration as research topic in mainstream archaeology may then also have strong relation to the multitude of millions of uprooted in the broader social, political and economical context of human displacement after WW2, cold war interventions, decolonization and post-1989 world. "Voluntary" or forced international migrants, labor migrants feeding the dynamics of labor market, asylum-seekers or refugees are the many facets of the present-day politics and history of global migratory flows and structures (de Haas; Castles; Miller, [1993] 2020: chs. 5-6; Manning, [2004] 2020: 177-210; Albahari, 2015; Demoule, 2022: ch. 9; Del Grande, 2023: chs. 3-9). Take to note the long-term trend of migrants from many countries of the former URSS after the fall of the Berlin Wall and of the former colonies of the Third World across the borders of the Euro-Mediterranean area in the late 1980s and the developments of a globally neoliberal order through the present times. Or, along USA-Mexico corridor, the migration pattern of low-skilled migrants from Latin American countries, especially Mexico through employment ties (e.g., Bracero programme) that since the mid-1990 and specially after the events of 9/11 have been receiving a marked militarization approach by the US government (e.g., 2001 US Patriot Act, cf. de Haas; Castles; Miller, [1993] 2020: ch. 7; 10; De Léon, 2012; 2013; 2015).

Fig. 1.12. Mosse. Incoming #88. 2014-2017, digital chromogenic print on metallic paper. Jack Shainman Gallery.

The major global trends concerning international migration of the last couple of decades is the multi-layered process of people going from the southern hemisphere towards the North and the politicization/securitization of the issue with rhetoric of discourses of closeness and autochthony and border enforcement strategies (de Haas; Castles; Miller, [1993] 2020: 137-138, box 6.1; 217-220; ch. 10; Ψαρράς, 2012; Andersson, 2014; Albahari, 2015; Leogrande, 2015; Padilla Peralta, 2015a; 2015b; Bauman, [2016] 2017; Le Bras, 2017; 2022; Saviano, 2019; Besteman, 2020; Del Grande, [2007] 2008; 2023). Could it be that the protracted 'emergency' scenarios of refugee movements have been shaping generational attitudes to the phenomenon? Have regimes of surveillance and border spectacle of state and supra-state sovereignty in Euro-Mediterranean since the early 1990s and the US after 9/11 and the global war on terror been encoded in discourses and ideology of containment of mobility? It could be argued that archaeological ideas of migration and population displacement are a reduced scale of on-going events, in which immigrant mobilities and immobilities gained expressions in the (bio)political spectacle industry and threshold proliferation (**Fig. 1.12**)?

Current metaphors of mobility and immigration are much informed by contemporary anxieties and notions of fundamental threats that have fundamentally changed what might have had been perceived until the last very few years differently in segments of Western academic establishment. The so-called migrant 'crisis' of the recent years and massive fleeing of Syrians, Afghans and Africans in the mid-2010s across the borders of contemporary Europe (especially in the Mediterranean Sea) is most emblematic of a growing concern with migration and starling proportions of mortality that have been affecting society in general and, explicitly or implicitly, archaeologists' perceptions of connectivity and mobility (Broodbank, 2013; Garcia; Le Bras, 2017; Hamilakis, 2018b; Driessen, 2018b; Wallace, 2018: 4; 9-10; Iacono, 2019: 4-5.; Demoule, 2022; Fernández-Götz *et al.* 2023a: 2; see **Introduction: boat people**).

Exclusionary policies against the 'barbarious beyond the wall' draw on the perceived threatening position to the sovereignty of national states and social welfare of its members. The foreigner, displaced to a "bare life" (Agamben, [1995] 2005) of a socio-political order, is politically situated in forms of racialized control and hierarchy of labor system that coexist with legitimizing notions about citizenship and civil rights of Western liberal democracies

(Shore, 1996). Symptomatic of these chronic anxieties are fears about a ‘flooding’ and ‘submersion’ of locals regarding birth and migration rates along racial categories and the contradictory stances on the politics of immigration loom large in the destiny of Old-World nations in tandem with the aging of their population (Le Bras, 2017: ch. 5; de Haas; Castles; Miller, [1993] 2020; de Haas, 2023).

Connectivity and mobility are sociocultural resource and strategy performed, represented and enacted differently (Cresswell, 2006; 2010; 2011; 2012). No one leaves his home base behind because mobility has been endemicized in the liquid means of the Mediterranean Wide Web. Human migratory behavior is a basic fact of the evolutionary development of the species (Bretell; Hollifield, [2000] 2023b; Manning, 2006; [2004] 2020; Baker; Tsuda, 2015b; Garcia; Le Bras, 2017b; Demoule, 2022; Daniels, 2022b). Migration involves nearly always a structure of constraints and choices: historical ties between localities, costs and means of transportation, information about routes and target destination, inter-personal networks of mutual support, allure of destination and, last but not last, one’s decision and agency (left but with little choice sometimes).

The archaeological ethnography of De Léon (2012; 2013; 2015) and Hamilakis (2016; 2018c; 2021; 2022a; 2022b; 2023) with contemporary migration capture the contradictions of world labor division, territorial sovereignty and border enforcement in the identity politics and management of the movement of people. The low visibility of material traces left behind and deposited in migrant stations or in shipwrecks in beaches by these 'in-transit' mobilities across major geophysical deterrents and gateways through expanses of desert or water reflects the own liminality of the status of border-crossers. These factors also defy recording strategies of a systematic phenomenon and life experience that could be destined to fade almost into the invisibility of policies of head office, anonymity of morbid statistics, confinement in prisons, or, worst, advanced state of corpse decomposition (**Box 1**).

Box 1 – Lampedusa and Lesvos

The islands of Lampedusa and Lesvos hold key positions on the intricacies of re-routing and channeling of migration flows along Europe's Mediterranean borders by patrolling and regulations (e.g., bilateral agreements between nation-states and the Dublin Regulation) (cf. Gori; Revello Lami, 2018: 31-32). The high incidence of mortality is a direct result of these entanglements (Fargues, 2017: 14; see **Introduction: boat people**).

Over the last 15 years, the island of Lampedusa has been the foothold of thousands of hundred migrants from many sub-Saharan countries and Syria. In October the 3rd, 2013, a boat carrying thousands of individuals, the majority from Eritrea, sank before reach the coast, a few meters away from the small island of *Conigli*, the last stage of a long journey going through Sudan and Libya. The corpses of more than 366 individuals were rescued. Few days lart, on 11 October, another shipwreck resulted in the death of 250 individuals (Albahari, 2015: 171-176; Leogrande, 2015; Enia ([2017] 2021; **Fig. 1.13**).

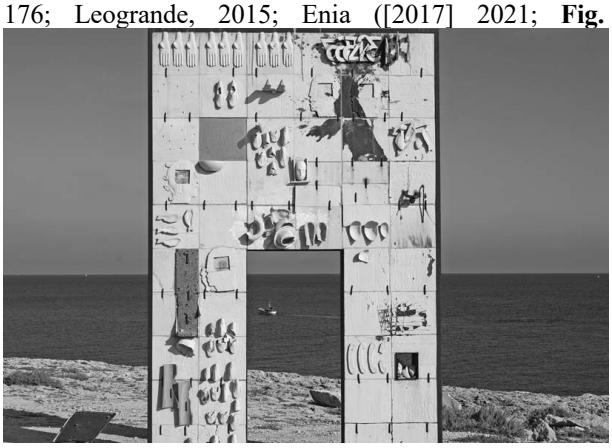

Fig. 1.13. Porta di Lampedusa—Porta d'Europa by Domenico ''Mimmo'' Paladino. Photograph © Maurizio Albahari. In Albahari, 2015: 191, fig. 10.

Moria, an ex-military camp turned into a detention camp for migrants seeking a refuge in Europe, is another example of policies of geographical buffer zones of Europe (Hamilakis, 2021; 2022a; 2022b; 2022c; 2023). Between 2019-2020, the camp experienced an upsurge of its inhabitants to a total of 20,000 people. In September 2022 a fire burnt it down (Hamilakis, 2022b: 219; 2022c).

Old-century misconceptions of population movement have been re-enacted in political demagogy aimed at domestic audiences.[23] Migration is more than never an arena of political saliences and dispute with the currency of xenophobia, pseudo-theories of mass invasion and

[23] For instance, one of the commonest fallacies is of Europe 'flooded' by migrant incoming. The continent only receives a small fraction of world's statistics of refugees as poorest and emergent countries have the largest share (Brettell; Hollefield, [2000] 2023a: 2; de Haas; Castles; Miller, [1993] 2020: 8-9; ch. 9; 244-246; de Haas, 2023). Transcontinental migration goes in the same trend, where for instance international emigration within African countries between 2010-2020 is greater than those out of Africa to Europe and Asia (Manning, [2004] 2020: 217; Haas; Castles; Miller, [1993] 2020: ch. 9).

thread to cultural integrity and, worst beyond the anecdote, the electoral wins of far-right groups. The Brexit Vote, the election of Donald Trump running on the Republican Party and alt-right parties throughout the globe such as the Front National in France, the Northern League in Italy and Golden Dawn[24] denounce the boiling atmosphere of hate that racialist discourse tap into political gain. Moreover, the moral panic talk of a 'migrant crisis' and apparatus of border surveillance and control are institutionalizing new regimes of seclusion. Mounting xenophobia are much conditioned by the terms of racialized nativism, notions of populations or cultures predicted on racial or quasi-racial (biogeographical) categories (e.g., "non-white immigrant descent," "African", "Arab" or "Hispanic") and 'othering' stereotypes (Hamilakis, 2018b: 8).

Concluding remarks

The breadth of topics covered in the chapter is great, as it concentrates on the notion of mobility as an active process in shaping identities of people, artifacts, and environment over time. The comparative approach to writing the history of some millennia of the Mediterranean Sea and Amazonia serves from the concept of network, figurative and heuristically, with the aim of raising new questions about the meaning of material similarity and physical distance in contexts of strucutural mobility. It has been postulated that these geographical areas constituted areas of relatively ease connectivity whereby ideas, techniques, and material got transmitted in multiple directions. The complexity and variety of ecologies in the Mediterranean and Amazonia is correlate to the patterns of human mobility that tell us fundamentally different histories from the *histoire événementielle*, challenging the normative view of social interaction and related assumptions of biological relationships and population movement.

It has been also stressed with the critical review of archaeological literature that unique bounded entities should not provide the end of analytical units as they are emergent properties of interrelatedness. The stationary and static reality of a dot in a distribution map in archaeology should be thought as condensed testimonies of past movement from raw material procurement and manufacture, human interactions of master-apprenticeship, trade, circulation of finished products and so on. Interaction and mobility require thus the mobilization of analytical units that operate both below and above metaphysical units, assemblages, and types, as well as

[24] In 2020, a country in Athens considered the party a criminal organization and its leaders sentenced to prison (see https://thepressproject.gr/egklimatiki-organosi-i-chrysi-avgi/). See Ψαρράς, 2012 for an historical account of the ascension of the party.

dichotomies like style versus function, to develop into a apposite stylistic theory and method for analyzing variability in social terms.

Our line of investigation demosntrates a strong epistemological focus on concepts, explanatory constructs, and the empirical basis they rest. It is also particularly concerned with the social construction of mobility, representation and its various politics. In archaeology, issues of simplistic identity symbolic construction are neither less tokens of its historiographic past nor limited to specific schools of thought. The broad appeal of dominant forms of cultural identity and alterity, especially in relation to international migration patterns and trends over recent decades is part and parcel of the perennial link between archaeological practices with hegemonic discourses.

CHAPTER 2.THE INDO-EUROPEAN CONNECTION: ARCHAEOLOGY, LINGUISTICS AND GENETICS

> Not only are they worthless; they are mischievous. They have induced their votaries to postulate all sorts or migrations, for which there are as yet not a particle of evidence. To buttress the Nordic's claim to be the ruling race par excellence, attempts have been made. and are still being made, to prove that the earliest dynasties of China, Sumer, and Egypt were established by invaders from Europe and even today the vision of certain prehistorians is absolutely distorted by this preconception. Such misdirected enthusiasm also injures science in another way. The apotheosis of the Nordics has been linked to the policies of imperialism and world domination: the word 'Aryan' has become the watchword of dangerous factions and especially of the more brutal and blatant forms of anti-Semitism. Indeed the neglect and discredit into which the study of Indo-European philology has fallen in England are very largely attributable to a legitimate reaction against the extravagancies of Houston Stewart Chamberlain and his ilk, and the gravest objection to the word Aryan is its association with pogroms.
> (Childe, *The Aryans*, p. 164).

Bringing up things out of date

In view of recent developments of methods of genome sequencing in the paleogenomics and the rise of optimism about the possibilities for big historiographical questions, it is instructive to revive old issues of interpretation in archaeology under the heading of the Indo-European (IE hereon) problem. Questions that have been phrased through aDNA are not so bright and the growing flood of genomic data is becoming the mainstay of academic and popular discourses on origins and migrations. To chronicle at present the IE intellectual history thus represents a sort of step-back stopover in the discussion of 'aDNA-rush.'

Originally, the IE question emerged as a branch of the main investigations of the genetic relationship of living and dead languages in comparative linguistics (**Fig. 2.1**). "*Une reconstruction hagiographique*" (Demoule, 2014: 35) has Sir William Jones's third annual address to the Royal Asiatic Society of Bengal in 1786 as a traditional milestone for modern historical (or comparative) linguistics because he traced a common genetic ancestry of Sanskrit, Latin and Greek, and even of Celtic and Gothic. This linguistic mechanism of evolution built a phylogenetic analysis between daughter languages branching off from a common ancestral stem. The linguistic search for the homeland of the speakers of this common ancestral, the Proto-Indo-European (PIE) language, was set up by August Schleicher in mid-nineteenth century in a genetic tree diagram (see Mallory, 1988: 18, fig. 7; Arvidsson, [2000] 2006. p. 27, fig. 2). This linguistic mechanism built a phylogenetic relation between the IE languages branching off from the PIE stem.

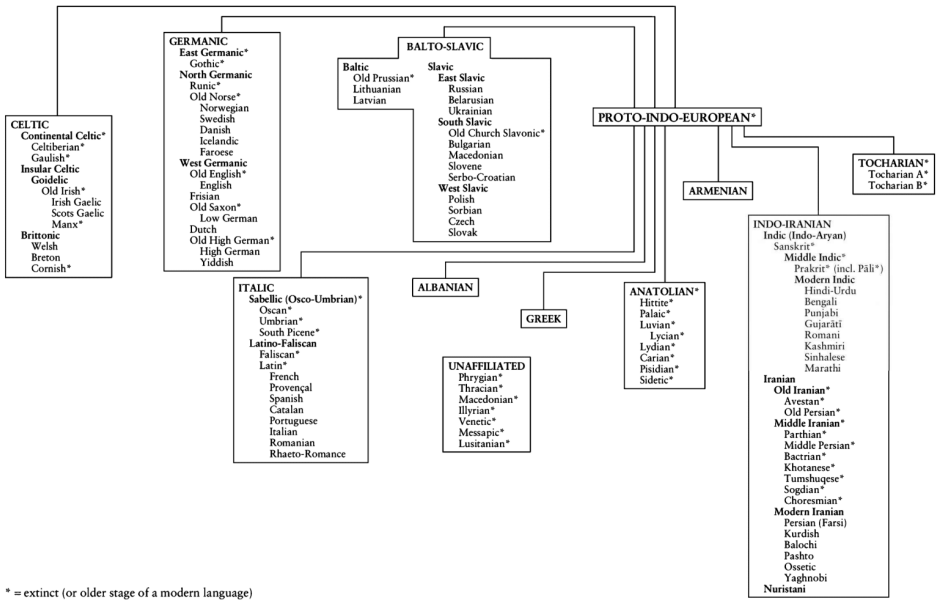

Fig. 2.1. IE family tree with relative geographical position. In: Fortson IV ([2004] 2010: 10, fig. 1.1.

Trees as visual symbols of relatedness occupy a center stage in the intellectual history of the Occident (Ingold, 2000: 134). With the tree model scholars ascertain genetic relationships among a set of entities, be it among species, languages, and cultures. The method is closely linked to the development of comparative linguistics from the mid-ninettenth century with the vocabulary of biological taxonomy. As a matter of fact, it puts down its roots earlier in the explanation of human linguistic diversity from a unique human origin formulated in the vein of the biblical scholar tradition in the search of the language spoken in the Paradise before the Fall of Man (Olender, [1989] 2002). The monogenetic idea of the origin of man is an ingrained belief of Christianity, symbolized, for example, in the account of the construction of the Tower of Babel in the Book of Genesis. Migration serves as an explanatory device to creationist myths equating the traveling of cultural traits with those of humans (cf. Adams; Van Gerven; Levy, 1978: 484; 497; Daniels, 2022b: 4). In historical linguistics, the family-tree model commonly orders hierarchically languages from a unique family language; and migratory movements melds present-day distribution of languages into a split-and-spread account of population history.

Childe is a key figure to the IE research history. Without doubt, he is still one of the world's best-known archaeologists and about whom much ink has been spent (Trigger, 1980; McNairn, 1980; Green, 1981; Sherratt, 1988; Harris, 1994; Patterson; Orser Jr, 2004a; Díaz-Andreu, 2009; Hirata, 2021 *inter alia*). Childe (1925; 1926) is important here mainly because

of his earlier involvement in the Aryan or Indo-German[25] philology at the beginning of the nineteenth century. His philological thesis (McNairn, 1980: 17) was designed as a contraposition to the racialist views held by the German school of prehistory championed by Gustaf Kossinna who, like Childe, was also a philologist turned archaeologist. Furthermore, Childe is responsible for the diffusion of the concept of archaeological culture in the English-speaking scholarship tributary to the work of Kossinna.

Childe (1958: 69) gave his first step in archaeology "[…] in the hope of finding the cradle of the Indo-Europeans and of identifying their primitive culture".[26] The ethnogenesis of the Corded Ware or Battle-axe culture is important in this account. In *The Aryans*, Childe (1926) maintained the association Corded Ware-Indo-Europeans made by Kossinna and opposed to the Nordic or Scandinavian thesis fundamentally in matters of sequence of cultures and direction of migrations. Childe (1926: 4) argued that language is a more reliable tool to outline prehistoric communities, at least more precise than flint, potsherds, craniometers and calipers. And in this regard, the IE speaking people "[…] must have been gifted with exceptional mental endowments […]" (Childe, 1926: 4). This racialized component would look today dissonant in the work of a scholar "[…] who dealt impeccably with race." (Renfrew, 1993b: 76), but a less anachronistic position would be to consider the Childe of the 1920s an antiracist racialist-Aryanist as racialist were countless of his generation (see Arvidsson, [2000] 2006: 282-288; Demoule, 2014: ch. 6).

Anthropology's romance with Aryan racism in the early 20th cent. was blossoming as it had been shaped Europe's self-identity and myths of origins as alternative myth to the Biblical account of origins (Poliakov, 1974; Olender, [1989] 2002; Trautmann, 1997; for "Aryan model" of nineteenth-century classical scholarship see Bernal, [1987] 2020: chs. 4-9; also Arvidsson, [2000] 2006: 41-46 for the complex relationship of Biblical narrative, IE linguistics and racial theories in the nineteenth century; Demoule, 2014: 12; 30-34; 596). In 1878, in Germany, Theodor Porsche was the first to associate the Indo-Europeans with dolichocephalic skulls with the tools of physical anthropology. Cephalic index was thus mobilized to contruct a superior physical type possessing other phenotypic characteristics as height (tall), hair (blonde), and eye colors (blue). These ideas contributed to years later, in

[25] *Indogermanisch* was coined by Julius von Krapoth and largely common in 19th-century German speaking scholarship since then to group some of the languages of the Indo-European family. See Arvidsson, [2000] 2006: 24.

[26] Thesis submitted in 1916 for the awarding of the B.Ltt degree in the Queen's College in Oxford on "The Influence of the Indo-Europeans in Prehistoric Greece," unfortunately today not preserved. *The Aryans* (1926) may contain part of his early research (Renfrew, 1987a: 16).

1886, Karl Penka link the dolichocephalic type with an Aryan racial type located in Northern Europe endowed with superior psychological capacities and willing to conquer (Childe, 1926: 163; Mallory, 1973: 30-31; Arvidsson, [2000] 2006: 142-143; Demoule, 2014: 88-89).

Childe was aware of the abuses of the idea of an archetypical Aryan race in his days in persecutory policies. However, Childe (1926: 212) himself attributed to Aryans, the tall and dolichocephalic physical type of Nordic strain, psychological superiority. After the rise to power of Hitler, Childe (1933: 198) felt compelled to clarify time again that the association between race and the concept of archaeological culture or language group is impracticable (cf. Trigger, 1980: 91). It should be borne in mind that such ideas were typical of the Romantic movement (Sherratt, 1989: 159), which projected into the past a sort of mystical community entitled by its language to pursue the path of progress (see Villar, [1991] 1996: 165-166 for a sympathetic view). No wonder to assert the views on Aryans of Childe and Kossinna were co-constituted with ideas to which race exerts a gravitational influence.

Racial origins theories and classification appear in various currents of thought that can divided into monogenists and the polygenists, a swinging between single or multiple episodes of racial creation even under the currency of the evolutionary theory of Darwin. To the last one is related the emergence of anthropological research niches as the phrenology and craniometry. Racialization and racism led to the construction of primordial identities of human groups *vis-à-vis* physiognomic features and psychological dispositions. Scientists were sure to gauge in the statistics of skull shape spiritual and moral inclinations of behavior. The linkage is a by-product of the modern colonial territorial annexation and exploitation and the mainstay to the scientific agendas of anthropological departments and museums that spanned the nineteenth century (Gould, [1981] 2014; Hinsley, 1981; Schwarcz, 1993: ch. 2; Trigger, 1989 [1996]: ch. 5; Jones, 1997: ch. 3; Thomas, 2000: chs. 3-11; Demoule, 2014: ch. 4). When social Darwinism gained popularity in the late ninettenth century, these ideas were harnessed in social public policies of social control and sectorial cleansing in segregation institutions of mental diseases, reproduction and birth control polices and eugenics programs in the United States (Lombardo, 2008; Mukherjee, 2016; Cohen, 2016), England, Denmark, Sweden and German.

Archaeological science in many countries is an intellectual offshot of Romantic ideas and nationalist ideologies of identity and alterity (cf. Trigger, [1984] 2003: 71-74; Díaz-Andreu, 2007; see also references in CHAPTER 1). In some cases, the definition of national identity was accompanied not only by a collective sense of past greatness, but also by racial segregation (Error! Reference source not found. and **Box 3)**. The most important figure to be remembered about the risks of instrumentalizing these prehistoric associations in political ideologies is Kossinna, even though his racial ideas were far from being unilateral in the intellectual milieu of his times (Díaz-Andreu, 2007: 397). In the beginning of the last century, he defined a series of correspondences between cultural groups, ceramic styles, language, and ethnic identities the *Method der Siedlungsärchaeologie* gained many followers in the prehistoric research in and outside Germany in the following decades (Kossinna, 1911). After Kossinna's death and the rise to power of the Nazi party, his romantic appeals of the *Indogermanen Volk* became doctrine of the official educational curriculum of the Nazi regime and irredentist aspirations of the Third Reich (cf. Mallory, 1973: 30-31; 39-41; Veit, 1989; Jones, 1997: 2-4; Arvidsson, [2000] 2006: 143-144; Klejn, 2008: 319-321; 325; Demoule, 2014: ch. 6).

Box 2 – Greece and Israel

In Greece, nationalist ideals did not incorporate racialist doctrines of modern colonialism. Under the influences of Enlightenment, the ideal of classical antiquity became a cultural capital for liberal education in NW Europe and shaped in many ways collective identities over the 18th through 19th century (Clogg, [1992] 2017: ch. 1; Morris, 1994; Voutsaki, 2002; 2003; Dietler, 2005; Voutsaki; Cartledge, 2017; Hamilakis, 2007; Wallace, 2018: ch. 2). The charter myth of modern Greece is thus a foreign construction (Morris, 1994: 11; Voutsaki, 2003: 233; Hamilakis, 2007: 291). The national consciousness of the Greek nation was forged in the West and absorbed by a burgeoning Greek *intelligentsia* studying abroad (Morris, 1994: 8; 20; cf. Clogg, [1992] 2017; Hamilakis, 2007: ch. 3). To Hamilakis (2007: 86; Greenberg; Hamilakis, 2022), the active role of materiality is of cementing a genealogical relationship through the routinizing and embodiement of archaeology as practice of 'purification' of unwanted other's past, in a stage of the triumph of civilization over barbarism.

Like Hellenism and Greece (Morris, 1994: 11; Hamilakis, 2007: 19), Zonism and Israel provide another interesting take on the mutual influences of colonialism and nationalism in historical constructs of national identities (cf., e.g., Trigger's ([1984] 2003) categories). Historian Shlomo Sand (2008) argues that the modern conception of a nation is behind the creation of a Jewish people by the Zionistic movement. His key interpretation is that the idea of a Jewish national community and Israel's settler colonialism operate within the same logic of national ideologies, as revealed in the conflation between nationality and religion on ID cards issued by the State of Israel for Israeli and non-Israeli (**Fig. 2.2**)

Fig. 2.2. ID card issued by Israeli authorities. The category for nationality (in Hebrew **לאום**) lists "Jewish" (**יְהוּדִי**). In: Public Domain.

In view (but not only) of DNA research emerging as a potentially major player in nationalist-cum-racist ideologies, scholars have been elaborating a strong critique of modern national identity (Sand, 2013; 2020; Greenberg; Hamilakis, 2022; see Box 4).

It took for mainstream anthropology to challenge nineteenth-century racial typologies patterned into statistical clusters, especially after Franz Boas's studies with index in New York immigrants in the early twentieth century. A grave robber and skull collector decades earlier (Thomas, 2000: 58-63), Boas had shown races do not pattern into statistical clusters. From then on, a series of criticisms leveled against the notion of race joined the chorus of cultural relativism of Boas' school in the United States. They culminated only half century later in the outright rejection of the concept of race by most scholars, largely as a consequence of the disasters of the racial policies in the United States and Europe. Since then, however, "culture," "society," "linguistic group," or "ethnic group" have filled the void left by the disuse of the term without altering the epistemological foundations of the conceptual units (Jones 1997: 48; 50-51; Hall 1997: 19-20). If the topic is to become virtually taboo and Kossinna a sort of He-Who-Must-Not-Be-Named, the ethnic identifications of archaeological culture, origins and linguistic connections are a legacy of Kossina and "*miroir grossissant* [magnifying mirror]" of mainstream archaeology all the same (Klejn, 2008: 327; Demoule, 2014: 181).

Fearful of being associated with his name in the interpretations of genomic data,

Box 3 – The *sertanejos* in the backlands

Historian Lilia Schwartz (1993) in *O Espetáculo das Raças* highlights the originality in the Brazilian *intelligentsia* of the late 19th- and early 20th century in blending allogenous elements of evolutionism and racial theory in examineìing the singular racial composition of a former settler state.

Os Sertões [Rebellion in the backlands] ([1902] 2019), for instance, mixes geographical and racial determinism to describe the Canudos rebellion in 1897. Canudos was a settlement in the Brazilian northeastern backlands of mestizos *sertanejos*, social and economically alienated populations organized around the mystical command of Antonio Conselheiro (see summary in Hecht, 2013: 44 ff.; chs. 4-5). The newborn republic launched four military campaigns and sieged the "mud-walled Troy" to finish it in a tooth and nail fight. At first, what seems like an eminent victory of civilization over millenarian beliefs – and, consequently, state territorial and symbolic sovereignty – soon turns out differently. After three successive victories of impoverished guerrillas, da Cunha, an eyewitness of the conflict, take a close look at the backland of national imagination. In the figure of the *sertanejo* da Cunha constructs a hybrid national hero (**Fig. 2.3**).

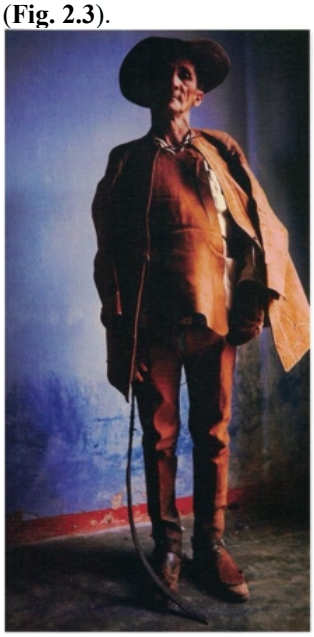

Fig. 2.3. A *vaqueiro* with 'bronze cuirass.' In: Bisilliat, [1982] 2013: 67.

Later, in an unfinished literary double to this epic, these disenfranchised heroes were transformed in the pioneer settlers of a litigious area in Brazil's western frontiers; and the battles of adapted mestizos continue in the vanguarda of a social formation in the tropical jungles. This is fundamentally the tale of the nationalization of Brazilian Amazonia, an internal colonization and huge western diasporic movement of *sertanejos* in the backdrop of imperialist geopolitics of global rubber circuits in the Upper Amazon (Hecht, 2013: 10-13; see CHAPTER 5; on the rubber exploration in Amazonia, see Hecht; Cockburn, [1990] 2022).

a good deal of *et alia* authors of Haak *et al.*'s (2015) study withdrew their participation after a preliminary version of the paper (Haak *et al.* 2015; cf. Reich, 2018: 112; see **Ancient-DNA and Indo-European research**). Reich (2018b: 112) clarifies instead that Childe's earlier steppe migration hypothesis has been proved right, evoking the memory of a less disturbing ghost. As matter of fact, this hypothesis was turned down later in *Prehistoric Migrations in Europe* (Childe, 1950a: 146-151; 210-211; 215-230). In a posthumously published life's statement, Childe (1958: 70) chide himself for "[…] over-credulous eyes for footprints of Steppe horsemen […] This was childish, not Childeish."

> Until archaeologists explore the ways in which conventional archaeological epistemology may intersect itself with racist and nationalist ideologies, in particular through the identification of discrete, monolithic, cultural entities, a whole series of implicit values and presuppositions will go unrecognized (Jones, 1997: 13).

Steppe migration hypothesis

It can be fairly asserted that the hypotheses on the IE problem have continuously dealt with the phenomenon of migration in archaeology (cf. Champion, 1992; also Daniels, 2022b: 8). And when it comes to it, the steppe migration hypothesis is the most widely supported theory among archaeologists, linguistics, and geneticists. More than half a century earlier, the location of the origin of the IE peoples in the steppes of southern Russia had already been originally defended by Otto Schrader in 1890 and, a few decades later, by Sigmund Feist in 1913, G. Childe (1926), T. Sulimirski in 1933 and Georges Poisson in 1934 (cf. Mallory, 1973: 36; 41; 44; 46; 47; Arvidsson, [2000] 2006: 239-308; Demoule, 2014: 77-86).

In post-WW 2, the late Lithuanian American archaeologist Marija Gimbutas became widely recognized as the leading figure to advocate the homeland of PIE peoples in the southern Russian steppes, between the Don and Volga and the Caucasus Mountains and the Ural Mountains. The "Kurgan hypothesis" is still certainly the most popular solution among experts (Villar, [1991] 1996: 40; Mallory; Adams, 1997; Fortson, [2004] 2010: 46). Gimbutas gained wide notoriety in the cultural feminism and Goddess circles after the mid-1970s with the "work of Goddess" (Gimbutas, 1974; 1989a; 1991). At least for the late 90s it may be possible to say that she was probably "[…] the best-known archaeologist in America" (Chapman, 1998: 292). There is is continuous after her death in 1994 in her life story and intellectual legacy in laudatory pieces, *ad hominem* attacks and historiographically critical contributions (Marler, 1997; Anthony, 1995; Meskell, 1995; Chapman, 1998; LaFont, 1998;

Milisauskas, 2000; Elster, 2007; 2015; Κοκκινίδου; Νικολαΐδου, 2014; Spretnak, 2011; Riboldi, 2015; ; Kokkinidou, 2020; Navickaitė, 2023).[27] As it should be, Gimbutas's ideas have been foregrounded in connection to the steppe theory and IE research, which peaked with the new evidence of aDNA research that have supported some aspects of her ideas (Renfrew, 2017; Demoule, 2014: 388-425; Brami, 2021; Preda-Bălănică, 2021; Anthony, 2022; Kristiansen; Kroonen; Willerslev, 2023; Peixoto fortcoming).[28]

Gimbutas' (1989a) work traces the events forging "Western civilization" (read Europe) from the origins of agriculture and "Old Europe," through the IE invasions and hybrid cultures that arosed out of this encounter between two civilizations as distinct as they could be in terms of cosmology and religious symbols, social organization, and modes of economic exploitation. As the argument went in its developed form, Old Europe was a women-centered civilization, peaceful and egalitarian primary of SE and central Europe formed in a protacted process of agriculture diffusion and the sedentary economy way of life (neolithization) (Gimbutas, 1974; 1989a; 1989b; 1990; 1991; 1999; Leslie, 1989; SIGNS out of time, 2003 cf. fierce criticism, post-structuralist gender-based critiques and critical reception in Tringham, 1991; Talalay, 1994; Tringham; Conkey, 1995; Meskell, 1995; Anthony, 1995; Chapman, 1998; Elster, 2007; 2015; Arvidsson, [2000] 2006: 288-295; 2014; Spretnak, 2011; Graeber; Wengrow, 2021: 214-220; Navickaitė, 2023: ch. 4).

The Kurgan hypothesis was originally elaborated by Gimbutas in 1956 in her monograph *The Prehistory of Eastern Europe: Part I: Mesolithic, Neolithic, and Copper Age Cultures in Russia and the Baltic Area*. The Kurgan theory defines a series of past movements of horseman migrants whose footprints of culture traits go right into the Russian steppes. The name of this culture – "kurgan," a Russian and Turkish word for barrow – designates the earthen burial mounds that cover graves in the pits of male individuals. The "Kurgan culture" is a broad 'umbrella' to order in a chronological sequence the archaeological phenomena related to the IE culture, language and expansion during the 5th, 4th and 3rd millennia BC (**Fig. 2.4**). To Gimbutas, the socio-economic organization, funeral customs, and religious beliefs define a clear-cut cultural superstratum that imposes through successive migratory waves over

[27] One session in the Nordic TAG in 2011, "After Gimbutas. Mobility of Culture in 21st-Century Archaeological Studies," was inspired by the scholar to create an epistemologically orientated environment of discussion on mobility. Marler (1996; 1997; 2022) have been announcing a Gimbutas' biography since the 1990s.

[28] It is also worth noting the memorial lectures held in The Oriental Institute of the University of Chicago since 2017. Her birth anniversary was commemorated by UNESCO's 2021 Centennial honoree and a virtual Round Table "Marija Gimbutas: A Magnificent Vindication."

the Neolithic cultures of Old Europe. In her latest publications, Gimbutas differentiated three big migratory waves in a long temporal spectrum of 2500 years.

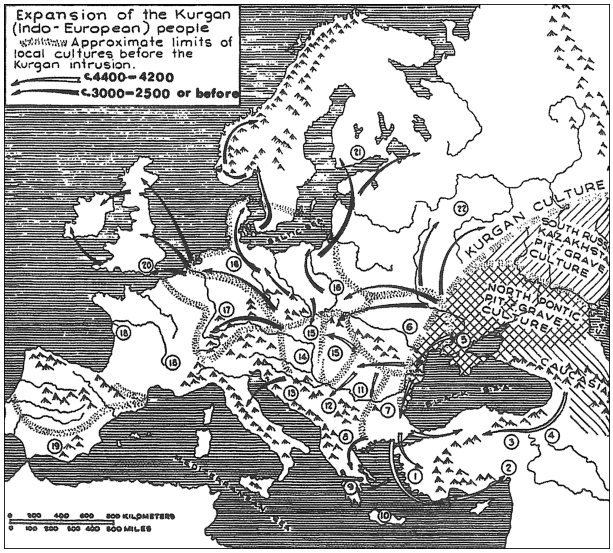

Fig. 2.4. Kurgan invasions into European community territories. In: Gimbutas, [1963] 1997: 23, fig. 2 (modified from Gimbutas, 1963: 826, fig. 2).

The Kurgan expansion was constituted mainly by processes through which whole indigneous cultures are displaced from their home territories, completely destroyed or restructured with elements of the invading culture (cf. Gimbutas (1970: 197; 1993: 206; [1993] 1997: 360-361). Physical change of the population is not a necessary condition of the process of Indo-Europeanization. This process attains a progressive but never complete "kurganization" of Europe. Old Europe heritage still surivives to day as an undergroung current in the of folk customs and traditions as in her homeland, last frontiers of Christianity in the continent and distant echo of a anti-modern 'Golden Age' peasant cultures (see e.g., Gimbutas, 1958: 3; 1999; Riboldi, 2015: 191; Elster, 2007; 2015).

The domestication of the horse is a prime mover and the technological means (Gimbutas [1979] 1997: 241) for Kurgan expansion. Gimbutas (1993: 207-208; [1993] 1997: 355-357) believed that the horse had been domesticated for riding purposes and that, in addition to travel distances and have facilitated the development of pastoral and trade, the Kurgans pursued strategies of war and wealth accumulation through looting and subjugation. Riding on horses, in control of harnesses made of organic materials such as ropes or leather straps with bone or horn cheekpieces for the horse's bridle (Gimbutas, 1970: 158; 159, fig. 2) and armed with bifacial spearheads, triangular flint arrowheads, polished stone axes and daggers (Gimbutas [1979] 1997: 241; [1985] 1997: 306; 1991: 361), the archaeologist pictures a "[…] a drastic

cultural change reminiscent of the conquest of the American continent" (Gimbutas, 1991: 352).[29]

The repercussions of these incursions provoked reactions of wholesale displacement of populations established in these regions, not unlike the impact roll of balls in a billiard game in setting in motion abstract concepts as agents of change (Wolf, 1982: 6; cf. Sherratt, 1988: 459; Sherratt; Sherratt, 1988: 584; Renfrew, 1989: 107; 1992b: 18; Anthony, 2007: 108; cf. Hornborg; Hill 2011a: 1) (**Fig. 2.5**). Gimbutas never clarified what she meant by the Kurgan migrations, modalities of interaction or the transformative impact (Does it always involves physical incursion of people or is it also a matter of cultural transmission?) (Kristiansen, 1989; 221, n. 4; Elster, 2007: 104; Demoule, 2014: 406-407; Mallory; Adams, 1997: 338; Anthony, 2021: 71; cf. Adams; Van Gerven; Levy, 1978: 485-486; 493; 501). Moreover, she did not deal with the epistemic heritage of her explanatory concepts (Kristiansen, 1989: 214).[30]

[29] Here, it is worth highlighting, in line with Riboldi (2015: 71, n. 48; 189, n. 66; see also Brami, 2021), however, that this military aspect and conflict engendered by the IE forces were progressively reinforced in her writings of the 1970s *pari passu* to the narrative of a pre-IE strata hinted in *Gods and Goddesses of Old Europe* (1974)

[30] Even more disturbing, Gimbutas seems to had collaborated with field specialists criticized for supporting racist ideas, as Roger Pearson, former member of the editorial board of *JIES* and, integrated the "Comité de patronaige" along the same, Alain de Benoist's journal *Nouvelle École* (Arvidsson, [2000] 2006: 303-304; Demoule, 2014: 298-299; 396; Bojs, 2017: 252; cf., on the French *Nouvelle Droite*, see Schnapp; Svenbro, 1980). Swedish journalist Bojs notes her silence around the Nazism and Holocaust when Gimbutas (1990: 319) wrote about the two biggest world's dramas, the Christian Inquisition and Stalin's totalitarianism (Bojs, 2017: 253; cf. Navickaitė, 2023: 164-165). Indeed, the life of Gimbutas during the two Soviet occupations in Lithuania sound particularly harsh. Several friends and members of her family were deported or died and Gimbutas herself enrolled in the Lithuanian Uprising liberation movement against the Bolshevik troops (Marler, 1996: 39-40; 2022: 15; Milisauskas, 2000: 803). The suggestion that Gimbutas' model of Kurgan dramatic invasions into Old Europe and the occupation of Soviet troops in eastern Europe share strong resemblances surely hits the mark (Meskell, 1995: 78-79; Chapman, 1998: 297-301; Arvidsson [2000] 2006: 293 cf. 298-299, figs. 14.3, a-b; Bojs, 2017: 253 *contra* Milisauskas, 2000: 803-804; Navickaitė, 2023: 126-129), in line with the extensively suggested relationship between life, national and generational experiences and different attitudes practice and theory of migration (cf. Kohl; Fawcett, 1995a: 16; Chapman, 1997: 11; 14; 1998: 287-288 Härke, 1998: 24; 41). According to Elster (2007: 85; 2015: 95; see also Navickaitė, 2023: ch. 6), political aspirations for independence and democracy in Lithuanian civil circles were part of Gimbutas nationalist-romantic early formations, accentuated in the post-Soviet Lithuania movements. Most scholar forget, however, to mention about the German occupation of Lithuania in 1941. As Chapman (1998: 291) observes, "[…] Gimbutas clearly believed Hitler's Germany was the lesser of the two evils in comparison with Stalin's Red Army. It is difficult to assess the degree to which Gimbutas tacitly accepted Nazi aims […]". If anything, the war period was very difficult to Gimbutas and her family. Her mother hid two Jewish women in her country property close-by Kaunas and the Vilnius University was closed in 1943, so Gimbutas had to defend her thesis under the covers (Marler, 1996: 40). Other aspects of her biography should be considered, as for instance academic influences of German diffusionist school during her doctoral studies at Tübingen (Chapman, 1998: 291; Demoule, 2014: 390). Also, other male, white Anglo-American archaeologists have to be submitted, as not of yet, to the same scrutine (Navickaitė, 2023: 127).

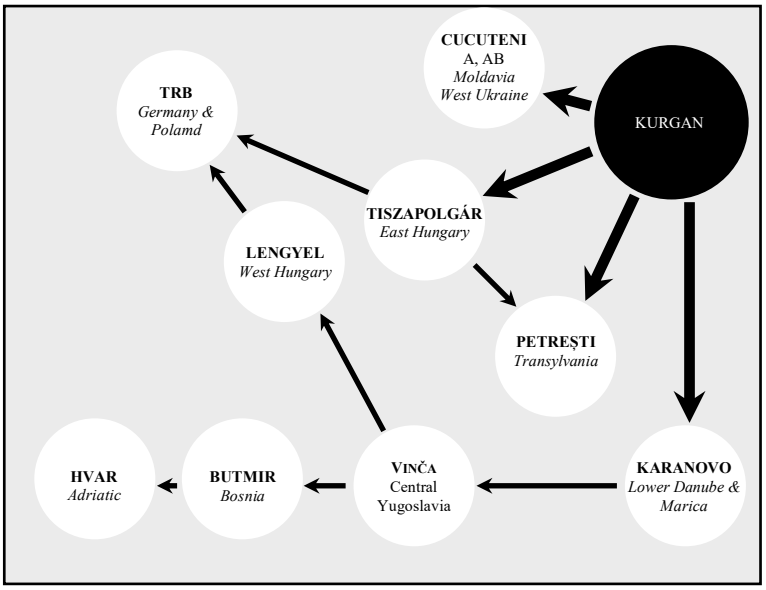

Fig. 2.5. Transformative impact of the wave no. 1 (ca. 4400-4300). Modified from: Gimbutas [1977] 1997: 217, fig. 15.

Concepts and terminology of human mobility and precise mechanisms may be a latecomer in archaeology theory, but the phenomenon is immanent to society (see **Archaeology of mobilities**). The litany of complaints about culture-history assumptions by most new archaeologists since the late 1960s opened up a large gap between mobility and migration and "retreat of migrationism" (Adams; Van Gerven; Levy, 1978). The late G. Clark (1966: 173) diagnosed an "invasion neurosis" among his fellow British prehistorians. In the 1970s, Renfrew published his iconic *Before civilisation* (1973b), a new European prehistory narrative constructed out of the new available radiocarbon dates. The prospects for the subject in the 1980s were not any better under postprocessual approaches which were a form of magnification of small-scale histories.

The topic, however, remained well and alive in the culture-history vein traditions of Americanist and continental archaeologies as in Germany (Rouse, 1986; Härke, 1997 Veit, 1989). As of the end of the 1980s onwards, archaeologists start to encourage the incorporation of migration into archaeology's theoretical and methodological apparatus beyond the two dimensionality of migrationists and anti-migrationists in step gradients of patterns and modalities of interaction in concepts such as "population movements" (Kristiansen, 1989: 219; 1998: 314-320; cf. Hakenbeck, 2008: 19). In the intervening period two *summa indo-europeicea* relevant to the discussion of migration and IE problem appeared, by C. Renfrew and J. P. Mallory.

In 1989, Mallory publishes *In Search of the Indo-Europeans*, a systematic survey of comparative linguistical and archaeological evidence of the IE problem, one that continues the

work of his thesis's supervisor at UCLA in the 1970s, Gimbutas.[31] It is an revised version of the steppe migration hypothesis that lay stress on the fact that folk-migrations did happen in prehistory (Mallory, 1989: 166). *In Search*… Mallory settles up a series of linguistic guideposts for tracking ancient migrations into areas where they were first recorded. In many notes to the book, he exposes the serious flaws in the linguistic arguments of the Anatolian migration hypothesis (see below).[32] The linguistic corollary to his argument set a timespan to the existence of PIE speaking community between the 5th and 3rd millennium BC. In archaeological terms this is a process of cultural development and convergence by interaction in the Pontic-Caspian block since the Mesolithic period, including the Dnieper-Donets culture which for Gimbutas were from a different cultural matrix from his Kurgan culture. The emergence of the Yamanaya culture in the 4th millennium BC "[…] 3,000 kilometers across […]" (Mallory, 1989: 211) Dniester and Ural rivers, related to stockbreeding activities and wheeled vehicles, sheep and horse domestic animals signals the unity of PIE culture before its dispersion (ibid., ch. 7).

Intruders were found buried in kurgans spread all over SE Europe, who brought with them new technologies and socioeconomic practices as pastoralism. This expansion opens a bridge over steppes and SE Europe through which flow people and languages from the 4th and 3rd third millennium BC. The genetic links of the steppe with the Corded Ware horizon represents a westward genetic and cultural influx and expansion of the Celtic, Germanic, Baltic, and Slavic and possibly languages from the Italic branch. Afanasievo culture is the eastward arm of the expansion process, associated to Tocharian. Greek, Armenian, Indo-Iranians, Thracian, Phrygian, Illyria and other languages from the Italian branch (Messapic, for instance) are all linked together in an arch through Balkans and west Siberian, sharing later linguistic innovations. Indo-Iranian speakers are identified with Andronovans and its southward movements during the 2nd millennium BC into India. In essence, Mallory does not follow Gimbutas in two points: 1) in questioning the steppe-origin of Globular Amphora culture; and 2) not tracing steppe expansion into the Caucasus (through the Kura-Araxes valleys). Rather,

[31] In a face-to-face interview for the Swedish journalist K. Bojs, Mallory commented on Gimbutas' outdated culture-history-loaded teaching method (cf. Elster, 2007: 87; 106-107, on Gimbutas' model in archaeology and the watertight boundary between Gimbutas' thinking and the ongoing theoretical and methodological developments of archaeology. E. Elster, Research Associate at UCLA Institute of Archaeology was directed in her graduate studies by Gimbutas).

[32] For instance, the linguistic affinities between Greek and Armenian, and Greek and Indo-Iranian branches, the time of divergence of continental and insular Celtic, and historical linguistics reconstructions of wheel- and wagon-related words (Mallory, 1989: 273-274, n. 10; 274, n. 11; 274, n. 19; 275, n. 25).

he supposes an incursion through the NW tip of Anatolia, made by "kurganized" Balkan cultures around 3000 BC (Mallory, 1989: ch. 8).

The main case studies elaborated by the American archaeologist D. Anthony (1986; 1990; 1992; 2007) also deals with the archaeological cultures of the northern shores of the Black Sea and the debate of PIE origins and expansion but in a very critical take. The core of his model is the dynamic interplay between economic exploitative strategies of ecological zones in the formation of the Yamnaya horizon. Outlining a much-overworked theme of the expansion of pastoralist societies, Anthony (1990: 905 ff.; 1992; 2007 *contra* Chapman; Doluhanov, 1992) frames migration as a social resource and strategy of groups with regular and predictable outcomes in the interplay of push/pull factors (**Fig. 2.6**).

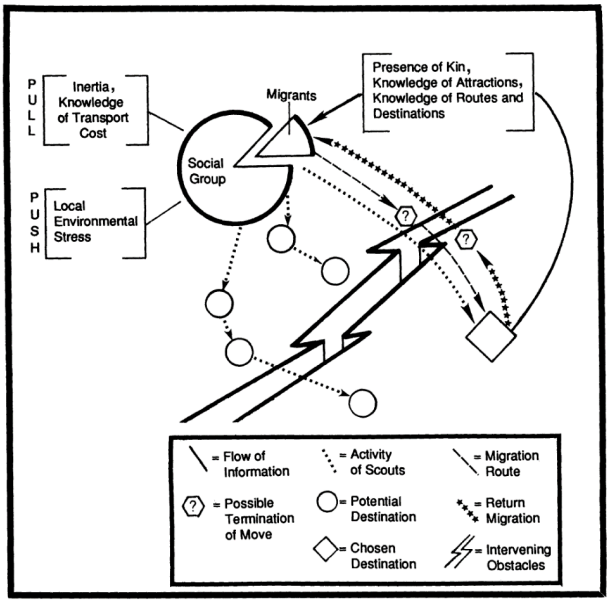

Fig. 2.6. The structure of migration. In: Anthony, 1990: 899, fig. 1.

In *The Horse, the Wheel and Language* (2007) is a must-read reference to the basics of IE question, migration theory and the relationship between language and material culture. The concept of robust culture frontier (Anthony, 2007: 105), closely related to a definition of culture as "[…] co-occurrence of many similar customs, crafts, and dwelling styles across a region […]" (Anthony, 2007: 131) and socio-economic niches, is critical for the operationalization of archaeological and linguistic concetps in general.

There are basically two key differences in respect to Gimbutas' theory. The first is the introduction of farming migrants and practices (plants and animals) from SE Europe in the Pontic-Caspian steppe zones in the 6th millennium BCE that represent an important process to consolidate linguistic and material culture frontiers between non-IE farmers – possibly speaking an Afro-Asiatic language (Anthony, 2007: 147) – and Pre-PIE foragers around the shores of the Black Sea (Anthony, 1986: 293; 2007: ch. 8). Thus, "Old Europe"[33] and Pontic-Caspian steppes cultures "[…] was the most pronounced divide in prehistoric Europe […]" (Anthony, 2007: 162; cf. id., 1986: 304; 1990: 906). The second is a resistance to pinpoint a specific homeland for the Yamnaya horizon.

[33] "[…] a description that would have satisfied Marija" (Elster, 2015: 100).

Anthony uses comparative linguistic both to effectuate the paleocological and socioeconomical reconstruction to establish the geo-chronological boundaries of the PIE. In his rationale, to infer technologies such as wool spindle and wagon transport in the proto-language is a fundamental step alongside the archaeological supportive evidence. Evidence points to a *terminus ante quem* of PIE of 4000/3500-2500 BCE (id., 2007: ch. 4). It results that for the archaeologist the homeland must be placed in temperate climate and the archaeological groups investigated must practice farming and stockbreeding in addition to possess technologies of textile production and wheeled transport paired by oxen that increased the exploitation of the steppe-niche environment (id., 1990; 2007: ch. 5).

The Yamnaya people, as Athony's argument goes, are the PIE speakers and its dispersion represents a pan-Pontic-Caspian steppes phenomenon between 3400 and 3200 BCE, but it is "[…] just one part of the original core of Gimbutas' Kurgan culture concept" (Anthony, 2007: 307). Anthony (2007: 343; 464; cf. Anthony; Ringe, 2015: 214) pictures the expansion of PIE languages into Europe "[…] was more like a franchising operation than an invasion" through institutions of patron-client and guest-host relationships. To Anthony (2007: 221-22), horse domestication is situated in the last quarter of the 5th millennium BC. Horseback riding, the argument goes, also implied a higher mobility which resulted in the long-distance migration of a herding elite into the Danube delta around 4200-3900 BC (ibid., 251) and into Transylvanian plateau and eastern Hungary. Clientelist relations and interbreeding between local populations and the minority steppe became currency after the assailing of the tell settlement. Afanasievo archaeological culture of 3500 BCE would represent a population detachment from the Volga-Ural steppes, in a period pre-dating the Yamnaya horizon, associated with the Tocharian branch (ibid., 264-265).[34] In the other side of the western branches of the IE family are associated with a three-folded process of expansion of Yamanaya culture from 3300 BCE onwards, north and south of the Carpathians Mountains: 1) cultural contact and integration in the form of client-patron relationship in the Prut-Dniester corridor; 2) expansion of this network of client patronage upper the Dniester, responsible for the western block of IE languages; and 3) a massive and continuous migration into the Danube valley (ibid.,

[34] However, in aDNA studies, Botai individuals lack the Caucasian component of the 'Yamnaya ancestry' (cf. Damgaard *et al.* 2018: 1426).

ch. 14).[35] Indo-Iranian languages was spoken by Sintasha people, the drivers of two-spoked-wheel chariot and javelin shooters around 2000 BC (ibid., ch. 15).[36]

The horizotal mobility attained by the use of horse and wheeled vehicles in the exploitation of the steppe-zone resources by theses tribes is paralled by vertical mobility. As Reich (2018: 108; cf. Anthony; Brown, 2017: 37; Anthony, 2022) reminds us, as of 2015 few archaeologists would still support in terms of massive migration the spread of the Yamnaya culture complex. Other important aspects of the argument were also challenged by the new data derived from paleogenomics. For instance, the scenario of the arriving of the Anatolian languages out of the steppes through NW Anatolia (Mathieson *et al.* 2018: 201; de Barros Damagaard *et al.* 2018b; cf. Heggarty, 2018: 166; Kristiansen, 2020: 159).

The fundamental contribution of the work of Anthony (1990; 1997; 2007; 2022) in general is his theoretical reflection to the topic of human migration as a social and economic process in archaeology. In order to meet the challenges of the bewildering variety of migration, the archaeologist runs through an entire gamut of short- and long-distance types (Anthony, 1990: 902-905; 1997: 26-27). Short-distance migration includes people moving within ranges kinship netwroks and ecological continuities (local migration). Long-distance migration embraces seasonal movement (circular migration); people settling in a new and distant territory retracing routes taken previously by kin groups (chain migration or leapfrogging); a migration back to home region (return migration); moving of specialists to demanding regions (career migration); and forced displacement caused by political contingencies as war or environmental disasters (coerced migration).

[35] The outward migration of Yamnaya people into Hungary and the lower Danube as suggested by tumulus pit-graves was explicitly acknowledged by Anthony (1986: 301) and it was subsequently dealt with in other articles (Anthony, 1990; 1992).

[36] Anthony and Ringe (2015) provide a neat summing-up of the main arguments of the steppe hypothesis, migration route and linguistic splitting-off process. "Archaic," "early," or "post-Anatolian," and "late" PIE stand for different stages of the strand of the linguistic continuum and the events of linguistic diversification of the Anatolian and Tocharian branches (ibid., 201) against which the wagon/wheel vocabulary and archaeological evidence for wagon's parts must fit in. The post-Anatolian PIE (4000-3500 BC) is the only period that fully covers the invention of wheeled vehicles and the developing of a shared wheel-axle vocabulary between all the non-Anatolian languages (Anthony; Ringe, 2015: 201-202; Anthony; Brown, 2017: 33-35). The core of the argument is much the same as outlined, so not worth recapping the population movements and linguistic relationships implied (see Anthony; Ringe, 2015: 208; 211).

Ancient-DNA and Indo-European research

In the last couple of years, the steppe migration hypothesis has received much archaeological attention in the light of ancient genomics (Anthony; Ringe, 2015; Anthony; Brown, 2017; Heyd; Kulcsár; Preda-Bălănică, 2021; Kristiansen; Kroonen; Willerslev, 2023). The extraction and full genome analysis from skeletal remains followed by next-generation sequencing and methods of estimation of DNA degradation are the main breakthrough of the "aDNA revolution" (Kristiansen, 2014; 2022a; 2022b; Der Sarkissan *et al.* 2015; Callaway, 2018; Reich, 2018a; 2018b; Piscitelli, 2019; Krause; Trappe 2021) (see **Archaeology of mobilities**). "The coming of geneticists" sweep as a barbarian wave in the study of human past and maybe it is not a good idea, probably no longer possible (Burmeister, 2017: 65), I tend to agree with Reich (2018: 128), to ignore their presence. With the insights and lens of paleogenomics, I shall discuss the IE migrations and language dispersal hypotheses.

June 2015 has been marked as a turning point in the study of 3rd millennium BC archaeology, migrationist theory and Indo-Europeanist research (cf. Heyd, 2017: 348). Two studies conducted by two independent laboratories reported the same genetic signal (Haak *et al.* 2015; Allentoft *et al.* 2015). The genome-wide data of ancient humans systematized by both papers pointed out a genetic input in the genomic signature of Europe during the BA.

The archaeological population source of this gene flow in Central and North Europe was traced both in Allentoft (*et al.* 2015) and Haak (*et al.* 2015) to the Yamnaya culture of the Eurasian steppes (or Pontic-Caspian steppe).[37] And based on the high

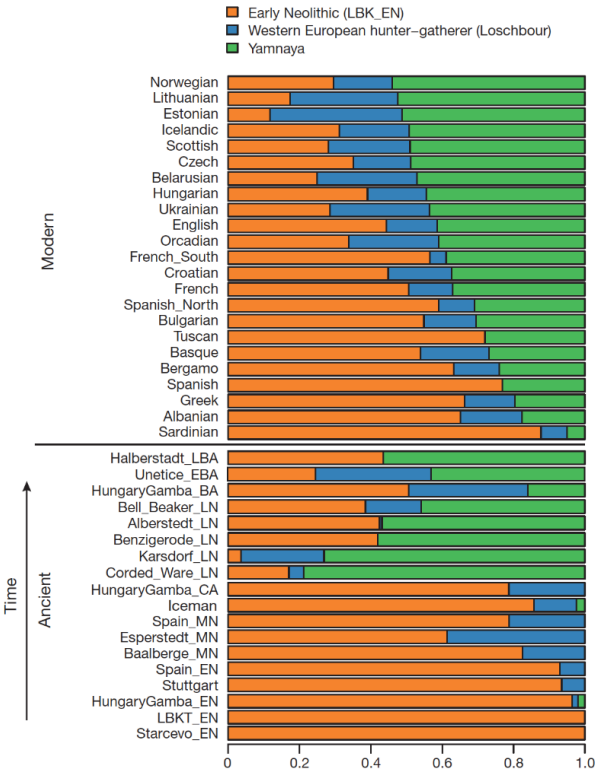

Fig. 2.7. Admixture proportions of each of the three ancestral sources in present-day and ancient population samples across Europe. In: Haak *et al.* 2015: 210, fig. 3.

[37] The human remains of nine individuals were collected in cemeteries located in the Russian city of Samara, in the Volga-Ural steppes, during the archaeological season of 2012 of the Samara Valley Project, directed by David Anthony. According to Callaway (2018: 575), Anthony himself had excavated the human remains that went back to the Copper Age and piled all the bones, inside boxes, in his car so as to deliver them to Reich's laboratory. The five sampled individuals associated with Yamnaya archaeological culture analyzed by Willerslev's lab were taken from burials contexts located in the North Caucasus/Caspian steppes dating to Copper Age-Early Bronze Age

rates of genetic contribution of the Yamnaya-related rates in samples assigned to Corded Ware cultural complex (**Fig. 2.7**), they inferred a massive westward thrust from steppe people that brought to temperate Europe genes alongside languages of the IE family language (Allentoft *et al.* 2015: 168, fig. 1; Haak *et al.* 2015: 217, fig. 4, c). Allentoft *et al.* (2015: 169) also suggested an eastward expansion with the genomic data of two individuals related to the Afanasievo archaeological cultute of south Siberia.

Questions have been raised about the claimed genetic support of the steppe hypothesis. Heggarty (2015; cf. 2018) argued in a blog post that the interpretations advanced by both teams overlooked much of the full complexity of the IE problem. There is also a series of critical takes by archaeologists of the early development of aDNA research (e.g., the "'first wave' criticisms" (Daniels, 2022b: 14; Hofmann, 2015; Vander Linden; 2016; Burmeister, 2016; 2017; 2021; Furholt, 2018b; 2019a; 2019b; 2021; Veeramah, 2018; Hakenbeck, 2019; Frieman; Hofmann, 2019; Crellin; Harris, 2020). The late Leo Klejn (*et al.* 2018) in a discussion article argued for an earlier Scandinavian homeland hypothesis for the origins and split of the PIE that few specialists today would adhere today.[38]

Technological improvements in molecular biology hide, however, a more unsophisticated side of outdated explanations such as society-level migration (cf. Vander Linden, 2016: 720; Eisenmann *et al.* 2018: 1; Furholt, 2018b: 161; cf. 2019a; 2019b: 54; 2021: 2; 39). The panoramic perspective gained by the aerial sample coverage is highly unbalanced to the big interpretative leaps and headings. Self-praise and unbridled enthusiasm led Reich (2018b: xx) to declare even that aDNA "[…] has surpassed the traditional toolkit of archaeology […]". There a growing undercurrent of skepticism about grandiloquent conclusions such as that (cf. Burmeister, 2016: 52-57; 2017: 66; cf. critical reviews of Reich's (2018b) book in *Curr. Anthropol*. vol. 59, n. 5; also Burmeister, 2019). Punning the 2015 papers' titles, journalist Lewis-Kraus (2019) in a critical essay for the *New York Times Magazine* reveals:

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period. The molecular material extracted from nine ancient individuals associated with Corded Ware/Battle Axe material culture from Estonia, Poland, Sweden, and Germany (Allentoft *et al.*, 2015) and from five individuals from Corded Ware cemeteries in Germany (Haak *et al.* 2015) detected this intrusive population element.

[38] Klejn's paper might have been much more persuasive if he had considered the two-way genetic admixture of Yamnaya people and its specific contribution to the modern-day European genetic pool. He focuses on the shared EHG ancestry both in Scandinavian hunter-gatherers and Early Bronze Age herders from the steppe. In a word, he wants to derive all shared genetic ancestries, including the Caucasian-related, from one ancestral population from northern Europe. Klejn (*et al.* 2018: 7-8) considers EHG a genetic substrate from Mesolithic Scandinavia which entered Europe and southeastern regions in the Dnieper and Donets during the Late Mesolithic and Early Neolithic. Here, he reveals he cannot understand the connection of the Caucasian-related ancestry brought by the Yamnaya into Europe via Yamnaya-Corded Ware migrations. Again, that Yamnaya's genetic combination is a specific signature of Yamnaya's genetic profile.

> One told me that I should model this article after the format of the standard Nature paper: 'Ancient DNA Reveals Massive Population Turnovers in the Humanities,' she suggested as a title, and proposed this as an abstract: 'The aristocratic lab scientists arrived with their superior technology and displaced the pre-existing researchers and their primitive truth-implements and overcomplicated belief systems.'

Uniformitarist concepts of migration and invasions are not of great help for unraveling the threads of complex interactions contexts marked by continuous and long-range cultural contacts and gene flow (Hofmann, 2015: 460; Vander Linden, 2016: 723; Heyd, 2017: 351; Furholt, 2019a: 116-117; 2019b: 56-58; 2021: 4). The network of these interactions can be seen as a too dense mesh to be represented as sweeping arrows on a continental map – the "God's eye" perspective of the genetic population history (cf. Hakenbeck, 2008: 16). It is in the local-focused contexts that combine multiple scientific methods that the full potentialities of ancient biomolecules are best recognized. This made up the plea for more 'bottom-up' perspectives over the last years, and which seems to direct research towards a mature and collaborative environment (Hakenbeck, 2008: 19; 2019: 7; Vander Linden, 2016: 724; Johannsen *et al.* 2017; Callaway, 2018: 576; Furholt, 2018b: 171; 2019a; 2019b; 2021; Veeramah, 2018: 87; Racimo *et al.* 2020b).[39]

'Yamanayas ancestry'

The genomic data of more than two hundred ancient individuals across Eurasia collected between 2014 and 2015 by different laboratories provided a deep temporal transect of genomic change across Europe, notably its central region (Gamba *et al.* 2014; Allentoft *et al.* 2015; Haak *et al.* 2015; Mathieson *et al.* 2015).[40] The discontinuity associated to genetic admixture events had been already identified in former studies. This new component constitutes one of three main components of the gene pool of all present-day Europeans

[39] In this direction, studies of 6th-7th AD cemeteries in western Hungary (Szólád) and northern Italy (Collegno) provide a large paleogenomic data for single contexts. With results of isotopic analyses and material culture patterning, Amorim *et al.* (2018: 8-9) were able to point out the direction of migration, the interindividual genetic variability, as well as the overlapping of grave goods with kindred groups genetically defined. Statistics refining population models as to infer biological relatedness, genetic divergence, and admixture events are also very powerful tools to detail aDNA information (cf. Racimo *et al.* 2020b, who have described some of them). The development of precise new methodologies to modelling the distribution of rare allele variants in whole-genome panel of modern-day populations, for instance, has been providing important insights on migrations (cf. Schiffels *et al.* 2016; Schiffels; Sayer, 2017, for a study on Anglo-Saxon migrations in East England).

[40] Until 18th July 2018, the number of Eurasian ancient genomes published amounted to 1,545 individuals (Veeramah, 2018: 86). The unpublished totalizes for the same year 3,748 samples! (cf. Reich, 2018: xvi, fig. 2).

populations. Lazaridis (*et al.* 2014: 409) observed for instance that it can only be statistically reconstructed with a genetic input of a source population related to the twenty-four-thousand-years-old Mal'ta individual (MA1) found in south-central Siberia, near the Lake Baikal (Raghavan *et al.* 2014). The hunter-gatherer Mal'ta's genome shows a close relationship with the genotype of contemporary Europeans and Native Americans (Raghavan *et al.* 2014: 89), a direct descent of a "ghost population".[41]

The ancestry of this lineage of the Mal'ta have been known as Ancestral North Eurasians (ANE), in turn a descendant of an earlier lineage, Ancestral North Siberians (ANS) (Sikora *et al.* 2019: 184). ANE ancestry is found nowadays all over Europe and in the Caucasus, in the Near East but not in Western Hunter Gatherers (WHG) and Early European farmers (EEF), with exception of Scandinavian hunter gatherer (SHG) (Lazaridis *et al.* 2014: 411). SHG samples thus occupy an intermediate position in a cline across Europe between WHG and eastern hunter-gatherer (EHG) ancestry, the descendant group from a widespread lineage in north Eurasia over the Mesolithic period (Haak *et al.* 2015: 208). Geneticists had been already aware of the strong possibility that the coming of the ANE ancestry into Europe was a good proxy for the purported Kurgan/Yamnaya migrations.

Yamanaya-related ancestry is modelled by a mixture of two ancestry profiles. Some late steppe herders Yamnaya individuals, dated around 3000 BC, plot in a midway position between hunter-gatherers from Russia with EHG-related ancestry and present-day Near East/Caucasus (Armenian and Iranian-related) in the principal component analysis (PCA),[42] (Haak *et al.* 2015: 208; Reich, 2018a: 109; Mathieson *et al.* 2018: 200). Around 3/4 of the EHG-related ancestry were picked up from ANE, which in turn entered both the gene pool of Europeans and Native Americans (Lazaridis *et al.* 2016: 423).

The phenotypic features of this incoming steppe population are indicated by the single nucleotide polymorphism (SNPs) associated with skin lighter pigmentation, blonde hair, brown eyes, and lactose persistence (Allentoft *et al.* 2015: 171; Mathieson *et al.* 2015: 501). It was also pointed out that they had higher stature compared to earlier farmers, a genetic impact which can be still observed in the present-day Europe height gradient: low rates in south and higher rates in northern regions (Mathieson *et al.* 2015: 502).[43]

[41] A population group created by geneticists to account stages before admixing events in populational history (cf. Der Sarkissian, 2015: 3; Pickrell; Reich, 2014: 380; Reich, 2018: 81).
[42] PCA, a mathematically based statitics, is used in human genetics for displaying the difference between the mutation frequency of sampled data in clinal distrubiton.
[43] Aspects of skin, hair and eye color have been particularly coloring interpretations of incoming groups in press release (Brophy, 2018; Frieman; Hofmann, 2019: 530-531).

Further studies assessed the ancestors of Near East/Caucasus ancestry in ancient individuals who harbored the 'Yamnaya ancestry.' Jones (*et al.* 2015) defines an ancestral lineage which split from WHG and another from earlier farmers in western Anatolia respectively 45,000 and 25,000 BP. The Caucasus hunter-gatherer (CHG) clade clusters in a separate area of the PCA analysis with WHG and early farmers, in proximity with modern Eurasian populations, particularly from Central and South Asia (Jones *et al.* 2015: 4). It is part of a population which occupied a broader region between the south of Caucasus and the Levant since the Holocene and whose contribution is significant in the present-day populations further east and the Ancestral North India (ANI) (Jones *et al.* 2015: 5). ANI, in a word, is a genetic component which did not exist in unadmixed form in present-day Indian populations (Lazaridis *et al.* 2016: 423). ANI ancestry has been associated with IE language spread in the Indian subcontinent.

Jones (*et al.* 2015: 3) revealed that the CHG ancestry shows a close affinity with modern populations from southern Georgia and Central Asia. In Europe, however, its higher input in northern Europe contradicts the expected phylogenetic relationship, since early farmers formed a clade with CHG when WHG ancestors split and clearly points to a genetic input via steppes (Jones *et al.* 2015: 4). Lazaridis (*et al.* 2016: 422), by his turn, concludes that BA steppe-related ancestry harbors 43% of Chalcolithic-Iran-related genotype, which in turn is made of ancestries related to Neolithic populations of western Iran and Levant in addition to the CHG ancestry (Lazaridis *et al.* 2016: 423). In other words, these findings have supported the view of the spreading of Near East ancestry into the steppe, beyond Caucasus (Lazaridis *et al.* 2016: 423).[44]

In addition, Mathieson *et al.*'s (2018) research suggests also a westward movement of this Caucasus/Iran source population, i.e., through Anatolia, to account for the increase of CHG-ancestry in five individuals from southern Greek Neolithic. The absence of steppe-ancestry in BA Anatolians individuals, who harbor the CHG ancestry, could lend support to the Caucasian cradle of the PIE or at least some of its purported population movements (Mathieson *et al.* 2018: 201; also Wang *et al.* 2019: 10; Kristiansen, 2020; Lazaridis *et al.* 2022). Wang *et al.* (2019) detected ancestry profiles in ancient individuals of northern Caucasus associated with farming populations further south, beyond the Caucasian corridor. This suggests that this massive geographical barrier did not prevent the gene flow from the

[44] cf. Broushaki *et al.* 2016: 501-502, however who claims that "[…] Neolithic Iranians were unlikely to be the main source of Near Eastern ancestry in the Steppe population, and that this ancestry in pre-Yamnaya populations originated primarily in the west of southwest Asia."; Jones *et al.* 2015: 4, who considers that the CHG ancestry came through the Caucasus into the steppes via the Maikop culture; cf. also Reich, 2018: 109 for the same timing.

south (also Lazaridis *et al.* 2022). In other words, the Neolithization process in the region seems to have been signaled by a mixed ancestry associated with Anatolian Neolithic and Iran Neolithic (Wang *et al.* 2019: 9). The lack of EHG and WHG in the southern Caucasian groups indicates that the route follows across the south Caucasus, instead from the northern steppes.

Yamnaya expansions and interactions

While the genetic data supported many aspects of the steppe migration hypothesis for the spread of the IE languages, the scenario of a sudden physical transplantation of Yamanayas or spread of the Yamanaya-related ancestry take place evenly and contemporaneously is far from the more likely (Reich, 2018a: ch. 5; Krause; Trappe, 2021; Lazaridis *et al.* 2022 for overviews). It is proabable then the existence of a denser texture of interaction and modalities of interaction in which the role of migration vary. Statistical models have also been shedding some light on the nature of mobility. It has been argued that although the speed of the expansion of Yamnaya-related ancestry is up to twice as fast as the expansion of Neolithic-related ancestry (Racimo *et al.* 2020a: 3).

In NW Europe, the steppe-related ancestry arrived at the proportion of around one-third during Irish BA, as the whole genome sequences of three Early Bronze Age men from Rathin Island detected (Cassidy *et al.* 2016; Mallory, 2023). The Y-chromosome haplotype[45] of these males belonged to R1b lineage, associated with steppe-related male individuals. Conversely, the genomic data of individuals associated to Globular Amphora culture and its regional variant in southern Poland (Tassi *et al.* 2017; Mathieson *et al.* 2018; Schroeder *et al.* 2019) lack steppe-deried ancestry.[46]

The decreasing gradient of Yamnaya ancestry observed in the north-south axis of European continent also have been posing questions to researchers of when this genetic component arrived in there (Haak *et al.* 2015: 210; Lazaridis *et al.* 2022). As a whole, the genomic coverage of samples still leaves big holes in this area of southern Europe in general (Heggarty, 2018: 132-133). In part, this could be explained by the preservation of aDNA in nontemperate environments such as the Mediterranean. In the Aegean Sea region (mainland Greece, the Cyclades and Crete), a relevant dataset of genomes is available, and it has been

[45] Haplotype is the set of genes from different *loci* that is passed down along maternal or paternal lines.
[46] Tassi (*et al.* 2017: 8) has concluded these data refute the Kurgan hypothesis proposed by Gimbutas, given that her mechanism for the steppe migrations entail a genetic affinity to the Globular-Amphora-associated individuals. However, Gimbutas ([1985] 1997: 309-310; [1986] 1997: 316) stated clearly physical changes of the populations is not a necessary condition of the process of indo-europeanization.

noted that a 'northern' EHG-related ancestry contributed to the genetic history of the area MBA onwards (early to mid-second millenium BC) (Lazaridis *et al.* 2017; 2022 see Box 4; Clemente *et al.* 2021; Skourtanioti *et al.* 2023). While this genetic flow pinpoints episodes of migration with local admixture, particularly associated to the arrival of the proto-Greeks hence the first Indo-European speakers, the mode of immigration and favored linguistic theories is to be determined (Lazaridis et al. 2017: 218; 2022).

Olalde *et al.* (2018) made a strong case of the variance between genetic and archaeolofical culture. Through the aDNA sequencing of ancient individuals associated with Bell Beaker material culture, the study concluded that the samples taken from Central Europe, Iberia and Britain have a heterogenous proportions of steppe ancestry (see Olalde *et al.* 2018: 192, fig. 2, a).

In the Iberian Peninsula, Olalde (*et al.* 2019: 1231) noted a decreasing north-south gradient of steppe-related ancestry in 14 samples spanning a few centuries before the BA period in the region. The admixing events with local population only occurred after 2000 BCE and resulted in a 40% turnover (Olalde *et al.* 2019: 1231). Furthermore, it was strongly male-driven, resulting in the almost total replacement of Y-chromosome Neolithic lineages (Olalde *et al.* 2019: 1231). However, steppe ancestry is present in increasing quantities mostly from the IA onwards, without going hand in hand with IE languages (Olalde *et al.* 2019: 1231).

Central to assess the steppe migrations is also the presence of Yamnaya-derived ancestry in further Asia and Anatolia and the differential modelling of genetic compositions, source populations and admixture and vectors in historical scenarios (de Barros Damgaard *et al.* 2018a; 2018b; Narasimhan *et al.* 2019; Lazaridis *et al.* 2022). Steppe ancestry was not detected in samples of BA Anatolia associated with IE speakers, implying that the Anatolian branch cannot be explained as an incursion of people from the steppe into the region (de Barros Damagaard *et al.* 2018b: 1429).

Reconstructions of contexts of massacres have also brought into sharp relief conflict and violence as a priviligied modality of interaction in BA Europe. Evidence of massacres assigned to the Corded Ware expansion in Central Europe has also been reported as the mass grave of Koszyce, southern Poland, dated to the early 3rd millennium BC (Schroeder *et al.* 2019). The Corded Ware cemetery of Eulau, Germany (Mittelelbe-Saale region), a burial location bearing four multiple graves with 13 individuals is another notorious example (Haak *et al.* 2008; Meyer *et al.* 2009; cf. Kristiansen *et al.* 2017: 338). The *causa mortis* by violent injuries in 5 out of 13 individuals pointed to a violent raid.

Causes other than warlike behavior has been evoked to to deduce demographic impact with the new steppe arrivals. It has been posited that steppe population movements also brought to Europe pathogens responsible for an early form of plague pandemics ancestral to the Black Death (Rasmussen; *et al.* 2015; Valtueña *et al.* 2017 *contra* Rascovan *et al.* 2019; Yu *et al.* 2020). The presence of the bacterium *Yersinia pestis* in individuals across Europe and Asia of the Late Neolithic to BA periods suggests a pneumonic and septicemic plague may be behind the Neolithic populations declines of the period (Rasmussen *et al.* 2015; Valtueña *et al.* 2017; Rascovan *et al.* 2019; Yu *et al.* 2020).

The emerging picture of the plague has it antedates the large-scale steppe migrations or it is tied to specific genetic ancestries (Rascovan *et al.* 2019; Yu *et al.* 2020). At least two events in the prehistory of the *Y. pestis* are currently known: 1) the existence of a basal lineage originated in the large and dense Neolithic towns of Cucuteni-Tripolye culture in the middle Dnieper and spreading to the whole Eurasia; 2) the emergence of a different lineage in central Eurasia associated with the so-called Yamanaya migrations into Europe (Rascovan *et al.* 2019: 299-301).

On top of that, the view of a millennial stasis and continuous population growth after the adoption of sedentary agricultural lifestyle have been reviewed (Shennan, 2002: ch. 5; 2012; *et al.* 2013). In many regions of Europe, the farming exploitation was punctuated by initial stages of population growth followed by demographic falls (Shennan, 2012: 307; *et al.* 2013: 3). In Jutland (Denmark) and Skania (Sweden), a steady population growth is observed in the 3rd millennium after a drop in the late 4th millennium BC. This period is associated with the archaeological phenomenon of the Single Grave/Corded Ware Culture. Shennan (2012: 308) claims that the genetic turnover can be attributable in these two regions to immigrants who took advantage of an economic crisis lived by neighbor farmers (Shennan, 2012: 308).

Anatolian migration hypothesis

In 1987, *Archaeology and Language* was published, by one of the world's best known living archaeologists (Ceserani, 1997; Peixoto; Florenzano, 2020). The book is today an antithesis to the steppe theory. In it, the British archaeologist linked diffusion of farming technologies in Europe with farmer migrants and IE languages through the application of Ammerman and Cavalli-Sforza's (1984) demic diffusion or wave of advance model, a statistical genetics mechanism that had been developed to account the agricultural expansion through a constant rate of population growth over time. Renfrew's IE thesis is a continuation

of a linguistic argument the author had developed since his doctorate in contraposition to migrationist hypothesis for the "coming of the Greeks" (Renfrew, 1964; [1972] 2011; 1973c). If a human migration could be identified in the Aegean, that would remount millennia back to the Neolithic and the becoming of the Greeks constitute a long ethnic-linguistic process in the Aegean. The *tempo* and overall direction of the demic diffusion expansion had been outlined before by plot of radiocarbon dates available then for Neolithic settlement over Europe and over the British Isles in Clark's (1965: 46; cf. Ammerman; Cavalli-Sforza, 1984: 50-51; Renfrew, 1973a: 271, fig. 26.2; 1987a: 1987a: 149, fig. 7.4; 2000b: 8).

The wave of advance basically explains the linguistic propagation and settlement of all Europe through a protracted, multigenerational, radial and random process of expansion of the first farmers from a secondary locus of plant and animal domestication, 7,000-year-old Anatolia. Through short displacements in the order of 20 to 30 km over 3000 years, i.e. an average speed of 1 km/year, the whole process goes from end to end of two islands on the European mainland, Crete and Orkney Islands (**Fig. 2.8**). From Anatolia, these farmers and their descendants entered Central Greece, bordered the northern coast of the Mediterranean up to the Danube River, followed the riverflow and occupied, to the west, northern and central Europe, and to the east, the Black Sea shores and the southern Russian steppes (Renfrew, 1987: 126-131; 148-150; 160-161; cf. 1973b: 270). In their general aspect, his Indo-Europeans form a very different image from conquerors on chariots and, for the discipline of IE studies, certainly "[…] historically uninteresting" (Arvidsson, [2000] 2006: 300).

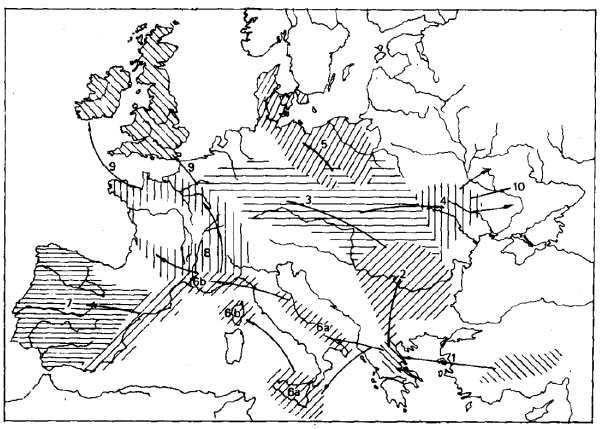

Fig. 2.8. Correlation of the wave of advance model and linguistic transformation. In: Renfrew, 1987a: 160, fig. 7.7.

Archaeology and Language provoked a series of critical responses and spirited discussions (Renfrew, 1988; Ehret, 1988; Zvelebil; Zvelebil, 1988; Sherratt; Sherratt, 1988; also Mallory, 1988; 1989; Trabulsi, 1991). Gimbutas (1988: 453) herself declared that "it is astounding that Renfrew, long the leading voice of antimigrationism in prehistoric Europe, now speaks of the migration of farmers […]".[47] A particular number of difficulties crop up in the

[47] Anthony (1990: 901-902) thinks that the demic diffusion is basically made up of haphazard migrations of a few numbers of farmers that only have expressive results over long time-spans. Shennan (1991: 32; 33) considers it a "population movement without population movement" or "'non-migration' migration" to highlights the difference

model when one considers the sequence of movement necessary to fit this slow-pace Neolithic-old expansion.

When it comes to the account of the IE language spread in Europe, the Neolithization of Europe is the favoured process in the scope and scale of the problem of change in demographic history (Anthony; Wales, 1988: 444; Ehret, 1988: 571; Trabulsi, 1991: 231; Kristiansen, 2005: 680; Shennan, 2012a: 303; see also Zvelebil, 1996). This understanding can be regarded as failure of the processualist thinking in denying but not dealing directly with the issue (cf. Adams; Van Gerven; Levy, 1978: 504), which may be related to the difficulty to conceptualize migration beyond the scale and scope of the event or major phenomena (Champion, 1992: 215). The demic model invoked to flesh out the IE language diffusion is also closely analogous to the idea of branching of trees and associated theory of society-level migration and homogenous population group (Sherratt, 1988: 459; Zvelebil; Zvelebil, 1988: 575; Zvelebil, 1996; Hakenbeck, 2008: 16; cf. Heggarty, 2018: 151).

Oddly, while Renfrew admits migrational even ts, they take a markedly similar form to what he wants to dismiss. Nomadic pastoralists mounted on horsebacks are a resonant imagery of barbarian invasions nurtured by nineteenth-century scholars which still holds on in studies of the European Migration Period (cf. Anthony, 2007: 236-237; Hakenbeck, 2008: 13; Arvidsson, [2000] 2006: 239-308). *Mutatis mutandis*, Renfrew fits in his "élite dominance" type,[48] migration-as-invasion and hence invasionist *par excellence* this component of horse-riding groups (cf. Renfrew, 1987a: 139), cornerstone of the migrationist model in archaeology (id., 1989: 124-125), which he reputed himself to be a pernicious myth for earlier periods than the first millennium BC (id., 1998c; cf. 1992a: 457; 1992b: 30-31). It can be argued that the image of foreign military elite on spoked wheel and nomadic hoarders exerts a mutual gravitational

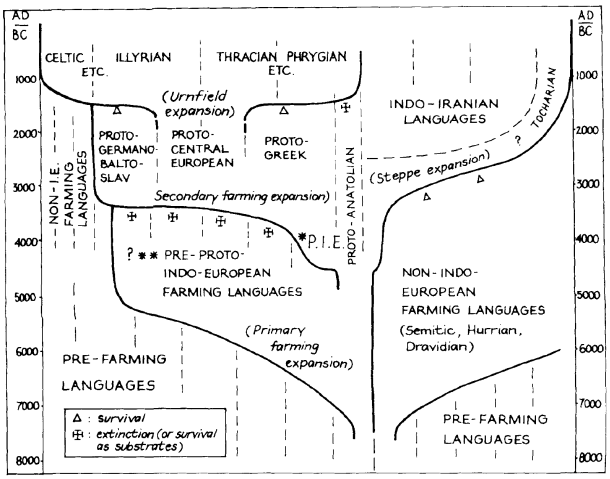

Fig. 2.9. Sherrats' IE dispersal model. In: Sherratt; Sherratt, 1988: 594, fig. 4.

between folk migrations and long-term process with cumulative results in the distribution of the material record. Hakenbeck (2008: 18) instead places it side by side with the ideas of massive migrations of culture-history archaeology.

[48] See note 5.

attraction. whose abundantly recorded migrations in the historical period in Europe and the Near East have a strong say (Adams; Van Gerven; Levy, 1978: 492; 501).

Sherratt and Sherratt (1988; see also Sherratt, 1981) developed also a historical model of linguistic convergence without tying PIE-speakers in a specific homeland. The Sherrats postulated a Pre-Proto-Indo-European (PPIE), as one or more ancestral languages that gave rise to various branches of the IE languages. The expansion of PPIE is part of a multi-directional dispersion of large linguistic families intiated on the margins of a nuclear region of agricultural origin in the Near East. Later, PIE would take par of a broader interaction zone around the Black Sea (

Fig. ***2.9***).

Farming/language dispersal hypothesis

The IE case argued by Renfrew (1987a; cf. Ceserani, 1997: 398) or the farming/language dispersal hypothesis (FLDH), as it has been currently known, has been the showcase for the modeling of a "minimalist view" (Renfrew, 1992b) of interdisciplinary synthesis rooted in major evens of human population history and language dispersals (Renfrew, 2000b; Bellwood; Renfrew, 2002; cf. Bellwood, 2002: 18-21; Bellwood, 2005: 1). This view is notably developed in higher abstract levels and essentialist pan-ethnic constructions by Renfrew (1989; 1991; 1992a; 1992b; 2000b; 2002b *contra* Demoule, 2014: 363-365; 517-520), in line with Sherratt and Sherratt (1988), in an archaeological scenario for the Nostratic linguistic hypothesis.[49]

For long analyses of mtDNA and Y-chromosome data of modern European populations have been adduced to support the the demic spread model (Ammerman; Cavalli-Sforza, 1984; Cavalli-Sforza, [1996] 2000; Renfrew; Boyle, 2000; Bellwood, 2005). For example, hypotheses of interaction and genetic flow between Paleolithic hunter-gatherers and Neolithic farmers were modeled via the frequency of a hapogroup (J) of the Y chromosome and mitochondrial DNA (mtDNA) in the genetic signature present-today populations in Europe (Renfrew, 2002c). In more recent years, with the extraction, high-throughput sequencing and reading of mtDNA and autosomal code, geneticists start to plot relatedness and increase the support of a major genetic event associated to the farming spread (Bramanti *et al.* 2009;

[49] Nostratic is one hypothetical macro linguistic phylum of humanity's tree of macrofamilies that would comprise the Indo-European, Afro-Asiatic, Dravidian, Altaic, Kartvelian and Uralic family languages. To the British archaeologist, a star-like explosion/dispersion of its language family components would correlate with the agricultural origins and diffusion from Western Asia.

Skoglund *et al.* 2012; 2014; Brandt *et al.* 2013; 2015). Previous aDNA papers reinforced the fact that the gene pool of modern Europeans presents a genetic affinity with hunter-gatherers and early farmers in a north-southeast cline (Skoglund *et al.* 2012; 2014; see also Mittnik *et al.* 2018).The first analysis of the nuclear genome of the iconic Ötzi or the "Iceman," a Copper Age mummy found almost thirty years ago in the Italian Ötzan Alps (Spindler, 1995) and comparison demonstrated a genetic affinity between the Iceman and present-day Sardinians that could suggest an imprint of the demic diffusion process (Keller *et al.* 2012; Sikora *et al.* 2014).

The European first farmers have a direct descendance with Neolithic populations from NW Anatolia (Lazaridis *et al.* 2016: 423) and Mediterranean, Danubian and Balkan ancient populations form a clade with the latter, suggesting a branching-off event from a single incoming Anatolian population in the Danubian and Mediterranean routes (Olalde *et al.* 2015: 3135; Hofmanová *et al.* 2016: 6889; Mathieson *et al.* 2018: 201; Racimo *et al.* 2020a: 5). Agriculture, however, did not originate from a single and genetically homogenous population and paleogenomic data have been outlining the different genetic population structure and source population of demic farming diffusion in the SW Asia and Europe (Broushaki *et al.* 2016; Gallego-Llorente *et al.* 2016; Lazarids et. al. 2016). The aDNA samples from the Zagros region of the Early Neolithic for instance bear close affinity with CHG and suggest the agriculture spread eastwards into SW Asia from a locus in the eastern Fertile Crescent (Broushaki et. al. 2016: 502; Gallego-Llorente *et al.* 2016: 3). According to Broushaki (*et al.* 2016: 501), the Early Neolithic Iranian population inherited part of its ancestry from a lineage that split from a common Basal Eurasian clade and part from an ANE-like source population. Therefore, we can note in these findings the presence of the two-way mixture of the 'Yamnaya ancestry' that bring deep implications on the steppe migration hypothesis (cf. Gallego-Llorente *et al.* 2016: 4; Heggarty, 2018: 155). In Europe, the front of the demic expansion presents also a great degree of regional variation with regard to the interaction with admixture with local populations. The early farmer ancestry is not a watertight barrier that prevents admixture events of pouring out in some areas of contact as evidenced in the increasing of hunter-gather ancestry across Neolithic Europe (Lipson *et al.* 2017; Mathieson *et al.* 2018; cf. Haak *et al.* 2015: 208).

In a memorial lecture dedicated to Gimbutas at the Chicago Institute, Renfrew (2017; see note 28) concedes she has been "magnificently vindicated" by aDNA research. However, there are still many loose threads in the Kurgan hypothesis as it is and it comes as no surprise to find he has begun to ponder the possibility of the Yamnaya migrations representing a secondary IE migration. The argument has been furthered by the linguist P. Heggarty (2015;

2018). As Renfrew's thesis, Heggarty (2014: 607-610; 2015) downplays the wheel/wagon vocabulary exposing the methodological limitations of the linguistic paleontology (see also Fraser, 1926; Pulgram, 1958: ch. 13; Coleman, 1988: 449-450). He argues Yamnaya-related ancestry may explain some, but not all, expansions of IE languages (Slavic, Baltic, and, possibly, Germanic branches) and, based on its presence in modern Uralic-speaking individuals, that theYamnaya migrations brought into Europe not only the IE branches but also non-IE languages (Heggarty, 2015; 2018: 136).[50] Heggarty (2015; 2018: 135) fits the Yamnaya migration as a secondary population movement out of the steppes within a long-chronological framework. The demographic expansion of agriculture from multiple *loci* of domestication in the Fertile Crescent is the first. The spread onto the steppe of the farming package follows the same reasoning of the Anatolian migration hypothesis, but in other direction: the Caucasus becomes the bridge (Heggarty, 2018: 143). Pastoralism arises from the process of economic specialization in areas not so well-endowed to agricultural production (Heggarty, 2018: 138-142).

Whose ancestry?

There are special concerns about this global intellectual project of Renfrew:

> [...] *se il valore generalizzante giustifica di per sé l'estensione della teoria delle origini indoeuropee agli altri casi nel mondo, e quindi dalla possibilità di applicare il modello in altri contesti si passa alla globalizzazione del modello stesso, dove sta la possibilità[...] di mettere alla prova il modello e di procedere a comparazioni?* (Ceserani, 1997: 399).

No wonder that such intellectual *hybris* (Trabulsi, 1991: 230) comes from scholars of countries that exert political and economic dominance in capitalist world economy. This textual practice is in consert to recurrent imperialist and neo-colonial attitude in textual practices of the discipline that steps over local historical trajectories in the name of universal schemes (Trigger, [1984] 2003: 78-84; Moro-Abadía, 2006; Gonzáles-Ruibal, 2009; 2010).

If epochal developments of the expansion of the European global empires and capitalist world political economy punctuate paradigmatic turnovers with regard to ideas of migration

[50] Cf. Mittnik, 2018: 8, who, after had not detected a component of ancestry common in modern Uralic-speaking populations of NE Europe during the Baltic Bronze Age, suggested that this ancestry was brought in the region after the BA period. See Heggarty, 2018: 164, commenting the results of Mittnik's *et al.* (2018). He questions this assertion based in the geographical and temporal resolution of the samples, as well as the proportion of this component. For instance, the BA samples were collected from regions where Uralic languages are not recorded (Lithuania and Latvia).

and mobility over the nineteenth century (Gonzáles-Ruibal, 2014: 43; Champion, 1990: 216), this one might be read as further conceptual development of the post-1980s world economic order, European identity integration and globalization (Jones; Graves-Brown, 1996; Shore, 1996).

Another point subject to criticism is the idea of a European prehistoric heritage constructed in this overarching socio-economic transformative process. In *The Roots of Ethnicity* we heard from Renfrew (1993a: 19) that "my title concerns the nature of our identity – our collective identities as citizens, each of our own nation, as inhabitants of Europe, and ultimately as members of the human species." The idea of a continental identity of Europe was object of another talk, an opening lecture given by the scholar to the Inaugural Meeting of the recently founded European Association of Archaeologists (EAA) (Renfrew, 1994b; 1996).[51]

To the "ultra-isolationist" (Bernal, 1987: 407) British archaeologist, the long-term perception of Europe is rooted in millennial contintenal developments set in motion since the neolithization cut Europe loose from the Near East. The process was accrued with the diffusion of metal technologies and emergence of ranked societies of the Bronze Age period (Renfrew, 1994b: 159-161; cf. Novaković, 2008: 40). By highlighting a supposedly indigeneity of Europe, Renfrew builds on Childe's (1925) narrative device of proto-capitalist societies as opposed to despotic Near East ruleship (Childe, 1925; Jones; Graves-Brown, 1996: 15; Kristiansen, 1996: 140-142; 1998: 16; Ceserani, 1997: 399; Pearce, 2008: 52).

It is also interesting to note that this step gradient towards human unity from citizens of European Union nations states serves as a rebuke to the ideological baggage of the ethnic rivalries well alive in eastern Europe (Renfrew, 1993a; 1996). To a certain extent, Renfrew's uneasiness with current ethnic conflict speaks volumes about unfulfilled promises of Western capitalist liberal democracies about a gradual fading of ethnic categories as a result of the prolonged effect of contact in the era of industrialization (cf. Jones, 1997: 53-54; Hall, 1997: 18). From the single blocks of nation-states, he proceeds towards pan-European constructs of integration and all-humanity collectivities. Indeed, "it thus seems as if Indo-European identity must give way to European identity" as Renfrew turned his attention to the *Indogermanenfrage* and "[…] brings to a close the British tradition that was initiated by Oriental Jones and assumed that the Europeans had close, but exotic, relatives in lands such as India and Iran" (Arvidsson, [2000] 2006: 300; 301).

[51] EAA's foundation dates to 1990/1991 and basically couches in continental terms an association of archaeologists from all over Europe (see Kristiansen, 2013: 172-173).

In a journal issue ensuing a Round Table session organized by the journal at the 13th Annual Meeting of the European Association of Archaeologists (EAA), it was posed if "do we need the 'archaeology of Europe'?" (Kristiansen, 2008). There is much to recommend to this subscription to larger (inter- and supra-national) institutional framework having in mind political and economic organization of funding agencies, as the European Research Council (ERC) (Jones; Graves-Brown, 1996: 13-14). More problematic is the instituinally-led meta-national identities and the cultural relationships between past constructions and archaeological practice it engenders (Kohl; Fawcett, 1995a: 17-18; Jones; Graves-Brown, 1996: 13-14; Shore, 1996; Roberts; Vander Linden, 2011: 6-7).

Indo-Europeanizing of Bronze Age Europe

The historian Robert Drews (1988; 1993; 2017) also traces the expansion of the IE culure and language, but chronologically he opts for the lowest chronology (2nd millennium BC). It is possible to say the series of publication mark the stages of development of his model in paradigm of the PIE *Urheimat*. In *The Coming of the Greeks*, Drews assumes southern Caucausus (today Armenia, Georgia, northeast Turkey, and northeast Iran) homeland, mainly based on the "glottalic theory" of the Soviet linguists Thomas V. Gamkrelidze and Vjačeslav V. Ivanov. In *Militarism and the Indo-Europeanizing of Europe* (2017) he identifies the cradle of the PIE in the 4th-millennium-BC Maikop culture of the northern Caucasus, between the Don and Volga riverine basins. He added in in his PIE model an earlier stage of linguistic divergence, following the Indo-Hittite hypothesis: the bifurcation of the proto-Anatolian and PIE branches from a common ancestral stock (Proto-Indo-Hittite in the theory), originally by the linguist E. Sturtevant (Villar, [1991] 1996: 303-304; 520; 526; Fortson, [2004] 2010: 11; 171-172) during the Neolithic period. These ealier groups expanded along a wave-of-advance migration into Anatolia and SE Europe.

In Drews' model, PIE continued the agricultural expansion and only physical distance in the form of a long-distance migration can explain a break between it and Proto-Indo-Hittite-speaking people, a gap in the dialectal continuum which promotes the linguistic split-off. To Drews (2017: 11), it is a migration over boats from the Black Sea coast of Anatolia into the Russian steppes (and from there up to the northern side of the foothills of the Caucasus mountains). Maikop culture is a local development form this Neolithic substratum. At the heart of this conception is the lexicographic reconstruction for the parts of a wheeled vehicle, present in all IE languages but Anatolian and archaeological evidence of it in northern Caucasus (ibid.,

6). The main difference of his model is: 1) the horse was not ridden before the 2nd millennium BC, which well post-dated its domestication (Drews, 1988: ch. 6; 2017: ch. 2); 2) PIE expansion is a militaristic conquest of chariot drivers (ibid., ch. 3).

PIE expansions in the LBA through the IA was prompted successevily by technological innovations in tactics (open-field battles and infantry) and weaponry (two-spoked chariots, bows, and cutting-and-thrust swords, spears, body-armour, and shields). These military developments have a transformative impact in the kingdoms and palaces in the Aegean and the Near East both in the second quarter and in the close of the 2nd millennium BC. The two-spoked chariot, "mobile firing platforms for archers" (Drews, 1993: 113; 2017: 191), is a steppe invention and only the modality of interaction through violence and conflict with conquest may explain its diffusion and the whole package associated with it (ibid., ch. 10). The military conquest of temperate Europe and mainland Greece territories aimed at the rich gold and copper ores in the Carpathians, amber from the Baltic, and silver from the Laurion (Attica). To Drews, the series of conquests of these warrior IE elite resulted in the diffusion from the Carpathian basin of Celtic, Italic, Germanic and other branches and, in manland Graves, the Shaft Graves in Mycenae (ibid., chs. 5-6). The "chariot revolution" also brought the open-field battles between states in western Asia (idi., 1988: ch. 5; 1993: ch. 9-10; 2017: ch. 4 *contra* Dickinson, 1999; 2016). *The End of the Bronze Age* (1993 *contra* Littauer and Crowel 1996) marks the 'Catasthrophe' and replacement of the package of chariot warfare and conquest by infantry and raiders in the late 13-early 12th cents. BC (see CHAPTER 4).

The Danish archaeologist Kristiansen is maybe one of the most eclectic archaeologists in the IE debate. He has been performing a leading role in the "Bronze age mobilities" (Sørensen, 2015) and the ancient genomics revolution (see above). He has been for long advocating a combination of migrationist and anti-migrationist hypotheses in a scenario of the arrival of the full-scale movement of pastoralists from the steppes north of the Black Sea in central and northern Europe and ensuing socioeconomic and landscape transformation in the Europe of the 3rd millennium BC (Kristiansen, 1989; 1998; Sherratt, 1981; Sherratt; Sherratt, 1988; Shennan, 1986b; 1986b; Gimbutas, [1977] 1997; [1979]; [1980] 1997; [1986] 1997; [1990] 1990; cf. 1981: 43) (**Fig. *2.10***).[52]

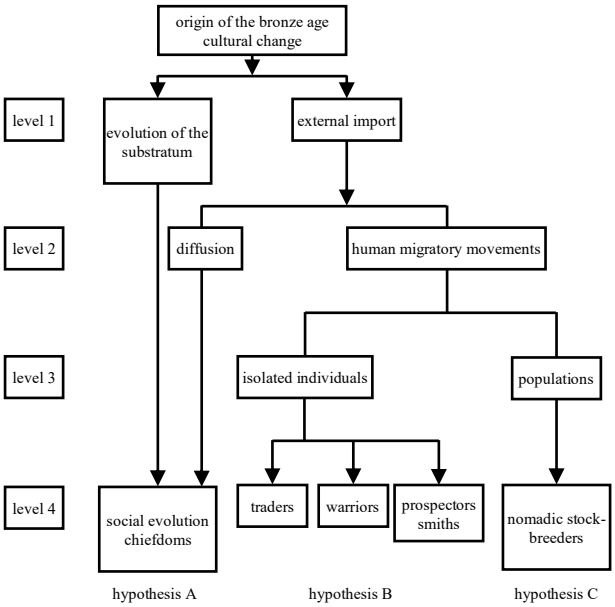

Fig. 2.10. Hierarchical map presenting conceptual paths on cultural change in Alpine Bronze Age. Adapted from: Gallay, 1981: 43, fig. 3; Kristiansen, 1989: 215, fig. 1.

Kristiansen's model for the expansion of the IE people and language is complex and includes cultural transmission in an interaction zone of Near East civilizations with the pastoralists groups from the Pontic-Caspian steppes from the late 4th millennium BC, long-term trends following the expansion of pastoral economies in Eurasia in the the 3rd millennium BC, and the emerging of an international BA network of exchange in a world system connecting Scandinavia to India over the 2nd through the 1st millennium BC (Kristiansen, 1998: ch. 8; 2009; 2011a; 2011b; Kristiansen; Larsson, 2005). For Kristiansen, transitions linked to socio economic landscape of exploitation should be detected more clearly in the archaeological record. This idea, later developed upon the concept of "persistent frontiers" (Anthony, 2007: 104-106; Kristiansen, 2009: 115), traced the expanding of steppe pastoralist economy from beyond a fault line which runs along the Dniester-Dnieper region and that separated two social and economic organizations for thousand years (Kristiansen, 2011b: 166; 2015: 4). Migration and acculturation accompany this process in northern and eastern Europe, on much the same line with Gimbutas' third migration wave (Kristiansen, 1989: 216-217). The expansion of

[52] Few DNA sequences of ancient individuals buried in a grave from eastern Jutland published tend to support this demographic rupture scenario related to the appearance of the steppe-related ancestry in Denmark (Egfjord *et al.* 2021).

steppe pastoralists in the European history – "[…] rapid and sometimes dramatic […]" (Kristiansen, 2009: 123; 2011b: 168) – is mixed to a complex framework of a huge interaction zone that linked the Eurasian steppes and much of Europe (Kristiansen, 1989: 217).

To Kristiansen & Larsson (2005: 109; Kristiansen, 2009: 121-122; 2011a: 245; 2011b: 171; 2015: 5), the mobile agropastoral communities from the steppes were organized around patrilineal institutions and derived concepts of family and rules of transmission of inheritance, gender divisions, and property diffused from Near East and Mesopotamia civilizations. He posites that this ideology was earliest formalized in the royal *kurgans* of the Maikop Culture, whose expansion into the steppe and Anatolia could account for the location of the PIE and the Hittite (Kristiansen, 2011b: 174).[53] Single Grave, Corded Ware and Yamnaya archaeological complexes compose a broad cultural continuum of mobile economies originating from the Pontic-Caspian steppes (cf. Kristiansen, 2011b: 167, fig. 14.1). The pastoralist migration in the form of the Single Grave Culture (SGC) brought to northern temperate Europe the western branch of PIE, the Proto-Germanic branch (Kristiansen, 2009: 130; 2011: 175; *et al.* 2017: 340).

It is important to emphasize here that for him, symbolically structured behavior express more reliable meaningful relationships of social and religious institutions and worldviews (Kristiansen, 1989: 221, n. 6; 1998; 2004a; Kristiansen; Larsson, 2005: ch. 1; *et al.* 2017: 336). These horizontal networks of meaning across time and time were constituted by the alliances of polities of different organization levels in the global center-periphery dynamics of BA Europe modelled on the the concept of the PPI approach (Renfrew; Cherry, 1986; Kristiansen, 2004a: 180; Kristiansen; Larsson, 2005: 19-20; Kristiansen, 2005: 603; see note 11). The dissolution and formation of networks of exchange in later periods, with different degrees of interaction are important to understand the social and economic cycles of cultural divergence and integration, formal patterned evidence, speaking areas and ethnicities (Kristiansen, 2009; 2011b).

The BA period marks in his model of late prehistory Europe a truly new world economic system of economic and political interdependence, exchange networks between the centers of civilization and peripheries of supplies and power (Earle, 2002; Earle; Kristiansen, 2010a; Kristiansen; Larsson, 2005; Kristiansen, 2018a; Kristiansen; Earle, 2015; Vandkilde, 2016). After 2000 BC, it particularly characterized by an international long-distance trade network

[53] Elsewhere, Kristiansen (2020: 160) has confirmed this scenario and has tracked down the split of Proto-Indo-Anatolian into two branches, the Proto-Anatolian and the Proto-Indo-European, to the northern Caucasus region.

exchange of metals (tin, copper, and bronze) (see CHAPTER 4 with full bibliography). They are first organized according to trading circuits established by the palace societies of the Aegean. The chiefdom institutions in tribal contexts in the periphery further north were a result of individuals who forged 'international' social alliances and attached to their status the power evoked by metal prestige goods and esoteric knowledge. Incorporating the symbols of this prestige system, they started a process which in the following centuries gave rise to a fully aristocratic warrior ethos and material symbolism, epitomized by the Kivik burial in SE Scania (see Kristiansen; Larsson, 2005: 186-194; Kristiansen, 2004a).

Trade and mobility mechanisms operating in the duration of the 2nd millennium BC were also crucial to frame long-distance associations as exemplified in the oft-recited example of the chariot package of warrior aristocracies associated with horse-drawn chariots, weaponry (bow, arrow, long swords and lance), and other paraphernalia widespreadly distributed across the Eurasian steppes, Aegean, and Near East (Kristiansen; Larsson, 2005: 130-131; 170-185; Kristiansen, 2005: 683-685; 2011a: 225-257; 2011b: 173-174; 2018b: 113-115). As the narrative goes, the distribution of similar types documents the institutionalization of a chariot-driven warrior ideology whereby long-distance trade, travel of minor groups of warriors accompanied by craftsmen, or even conquest by a warrior nobility (Drews, 1988: ch. 5; 1993: ch. 10; 2017: ch. 4 *contra* Dickinson, 1999; 2016).

As it has been long pointed out, diffusionist theory entails mobility of people in some degree (Adams; Van Gerven; Levy, 1978: 486). Archaeologically, the complex networks of interchange created between polities by social mechanisms of marriage alliances and travelling warriors or artisans and communities of learning and transmission can be detected in the distribution pattern of metalwork as through 'foreign' ornaments in women's burials and weapons such as octagonally and flange-hilted swords (Kristiansen; Larsson, 2005: 186-231, *passim*; Kristiansen; Suchoska-Ducke, 2015; Kristiansen, 2018b; 2018c; 2023). Societal institutions bonding people are reconstructed in the PIE vocabulary (Kristiansen; Larsson, 2005: 236-240; cf. Anthony; Ringe, 2015: 213; Kristiansen, 2018a: 127); and, recently, archaeometric studies have been used to support the sociological interpretation of mobility patterns in the 3rd and 2nd millennium BC linked to exogamy and virilocality and also fosterage and guest-host practices (Frei *et al.* 2015; 2019; Sjögren; Price; Kristiansen, 2016; 2020; Knipper *et al.* 2017; Cavazzuti *et al.* 2019 Mittnik *et al.* 2019; Kristiansen, 2023).

In recent years, Kristiansen *et al.* (2017: 339) have advancing a model for the the arrival of the steppe pastoralist migrants and the case for a male-specific Yamnaya incursions into central Europe has been particularly strengthened (Goldberg *et al.* 2017; Knipper *et al.* 2017; Mittnik *et al.* 2019). The overall cultural *mélange* process and "collision of ideologies" (Kristiansen *et al.* 2017: 343; Kristiansen, 2019) is depicted as incoming young male warriors with cleaninsing of 'indigenous' males and abduction of women (

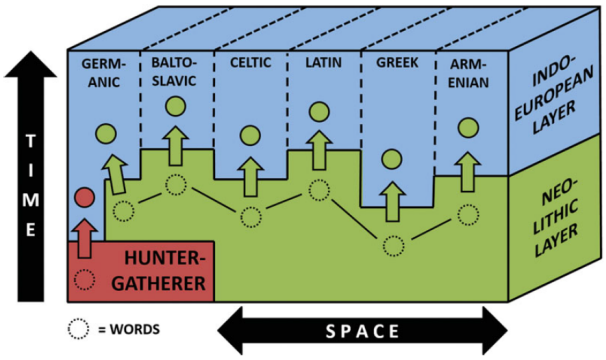

Fig. 2.11. Illustration of the borrowing process of words from the non-IE languages by different IE branches after Yamnaya/Corded Ware migrations. In: Kristiansen *et al.* 2017: 342; fig. 2.

Fig. *2.11*).

In an interview to the *New Scientist*, Kristiansen reveals that "I've become increasingly convinced there must have been a kind of genocide" (Hall, 2017; Barras, 2019; cf. Crellin, 2019: 440-441; Frieman; Hofmann, 2019: 528-531; 539, n. 5; Hakenbeck, 2019: 520; Kristiansen, 2019). An often-recited example of a dramatic picture of Corded Ware expansion into Central Europe is the multiple graves of Eulau and the mass grave of Koszyce (Haak *et al.* 2008; Meyer *et al.* 2009; Schroeder *et al.* 2019; cf. Kristiansen *et al.* 2017: 338). It seems the narrative of Kristiansen brings to a close Gimbutas's (1982: 1) "[…] clash and mélange […]" scenario of bloodthirsty warbands predating peaceful Old European farmers. The narrative raises the available evidence too great a height and replicate a monothetic view of cultures and process, brushing over variability and complex processes of identity, migration and mobility (e.g., exogamic rules, epidemics lethality, warrior violence, etcetera) (Furholt, 2019a: 121-124; 2021: 27-29). The way biomolecular data is grafted onto into culture-historical boxes is of great source of confusion and (cf. Heyd, 2017; Eisenmann *et al.* 2018; Frieman; Hofmann, 2019; Hakenbeck, 2019; Furholt, 2018b; 2021).

More traditional network-based techniques also demonstrate that Yamnaya-Corded Ware migrations should not be seen as an unlimited resource for the formation of interregional archaeological complexes. Bourgeois and Kroon (2017; 2023) assembled the data of 1161 Corded Ware graves across NW Europe to map networks of information and assess patterns of co-occurrences between the artifacts and gender-based similarities. The strong association of position and type of artifacts inside the grave with specific body position account for differently patterned dressing practices of burial males and females. These networks of information

regarding the proper practices of burial dressing of the dead were the channel for interregional exchanging of the Corded Ware phenomenon.

Ancestrality.Inc

The point I wish to make with this discussion is that many of the branches of 'ancestral 'proto-peoples' tree diagrams of cultures, languages and genes converge in the same abstraction of origins that serve as a lynch-pin to simplistic notions of biological relatedness, migrationism and diffusionism (Fraser, 1926; Pulgram, 1958: ch. 13; Gallay, 1986: 64-70; 2011: 102-105; Sim-Williams, 1998: 518-519; Ingold, 2000: ch. 8; Demoule, 2014: ch. 17; 567-591). The bird's eye view of many of aDNA research relies on these same correlations and romanticized ideas of descent and conceptions of biogeographic relatdness and temporal continuity. How migration is again stylized in 2015 aDNA studies after it had fell from favor in mainstream archaeology make us believe we have not move so far from Aryanism and the "[…] *modèle indo-européen canonique, arborescente, centrigufe et invasionniste*[…]" (Demoule, 2014: 593).

The current state of "racialization of genetics and the molecularization of race" in the words of Panofsky and Bliss (2017: 80; **Box 4** and **Box 5**) may be verified through passages of one the champion of genetic studies (Reich, 2018b; cf. id., 2018a: 247-273) on "how genetics is changing our understanding of 'race'." It is a characteristic piece of incendiary public rhetoric of geneticists (see Frieman; Hofmann, 2019). In it, it is clear that Reich expects to tease off with high-precision instruments the biological bedrock of differences among 'races': "With the help of these tools, we are learning that while race may be a social construct, differences in genetic ancestry that happen to correlate to many of today's racial constructs are real" (id., 2018b). The geneticist, however, ignores the historical dimension of the categories he 'hands on' (Burmeister, 2021: 42); and those who oppose to be converted by the succession of scientific truths risk to be grinded in this "[…] American-style genomics factory […]" (id., 2018a: xix) and "[…] not survive the onslaught of science" (id., 2018a: 254; 2018b).

In the era full of possibilities afforded by the genomic engineering technologies, the neo-eugenics, of genetic screening and artificial genetic selection within hand's reach it seems Pandora's box unleashed evils not yet anticipated (Mukherjee, 2016). Ancestry-DNA test companies worldwide promise to determine the historical mix in the makeup of any living human being. What kinds of identities will prevail in the future? (Burmeister, 2021: 43). In contexts where heritage roots are invoked by multiple stakeholders, ancestrality and cultural relatedness are articulated in terms of the hegemonic group, transforming the arbitration an ongoing contentious arena of colonialism with dire impacts in the here and now of indigenous communities.

Box 4 – The origins of the Greeks

Lazaridis's (et. al. 2017; Gibbon, 2017) study caught public the attention to the origins of the Greeks continuity of genetic heritage in Greece. In a blog comment, Hamilakis (2007; 2023; see also Maran, 2022) notices the political appropriation of the study by the Greek far-right party Golden Dawn (Ψαρράς, 2012; Clogg, [1992] 2017: 247 see note 24). The idea of unbroken racial continuity was conveyed then in one image in the party's website (see Hamilakis, 2023: 40, fig. 1). It was based on a collage by Nelly, originally exhibited in the Greek Pavillon in the 1939 New York's World Fair, juxtaposing a modern peasant and the Artemision Bronze (**Fig. 2.12**). Nelly was a supporter of Metaxas's dictatorship (1936-1941) (cf., on photography, Nelly and Greek autocratic regime, Clogg, [1992] 2017: 117-120; 263-264; Hamilakis, 2007: 187-189; 2023; Zacharia, 2015; Greenberg; Hamilakis, 2022).

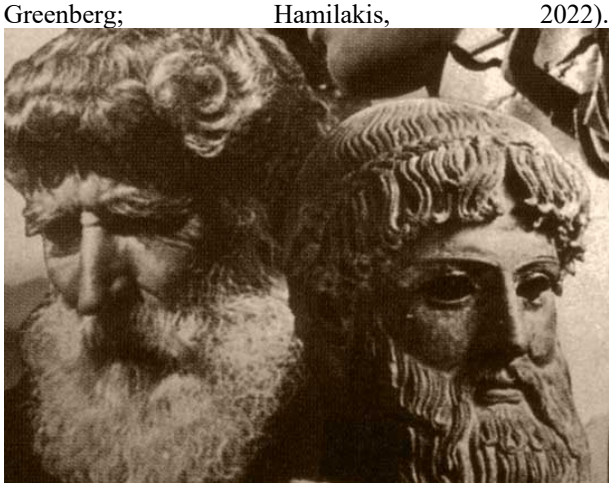

Fig. 2.12. Collage by Nelly. Available at: <https://web.archive.org/web/20110615140453/http://www.ethniko.net/nellys/home.html#>. Accessed May 21, 2024.

The very idea of archaeologically, linguistically or genetically population continuity reifies the notion of a purported Greek identity (cf. "the coming of the Greeks" paradigm, McNeal, 1972; Hooker, 1976; Hall, 1995; 1997; 2002; Dickinson, 2016).

Time and time again since the Conquest, Native groups embody in the Western imagination a site of knowledge production and source of information by the colonist over the colonized (see CHAPTER 5). The control of other's body is part of an inscription of the history of the Occident on the bodies – and over the pile of bodies – of "America" (de Certeau, [1975]; Césaire, [1955] 1978). From travelers, missionaries, collectors and anthropologists, a strategy of 'mapping' the gradient difference in time and space between human groups (Fabian, 1983) has been constituted as a rhetorical device in the capitalist exploitation of "the Indies." Notions of "civilization" and "progress" tied this notion to social Darwinism. As we have stressed earlier, under scientific racism, races emerged as biological measurable facts. By comparing races, scientists were sure to travel back in time in natural history through developmental stages of humankind.

Anthropologist Kim TallBear (2013: 70; Haraway, 1997: 141-148; see also Ingold, 2000: 134-139) in *Native American DNA* shows how indigeneity is fetishized in scientific and commonsensical constructions of genetic modes of relatedness and heritance, and what consequences racial 'othering' of Native American ethnic groups bear to tribal sovereignty and property rights in the biocolonial era. The discussion also raises important issues of civil demands for accountability and disposition of biological samples, indigenous governance and jurisdiction. Commenting on Wells' *The Journey of the Man* (2002) and NetGeo's The Genographic Project TallBear (2013: 143-176) puts across well the fact when it comes to humankind's ancestry, Western science does not disclose deep-hidden truths as it goes hand-in-hand with colonial power relationships by taking the genetic marker for the population and the man for the unadmixed ancestral race.

Box 5 – Kennewick Man

The case involving the remains of a nearly 10,000-year-old individual found in the Columbia River near Kennewick in 1996 is the point of a major critical appraisal of anthropological research in *Skull Wars* (Thomas, 2000). After the skeleton was identified morphologically as a not-so-old Caucasoid male, a troubled racial category by Blumenbach, it became a source of legal contention and quest of ancestral origins for disparate groups. These include far-right movement claiming descendant from Nordic races, scientists eagerly to probe the origins of America's first settlers, to Native American tribes, backed up by the 1990's Native American Graves Protection and Repatriation Act (NAGPRA), requesting the return of the bones for reburial. The Kennewick controversy revolved around how and who is determining cultural affiliation (Thomas, 2000; TallBear, 2013: 154-157; McGuire, 2004: 387) (**Fig. 2.13**).

Fig. 2.13. The Kennewick controversy. In: Thomas, 2000: xx.

In 2015, with the reading of the autosomal DNA of the Kennewick Man (Rasmussen *et al.* 2015) a new chapter has initiated where powerful genomic technologies have been dictating in biological language issues of repatriation (Callaway, 2016; Reich, 2018: 166-171 for two different accounts).

Concluding remarks

This chapter reviewed and critiqued the state of the art in the debates on the Indo-European homeland and dispersals. There has never been a lack of inventivity on the part of scholars in the field in adapting arguments and evidence to favor specific models. Genetic evidence support migration from the Eurasian steppe into Central and South-East Europe occurred in the late third and early to mid-second millennium BC, but the expansion of the Indo-European family language is not tied to specific modes of gene flow, which certainly varied spatially, temporally and socially. On the one hand, if the Yamnaya-Indo-European family language connection may be taken as strong, the scenario of the arrival of the steppe-related genetic component framed in terms of 'wave of population,' on the other hand, flattens the regional and local tapestry of interaction that interdisciplinary models should aim to construct. The genetic history is too vast in time and space to support the simplistic narratives that have dominated the public debate since the 2015 papers.

The overview also demonstrated that the archaeological concept of culture, grafted onto the phylogenetic relations of linguistic theories, is not exclusively the work of nationalist ideologies as it provides raw material for other contructs and simplifications that are freighted with moral value and broad public appeal. The Third Science Revolution is not less exempt from creating exclusivist identity discourses and breathe new life to century-old ideas of unbroken continuity in transnational 'imagined communities.' Under the varnish of anti-nationalist ideology of liberal philosophies or the language of universalistic reason of 'ancestors of us all,' lies the danger of alienating colonial strategies of territorial sovereignty and displacement, by which new forms of biological and intellectual extractivism are exerted.

CHAPTER 3. AN ARCHAEOLOGY OF CONNECTIVITIES: THINKING NETWORKS

> The man has been the node at the intersection of social, material, linguistic and genetic sets, each operating in different attribute dimensions, categorizing different aspects of the same population. In each aspect or dimension the man is connected in space and time to an ever-widening network of related individuals and items – some in a very remote and slight connection and others in a very direct and strong connection.
> (Clarke, *Analytical archaeology*, p. 358-359).

Archaeological problem, theoretical perspective and methodological procedure

Archaeologists take great pains in the full-fledged 21st-century life to catch up with global extra-disciplinary influences, key debates and emerging cross-disciplinary research fields. 'Turns' in direction and paradigmatic 'shifts' in the humanities and social sciences have come within the purview of archaeology of the last decades. They open a window onto the paradoxical current state of hyper globalness of late capitalism, time-space compression and life defined in zones filled with non-places and marginalia of post-colonial political histories, displacement and uprootedness (de Haas; Castles; Miller, [1993] 2020).

'Material' (Olsen, 2003; 2010; 2012; Domańska, 2006; Hicks, 2010), 'ontological' (Latour, [1991] 2011; 2005; Viveiros de Castro, 2002; Descola, 2005), 'relational' (Selg; Ventsel, 2020) and 'mobility' (Cresswell, 2006; 2010; 2011; 2012) turns over the last twenty-five years in anthropology, cultural theory and social sciences have met with the catch on of complex theory and network science approaches (Barabási, 2002) and new swinging of cycles of modernity sponsored by increasing influence of biological sciences' toolbox over interpretation (Kristiansen, 2014; 2022a; 2022b). Caught in such interdisciplinary and cross-disciplinary carrefour of research interests and agendas, certainly practitioners are not isolated in coping with the ways things have changed. And while the posture in facing these new venues will decide how much the discipline will re-orient itself and reinscribe types of knowledge, representation and power relations, its pragmatic concerning should not be overlooked. They are relevant to the extent it reclaims an archaeologically relevance in current cultural debates of the day. If anything, "[…] archaeology is archaeology or it is nothing" (Olsen, 2012: 224).

In view of the broad discussions here envisioned, some conceptual and analytical 'anchors' are raised in current theoretical archaeology with the intent to devise less polysemic concepts, insofar as possible, and heuristic tools for addressing archaeological problems. If not properly a unified intellectual construction, at least this is a common (epistemological and ontological) ground where differences are aggregated and fragmentation countered as the scientific means amenable to validate hypotheses, in greater or lesser degrees. To establish a

systematic comparisons and correlations of matter and materiality, movement and mobility, connectedness and connectivity, we recur to a range of operative definitions, positivistic oriented ways of testing historical and anthropological and sociological models and ontological basis for understanding the material engagement of social life, action and thought.

Although not necessarily affiliated with each other in terms of main theoretical strains (schools), one may still recognize a wealth of theories and research topics somewhat conversant with each other (see for instance Hodder, 2012b: 7, fig. 1.1; Hicks, 2010). In the following pages, we shall attempt to make the case these strands are mainly relevant (if not only) for a reflexive perception and ideological critique of archaeological scholarship. Collectively, they contribute to an in-depth understanding of the ways by which knowledge, discursive and non-discursive practices in the present, concrete changes in society and analytical categories gain 'life' in interpretation through archaeologists who grew up in, and partly reflect, politically and historically situated class conditions of 250 years of Euro-American archaeology (Trigger, 1981; [1984] 2003; [1989] 1996; 1986; [1989] 1996; 2001; Hinsley, 1981; Patterson, 1995; 2010; Silberman, 1995; Moro-Abadía, 2006; Gonzáles-Ruibal, 2010).

This theoretical trend is largely due to symbolic and interpretative issues from the 1980s, successfully raised by postmodernists on the back of post-processual programs (among all others, cf. Hodder, 1982b; 1985; 1986; and the "the black and the red" (Kristiansen, 1988): Shanks; Tilley, [1987] 1992; 1987; Shanks, 2008; see also overview of 'material culture studies' in anthropological archaeology provided by Hicks (2010)). Social agency and practice, 'meaningfully constituted' material culture, the politics of the interpreting archaeologist in relation in broader socio-economic forces, multivocality and archaeologically declined practices in the present tense widened the scope for discussion in the subsequent agenda of theoretical archaeology and self-critical re-examinations of its social histories (Trigger, [1980] 2003; 1981; 1986; Hinsley, 1981; Silberman, 1989; Patterson, 1995; McGuire, 1992; 2004). The assimilation of critiques thereon, opposing stimulus, and the development of post-humanistic approaches can be seen in the same light. Concomitantly, a widespread unease with the pervasive lack of what Clarke (1973) called a "critical self-consciousness," produced in continental Europe of the same period a return to hyper coherent disciplinary projects as a means of redressing the idiosyncrasy of interpretation, Babylonian confusion of the increasing bulks of information, naïve reliance in exhaustive description and outsourcing of disciplinary epistemology to methods and instruments (see further references below).

As it stands, this thesis lies at the key points below, which we shall develop little by little along this chapter. They are relevant for exploring the limits of how we know things

archaeologically, the ontological content and meaningful ways of how humans interact and learn through the embeddedness of material culture together with promoting a critique to the present archaeological praxis towards plural and decolonial perspectives, no fewer than:

1) A polythetic conception of archaeological unities distinguished as against monothetic and closed totalities and mainly defined as clusters of co-occurred areas of similarities and dissimilarities in cultural attributes. This widens up for us a systematic and multidimensional parameter of material culture variability and cultural aspects of spatial variability and collectives of various sorts in changing sets of relationships across space and over time (i.e., meaningful polythetic patterns) (Clarke, 1968; Furholt, 2014; 2019a; 2019b).

Archaeology suffered for long from the dearth of approaches inspired by the work of Clarke. His legacy of a synthesis of cultural historical tradition have been revindicated by evolutionary perspectives (Shennan, 1989c; 2002; 2009). The so-called Darwinian Archaeology has the whole thrust in putting his artifact-centred syntax into use in large biologically related frameworks of cultural transmission-as-information exchange and related driven forces of selection. Although agreeing on the importance of developing complex and multi-scalar mechanisms of change bearing somewhat on Darwin's ideas of descent with modification and evolution of forms, we shall pursue a route that is different from the evolutionary typologies. If not necessarily wrong when teleological in conceiving time and processes in a historicist trend of directionality, reversibility and causality (Olivier, 2008), they are then certainly partial in the insistence on external conditions of the environment in shaping possible trajectories of the future (**Fig. 3.1**)

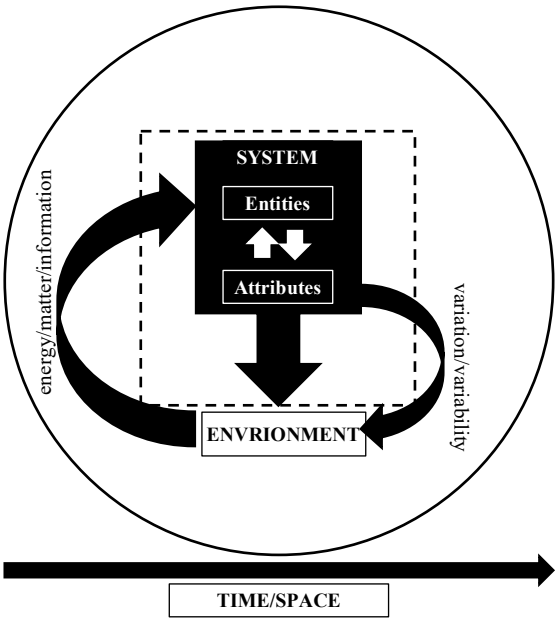

Fig. 3.1. Systematic view of the processes of variability and change. Drawing author (after Gallay, 1986: 101, fig. 21).

2) A logicist perspective on archaeological 'constructs' (explanatory framework) and the means of validation of enunciated propositions (i.e., "if this is true, then…") (Gardin, 1974; 1979; Gardin; Lagrange, 1975; Gallay, 1986; 1989; 2011). This is done by means of interpretative analogies (actualistic comparative studies) between archaeologically visible

traces and past cultural mechanisms of how technique was brought forth in the phenomenology of the action and lived on in craft traditions (**Fig. 3.2**). At the level of technical-stylistic variability, this is favoured mainly by means primarily of a focus on the practices (gestures and control of movement), techniques and methods of producing handmade objects through transcultural generalizations of learning processes and the 'etic' nature of *Homo sapiens sapiens*, motor habits and cognitive skills and constraints of various sorts.[54]

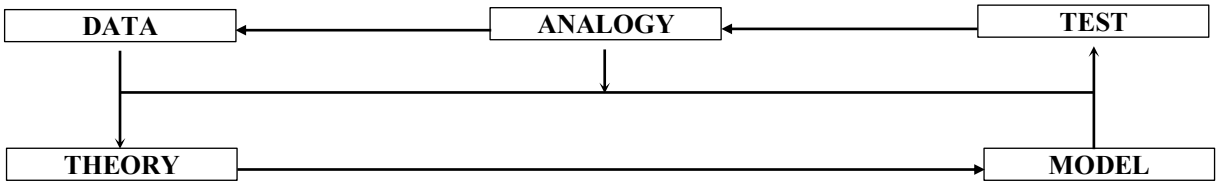

Fig. 3.2. Structure of reasoning process. Drawing author.

3) An integrated theory of formal stylistic/technological variability – "technological style" (Lechtman, 1977) – that stresses the irreducible character of cultural choices and, therefore, of equivalent functions of sequences, gestures and techniques in operational chains of behavioural events. Style is not just decorative elements of material culture (Dunnell, 1978) or reduced into a register of communicative system of material culture (e.g., "stylistic behavior" Wobst, 1977) (**Fig. 3.3**). By so doing, we explore the theoretical viability of poor/good markers for reconstructing culturally-specific social links (learning networks) and certain movements (i.e., best matches of spatial distribution/network and certain processes at the basis of cultural transfer).

[54] Examples of application in the work of Roux; Corbetta, 1990; Bril; Roux; Dietrich, 1995; Roux; Matarasso, 1999; Matarasso; Roux, 2000; Roux, 2007; 2013; 2015; 2016; 2017; 2019; 2020. The craft theory of Kuijpers (2018a, 2018b) based on physic-physiological invariants in the tradition of *chaîne opératoire* approach (see below) is compatible with many of these principles espoused by logicists.

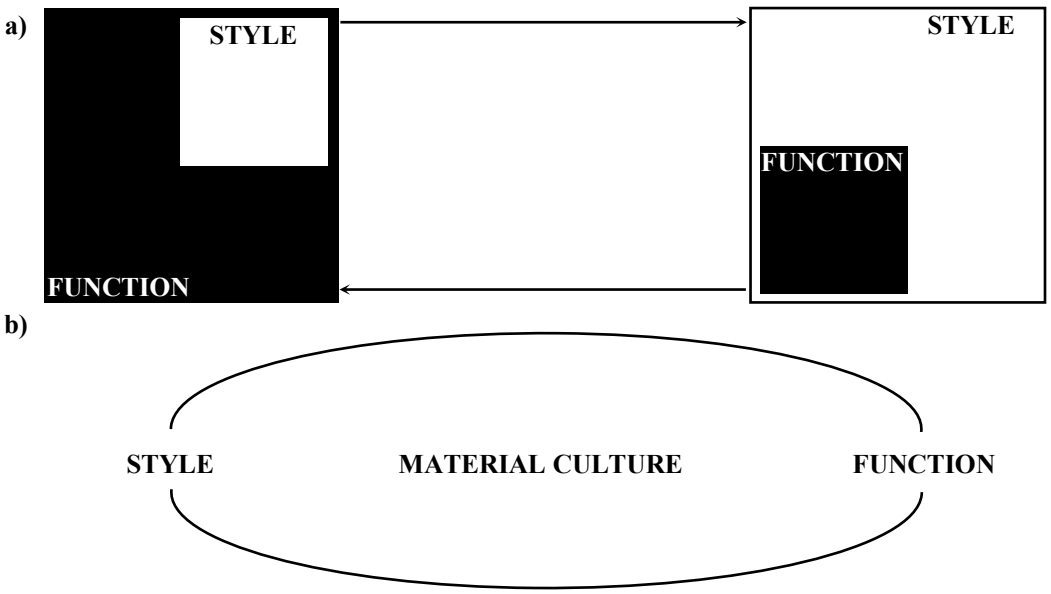

Fig. 3.3. Confronting views of (a) style as residue of function constraints and vice versa and the seamless interwowen relationship between style and function (b) adopted in this work. Drawing author.

As regards enchained relationships of production and consumption of material culture, we are keen to weld both anglophone concept of "behavioral chains" (Schiffer, 1972; 1976) and Francophone *chaîne opératoires* and *techniques et culture* (Anthropology of Technology) intellectual traditions with long roots in Mauss and Leroi-Gourhan (Sackett, 1982; Hegmon, 1992; 1998; Lemonnier, 1992; 2018; Carr, 1995a; 1995b; Clark, 2001; cf. also Stark, 1998; 1998b; Dietler; Herbich, 1989; 1998; Stark; Bowser; Horne, 2008; 2008b; cf. ethnohistorical and archaeological studies in Africa: Gosselain, 1992; 2000; southern lowland South America: La Salvia; Brochado, 1989; and Amazonia: Schaan, 2007; Dias, 2007; Silva, 2000; 2007; 2008; 2016; 2019). In addition to the manufacture and use-life cycles/life history of artifacts (Schiffer, 1972; 1976; 1999: 22-23; Schiffer; Skibo, 1987; 1997; Skibo, 1992), it is possible to combine insights from the 'social life of things' and cultural biographies of objects (Appadurai, 1986b; Kopytoff, 1986; Gosden; Marshall, 1999; Hahn; Weis, 2013b). The last reveal the multiple trajectories and interconnections between people and things ranging from whole vase and pot sherd, megalithic structures and marbles in new set of interpretative frameworks (Holtorf, 1998; 2002; Shanks, 1998; Hamilakis, 1999; 2007: 243-286) beyond the objectifying display (Pomian, 1987: 15-20; Gosden, 2004a; Shanks; Tilley, [1987] 1992) and historicism (Olivier, 2008: 66; cf., on "ethnographical archaeology," Hamilakis, 2011; 2016; Hamilakis; Anagnostopoulos, 2009; Silva, 2024) (**Fig. 3.4**).

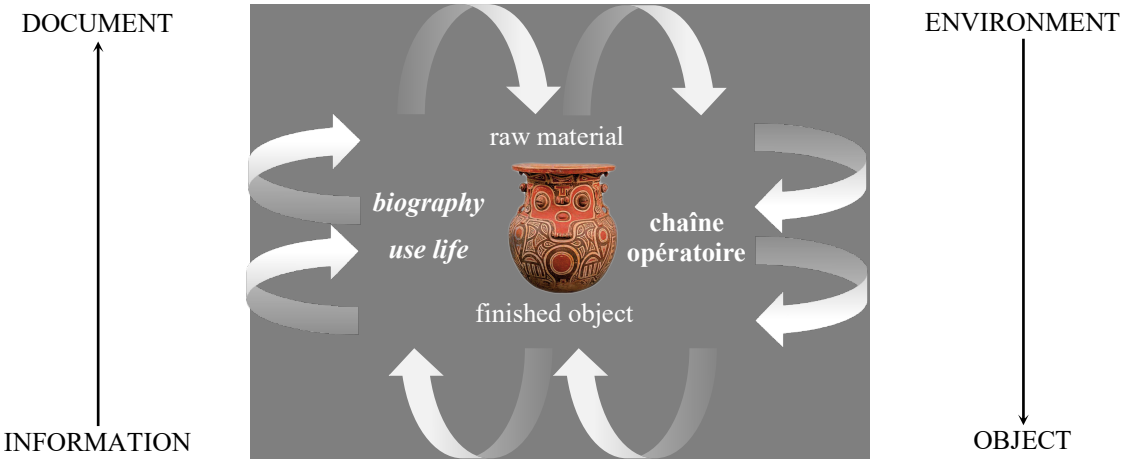

Fig. 3.4. Life cycle of artifact. Drawing author. Marajoaran funerary urn in MPEG.

4) Perspectives on the co-construction of human and material world and human decentered concepts and research programs with an untangled genealogy since "'Material-Culture Turn'" in archaeology (Hicks, 2010: 28). They place on equal footing of human and non-human actants and ontological entanglements of Nature and Culture in alternative to modernist thought as in the influential ANT, 'symmetrical anthropology', Amerindian perspectivism and animism and ontologies in general or, simply 'ontological turn' (Latour, [1991] 2011; 2005; Viveiros de Castro, [1998] 2002; Descola, 2005). The mainstay of this varied set of approaches is the inextricable materiality of human socio-historical experience of self and iteractive parameters of agency and agency of things on social life.

They partake in a strong critique against the reduction of 'symmetric' and 'non-anthropocentric' nature of semiotics of material relations into social constructivism by language-based post-structuralist, symbolic or communication approaches in general, especially as regards the prevalence of the 'social' and representational dimension in the new material studies. Material culture studies go beyond the confines of archaeology in that it is an interdisciplinary endeavor of Anglo-Saxon literature in anthropology in consumption studies, cultural studies and social theory over the 1980s and 1990s (Hicks, 2010). Scholarship has tried hard to dissipate a perceived discursive dematerialization of things and gain a foothold in the 'real' physical foundation of life, a "return to things" (Dománska, 2006).

Among all other insights they build up, there is a range of social theories from Bourdieu to Giddens on the agency *versus* structure dialectic and versions of phenomenology (Bergson, Heidegger and Merleau-Ponty) in philosophy in Heideggerian Archaeology (Thomas, 1996); relational views of agency influenced in anthropology (Strathern, Gell and Ingold) (Gosden, 1994; 1999; 2004a; 2004b; 2005; 2009) and Latour in Symmetric Archaeology and later Thing Theory (Shanks, 1998; 2007; Olsen, 2003; 2007; 2010; 2012; Webmoor, 2007; Witmore, 2007;

Gonzáles-Ruibal, 2007); semiotician Peirce (Preucel; Bauer, 2001; Preucel, 2006); and Gibsonian ecological psychology (Knappet, 2004; 2005) and Social Network Analysis (Knappett, 2008; 2010; 2011a; 2011b; 2012); computer science and cognitive neuroscience in Material Engagement Theory (Renfrew, [2001] 2012b; 2003a; 2004; Malafouris, 2004; 2009; 2013; Renfrew; Frith; Malafouris, 2009; Malafouris; Renfrew, 2010); last but not least, Entanglement Theory (Hodder, 2012a).

The above approaches are infused by some universalistic notion of the bearing of matter on thought and distributed brainly and bodily perceptions in the material environment – "material agency" and "cognitive life of things" as new phrases to counter anthropocentric views (Knappett; Malafouris, 2008a; Malafouris; Renfrew, 2010; Malafouris, 2013: 119-149). As shown by influences of as diverse fields of enquiry as robotics, computer and cognitive science, neuroscience and artificial intelligence as well as contemporary art (Coles; Dion, 1999; Renfrew, 2003a) and photography (Andreassen; Bjerck; Olsen, 2010) to arrive at broader issues of neurons, body, image and memory (DeMarrais; Gosden; Renfrew, 2004; Renfrew; Morley, 2007; Renfrew; Gosden; DeMarrais, 2004).

Several scholars have noted countless shortcomings in borrowing Saussure-inspired linguistic approaches to material culture (Patrik, 1985), in particular by those advocating an alternative (Peircean) semiotics (Gell, 1998; Knappett, 2005; Preucel, 2006; see 'material semiosis' in Malafouris, 2013: 86-118). Useful insights derived from the latter describes a more spatially saturated practice of material culture signs. That is, other than operating in symbolic sphere, material culture relations go through and transcend, through objectification, local situations constituted by practice in extra immediate experience of time and space. A fundamental implication of the relationality of human-artifact interaction as, to recap, "[…] any matter-energy transaction […]" (Schiffer, 1999: 13) is that it then provides us food for thought concerning potential dimensions of material culture suggestive of sustained contiguity and those that put people in increasing spheres of communication, interaction and exchange modes, e.g., between detached objects

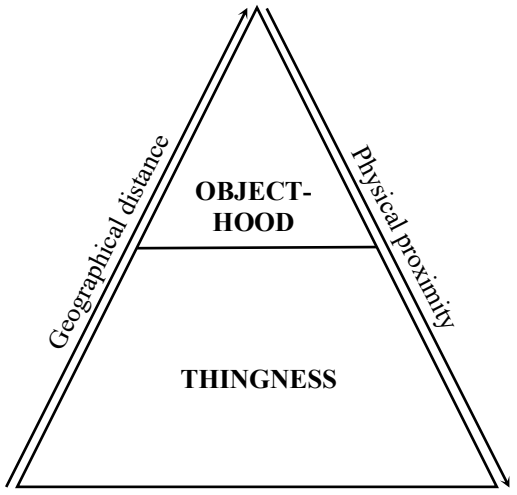

Fig. 3.5. Structure of thing/object relations with parameters of distance and proximity. Drawing author.

and assemblage of things (Gosden, 2004a; 2004b; Knappett, 2008; 2010: 82; 2011a; 2011b), of which more below (**Fig. 3.5**).

In the anthropology of 'primitive economy' (see CHAPTER 1), there is a long tendency to see these topics in terms of specific relations of reciprocity and kinship ties pitching economic and social interests in two extremes (Appadurai, 1986a: 11). Sahlins (1972: 198; cf. recently Nakassis *et al.* 2016) outlines "[…] a series of more and more inclusive kinship-residential sectors, and reciprocity seen then to vary in character be sectoral position." Testart (2001; see also Gallay, 2013; Roux, 2016) usefully distinguishes value in exchange according to what weight is accorded to social and economic links in commercial and noncommercial transactions. As concerns exchange across geographical distance in preindustrial communities, we believe we are on safe ground assuming that as an expectation (null model), exchange modalities maps onto an inverse logic of kin and social distance and physical space and the terms of relations entertained between partners commands (**Fig. 3.6**). Situation where these expectations are not met and contradicted are significant and compel explanations.

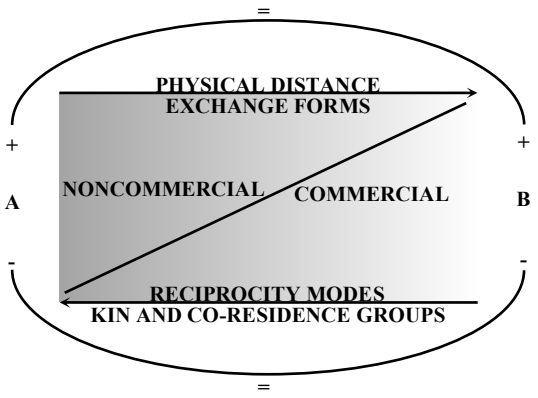

Fig. 3.6. General principles of exchange modalities and reciprocity balances in preindustrial communities. Drawing author (after Sahlins, 1972: ch. 5; Testart, 2001; Gallay, 2013).

Fig. 3.7 might look unduly polar, but it analyses juxtaposed components of material culture by giving centrality to materiality, that is "[…] human relations with the world" (Gosden, 1994: 82). The multiple human-material relationships are differentiated in planes and focuses of analyses and sub-/meta-disciplines research traditions thereof involved in the study of these very same relations (see e.g., Gibson's (1979) notion of "affordances"; Behavioral Archaeology and the interactive properties of material in behavioral chain activities ("performance characteristic"): Schiffer; Skibo, 1987; 1997; Skibo, 1992; Shiffer, 1999: 16-20). In other words, it highlights the materially mediated dimension of our bodily and cognitive relationship (engagement) with the surrounding and different registers of people-things and things-things interactions through interconnected processes moving people around across scale and spaces.

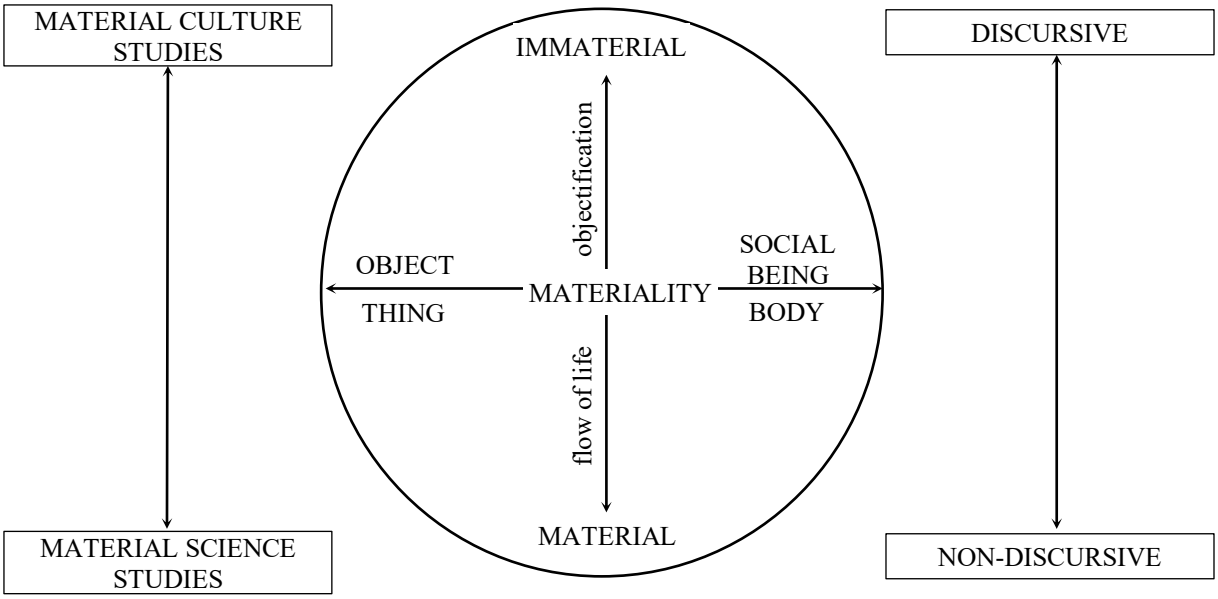

Fig. 3.7. Main axes of materiality, types of knowledge and sub or meta-disciplines involved. Drawing author.

5) Our approach aligns with sociological and anthropological theories keen to the social dimension of action, production and reproduction of structure so much a part of bodily memory and interconnected localities (Bourdieu, [1972] 2000; Giddens, 1979; [1984] 2013; Connerton, 1989; Ingold, 2000). The dynamics of craftmanship learning is grounded in situaded contexts of practice, identity of practitioners relational to other members (i.e., emergent nature of the self and shifting strategies of meaning over the life time) and experience of action recursive at many social scales (and of, simultaneously and overlapping, social boundaries in "communities of practices" thereof, e.g., kin and not biologically related groups, workshops, etc) (**Fig. 3.8**) (Lave; Wenger, [1991] 2022; Wenger, 1998; within archaeology Gosselain, 2008; 2011; 2016a; 2016b; 2018; Knappett; 2011; Wendrich, 2012b; Knappett; 2011; Knappett; Kiriatzi, 2016; Roddick; Stahl, 2016b; Furholt, 2018a).

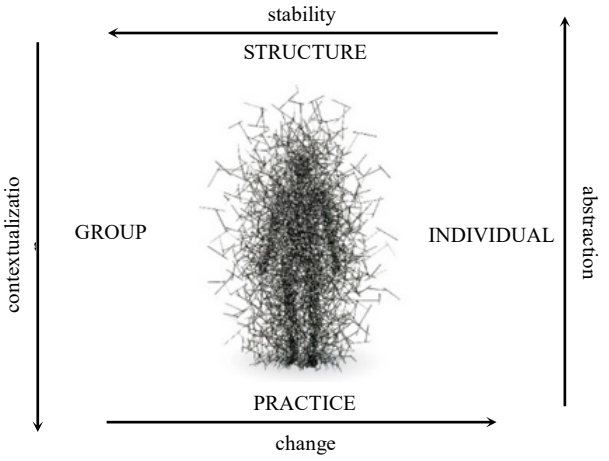

Fig. 3.8. Intersection of human social constitution. Drawing author after Gormely's Quamtum Cloud VII.

6) We draw on postcolonial theory in archaeology, that, by eschewing top-down views of movement and interaction, atomistic views of identities and cultural integrity, move

away from essentializing conceptions of identity, active/passive dualities or images of wholesale movement of cultures and absorption or displacement modelled by imperialist colonialism (van Dommelen, 1997; 2012; Gosden, 1999; 2001; [2001] 2012; 2004b; Silliman, 2005; 2009; 2012; see in special Lyons; Papadopoulos, 2002b; Stein, 2005b; Cornell; Fahlander, 2007a; Liebmann; Rizvi, 2008; Lydon; Rizvi, 2010b; van Dommelen; Knapp, 2010; Maran; Stockhammer, 2012 and papers therein). Whereas any every modern archaeology is post-colonial in the sense it is historically charted after the mid-twenty-century political decolonization (Gosden, 2001: 242; cf. Liebmann, 2008a: 3-4; Lydon; Rizvi, 2010a: 19), its close links with colonialism in the rise of globalism should bring into sharp relief ethical challenges to reposition current disciplinary praxis written into the heritage of colonialism and imperialism. They have been shaping past-present connections and discursive relations of dominant groups over subalterns along the intellectual history of archaeology in the wake of colonial expansion in Asia, Africa, America and later Oceania, exemplified by works on Occident's Orient in domains of history, philology and literature (i.e., *Orientalism*: Said, 1978), anthropology (Fabian, 1983) and archaeology in the conquest of the West and Aboriginal peoples and Third World periphery's (i.e. North American archaeology: Trigger, [1980] 2003; 1981; 1986; Hinsley, 1981; McGuire, 1992; 1997; 2004; Patterson, 1995; Gosden, 1999; Thomas, 2000; Diáz-Andreu, 2007; South America: Haber, 2016) and in subfields of classical studies and Indian studies (Poliakov, 1974; Bernal, 1987; Olender, [1989] 2002; Trautmann, 1997; Arvidsson, [2000] 2006; Demoule, 2014).

Postcolonial thinking is much due to a vast array of post-structural philosophies of Lacan, Derrida and Foucault mediated in the foundational works of Said (1978), Spivak and Bhabha (see overviews in Gosden, 2001; Fahlander, 2007; Patterson, 2008). At the core of it, there are more nuanced and sophisticated perspectives on the materially fluid patterns and heterogenous compositions of entities interacting in the interstices of social encounters, power dynamics as well as the context-dependent nature of identities. This can involve also the appropriation and re-signification of practices brought together from different backgrounds and distances at multiple intersections (class, gender and race). Moreover, postcolonial thinkers have contributed in much stronger tones to the critique of Western power knowledge on the "Other" and enduring hegemony beyond political and administrative colonization and economic control. The long root of global connections lays on colonialism and the reckoning with the fact that "[…] we have all been created as colonial subjects" (Gosden, 1999: 194) presses for the liberation of complex histories beyond European's history and episteme to advocate new pasts (Gosden, 1999; 2001; [2001] 2012; Thomas, 2000).

7) Application of formal network exploratory and systematic analysis and relational theories in archaeology (de Nooy; Mrvar; Batagelj, 2005; cf. Knappett, 2011a; 2013a; Brughmans, 2010; 2013; Brughmans; Collar; Coward, 2016a; Östborn; Gerding, 2014; Collar *et al.* 2015; Mills, 2017; Peeples, 2019; Dawson; Iacono, 2021; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024). In its most basic principles, a network is constituted by a list of vertices and lines in pairwise relationship. As heuristic tools par excellence, networks bear no contradiction with the messiness of pathways and movement along interwoven lines and heterogeneous components of real life ('meshwork' to use Ingold's (2007) term). They are just different planes of description and embeddedness of constant flux and movement of different sort of things.

8) The key to the comparison and contrast between the Mediterranean and Amazonia lies in the idea of regionally wide ecologies as metaphors of connectedness in a fractal structure of layered environmental fragmentation countered by the ease of movement and communication that constitute, in its turn, different aspects of identity beyond the scope of proximity (Horden; Purcell, 2000; Broodbank, 2013; 2016; see ch. 1). In an exercise of comparative 'thalassology' (Peters, 2003; Horden; Purcell, 2006; Broodbank, 2013; 2016), the complex mosaic of ecologies is linked together by liquid highways conducive to movement and exchange across scales. One might even opt for meshworks (Ingold, 2007; Horden; Purcell, 2019: ch. 5) or entanglements (Hodder, 2012a) and see through them, in a leap of faith, presentist analogies of increased global mobility, fluidity of boundaries and transcultural structures of membership (Morris, 2003; Vandkilde, 2016).

To operationalize these higher analytical images into elementary scales of real-world archaeology, we treat the model as guidelines for formalizing relational theories (Peeples, 2019; Brughmans; Peeples, 2023; Brughmans; Munson; Peeples, 2024). It is not a question of focusing on movement, but rather of understanding the situatedness of movement, the spatial constraints, means of technology, etc. (Morris, 2003; Gonzáles-Ruibal, 2014: 42-43; Broodbank, 2016; Gosselain, 2016b; Woolf, 2016). The framework of our proposed model condenses the previous theoretical and methodological points exposed to get at inter-relatable levels and across analytic scales in a set of complementary ideas of network of connections and meshwork of interwoven lines (**Fig. 3.9**). The attempt here is of recasting continuity and change in a figurative understanding of complex dynamics of flow and movement embedded in historically saturated practices in the hope of recasting the whole problem of mobility and migration in the culture history of the ecologies in study.

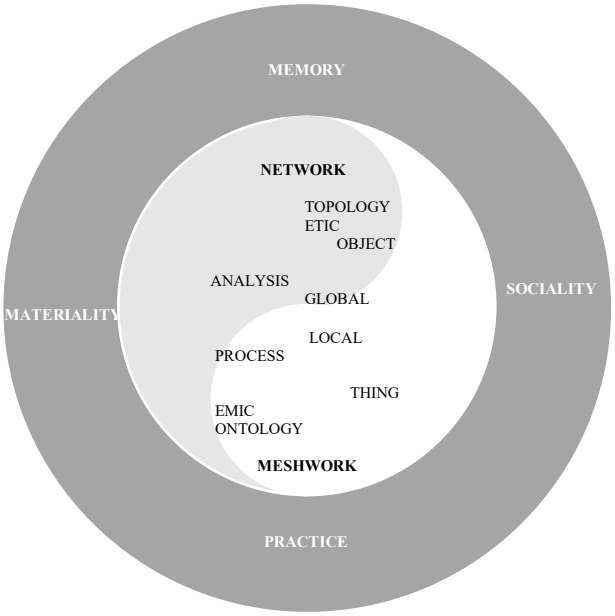

Fig. 3.9. Duality network/meshwork views in a comparative model that capitalizes in the complementarity of perspectives. Drawing author.

9) Last but not least, an interdisciplinary dialogue with contemporary migration studies (de Haas; Castles; Miller, [1993] 2020; Brettell; Hollefield, [2000] 2023b; Manning, [2004] 2020; Le Bras, 2017) and mobilities research (Sheller; Urry, 2006; Creswell, 2006; 2010; 2011) help us move back and forth towards both ends of the mobility and interaction spectrum. The aim is to discern a vast array of mobilities alongside the circumstances whereby they are produced in networks of exchange. In the framework of this model, underpinning scales of analyses, from components of things, body to groups and nature of what is moving (humans, things and ideas), disciplinary terminologies, theories and methods turn myriad concepts and research fields commensurable in types, variables and processes of societal transformation (Peixoto forthcoming) (**Fig. 3.10**).

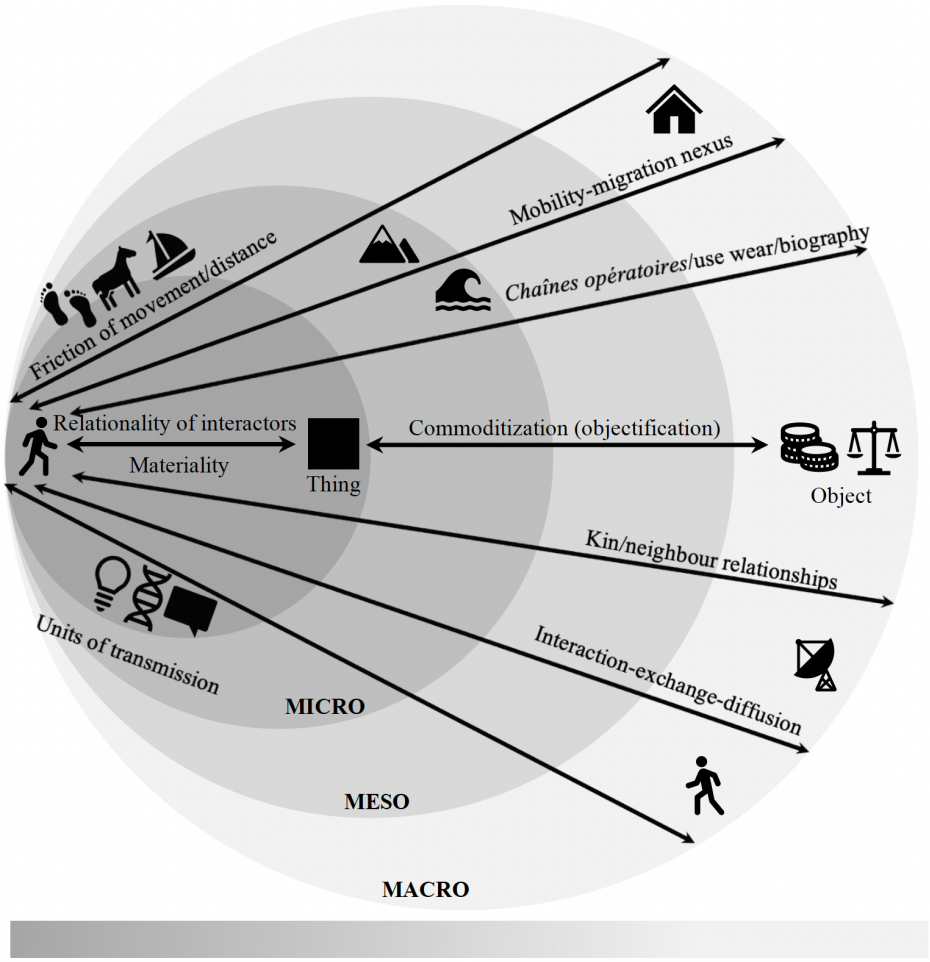

Fig. 3.10. Spatial scales and spectrums of movement and interaction ranges. Drawing author.

In the whole gamut of sites of bodily movement across a variety of locales, there is first and foremost the micro and enmeshed scale of recurrent and multi-directional human-thing interactions. Starting from the restricted familiar geography propinquity of experienced space, the friction of space and travel costs, technology of transportation play an increasing role upon process of embodied mobility, circulation of objects, techniques and ideas. In the case studies that follow, the human-centered approach proves of great contribution to hypothesize how mobility works with the archaeologically fossilized aspects of (empirical) movement (point A to B). Far from being a closed statement, it is a tentative account of a unified conception, and as diverse as conceptions in current archaeology, of ways to go about mobility and interaction

Things to be studied

The challenge of analysis of multi-scalar phenomena in the real world is to design appropriate resolution and instruments to disentangle and pick up threads of process.

Overlapping layers pertaining to heterogeneous views, scales and units of analysis of material culture variability, knowledge transmission, social boundaries and identities emerge as long as zoomed-in/out levels are activated. In this work, we have been arguing that to overcome any all-or-none view of mobility and migration in which untangled masses of people or flowing influences get transferred from A to B, a theoretical, methodological, and empirical perspectives of style have to link across different layers and scales, with a primary focus on local contexts of co-presence – i.e., sustained face-to-face interaction (locality/sociability) – and social and material interaction of people and material world in their daily practices (materiality). A general model of an archaeology of mobilities bridging types and processes will enable a testing ground so comparisons be drawn.

Narrowing the focus even further, we try to offer briefly examples of how such an approach might work and how the study areas can be brought together to come to a better understanding of mobility dynamics. The cross-cultural and diachronic comparison takes two distant and non-related archaeological areas separated by the Atlantic Sea in order to gauge "Mediterratlantic" (Pappa, 2020: 386) similarities and differences. Both are deeply involved in possible cases of migration and, to different degrees, episodes of linguistic dispersion. If nothing else, they are illustrative of the widely disparate interpretations placed on the same two sets of evidence. The phenomena under study are the significance of networks of similarity that should be read into classes of material in the interface of intersocietal encounters. How do we move across scales in analysing both ends of the broader spectrum of mobilities with archaeology's toolkit?

The definition of 'migration,' the nature of evidence and means of scientific validation are problematic. It is fair to say that the "history as-the-event-story" idea has been so far precluded many archaeologists of absorbing, in a broad comparative fashion, the work of the interdisciplinary field of migration studies (Haas; Castles; Miller, [1993] 2020: 42-74; Manning, [2004] 2020: appx; Bretell; Hollifield, [2000] 2023a: 4 ff.) as a social process within a continous spectrum of mobilities, with notable exceptions over the decades of influence of the processual school (see previous chapters). If archaeologists were to plough on the politics implicated in mobility in the past, the conditions that enabled it (Cresswell, 2006; 2010; 2011), they have first to untie the hard knot of definitions, unwind ranges and scales relative to scale and resolution to finally loose the string on which migration has been frequently tied down. Only now this has been mended with migration studies, mobility research and edge-cutting scientific arsenal in the same alloy mix (see bibliography in CHAPTER 1). In our view, archaeology should approach the question of origins first through material culture variability

and connections thereof and the mechanisms whereby people, practices and things could have got from point A to point B instead of assuming the movement of bubbles through "arrows on maps" (Hakenbeck, 2008: 16).

First and foremost, mobility and migration entail the empirical identification of movement with the multitude of data attributes and, indirectly, people as vectors of transmission of these traits. Sadly, for much of the theoretical reflection on the discipline, migration has been traditionally assumed rather than proved, with ideational concepts of groups of like-looking artifacts as surrogate for 'nations' and moving cultural wholes – "[…] whether in ancient Greece or Illinois […]" (Patterson, 1995: 87) – having the upper hand in how interregional encounters are signified. So, this is a fundamental dimension of theory that the appropriate tools and methods must bring to bear. All of this presses a systematic and self-critically examination of nearly seventy years of research on the typological method, in Europeanist (e.g., Childe and his followes) and North Americanist cultural history archaeology (e.g., Willey *et al.* 1956; Thompson, 1958; Rouse, 1986), in order to convert migrationist archaeology into archaeology of mobilities and connections in relational-based model conversant to a wide spectrum of late 20th- and 21st-century scholarship, classical postcolonial thinkers, posthumanist anthropologists and mobilities researchers (see below).

In *O Objeto Material como Documento*, Ulpiano de Meneses (1980) writes that a document is a "*suporte físico de informação*" and archaeologist's primary task is to reconstitute in hindsight life-cycle of object behind document. "*Decomponível, desmenbrável em unidades autônomas, mas que articulam entre si*," artifacts confront etic observers with information on the field of relationality they are enmeshed. As "*ex-objetos*" of cultural deposition, they elicit information on the dynamics and mechanisms of exchange of energy – capture and waste thereof – of dead socio organizations. Artifacts-as-documents have an enduring material trace and encompass many things as every-*thing*, it is only a matter if time, travel categories as information carriers from 'living' things/beings into dead things in the afterlife of time present ("*lixo-coisa, lixo-gente*").

An object, however, is constructed by the method and scales of analysis (Greek *análysis*), an objectification process which also is a function of scale here defined (Dunnell, [1971] 2007: 190-192; Gardin, 1979: 28-31; Bortolini, 2017: 652). Objects do not withhold an absolute essence (Shanks, 1998: 22; Olivier, 2008). To glean information through archaeological inference, inverting Meneses' words, archaeologists need to "*documentalizar* [to document]" the opaque raw material of things and craft theoretical objects. Threads run several spatial scales through and to untangle the mass of materials and histories condensated

in the object world we should proceed first an analytical disassembling of assemblage of things in decomposable unites to then re-assemble it in life histories or biographies ("follow the thing"). Human and things become of kindred breed of physical entities, as have been emphasizing proponents of Symmetrical Archaeology (Shanks, 1998; 2007; Olsen, 2003; 2007; 2010; 2012; *et al.* 2012; Webmoor, 2007; Witmore, 2007; Gonzáles-Ruibal, 2007).

A relational view of things serves both a source and resource of theory and method for exploring the structure of multiple threads in the weft of the fabric of social and material forms, emphasizing how things interweave humans and distributed relational properties through assemblages. Tracing the origin of traits in the form of oldest representatives so far know (be it a prototype of form, decorative element, etcetera) largely depends on the fragmentary nature of archaeological sample and biases thereof or, as a matter of fact, criteria for membership to arbitrarily divide continuous flux into analytical units of classification. Archaeological network exploration partly counteracts this major problem since connections do not necessarily assume a relation from/to but rather a pair of nodes in an undirected (dyadic) relationship, as we shall see.[55] While it may be right to maintain things are related to each other, if not properly in genealogical terms to be careful with the "fetish of origin" (Dománska, 2006: 180), trajectories of materiality and histories of connections are activated in the present (Kopytoff, 1986; Shanks, 1998; 2007; Gosden, Marshall 1999; Hortolf, 1998; 2002; Hamilakis, 1999; 2007: 243-286; Gosden, 2005; 2009; Hahn; Weis, 2013; Gosselain, 2000; 2018).

Through such methods, any object or archaeological feature for that matter can be singled out and then be 'broken down' into infinite characterization of the assemblage of component pieces it is made of. The whole process is not dissimilar of the reverse engineering of an exploded view of a garden shed in *Cold Dark Matter* by Cornelia Parker. Some of the intrinsic properties of the matter (Gardin, 1979: 119-124; Gallay, 1986: 175), can be connected into a network through a range of scientific- and humanities-based methods, some old and new (and whereby disciplines and scales are bridged, see Knappett, 2016). Conceptually, relational connections disclose an object's knot made of multiple histories (Olivier, 2008: 152; cf. Gosden, 2009: 116, fig. 7.2).

At specific scales of the unities mobilized, this might tell us about edges linking pairs of entities – as pegs to hang things on interconnecting cloth-lines. Naturally enough two straight points 'from' and 'to' of movement simplifies to scientific use a much more complicate process that is not made of blank spots traversed by fast-track lines (Cresswell, 2006; 2010; 2011; 2012;

[55] A pair of nodes with/out connections in network's structure.

Ingold 2007; 2011). By postulating that the structure of similatiry in material culture postulate social network of various formats and across spatially distributed learning contexts along which people and things are moved, I arrive to two key assumptions, that

1) Archaeological units polythetically classified are linked to culture systems of production and consumption, operational sequences and life-story cycles, ergo they stand for a reified social memory of materialized ways of doing;
2) Contextual frameworks favoring specific models of skill acquistion of cultural attributes overlap with the multiple scalar nature and modalities of mobility and interaction.

Material patterns are deposits of past practices of groups inculcated through socialization in a set of patterns. They are embodied through *habitus* (Bourdieu, [1972] 2000) and act out by the body in a concatenation of technical gestures and performances. Style expresses cultural variability of historic-specific groups in that they are performative structures of habit-memory that formalize technical traditions of social groups or sub-groups thereof (Wenger; Lave, [1991] 2022; Wenger, 1998). Based on these observations, in this work we develop on Clark's (2001: 14-22) testing approach to evaluate culture material markers that passively reflect historically situated ways of doing. The polythetic structure in the distribution of low-visibility morpho-stylistic traits across much of a region can function as a proxy for shared production practices and hence specific modes and ranges of interregional interaction and tranfer given independent invention and convergent (analogous similarities) in these cases is a less likely scenario.

The assumption here is of a strong correlation of social networks of practice and learning, regularity of proximal interaction and stylistic similarity at some level and degree "implemented by the type" (Clarke, 1968: 135, fig. 19).[56] If an artifact (B) is connected through an array of edges with (A) in place (1), separated by great distances and no enculturative background with place (2) might seem to have existed, types ranges of movement and interaction as action at a distance can be narrowed down to explain how (B) came up in society (1). Proof of migration must not be taken as an end in itself and the new age of mobilities research compel scholars further ahead in the direction of new pathways where "'it's about more than getting from A to B'" (Cresswell, 2011: 554). However, albeit movement is a basic

[56] The kind that made for 'traditionalists', Deetz and Binford for strange 'normative' bedfellows (cf. Plog, 1980: 115-119).

fact from the very beginning of life, mobility is indispensable for approaching archaeologically in the historical contingency of the phenomenon and meaningful forms of mobilties (Sørensen, 2015; see **Archaeology of mobilities**; Peixoto forthcoming). The question here being "at which levels and what parts of a spectrum of spatial mobilities and interaction ranges can be deduced through the dense network of artifact attributes in relational connections?".

Different sorts of entities are analyzed as nodes of connectivity. At what aspects of formalized action these insights apply? As we noted, not technological characterization defined as function or stylistic attributes in the narrow room left over by functional constraints of the matter, environment and use in materialist philosophies of processual and evolutionary archaeologists.[57] Material traits are only meaningful when put together in operational sequences, hence in the practices of social groups involved in bringing forth stylistic forms (or artifact design (Carr, 1995a: 157). Technology is interwoven in style as style in social and cultural choices. It can be shortly defined as "[…] all aspects of the process of action upon matter, whether it is scratching one's nose, planting sweet potatoes, or making jumbo jets" (Lemonnier, 1992: 1). Naturally enough in the continued dialogue maker-material (Leroi-Gourhan, 1965: 132) there are limiting boundaries of possibility, interdependence of choices and channeling of response both for producers and consumers.[58]

Set of skills written into reiterated aspects of practice are characterized by a differentiated potential and context-dependent of message display and investment of identity in material style (cf. critiques and counter ethnographic examples in Dietler; Herbich, 1989; 1998; see also Carr. 1995a, 1995b; Clark, 2001 for a refinement of Wobst's "information exchange" approach; see **Origins and migrations**). In view of the complex relationship of the degree of visibility and differentiated potential for passive (Sackett, 1982) and active (Wiessner, 1983) investment of identity through elements of "technological style" (Lechtman, 1977), some marks of the archaeological remain may bespeak real historic situations and practice-based circumstances of social interaction structures of learning, memory and knowledge and mobility patterns (Carr, 1995a; 1995b; socialization in CoPs, see Lave; Weger, [1991] 2022; Wenger, 1998; Gosselain, 2008; 2011; 2018; Knappett; 2011; Wendrich, 2012a; 2012b; Knappett; Kiriatzi, 2016; Roddick; Stahl, 2016a; 2016b; Furholt, 2018a). The

[57] See e.g., "technological style" and "cultural technology" perspectives in Lechtman, 1977; Sackett, 1982; Lemonnier, 1992; Carr, 1995a; 1995b; cf. in special Gosselain, 1992; 1998 and Hegmon, 1992; 1998 for critiques on "ceramic ecology"; and Dietler & Herbich (1989: 1998) pitching "ceramic style" against functionalism.
[58] E.g., Leroi-Gourhan's (1943) concept of *tendance* of certain tools in converging in technical functions, behaviorist "performance characteristics" (Schiffer; Skibo, 1987; 1997: 30 ff.; Skibo, 1992; Shiffer, 1999: 16-20) or "affordances" of action in Gibsonian ecological psychology (Gibson, 1979).

relationship between the stylistic nature of elements linked to earlier or intermediate stages of manufacturing activities (Clark, 2001) of "technical bundles" or "aggregates" (*chaînes opératoires*) (Gosselain, 2000: 190; 2008: 152; 2011: 219; 2016a: 45; 2018) of situated social memory is crucial to distinguish enduring material aspects of situated practice from looser interactions easily to be spatially diffused. The material residues of these aspects are a crucial archaeological link to operate a connection of anthropological abd social network theory.

Hybrid collectives

> […] pushed into a corner and cumbered with little bottles, Joe now sat down to his great work, first choosing a pen from the pen-tray as if it were a chest of large tools, and tucking up his sleeves as if he were going to wield a crowbar or sledge-hammer. It was necessary for Joe to hold on heavily to the table with his left elbow, and to get his right leg well out behind him, before he could begin, and when he did begin, he made every down-stroke so slowly that it might have been six feet long, while at every up-stroke I could hear his pen spluttering extensively. […] Occasionally, he was tripped up by some orthographical stumbling-block, but on the whole he got on very well indeed, and when he had signed his name, and had removed a finishing blot from the paper to the crown of his head with his two forefingers, he got up and hovered about the table, trying the effect of his performance from various points of view as it lay there, with unbounded satisfaction. (Dickens, [1861] 2017: 463).

As blacksmith of Dickens' *Great Expectations* wields the pen for writing, habit memories of his craftsmanship written into the hardwire of gestures and postures transpire at each stroke of the pen and constitute a springboard for new cognitive capabilities to be embodied in the psycho-motor schema, enacted and mediated through action. Joe's set of bodily performances offer readers a powerful metaphor for confronting philosophical and ideological preeminence of mentality over materiality, intellect over manual work and the meaningless of attempts to isolate the self, agency and representation out of the number of inter-connections and interaction cognition established with the physical world. Life on earth is enmeshed with things and nature and humanity, kindred with other forms of life, is enmeshed with the material world it is engaged, shape and, in reverse, is shaped by.

Says Olsen (2003: 88; 2007: 586; 2010: 9) "if there is one history running all the way down from Olduwai Gorge to Post-Modernia, it must be one of increasing materiality – that more and more tasks are delegated to non-human actors; more and more actions mediated by things." Keeping in mind Joe's persistent forms of memory in performance, could it be that in the dialectal relationship nature-culture the age of metals "[…] engage the whole body more

than many previous materials" (Gosden, 2009: 116)? Should we view in it an intensification of previous 'episodes' and trends of developments of *sapiens sapiens* or just another instance of a constant feature of material entanglements? For addressing properly these questions of body-world fluid engagement more than few paragraphs would be necessary, but in the beginning of an answer there is the ontological status of abstract identities, body, agency and things that must be addressed.

Identities lie first and foremost in the ubiquitous – and often obliterate (Schiffer, 1999: 4) – materiality of daily life experience. The material medium and multiple interactions thereof are a quintessential dimension of human living experience. The background and stuff of experience is thingness and its agential aspects come forth mediated by the currency of everyday life as we humans go about our daily activities. That some properties of multiple interactors/agents implicated are mobilized to explain with hindsight the overall process should not get us astray from the fact of the materiality of agency shaping behavioral performances, interaction and cognition (Schiffer, 1999; Malafouris, 2013).

Not few observations have been made about the fact that archaeological data do not display the strong bias of spoken (Rathje, 1974) or written testimonies (e.g., Bruneau; Balut, 1981-1982: 26-27; Lyons; Papadopoulos, 2002a: 1; Fahlander, 2007: 35-36; Andreassen; Bjerck; Olsen, 2010: 16). The overfocus on self-conscious and ideologically charged cultural forms of signaling identity and display have distracted archaeologists from other materially saturated forms of lived experience. Few archaeologists, however, have grounded aspects of identity in the enduring 'layers' and forms of memory present in bodies, traits, habits and artifacts (Shanks, 1998; 2007; Webmoor, 2007; Gosden, 2008; Olivier, 2008; Olsen, 2010; 2012).

Every object is entangled in socio-technical practices and assemblages of people, things and localities that brought it about. The archaeologist's toolbox can partly reconstruct, relative to the scale and unity of analysis, specific time-enduring genealogies and biographies accumulated on things. By this definition of object emphasizing the technically made product different sorts of material things can be put together, including that heritage written into the human body, "[…] *le premier et le plus naturel objet technique, et en même temps moyen technique, de l'homme*[…]" (Mauss, 1936: 372; cf. Bourdieu, [1972] 2000; Connerton, 1989; Dietler; Herbich, 1989; 1998). The body, therefore, far from a Platonic Idea is also a macroartifact equipped with habiliment (Schiffer, 1999: 34-49) as the "[…] brain is as much a cultural artifact as a biological entity […]" (Malafouris, 2013: 45).

The ontological premise that material culture makes one's life in the world and humanity as materiality brings us back to Dickens' Joe. There are many thinkers addressing over many of these issues in anthropology and archaeology in order to overcome intellectual splitting of mind and body, nature and culture in common Western wisdom.

Cognitive archaeologists are known to have been laying great stress on agency of material culture in shaping human perception through, first along the lines of the modelling of intelligent systems in response to a myriad of stimuli and interactions with the material world cf. Preucel, 2010: 147-174 for a review of cognitive science and archaeology; Renfrew, 1982; 1987b; 1993c; Renfrew; Zubrow, 1994; Renfrew; Scarre, 1998) later on morphed in Material Engagement Theory in line with insights from neuroscience and the embodied-cognition paradigm in Renfrew, 2001a; 2003; 2012b; DeMarrais; Gosden; Renfrew, 2004; Renfrew; Frith; Malafouris, 2009; Malafouris; Renfrew, 2010; Malafouris, 2004; 2013; cf. Preucel, 2006: ch. 7). At core of the idea of the agency of material culture on cognition is the rejection of aprioristic structures of experience objectified in Cartesian asymmetries subject:mind, spirit:matter and body:mind. Against the conceptual background that material world must not be interpreted as reflectors of societal rules and norms, material engagement theorists emphasize mediative quality of things in mapping and cuing action and non-verbal memory in the environment.[59] Cognitive archaeology harks back to old issues in anthropology and archaeology with current insights of cognitive sciences, as the long-term effects of increasing dependency with material culture in the evolution of the species' brainly capabilities and the mutual interaction with major episodes of human development bearing on, hence, "[…] a form of consciousness as much as a philosophy, an anthropology, and a prehistory of human becoming" (Malafouris, 2013: 1; see discussion on the "sapient paradox" in **Epilogue: on ants, humans and pyramids**).

From the mid-1990s, as the grip of social constructivist and symbolic communication loosened, studies of landscape in archaeology (Gosden, 1994; Thomas, 1996) started to borrow, among many philosophical, sociological and anthropological concepts, practiced-based and phenomenological approaches that challenge ontological cleavage between culture and nature. *Dwelling*, *meshwork* and *wayfairing* (Ingold, 1993; 2000; 2007; 2011), for instance, have been reconfiguring the relationship of life as becoming, a locus where space, time and movement emerge as relational properties of interwoven collectives and ecologies.

[59] An idea worked at with, among others, objects embodying symbol in experience as stone weights (Renfrew, 1982: 16 ff.) and material agents holding a cognitive life as Mycenean swords, clay on potter's wheel and knapped hand axe (Malafouris, 2008a; 2008b; cf. 2013: chs. 7; 9).

In *We Have Never Been Modern* the late Latour ([1991] 2011) reckon with the fact modernity is ontologically grounded on the othering of humans and non-humans and the fact the degrees of culture-nature divide have never been so shade. *Actor-network-theory* and *symmetrical approaches* (Latour, 2005) identify a number of actors (*actants*) on the same foot to perform agency in the web of relationships they combine (see e.g., Shanks, 2007; Olsen, 2003; 2007; 2010; 2012; Olsen *et al.* 2012; Webmoor, 2007; Witmore, 2007).

Art and Agency by Gell (1998; see also Gosden, 2005: 195-197) is another canon that put across agency and style to great effect. Although today much criticized on the grounds of asymmetric nature of people-artifact relations, the art anthropologist felt that contextual relationality, attribution and causality of action distribute agency beyond the confines of internal states of humans and style in the weft and warp of relations of social life (see e.g., the concept of "inter-artifactual domain" Gell, 1998: 216). To Gell, style is not a vehicle of meaning (metaphor), an icon, text or symbol, but a horizon of relationships between synchronous artworks forming an independent system engendering its own logic of motif change ("'the principle of *least difference*'") (Gell, 1998: 218, author's italics). Style can only be grasped within the internal dynamics and structural coherence of a set, a "[…] 'relation between relations' of forms" (ibid., 215) and agent/patient relationships.[60] Formal relations as in Maori houses may be rendered even as a formal network in contributing to its great appeal to current network theory (ibid., 255, fig. 9.6).[61]

The unleashing over many social disciplines, the so-called "return to things" (Dománska, 2006) and trend running in parallel to the long "material-turn culture" (Hicks, 2010) express an ontological re-positioning in the "discipline of things" (Olsen, 2010: 22; 2012: 224; Olsen *et al.* 2012b) in progressively detaching archaeological theory from language-based models to think about things. Always dealing with sets of relationships of material assemblages, archaeologists are prone as ever to embrace a relational viewpoint, but the incorporation of perspectives of hybrid constituencies and different from the modernist episteme have been proved difficult and the reception of (post-)poststructuralist views slow.

[60] Explored in decorative art (ibid., 73-98), Marquesan art (ibid., 168-220), Duchamp's artwork (ibid., 242-251) and Maori meeting houses (ibid., 251-258).

[61] An analytic repair might take to the heart, however, research objectifying practices and the boundary specification in setting network (Peeples, 2019: 466 ff.). Echoing Knappett (2011a: 56), houses are multidimensional artifacts and potential small networks on their right. Those familiar with Ford's (1954: 47; cf. Lyman; O'Brien; Dunnel, 1997a: 153-157) imaginary example of house types in the island of Gamma-gamma, would recall that "houses" are not the self-evident place where the typological analysis must begin. See also related discussion on "abstract identities" and unicity imparted to things amidst multiplicity of the material world in Shanks, 1998: 24.

Archaeologists are able as few philosophers or social scientists in probing the relationality between mind-world interactions. To do so, however the interest must shift from single artifacts with essentialized properties to assemblages of things, the group-agency (workforce) of "missing masses" (Latour, 1992) or "collective work of a brigade of actors" (Olsen, 2003: 88; 2010: 145; cf. 2012: 214).[62] A strategy to distinguish material styles and technological practice with respect to differentiated layers of perceptions and actions is of ascertaining through material culture objectifying and de-objectifying relations enmeshed in conscious meanings and habitual behavior instilled by practice.

A fundamental factor underwriting different levels of identities is the meshwork of things in which they are structured, as we have been emphasizing. Overall visibility, semiotic links of material culture, chained references of ensembles and judgment of value in increasing degrees of sociality and human-object/thing interactions/entanglements across physical scales have been recurrently stressed by many archaeologists of diverse calibers and strains of thought.[63] Gosden (2004a: 39, tab. 3.1; 2004b: 33-40) sees in object/thing dichotomy the construction of different regimes of value enabled and constituted by material world and articulated within a social and physical logic of space. When things are alienated from local contexts and sets of meanings, they become quantifiable medium of value and objectified forms of relation, display and exchange in broader spatial ranges of interaction. Knappett (2008: 144; 2010: 82; 2011a: 175; 2011b) writes about "relational registers" of objecthood and thingness that enable situaded perception and action across spatial scales and mixed ensembles.

As of current scholarship, no longer material culture index (often stylistic in traditional terms) can be taken at face value to express fixed markers of frequency of interaction or identity relationships, monolithic ideas of collectivities or coallescensce with biologically conceived categories (Plog, 1980: 5-12; Hodder, 1982a; Wiessner, 1984: 228; Shanks; Tilley, [1987] 1992: 141, Hegmon, 1992; 1998: 276; Shennan, 1989a; 1991; Burmeister, 1997: 193-196; Jones, 1997: 25). But one could still see in traits and habits a proxy of a type, if not descent and genealogy properly (Antonaccio, 2009: 47) if one wants to avoid from the outset the biological

[62] Olsen (2003: 98-99; 2010: 143-145) explores this point in particular discussing Deetz's ([1977] 1996) argument on the diffusion of Georgian style in Anglo-American colonies of the eastern North America from the late eighteenth century AD as expressed from house plans, dinner sets to tombstones; cf. Gosden, 2004b: 129, for a similar view, in that "Georgian sensibilities are thought to be based around the intellect rather than the emotions […] Material culture was integral to the emergence of the new types of rational personhood separate from the group at the heart of the Georgian order."

[63] E.g., Material Engagement Theory (Renfrew, 2001a; 2003a; 2004; 2012b; Malafouris, 2004; 2013); the general communication theory (Schiffer, 1999) and many others echoing Heidegger's philosophical concepts "ready-to-hand" (thing) and "present-at hand" (object) within more or less localized phenomenal world (Gosden, 1994; Thomas, 1996; Olsen, 2010; Hodder, 2012a).

overtones (Domańska, 2006), at least then of connectivity pregnant with sources and origins of allotopos (other places) and blending, technical boundaries and learning continuums (Gosden, 2005; Gosselain, 2018). Languages and genes and components thereof have multiple trajectories, namely words, genetic markers of mutation, hence a history of origins of sorts, regardless of user's self-awareness or discursive practice and the criteria of ethnicity as ancestral ties and homeland might be applied to these decomposed elements as well.[64]

Once it is recognized that no organic connection exists between who we think we are and the material culture we use, the language we happen to speak or the hereditary script we hold in our DNA, it is to be expected complex histories amalgamating into humans and artifacts alike. In a broad sense, being the nature of language and genes handed down to generations in historically specific social environments, they constitute valuable source of information for archaeologists as well. Historical linguistics is an alternative way to go about generalized linguistic identity, a very "access road" (Heggarty, 2014: 598) to ephemerous states of material culture, a culturally learned system put into practice and transformed over generations by organisms physiologically able to speak and enchained in "[…] sequences of formed air masses […]" (Deetz, 1967: 87; cf. also id., [1977] 1996: 36-37). Genetic structures of DNA are perpetuated and recombined with modification over the reproductive history of living beings. A genomic history "[…] with no reference to the fossil record, to linguistic lineages, geologic strata, geographic maps, or anthropological surveys" (Mukherjee, 2016: 335).

Our stand on the nature of identities articulates more holistic views of material embeddedness of experience, people's *habitus* and interaction *vis-à-vis* identities that are not limited to self-conscious and symbolic forms of cultural identity (see discussions on the concept of ethnicity in Jones, 1997; Gosden, 1999). To trace back over time a sequence of ancestral relationships of forms, traits and habit performances to "home territory" (Antonaccio, 2009: 50) is a way of disclosing an ethnic discourse of cultural practices that things might happen to emically embody in strategies of identity construction. It is in the encounter and confrontation with the novel in situations of interconnections of materialities and conscious and unconscious social practices that identities might be charted and communicated and habits (re-)shaped as aspects of these relationships. Physical co-presence enabled by long-distance movement between individuals and groups evolving after periods of relative mutual isolation is a case in point here, as it offers an optimal chance to archaeologists of isolating stylistic

[64] Cf. debate on cultural identity and ethnicity on Greek history and archaeology (see e.g., Hall, 1995; 1997; 2012; Antonaccio, 2009; Malkin, 2003b; 2011; Finkelberg, 2005.

meaningful elements and patterns of material culture interwoven in differentiated places and juxtaposed in contact situations.

Questions about the linkages between identity and things are one of major locus of interest on colonial situations and interregional interaction networks. In the last decades, it has been increasingly concentrating in periods before European colonialism in areas of Latin America, Middle East and historical and prehistorical, early historical and historical periods of the Mediterranean and North American historical archaeology (van Dommelen, 1997; 2005; 2012; Rowlands, 1998; Antonaccio, 2009; Lyons; Papadopoulos, 2002b; Gosden, 2004b; Dietler, 2005; Stein, 2005b; Hurst; Owen, 2005; van Dommelen; Knapp, 2010; van Dommelen; Rowlands, 2012; Silliman, 2005; 2009; 2012). Postcolonial theorists since the late 1980s have been placing great stress on the fact that cultures are not homogeneous entities and identity came into being in the very same dynamics of networks of materiality of cultural contact and practice and the modes of interaction, physical juxtaposition and power relationships whereby they are affected. Social encounters and, for that matter colonial situations as a subset of interregional interaction (Stein, 2005a; 2005b), exchange and contextualization of cultural practices have been foregrounded by the growing influence of post-colonial thinking in archaeology since the early 2000s onwards (see e.g., Cornell; Fahlander, 2007a; 2007b; Fahlander, 2007; Liebmann; Rizvi, 2008; Liebmann, 2008a; 2008b; Patterson, 2008; Lydon; Rizvi, 2010b; 2010b; Gosden, 1999; 2001; 2004b; 2012; Silliman, 2005; 2009; 2012; van Dommelen; Knapp, 2010; van Dommelen; Rowlands, 2012). Concepts as hybridity, Third Space and mimicry distance themselves of one-way acculturation models to lay claim to persistent cultural practices, memory and materialities in diachronic perspectives (e.g., van Dommelen, 1997; Antonaccio, 2009; Cornell; Fahlander, 2007a; 2007b; Fahlander, 2007; Liebemann, 2008; Silliman, 2005; 2009; 2012 van Dommelen; Rowlands, 2012: 27-29).

People identities are never unique in the way essences are molded on bodies or inscribed on artifacts. They are in this sense polythetically defined and multi-scalar phenomena extended deep into levels not necessarily consciously manipulated by persons. Embedded in daily practices and fractured in diverse combinations across groups, appropriate analytical units might expand relationships into thick fabrics of daily encounters or length strands transcending localized contexts.[65] As scientists, we are allowed to pick up and follow through varied sort of

[65] Along similar lines to a "microarchaeology of social practice" in that "[…] regularities and patterns of materialities in time and space form the basis for inferring various social practices" Cornell; Fahlander, 2007a: 6; Fahlander, 2007: 36.

conventional methods and track trajectories which mix history of connections and genealogies. Indeed, scholars can only trace fragments of these entanglements and identities.

Essentialist concepts of large-scale population movement and genealogy as defined at the culture level did not appear in a socio-political and economical vacuum. The relationship between identity of social collectivities and materials signifiers of ethnicity and migration have been shaped by recent experiences of Western colonialism and imperialism as anthropology and archaeology gained institutional colors in the grading continuum of the settler, the missionary, the dilletante, the enthusiastic amateur and would-be savant (Willey; Sabloff, [1974] 1980; Fabian, 1983; Bernal, 1987; Trigger, [1989] 1996; Patterson, 1995; Schnapp, [1993] 2020; Morris, 1994; Gosden, 1999; Thomas, 2000; Lyons; Papadopoulos, 2002a; Dietler, 2005; Díaz-Andreu, 2007; Silva, 2024). It transpires that for building an epistemologically informed critical theoretical framework of circumstances, spatial logic and implications of mobilities beyond the anonymous masses of large-scale process, archaeologists urgently need to reflexively problematize knowledge about colonial Self and colonized Other that may influence archaeologists and wider public audiences in the present.

Network to hang things on

Similarities and dissimilarities are hardly an objective property of archaeological remains and low are the odds of archaeologists, doubly implicated in the foci of analysis and the purported interpretation, would reach a consensus soon of what aspects of material culture to prioritize. The trouble comes in judging which traits should be described, retained, in short prioritized. In what scale and resolution operates the analytical description? How hypotheses of convergence, influence and divergence related to the so-described analysis of formal (di)similarities? In what ways a Linnaean-style taxonomy signify phylogeny? How objects denote an epistemologically organized knowledge for archaeologists (Pomian, 1987: 55; Schnapp, [1993] 2020: 19-20)? Which methodologies could be developed for analyzing the material culture phenomena to be studied?

A favored analogy always has been with biological evolution and genetic mutation operating in gene pools as a driving-force of drift and (subsequently) natural selection. In order to account for this ‘variability without a “why”’ in cultural inventories different names surfaced in archaeology. In the evolutionary sequences of “percentage stratigraphy” (Ford, 1962: 5) there were already elements of form subject to temporal and spatial drift in the bundle of typological fluid streams of cultural traditions (Ford, 1954; 1962; Meggers; Evans, 1970).

"Cultural drift" (Binford, 1963) and stochastic factors (Clarke, 1968) and "memes" (Dawkins, [1976]: 2016: 245-260) are other examples taken up by fully evolutionary approaches to cultural transmission. While traditional knowledge retains that Darwinian evolution works according to a "descent with modification" logic along parent-offspring axis of inheritance, – 1 letter in a thousand every 2,000 years as biologists calculate – in cultural evolution there is no such thing, *strictu sensu*, as inheritable properties of units of cultural traits or "cultural mutation rate," being time just a reference variable. Humanists have been claiming for long culture goes transmitted in a Lamarckian sense – unlike genetic evolution. Humans can learn from others how to do things and do it over and over again in a really speeded-up process.

In spite of all of this, however, there is much to suggest that differences and variations of material culture operate along similar lines to the Darwinian descent with modification mechanism if, and only if, the metaphorical logic is moved from a genomic-centered view of change to one of situated experiences of practice in a world in which changing and becoming are the natural order of things. It must be stressed that this is a probabilistic view of open systems in a field of interactions and relations and that we do not hold a selectionist view of many neo-Darwinian approaches. To assume, in parallel to genetic evolution, a scenario in which adaptative edge is driven by random mutation mechanism would fraught the metaphor with dangers.[66]

No motor skill is governed by a jack-in-the-box's mechanism or organic life is a direct translation of a genotype algorithm, hence no artifact is the exact copy of another and not genotype of a child is the identical halved copy of his/her parents'. Differences and variations in products of human craft due to countless specificities of developmental and learning experiences engender a high degree of variability regardless of subject's awareness. Philology is full of scribal mistakes like eye-skip, mechanical repetition of an all-encompassing phenomenon and this is no less for the making of things, whose "[…] whim and […] inability to reproduce repeatedly and exactly […] [appear] even when exact replication is strongly desired" (Clarke, 1968: 178).

Change and continuity are part and parcel of the same material phenomenon and largely rely on the correlation of differentiated association of patterns, scales of temporal and spatial analyses in entities and components thereof and clusters of entities (see Shennan, 1989c: 833).

[66] That is, artifacts as components of a phenotype output constitution of cultures hand down over generations within evolutionary channels in the vein of White's neo-evolutionism (e.g., Leonard, 2001 *contra* Gosselain, 2008; 2011; Kristiansen, 2004b; 2013: 166-167 on the lack of historical content on concepts borrowed from molecular biology; see also "cognitive development" within Material Engagement Theory in Malafouris, 2013: 38-43.

General theoretical standings coupled with experimental, ethno-graphic and archaeological approaches since then have confirmed the polythetic nature of stylistic stability and innovation thereon. As for the innovation, change operates on coordinates other than homogenous entities "[…] *en découpant à sa façon les temps, les lieux et les milieux*" (Bruneau; Balut, 1997: 141) in the vagaries of materially constituted elements and technical behavior of every steps of *chaînes opératoires* across and from cultural group to cultural group tradition in mediated responses to broader social, political and economic forces.[67] Polythetic sets (like graph theory, as we shall see) favor a multidimensional representations of cultural patterns, instead of plot distribution in bidimensional space.

I shall explain better now how this approach might be operationalized. To get there, first some definitions should be provided. "Attribute" is here defined as intrinsic properties such as physico-chemical and formal descriptions of objects by a series of extrinsic properties as date, place (of founding and sometimes unverified origin of manufacture), and function of certain classes of objects (Gardin, 1979: 119-124; Gallay, 1986: 161-165; 2011: 80-81, but notice the property/attribute distinction; see also Carr, 1995b: 172-173). Attributes are not free-floating things to be amassed at will and catalogued without some sort of symbolic construction (Gardin, 1979: ch. 3). The "putting in order" of the unities of interest of the corpus is always arbitrary and geared to answer research problematics (Dunnell, [1971] 2007).[68] Typology is based on assumptions and preferences. Questions boil down then to how to operationalize the degree of similarity – and complexity of relationships by different sort of criteria.

Very briefly, here is how similarity-based affiliation networks[69] serve our interpretation of connection of classes of artifacts, *chaînes opératoires* or sites. Attributes can be sorted out in diverse classes in the representation and visualization of relationships in the archaeological dataset (Östborn; Gerding, 2014; Collar *et al.* 2015; Brughmans, 2010; 2013; Mills, 2017; Peeples, 2019: 466; Brughmans; Peeples, 2023: ch. 3; Brughmans; Mills; Peeples, 2024). Discrete attributes may be plotted in polythetic clusters of material similarities. In cases of multistate of attributes that range in continuous numerical properties, it is necessary to either define integers or weight edges and record the value associated to it.[70] Unipartite or one-mode

[67] Examples in dress costumes: Burmeister, 1997; for pottery production systems: Gosselain, 1998; 2000; 2008; 2011; 2018; Roux; Corbeletta, 1990; Roux, 2007; 2015; 2016; 2017; Furholt, 2018a; cf. Dietler; Herbich, 1989; 1998: 253; Hegmon, 1992; 1998; Roux, 2019; 2020: 19-22; and stone knapping: Bril; Roux; Dietrich, 1995.
[68] This in essence is not so different from the model-oriented perspective of C. J. Thomsem and his three-age system, in clear rupture to the *bric-à-brac* of the antiquaries' collections (Clarke, 1968: 9; cf. Gallay, 1979: 113).
[69] Affiliation network is a similarity network connecting different categories of nodes (de Nooy; Mrvar; Batagelj, 2005: ch. 5; Brughmans; Peeples, 2023: 79).
[70] Weighted networks are a non-binarized formalization of a set of nodes in pairwise relations measured in valued scales (Peeples and Roberts, 2013; Collar *et al.* 2015: 25; Brughmans; Peeples, 2023: 77-78).

networks (e.g., a–b) is a good choice but far from the only for visualizing and storing these properties using Pajek (de Nooy; Mrvar; Batagelj, 2005).[71] It makes a one-to-one correspondence between our entities (nodes).

Network models have been providing for many decades now beyond metaphor an important full variety of analytical tools for conceptualizing archaeological phenomena and dataset (Peeples, 2019; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024). As often stressed by archaeologists influenced by network theory, nodes and ties can stand for any relation whatsoever and the nature and significance of interaction among entities can be worked at multiple levels and degrees, places and periods (cf. e.g., Knappett, 2011a: 38; 2013b; 2016; Brughmans, 2010; 2013; Brughmans; Collar; Coward, 2016b; Brughmans; Mills; Peeples, 2024; Östborn; Gerding, 2014; Collar *et al.* 2015; Mills, 2017; Prignano; Morer; Diaz-Guilera, 2017; Peeples, 2019; Dawson; Iacono, 2021). Above all, network concepts and methods bring to the fore relational connections rather than static entities (a node's attribute), as the latter do not provide the basic unit of analysis and should be understood as the emergent properties of the field of relationships.

No aprioristic direction needs to be given to *edges* in a dyadic relationship. Such undirect relational connection among pairwise entities is the strongest aspect of network-based approaches. Archaeological data rarely allows the targeting of directed social interaction among nodes as defined by proxies of accumulated social interaction over time (Sindbæk, 2007; 2013; Mills *et al.* 2013a; 2013b; id. 2016; Peeples, 2019: 468; Brughmans; Peeples, 2023). Graphs can summarize a range of types and values of attributes in arbitrary stances to become a useful tool for systematically assessing similarity significance in the multidimensional distribution of material culture and testing hypotheses of social relations of co-presence and shared practices of learning (i.e., statistical falsifiability and quantitative confirmatory tools). In a qualitative approach, attributes can be depicted as binary states present/absent (attribute values 1 or 0) in a database matrix and *general similarity networks* (Peeples and Roberts, 2013; Östborn; Gerding, 2014). If there is a strong relationship between two vertices (1), an edge is drawn. Extrinsic properties of the nodes such as chronology and location may be coded into discrete characteristics (i.e., a cluster of *partition*) or by the edges themselves.

[71] Pajek is a publicly available software package with an an accessible accompanying manual published by Cambridge Press (de Nooy; Mrvar; Batagelj, 2005). In archaeological network, it has been employed by Sindbæk (2007; 2013).

The default assumption here is that a more parsimonious form of explanation in terms of spatial movement, particularly for the selected categories of artifacts (see below) is that of migratory mobility of people with specialized skills, exchange of intermediate or finished products or diffusion of easily emulated and visible morpho-technical traits among specialists or non-specialists with non-migratory forms of mobility. Even though the actual objects do not necessarily share the same manufacturing sequence, they might then indicate a discrete production activity practice initiated in one region and later spread in another or a mediated or unmediated interaction among crafters. Geographical sources and findspots may be connected in raw material use (cf. Mills *et al.*, 2013a: 5788-5789 for example in two-mode network topology of 4,800 sourced obsidian in the U.S. Southwest between 1200-1450 AD), but in the analyses of this work edges are tailored to reflect this in dyadic relationships (see CHAPTER 4). To reinforce the point, and the sum value and weight edge of pairwise relations of technological and stylistic similarity of artifacts and settlements express differential registers of network of interaction that one may define according to the nature, frequency and time duration "strong" or "weak ties" of network topology (Granovetter, 1973). When cross-comparing vertices (v1, v2…) with different characteristics, chronological and geographical coordinates, the tendency is the thickening of some edges over others.

Concluding remarks

The mobility and relation turns have been increasingly pointing to the fact that humans, things and localities are connected somehow. Archaeological social network analyses may explore the polythetic networks whereby people, objects and ideas moved. By addressing the generative process of archaeological patterns, it probes the social nature of entities involved in relational links and vectors. Affiliation networks of similarity of production and consumption is mainly a visualization proxy for patterns of material practices that are related to either mobility of producers, users or goods, which means that it remains to be tested. Hypothetically, it can favor either a same production locus within/out regions (proximal and distal movement and interaction patterns) or different loci of production and consumption across regions and, therefore, a causal relationship between localities (e.g., action of skilled craftsmen, decision-makers or traders through forms of mobility and systems of exchange of intermediate or finished products or information (technique).

CHAPTER 4. "WEAPONS, WEAPONS, WEAPONS!"[72]: THE AGE OF MIGRATION IN THE MEDITERRANEAN

> The economy of Greece is in shambles. Internal rebellions have engulfed Libya, Syria, and Egypt, with outsiders and foreign warriors fanning the flames. Turkey fears it will become involved, as does Israel. Jordan is crowded with refugees. Iran is bellicose and threatening, while Iraq is in turmoil. AD 2013? Yes. But it was also the situation in 1177 B.C., more than three thousand years ago, when the Bronze Age Mediterranean civilizations collapsed one after the other, changing forever the course and the future of the Western world.
> (Cline, *1777 B.C.*, 2014, p. xv).

> Over the centuries and across the continent there must have been countless refugee movements […] Around 1200 BCE, a huge number of refugees suddenly appeared on boats in the eastern Mediterranean region[…].
> (Krause & Trappe, *A Short History of Humanity*, ch. 7).

Introduction: boat people[73]

Rhetoric of a troubled end and age of migration in the Mediterranean of the 13th through 11th cents. BC strongly echoes the state of flux and change in the age of multi-layered mobility and hyper-regional character of connectivity we are currently living in (de Haas; Castles; Miller, [1993] 2020; Le Bras, 2017; Hamilakis, 2018c; Del Grande, 2023). The contemporary idea of mobility is intellectually and ideologically charged in a spectrum of social sciences (Cresswell, 2006: 42-54) and new research agendas (Sheller; Urry, 2006; Cresswell, 2006; 2010; 2011; 2012; Sorge; Roddick, 2012; Beaudry; Parno, 2013a; Aldred, 2021). The impact in archaeology is reflected in the new 'paradigms' of Mediterranean and 'Bronze Age mobilities' (Morris, 2003; Aslaksen, 2013a; Kristiansen, 2014; Sørensen, 2015; Hodos, 2017).

The more we avoid affirming our modernity in the past, the more the kinetic of bodily mobilities and immobilities are heightened – in both primitive and present breadths of 'globalized' worlds (Cresswell, 2006; 2010; 2012; see CHAPTER 1). Thus, whereas one may signify current transnational flow of people, goods and capital positively, international cross border migration in their many facets underscores the negative coding linked to differences in the social production of mobility and the power dynamics anchored in historical and structural global systemic relations (de Haas; Castles; Miller, [1993] 2020; Del Grande, 2023).

[72] A quote from Gimbutas in the *Los Angeles Times* (Leslie, 1989: 22) expresses her fatigue on her earlier work with bronze swords and daggers, which were seen as signs of marauding Indo-Europeans. This should be read in light of her later work and the reception of female-centered approaches of European prehistory in cultural feminism and ecofeminism movements of the 1970s (Navickaitė, 2023: ch. 5; see **Steppe migration hypothesis**).
[73] "Boat people" refers to refugees who fled areas of SE Asia over the 1970s and 1980s due to the Vietnam War.

It is true that ideas about mobility tap into and reinforce the lack of public consciousness of who the migrant, the scapegoat for societal disorders (Demoule, 2022: 341-343), really is, "how migration really works" (de Haas, 2023), and what is happening the Global North's south borders. In places not far away in 'hotspots' of mass tourism in the Mediterranean Sea, thousands of lives have been drowning in the sea depths of our collective amnesia (**Box 6**). Readers may wonder what all this has to do with a past more than 3000 years ago. However, I argue that it is not an overstatement to suggest that the prevailing idiom of the present has been veering Anglophone archaeologists to adopt particular ideological stances on forced migration.

The 21st century *Zeitgeist* has much to do with a growing public concern about worsening conditions in the southern hemisphere, which may eventually trigger unsettling conditions and increased out-migration. The controversial status of "environmental refugees"[74] loom larger and, on weaker grounds, takes on Malthusian migration proportion – ranging from millions, as claimed by alarmists like Myers,

Box 6 – Migrant deaths in the *Mare Nostrum*

In the recent years, migrant deaths in the Mediterranean Sea have intensified in the intricacies of re-routing and border enforcement. As I write these lines, heterogenous agents of the Mediterranean "hybrid collectif" (after De Léon's (2015) concept of Sonora Desert collectif) make of it the 'world's deadliest border' (Albahari, 2015). Italian journalist Del Grande in his blog *Fortress Europe* (http://fortresseurope.blogspot.com/) compiled a list with 27,382 deaths from 1988 to February 2016 (on the issues in counting deaths, cf. Last; Spijkerboer, 2014; Albahari, 2015: 103-104; Grant, 2016; Fargues, 2017: 6-7).

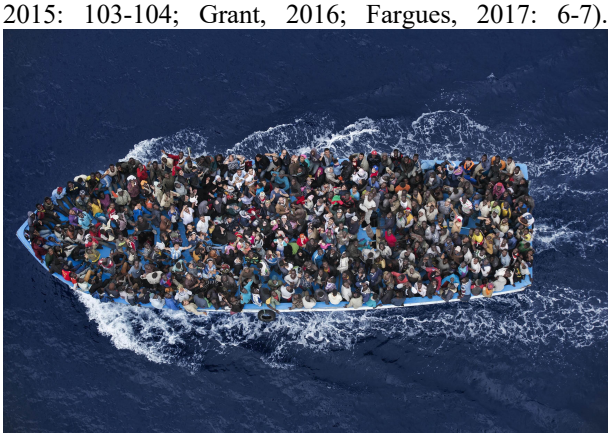

Fig. 4.1. *Mar Mediterraneo* (2014) photograph © by Massimo Sestini. Ship loaded with refugees, few kilometers from the Libyan coast.

The sky-rocketing peak of deaths is notable even without a graph of deaths at the *locus mediterraneus*, a precise point in space that is hard to pin down as borders flute and drift in the bodies of migrants themselves. In the aftermath of the Arab Spring, UNHCR (2012) reports, as of 2011, 58,000 individuals entering Europe's gates and 1,500 deaths in the attempt. In the *Fatal journeys* series (Brian; Laczko, 2014b; 2015b; Laczko; Singleton; Black, 2017), the IOM says that, from 2000 to 2014, the number of deaths was 22,400. The Migrants Files (http://www.themigrantsfiles.com/) consortium estimates in 25,000 of drown or missing individuals between 2000 and August 2014. From 2014 through 2016, more than 1,582,759 asylum seekers (1,047,939 only in Greece) landed on European shores by sea (Fargues, 2017: 11). In 2015, over 1 million individuals came into Europe by sea routes and 3,770 died (Brian; Laczko, 2015a: 3, fig. 1; 5, fig. 3; 6). In 2016, 5,143 dead and disappeared (Black; Dearden; Singleton, 2017: 6). Fargues (2017: 13) estimates 33,761 deaths between 2000 and July 2017. In 2018, 2,275 deaths were documented, with higher death rate per arrival than the previous year (UNHCR, 2019: 5-6; cf. de Haas; Castles; Miller, [1993] 2020: 219-220). IOM's Missing Migrants Project have been tracking the missing migrants in a global scale with record by year since 2014. (https://missingmigrants.iom.int/region/mediterranean).

[74] The term appears in El-Hinnawi's report (1985: 4) for the United National Environmental Programme for "[…] those people who have been forced to leave their traditional habitat, temporally or permanently. Because of a

or even billions.[75] In a typical move of interpretative isomorphism of how humans respond mass migratory to growing environmental disruptions (Black *et al.* 2011; Gemenne, 2011; de Haas; Castles; Miller, [1993] 2020: 36-40; Tsuda; Baker, 2015: 298; Le Bras, 2017: 80), explanations of change are re-signified with the language of traditional population movement narratives. The sensible effects of future-climate change, rise of sea levels and increasing temperature and disposal of earthling resources in the "Plantationocene" (Haraway, 2015; [2016] 2023; Haraway *et al.* 2015; Malm, 2017; Ferdinand, [2019] 2022) are transplanted to external stimulus of transformation near and far away in time.

The choice is not fortuitous since re-negotiating of identities through late 19th and early through the 20th century paradigmatic wave theories and widespread Victorian "invasion fantasies" (Silberman, 1998: 271; Clark, 1966: 173; cf. Champion, 1992: 217), have been receiving modern dress in the general identity crisis in the Global North (Shore, 1996: 96-97; Bauman, [2016] 2017; Hamilakis, 2018a: xiv). New tales of aliens' invasion, submersion by piecemeal migration and organic demographic growth of the 'foreign' cell inside the gate – as in a Houellebecq's (2015) piece of anti-Islam social dystopia – gain ground in forms of nativism as barriers strengthened (de Haas; Castles; Miller, [1993] 2020: ch. 10; Shore, 1996; Andersson, 2014; Padilla Peralta, 2015a; 2015b; Bauman, [2016] 2017; Le Bras, 2017; 2022; Frieman; Hofmann, 2019; Besteman, 2020; see **The 'refugee crisis'**). Our generation may be typified by a "Brexit neurosis" (Brophy, 2018: 1651) and the likes.

The troubled end of the LBA throughout the eastern Mediterranean is marked by an overarching transition on the threshold of the IA, the "[…] birth pangs of a new social and economic order […]" (Broodbank, 2013: 468). Over a 300-plus-years, change the scale, levels and range of mobile agents, multi-layered contacts and cross-community exchange, settlement and burial patterns and trends, economic exploration, socio-political organization, demographic structure and material production and consumption (Sandars, [1978] 1985; Drews, 1993; Popham, 1994; Lemos, 2002; Monroe, 2009; Dickinson, 2006; Broodbank, 2013; Cline, 2014; Knapp; Manning, 2016). But what draws attention to this time slice, and the metal weapon evidence in study here relevant to modern scholarship to deduce historical information of LBA crisis and collapse, are the Greek sources in the Thucydidean (1.1-13) account of

marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life". Cf Bates, 2002 for critical stances and the development of a scheme for a grading continuum of situations involving compulsive factors and environmental disruption over time.

[75] Cf. discussion in Black *et al.* 2011; Germenne, 2011; Haas; Castles; Miller, [1993] 2020: 36-40; Le Bras, 2017: 77-93; see also e.g., Manning, [2004] 2020: 215 projecting 40-120 million of environmental refugees in 2050; Demoule, 2022: 324 gives us a somber number of 150-300 million until 2100.

instability and mutability of *archaea* Greece and the hall of documentary Ramesside pillars upon which rests the narratives of the seaborne marauding activities of the 'Peoples of the Sea' (Drews, 1993: ch. 1; Dickinson, 2006: chs. 2-3; Deger-Jalkotzy, 2006: 383-392; 2008; Cline, 2014: 102-138; Knapp; Manning, 2016: 123-134; cf. Deger-Jalkotzy; Lemos, 2006; Middleton, 2020b and papers therein). As a result of over-reliance on 'global' sweeping brushstrokes of explanation over an area bigger than 6,0000000 m² laced with events in the Near East with the Aegean, many archaeologists have been favoring some causes and consequences over others (cf. Knapp; Manning, 2016). Laymen and archaeologists alike may know best these times by what have been routinely casted in quasi-teleological terms, an 'emergency' of sorts: 'Crisis', 'the Fall', 'the Collapse', or 'Catastrophe' (Drews, 1993; Popham, 1994; Cline, 2014; cf. Dickinson, 2006; Knapp; Manning, 2016; Middleton, 2020). One might even think to be reading in newspaper the current refugee flows in Europe as past mirror its relationship with the present (see above).

The broad appeal of the period may have something to do with exacerbated fears of the own capitalism's collapse, environmental degradation and rapid climate change and the old historiography, blunt by now, of hordes of foreigners and tropes of shock waves of mass invasion. The closing down of an early experience of globalization (Vandkilde, 2016) seem the death throes of our present globalization. Archaeologists' attentions have been concomitantly re-direct to these very same past-present analogies in re-evaluating categories of environmentally or conflict-induced migration to the period being considered (Cline, 2014; Driessen, 2018a; Yasur-Landau, 2018; Knapp; Manning, 2016; Knapp, 2021; Fernández-Götz *et al.* 2023a). The influence of the social and intellectual *milieu* is undeniable true in the archaeological discourses of a prominent Anglo-American white, male and middle-class scholarship (Trigger, 1981; [1984] 2003; 2001; Kristiansen, 1981; Shanks; Tilley, [1987] 1992; Silberman, 1989; 1995; Patterson, 1995). However, few have adventured in a self-reflection of the bias of data and narrative produced, presented and consumed by public.

"Nomads of the sea" (Artzy, 1997; 1998; Gilboa; Yasur-Landau, 2020) or, known alternatively as "pirates" (Hitchcock; Maier, 2014) or "Sea Peoples phenomenon" (Fischer; Bürge, 2017a: 11) are elusive and ephemeral figures of archaeological and iconographic evidence. As "[…] a lot of faceless blobs […]" (Tringham, 1991: 94), they have been playing distinctive roles in a range of interaction modes in the waters of the Mediterranean as they went about pursuing their routine business of either/or wreaking havoc civilization, entrepreneurship and mass invasion/migration episodes. If not devoid of insignia to advertise their links (e.g., reeded or feathered caps, maneuverable ships with bird decoration over the prows, etc.),

sometimes they lack materially supporting archaeological evidence of their invisible trail or mixed 'origin' that acknowledges adequately any means to prove or disprove hypotheses as to free at the furthest it from the equifinality.[76] One may transplant words and change signifiers accordingly in order to cloak the phenomenon by different terms: 'Sea Peoples' by the 'international' and maritime-oriented connectors (i.e., "peoples of the sea"), discrete ethnic entities by a "pretty cosmopolitan bunch" (Sherratt, 1998: 307) but the unavoidable fact is that "[…] archaeologists are still creatures of the prevailing ideology" (Sharon, 2001: 596; cf. Silberman, 1998: 272).

As 21st century wears on and people crown at the gates of Europe and deaths accumulated at the Middle Sea, one might legitimately ask how much of present *Zeitgeist* is influenced by class concerns of archaeologists and how rooted in the archaeological data is speculation. How driven is phenomenology by theory? Can archaeologically based approaches challenge event-induced interpretations of migration, stories or myths of large-scale movement and invasions (re)popularized in the present (e.g., Kaniewski and his collaborators)? If the paraphrase of present is part and parcel of the history of archaeology, reflected and refracted by its practitioners (Silberman, 1998: 268), to what extent can it put to a better use in contesting the antiquity of the modern immigration policy stances (see e.g., excellent discussions in Padilla Peralta, 2015a; 2015b; Brophy, 2018; Frieman; Hofmann, 2019; Fernández-Götz *et al.* 2023a: 2)? In what ways it can do better to go about migration and the conditions that enabled it, past and present? How are we archaeologists ethically implied to a humanized outlook of the migration phenomenon through refugees' material remains (De Léon, 2012; 2013; 2015; Hamilakis, 2016; 2018c; 2021; 2023; Real Archaeology, 2017; Yasur-Landau, 2018: 177)?

If any, we may hope shedding some light on the ideological baggage of the intellectual history in issues as migration, ethnicity and identity by carrying out a self-reflexive critical examination of migration archaeology (Burmeister, 2019a) and archaeology as a whole. It might also, potentially, if pushed further ahead in current times and disposing of an interdisciplinary conceptual framework demystify events erroneously telescoped together in a dramatic story of 'boat-people invasion' and caricatures the migrant and refugee of voluntary and involuntary migration is presented to public consciousness in North American and western European societies, in anti-immigration sentiments and discourses of 'fixed essences' with "[…] facts [that] expose the flawed nature of popular views that represent contemporary global

[76] A scientific stalemate quite common among Indo-Europeanists (Demoule, 2014: 448-450; see CHAPTER 2).

migration as a massive move or ‘exodus’ from the global ‘South’ to the global ‘North’” (de Haas; Castles; Miller, [1993] 2020: 7).

Non-classical archaeology

To dispute the relevance of a pan-Mediterranean perspective in in both sides of 1200 BC inside the tradition of scholarship of classical archaeology in Brazil is to cross at least historically sedimented barriers in the field and periodization and the moral Eurocentric placement it is usually addressed (Renfrew, 1980; Morris, 1994: 14-15; Alcoock; Osborne, [2007] 2012 and contributions therein).

The archaeology of non-classical contexts of the Mediterranean of late prehistory points to first and foremost an alternative to the writing of ancient history and classical archaeology by expanding the scope from a Graeco-Roman world to a Mediterranean-wide outlook (Horden; Purcell, 2000; Broodbank, 2013). In Brazilian archaeology in general, the label “classical archaeology” applies mainly to armchair archaeologists devoted to the Graeco-Roman legacy. To claim a classical archaeology other than the conceptual divides and institutions through which classical archaeology has been “policed” (Morris, 1994: 14) is a subversive message of the Third World archaeology to classical mainstream establishment (Funari, 1997; Pappa, 2020), a critical reassessment of the intellectual legacy and colonial and racial myths antiquity have been incarnating over more than 200 years (Bernal, 1987; Dietler, 2005; Hamilakis, 2007; 2023; Greenberg; Hamilakis, 2022).

Forging connections

The first case study is nested within major debates of Mycenaean links with northern, western Europe and central Mediterranean and the post-palatial period of the 12th cent. BC.[77] It is related to the phenomenon of Italian-ancestry of bronze weapons, tools, implements and accessories of dressing found in contexts of the Aegean and eastern Mediterranean over the half of the 13th and 12-11th cents. BC. Since the earlier years of the last century these metal artifacts have been sparkling among scholars debates on the reasons for their movement or at least circulation of similar morphological models, whether through mechanisms of technological transfer, commercial exchange or migration. More specifically among this group,

[77] We follow the arbitrary lines drawn by Broodbank (2013: 73) that goes from Gilbraltar to Sardinia and Corsica (west), the sub-basins (Tyrrhenian and Adriatic) enclosing of the Appenine Peninsula (central) and the Aegean and Cyrenaica (see Fig. 1.2).

a type of sword constitutes a cornerstone for scenarios of cultural change in the archaeological record observed more broadly in the Late Helladic III B-C.

Long ago, Clarke (1968: 412; cf. id., 390-391) characterized Italian UB in Mycenaean contexts as an archaeological process of population movement and know-how transfer, a subcategory of socio-archaeological processes labelled "subcultural intrusion/insertion." In its organized form, it is represented by craftsmen or mercenaries hired by state palatial powers at the end of the Aegean. The argument uptake Catling's (1961: 121; 1964: 115) theory of "barbarian mercenaries [that] […] may have travelled overland south to the Adriatic, and thence by sea up the Gulf of Corinth[…] [and] […] further […] south and east (Crete and the Levant) […]" (ibid. 121 also Drews, 1993; Kristiansen, 1998; Bettelli, 2002; Jung; Mehofer, 2005-2006; Mehofer; Jung, 2017; Kristiansen; Suchowska-Ducke, 2015 *contra* Harding, 1984; 2022). Taking as a starting point that the first flange-hilted swords in the Aegean were brought complete from without, Catling (1961: 121) suggested as options for interpreting it that: "(*a*) They were traded. (*b*) They were brought by barbarian invaders. (*c*) They were brought by barbarian mercenaries, enlisted by hard-pressed Mycenaean princes […]". Ever since, the idea of alien objects has been established as an orthodoxy setting the bar at very high heights in terms of data resolution for testability or falsifiability of the theory of extra-local production of these objects (Kilian-Dirlmeir, 1993: 103). Time is ripe to test the nature of these relationships by asking different sort of questions and determine as far as the material evidence allows us, if people, artifacts or know-how were on the move in the on either side of 1200 BC.

The hypothesis I want to explore here is of a complex patterned fabric of sociotechnical elements, cultural boundaries and geographical mobility of groups from the perspective practice-based theories of material and crafting, techniques and skills with the *chaîne opératoire* and network analysis approaches. This hypothesis is of cross-cultural relevance and repercussions for conditions of co-socialization, practical conditions of production and learning mechanisms as evinced in polythetic archaeological structures (Clarke, 1968; Furholt, 2014; 2019a; 2019b). As for the latter and by reference of our case study material, we want to propose here alternative forms of mobility and migration behind mechanisms and modes of transmission by apprenticeship (Stark; Bowser, Horne, 2008b; Wendrich, 2012b; Roddick; Stahl, 2016b), beyond old statements of population movement and diffusion (see examples in Gosselain, 2000; Cameron, 2013; Roux, 2007; 2015; 2020; Furholt, 2018a).

Sword-bearers on the move

The movement of bronze working from cultural circles up North to the South and East into the Mycenaean and post-Mycenaean period has been a perennial academic interest over the time-span of the LBA Mediterranean (**Tab. 4.1**).

<table>
<tr><th rowspan="3">Historical period</th><th>Italy</th><th colspan="2">Aegean</th><th rowspan="3">Cent. BC</th><th rowspan="3">Absolute years BC</th><th rowspan="3">Pharaoh and major events</th></tr>
<tr><th rowspan="2">Mainland</th><th colspan="2">Mainland</th><th rowspan="2">Crete</th></tr>
<tr><th>Achaea</th><th></th></tr>
<tr><td rowspan="30">Palatial</td><td rowspan="6">MBA 3</td><td rowspan="30"></td><td rowspan="6">LH III B Early</td><td rowspan="6">LM IIIB1</td><td rowspan="6">14th</td><td>1400</td><td rowspan="12"></td></tr>
<tr><td>1390</td></tr>
<tr><td>1380</td></tr>
<tr><td>1370</td></tr>
<tr><td>1360</td></tr>
<tr><td>1350</td></tr>
<tr><td rowspan="24">RBA 1</td><td rowspan="24">LH IIIB Middle-Late</td><td rowspan="24">LM IIIB2</td><td>1340</td></tr>
<tr><td>1330</td></tr>
<tr><td>1320</td></tr>
<tr><td>1310</td></tr>
<tr><td rowspan="18">13th</td><td>1300</td></tr>
<tr><td>1290</td></tr>
<tr><td>1280</td><td>Ascension of Ramesses II (1279BC)
Battle of Kadesh (1274 BC)</td></tr>
<tr><td>1270</td><td rowspan="6"></td></tr>
<tr><td>1260</td></tr>
<tr><td>1250</td></tr>
<tr><td>1240</td></tr>
<tr><td>1230</td></tr>
<tr><td>1220</td><td rowspan="2">Menerptah (1213 BC-1203)</td></tr>
<tr><td>Phase 1</td><td rowspan="3">LHIIIC Early</td><td rowspan="3">LM IIIC Early</td><td>1210</td></tr>
<tr><td rowspan="6">RBA 2</td><td rowspan="5">Phase 2</td><td rowspan="6">12th</td><td>1200</td><td></td></tr>
<tr><td>1190</td><td rowspan="5">Ramesses III (1186-1155 BC)
1177 BC</td></tr>
<tr><td></td></tr>
<tr><td></td></tr>
<tr><td></td></tr>
<tr><td>1150</td></tr>
<tr><td rowspan="6">Postpalatial</td><td>1140</td><td rowspan="18"></td></tr>
<tr><td rowspan="3">FBA 1</td><td rowspan="3">LH IIIC Developed-Advanced</td><td rowspan="6">LM III C</td><td>1130</td></tr>
<tr><td>1120</td></tr>
<tr><td>Phase 3</td><td>1110</td></tr>
<tr><td rowspan="4">FBA 2</td><td>Phase 4</td><td rowspan="3">LH IIIC Late</td><td rowspan="7">11th</td><td>1100</td></tr>
<tr><td>Phase 5</td><td>1090</td></tr>
<tr><td>Phase 6a</td><td>1080</td></tr>
<tr><td rowspan="3">Phase 6b</td><td rowspan="5">SM</td><td rowspan="5">SM</td><td>1070</td></tr>
<tr><td rowspan="4">FBA 3</td><td>1060</td></tr>
<tr><td>1050</td></tr>
<tr><td>1040</td></tr>
<tr><td>1030</td></tr>
<tr><td>1020</td></tr>
<tr><td>1010</td></tr>
<tr><td>EIA 1</td><td>10th</td><td>1000</td></tr>
</table>

						990	
EIA			EPG			980	
						970	
						960	
						950	
						940	
						930	
						920	
						910	
						900	

Tab. 4.1. Chronological scheme and relative synchronism between central Mediterranean and the Aegean over the LBA used in this work. Calendar years based on the high chronology of the Thera eruption (Manning, 2014). After Carancini; Peroni, 1999; Jung, 2005: pl. 46, i; 2006: 216, tab. 24; Dickinson, 1994: 13, fig. 1.2; 2006: 23, fig. 1.1; Moschos, 2009a: 348, tab. 1; 2009b: 238, tab. 1; Iacono *et al.* 2022: 374, fig. 2.

The documentation of cross-community contact of the period, across maritime and terrestrial routes–whether direct or down-the-line–can be mapped in the exchange networks within Aegean regions of western and central and north and south of the Corinthian gulf and between the Aegean, eastern and central Mediterranean and temperate Europe (Bietti Sestieri, 1973; 1988; Peroni, 1983; Harding, 1984; 2022; Bouzek, 1985; Bettelli, 2002; 2004; Sherratt, 2000; Eder, 2003; Broodbank: 2013; Molloy, 2016c; Suchowska-Ducke, 2016; Iacono *et al.* 2021). The nature of these earlier cultural encounters and presence of Mycenaean sailors in coastal and island sites of the Italian peninsula heavily relies on the testimony of fine and wheel-turned pottery with Mycenaean ascendancy at least since the LHI/Italian MBA. At a later moment, in the turn of the 13th-12th cents. (corresponding to the LH III B-C/Italian RBA/FBA periods), itevolved into a generalized east-west comings and goings that produce "[…] *la sensazione ambigua ed estremamente problematica di un incrociarsi d'influenze, che in qualche modo sembra sfociare in singolari forme di koiné interculturale, ma sempre in rapporto con fenomeni di circolazione, più che di bene, di persone*" (Peroni, 1983: 261).

The wide distribution of pottery traditions and bronze artifacts of 'northern origin' form an interdigitated entanglement of cultural ties through elements and fashions, implements and weapons in both sides of the Adriatic Sea corridor (Matthäus, 1980; Harding, 1984: 213-228; 244-261; 2022; Bouzek, 1985: 92-239; Hallager, 1985; Bettelli, 2002: 121-126; 2004; Papadopoulos; Kontorli-Papadopoulou, 2000; Eder, 2003; Cultraro, 2005; Borgna; Càssola Guida, 2005; 2009 and papers therein; Eder; Jung, 2005; Dickinson, 2006: ch. 3) (**Fig. 4.2**). For this reason, the phenomenon is termed (trans-)"Adriatic"/"Mycenaean connection" (Harding, 1984: 261; Bietti Sestieri, 1988), "metallurgical *koiné*" of finished bronze good types (Bietti Sestieri, 1973; Carancini; Peroni, 1997; Sherratt, 2000: 85) or "westernizing Aegean"

in a reversal of balance of core-periphery relations (Iacono, 2013: 64, fig. 5.2; 2019: 140-146; 203; Kristiansen, 2016: 173; 2018b: 122 *contra* Molloy, 2016b: 364-365).

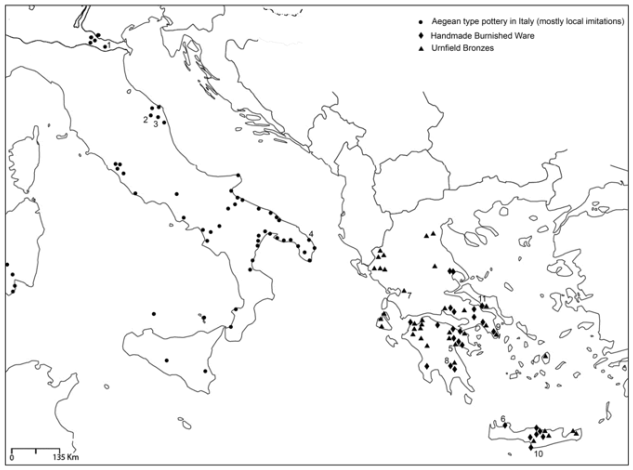

Fig. 4.2. Plot distribution map of HBW and UF across central Mediterranean and the Aegean over LH IIIB and C. Number legend: 1) Frattesina, 2) Moscosi di Cingoli, 3) Cisterna di Tollentino, 4) Rocavecchia, 5) Tiryns, 6) Chania, 7) Kouvara, 8) Pellana, 9) Perati, 10) Kommos. In: Iacono, 2013: 64 fig. 5.2; see also id., 2019: 145, fig. 4.15.

Handmade and burnished (HBM) pottery[78] along with 'intrusive' bronze work tools, ornaments and weaponry such as Peschiera type daggers, flange-hilted swords and safety-pins (violin-bow fibulae) are materially discernible elements of a kind of a storytelling of rupture with Aegean craft making traditions, exogenous origins and migration. Scholars have for long tried to unravel the spreading routes of cultural influences in Mediterranean and Near East cultures through the introduction of metal and ceramic types (Müller-Karpe, 1962; Schauer, 1971: 148-149). These metal objects are generally held as members of ancestry strains leading to the North and West through the so-called 'Urnfield Bronzes' (UB), a taxonomic symbol of foreignness, swordmen of diverse identities and modes of action (Harding 1984; Sherratt 2000; Jung, 2009b; id.; Mehofer, 2013; Iacono 2013; 2019; Broodbank, 2013: 463, fig. 9.15; cf. Molloy, 2016b: 347-348).[79]

The *histoire évènementielle* of migratory influx into Greece, Anatolia, Cyprus and the Levant at the fall of the Mycenaean civilization are intimately associated with the late

[78] Handmade *impasto* pottery is referred to in an older literature in a negative way as 'Barbarian Ware' or *Kummerkeramik*. This term designates a ceramic assemblage with coarse fabric of red, brow or grey color, modelled by hand and fired at low temperatures and with a surface treatment consisting of burnishing on leather-hard paste with a tool that brings the fine particles of the paste to the surface. With regard to its use it was mainly of, but not exclusively, domestic deployment found in relatively small quantities over as many as thirty sites of the Aegean (southern and central mainland and Crete), Cyprus and the Syro-Levantine coast over the LHIII B to Postpalatial period (Harding, 1984: ch. 8; 2022: 31; Rutter, 1990; Bettelli, 2002: ch. 4; 2004: 304-305 Dickinson, 2006: 52-53; Iacono, 2013: 63-66; 2019: 143-146 for useful overviews).

[79] The so-called 'Urnfield Culture' block of northern and central Europe is a polysemous concept into which material variability in time and space is subsumed (Sørensen; Rebay-Salisbury, 2008).

nineteenth and early twentieth century scholarship and typical nationalist ideologies thriving in Europe (see previous chapters). According to the rationale of isomorphic relations, ethnic groups are labeled or ethnonyms transferred to material assemblages to shape agents of change in the form of 'nations' (Shennan, 1989a; 1991; Jones, 1997). The material has been claimed to be a sort of 'visiting card' of a range of ethnic groups, invoked as a *deus ex machina*:

1. Northerners (with a number of variants) in a 'season of migration to the South', in an allusion to Salih's ([1966] 2003) literature classic:

(a) Hypotheses concerning the 'Dorian Question'

The question is similar to the earlier strand of research "in/the search of" as regards the ethnolinguistic terms of textual resources and with the aid of which it was made to 'read' in the archaeological record of large-scale movement or invasion of groups connected with the fall of Mycenaean palaces. The legend in the case is of the Dorian Invasion and Return of the Heraclids in Greek archaic and classic sources and later accounts (e.g., Tyrtaeus fr. 2, Herod. 1.56.3 and Thuc. 1.12; cf. Snodgrass, 1971: 299-304; Hooker, 1976: appx. 1; Hall, 1997: 56-65; [2007] 2014: 44-51).

In particular, items of 'northern pedigree' as swords, spearheads, safety pins and a type of 'rude' pottery production so-called 'Dorian Ware' but also later cultural traits such as ironwork, cremation and single graves were marshaled in compressed narratives of LBA/early IA transition in the Aegean (Desborough, 1964). Essentially, 'the coming down of the Dorians' is closely related to the history of distribution of dialect groups of the Greek language in the Aegean and Indo-European language family, hence a cultural artifact of modern philology (cf. Hall, 1995: 100, fig. 2; 1997: 154, fig. 25: ch. 6; 2002: ch. 2; [2007] 2014: 46, map. 3.2 for distribution of dialects and discussion).

Greek is one of the branches of the 'Aryan' tree of languages, and the question was embedded in racial conceptions of the early 20th century, which, after the WW2, thrived on the primacy of the linguistic criteria in defining ethnic group identity (Greek historians like Starr, Murray and Finley; cf. Hall, 1995: 83-84; 1997: chs. 1; 5-6). As an example from the early part of the last century, Hawes (1909-1910: 259; cf. Wallace, 2018: 41-42) postulated, using the methods of racial anthropology, a Dorian ancestry in modern populations of Albania, Peloponnese (Tsakonians) and Crete (Sphakiots). He posited past mixing events in the Aegean with a northern influx of broad-headed type of population branching off from the 'Aryan' stock.

As it is usual in linguistic questions of the kind, it appeared to archaeologists as a byproduct of southward populational thrust bringing Greeks to present-day Greece. The 'κάθοδος των Δωριέων', literally 'descent of the Dorians,' so the account goes, would be

singled out in waves from northern nomadic pastoralists in a *Ursprungland* in Central Europe at the end of the BA Aegean (Milojčić, 1948-1949; Kimmig, 1964; Desborough, 1964; Grumach, 1968-1969; Únětice-Tumulus-Urnfield groups in Gimbutas' Kurgan theory ([1986] 1997: 328) *contra* Müller-Karpe, 1962) or displaced within Greece by similar armed groups (Hammond, 1931-1932; 1971; 1975; 1977 *contra* Snodgrass, 1965: 229-240; 1971: 304-323; 1973; Sandars, [1978] 1985: 91-95; Hooker, [1976] 1999: 7-42; McDonald; Thomas, 1990: 457-467; Lemos, 2002: 191-192; Dickinson, 2006: 44-56; Molloy, 2018: 81-85; see also Ανδρόνικος, 1954: 236-240, Hooker, 1975: 163-180; 1979: 359-360; Chadwick, 1976 for a hypothesis of rebellion of subaltern speaking West Greek dialects within palatial economies that escape from migratory theories).

Recent critique to the reductive equation of ethnolinguistic categories and archaeological record the 'Doric migration' of later origin legends (Hall, 1995; 1997: 114-128; 2002; [2007] 2014: 44-51) do not have inhibited this concept continuing to be re-worked in current scholarship. Linguist Finkelberg (2005: 144) states for instance that "[…] 'the coming of the Dorians', relates to miscellaneous population movements from the periphery to the centre of the Mycenaean world […]";

(b) 'Non-Mycenaeans' overland intruders from beyond the 'core zone' to the North, hence Northerners from the Balkans (Rutter, 1975; 1976; 1990; Deger-Jalkotzy, 1977; 1983; French, 1989; LBA complex of Morava Valley in SE Europe: Banfoff, Winter, 1984), and, to West, 'Italian' traders (Hallager, 1983; 1985); foreigner slaves brought in the Peloponnesus as captives (Bankoff; Meyer, Stefanovich, 1996: 201-3 *contra* Genz, 1997: 109-110; Small, 1997: 225-227), with special emphasizes on pottery evidence of HBW and their argued antecedents without the Aegean[80] and flanged-hilted swords among the so-called 'northern bronzes' (see below);

2) One-size-fits all 'Sea Peoples,' marauders or hordes of nomads plying land and sea.

For centuries Sea Peoples' trail has been riveting scholars' attention in Near East, Egyptian and Aegean archaeologies. The label encompasses many ethnonyms mentioned in the Egyptian sources of the 12th and 13th cents. BC in the wars of Ramesses and Merneptah –

[80] Many scholars dispute overtly diffusionists views with special regard to the origins of the HBW with economic motivated models of the context of household production and consumption of exogenous or indigenous tradition of material culture in the throes of the Mycenaean world (Walberg, 1976; Sandars, [1978] 1985: 192; 1983: 63-66). The need to go beyond the appearances of ceramic shape and decorative features, in order to restitute the mode of production and circulation in the Aegean redistributive system has been stressed by Small (1990; 1997 *contra* Rutter, 1990; Bankoff; Meyer, Stefanovich, 1996: 196-199; Bettelli, 2002: 120 ff.; 2004: 304). He sees HMW pots as part of risk-buffering strategies of part-time production and market exchange. Iacono (2013) emphasizes the possibilities of the bulk area of trade of metals and exogenous appeal of power prestige associated with HBW and UB objects.

Tjekker, Shardana, Shekelesh, Peleset, Ekwesh and Denyen to name only a few (see list of primary sources compiled by Adams; Cohen, 2013 and Middleton, 2018a: 102, tab. 1; 2018b: 118, tabs. 1-2). More precisely, "Sea Peoples" stands for a collective name for not a single people – and of not-so faceless horde as show the engravings of naval and land battles and the scene of captive in the inner colonnade of the mortuary temple of Ramesess III at Medinet Habut in West Thebes, Egypt.

To French Egyptologist scholarship in the second half of the nineteenth century as de Rouge, Chabas and Maspero are credited the weaving of biblical sources with Egyptian records (Karnak inscriptions, Medinet Habu reliefs[81] (Panels X through XV of the external northern face wall and within courtyard) and inscriptions (panels and great pylon wings) and Papyrus Harris) in the reconstruction of great migrations of historic peoples through the eastern Mediterranean (Sandars, [1978] 1985: ch. 5; O'Connor 2000; Cline; O'Connor, 2003: app. 2 for the essentials of Egyptian evidence). To Maspero, it is reputed the christening of '*les peuples de la mer*' [Sea Nations] after the hieroglyphic inscriptions at Medinet Habut in the western bank of Thebes and narratives of people coming from "the northern foreign countries" in national or folk migration (*Völkerwanderung*) storytelling familiar.[82]

In these eventful colored narratives, the Sea Peoples figure as major drivers of massive disruption in the Near East in the end of the 12th cent. BC, a generalized large-scale of raids, sieges and population movement whose first chain of events began in the barbaric north and the last in the Nile delta. On the movement's trail, the breakdown of the palaces either/or by

(a) Direct invasion waves and trail of destruction with the tearing down of the palaces by 'barbarian' conquerors in the closing years of the 13th cent. BC (Desborough, 1964; Bouzek, 1973: 172; 1985: 242-243; 2010: 40-42; for the Homeric Trojan War and Trojan level destruction at stratum (Troy VIIIa) as another example of widespread "massive marauding activity" in the Greece Bronze Age, see also Finley, [1954] 2002: app. 2; [1970] 1981: 56-66 in an essayistic form);

(b) Political instability and change pattern of trade routes that weakened the Mycenean powers (Vermeule, 1960: 64; 1964: 271-279).

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[81] Reliefs and inscriptions were fully published by University of Chicago's Oriental Institute and *Medinet Habu* volumes (Nelson, 1930; 1932). Cf. Dothan; Dothan, 1992: ch. 2; Drews, 2000; O'Connor 2000; Cline; O'Connor, 2003: 122-132; app. 2; Ben-Dor Evian, 2016 for good presentations of the evidence of the mortuary temple of Ramesses III and narrative's sequence.

[82] For historiographic and interpretative discussions, see Barnett, 1975; Sandars, [1978] 1985; Dothan; Dothan, 1992; Drews, 1993; 2000; Silberman, 1998; O'Connor 2000; Sharon, 2001; Cline; O'Connor, 2003; Suano, 2003: 84-97; Yasur-Landau, 2010; Broodbank, 2013: 460-472; Cline, 2014; cf. Ben-Dor Evian, 2015; 2016; 2017 renders the Egyptian *thr* of the Year 5 inscription, opting for a less charged translation as "allied troops" and contextual iconographical analysis of the reliefs.

Over more than 20 years, 'Sea Peoples' figure have been the topic of a series of major books, workshop volumes and monographs, in special the 'Philistines' and standard migrationist paradigm of the Philistine cultural formation (Dothan; Dothan, 1992; Oren, 2000; Yasur-Landau 2010; Killebrew; Lehmann, 2013; Fischer; Bürge, 2017b). Under the blanket 'Sea-People'/'Philistine' migrations lies a basic equation of this group with the *Prstw* of Egyptian literary documents and the biblical Philistines through which the idea of movement as major driver of sociocultural transformation remains much alive (Silberman, 1998; Sharon, 2001; Wallace, 2018: 321-322; Middleton, 2015; 2018a; 2018b; Knapp, 2021: 13-31). The migration of the Philistines and isomorphism of pots and people is "[…] a basic paradigm of the 12th century BCE […]" (Ben-Dor, 2018: 219; cf. Knapp, 2021: 14) and remains a predominant thesis among many scholars today.

Here, in the mixed composition and tapestry of narratives on the Sea Peoples, as well as the multiple nature of their movement–almost certainly not of a homogeneous *ethnos* and direct homeland/donor area to final/receiver settlement–the epistemological elements of early migratory-related accounts remain difficult to grasp. Nonetheless, as many scholars attempt to fit this complex picture into a high-resolution history of events, the narrative produced mirrors the ideologically charged compositional program of visual and textual discourses of Pharaonic victory over hordes of barbarians beyond the "northern hill countries," as has the head of the Year 5 inscription (Roberts, 2009: 60; Yasur-Landau, 2010: 340; Broodbank, 2013: 464). In the light of the predominance of the graphic and literary evidence marshaled up by modern scholars, archaeology comes to be conceived as a handmaiden of an event-historical model about origins and migration scenario of 19th-century European scholarship (Silberman, 1998: 270; Sharon, 2001; Drews, 2000: 166). This is the *Zeitgeist* of scholars that have gone about their interpretation for more than 250 years (cf. Drews, 1993: 51-53; 2000: 167-174; Bauer, 1998: 151; 2014: 31-32; Sherratt, 1998: 307; 2013; Silberman, 1998; O'Connor, 2000; Cline; O'Connor, 2003: 133-134; Dickinson, 2006: 47-48; Roberts, 2009; Middleton, 2015: 47-48; 2018a: 101-103; 136-137; 2018b: 117; Ben-Dor Evian, 2016; 2017: 275-278; Knapp; Manning, 2016; Knapp, 2021: 31-32 *et passim* for useful doubts and source criticism of Egyptian inscriptions and worldview). Ultimately, the gleaning of historical information from the reliefs tease out interpretation that relies on the "bad press" (Artzy, 1997: 3) and boastful discourse of Egyptian elites and worldview expressed in temple construction.

Childe in *The Dawn…* (1926: 72-76) offers an earlier account of *Indogermanisierung* process in the form of the so-called Great 'Aegean Migration' and the 'Dorian Invasion' triggered by chain reaction of displacement of local populations uprooted from their homelands

by ‘barbarians’ from the Danube area. Childe viewed the carvings of Medinet Habu of attackers and captives with the so-called ‘feathered crowns’ an illustration of a specific physical type “[…] depicted as blonde […]” (ibid., 76) known in the Egyptian texts as ‘Peleset’.[83] This interpretation was challenged by the decipherment of Linear B script in the 1950s. There is no need to bring Indo-European (Greek-speaking) northern invaders to end with the Minoan-Mycenaean civilizations and introduce a new language to the stock populations of the area.

However, debates on the identity of the feathered-helmet people have been proving perennial, albeit the pattern design and material of the headband has since then been challenged, with many reconstructions suggested (Sandars, [1973] 1985: 134-137; Mountjoy, 2005: 425-426; Yasur-Landau, 2012a; Be-Dor Evian, 2015; 2016). Broad similarities and possible parallels have been noted: the headdresses appliqué in anthropoid coffins and scarabs in Egyptian garrisons in southern Levant (Beth Shean, Deir el-Balah (North Cemetery) and Tell el-Far’ah (South – ‘500 Cemetery’)); iconographic representations of warrior head gear and possible associations (‘hedgehogs’ as in the LH IIIC Middle Warrior Vase of Mycenean) in pottery sherds of larnax and kraters from the Aegean, western Anatolia, the Levant; sealings and engravings on Cyprus and even with bronze helmets of Achaean, as far as insular Italy (Sardinia). These connections have avowed many scholars to argue for a direct ‘Philistine connection’ and hence the presence of Aegean mercenaries[84] or merchants in maritime activities in the Mediterranean and movement of the Sea Peoples (Dothan; Dothan, 1992: 93-94; Mountjoy, 2005; Yasur-Landau, 2010: 182-186; 207-211; 2012a; 2012b; 2018).[85]

Be that as it may, there is plenty of literary evidence to indicate that hairstyles, dress costumes and other external features could signal social identities in antiquity and later medieval periods as a resultant of the high density of interaction between groups (Burmeister,

[83] Childe thought this would mirror an Indo-Aryan breed (northern Achaean invaders in the Peloponnese) who mingled with Cretans to later occupy southern Levant and enter the recorded history as the Philistines of the Biblical narrative. As far as the swords go, later Childe posited a different origin for the Shardana’s swords in consonance to the new Asiatic cradle of the Indo-European folk. If earlier he derived these types from a development of Sardinian daggers after Minoan prototypes, now cut-and-thrust swords were wielded by Near Eastern charioteers in their ‘coming’ into the Aegean (Childe, 1948; 1950a: 177-211; see also Hawkes, 1948 *contra* Catling, 1956: 122; 1961: 118; Cowen, 1961: 212; cf. Σπυρόπουλος, 1972: 163-169 for short reviews of research history of Near East origins.

[84] Yasur-Landau (2010: 175-179; 2012a; 2012b; 2018) suggests that the feathered helmet is connected to an Aegean male warrior group identity and initiation, which amalgamated to Syro-Canaanite components (Sweeney; Yasur-Landau, 1999) along their migratory long route to Egypt and Canaan.

[85] Ben-Dor Evian (2015: 67-69; 2016; 2017; 2018) maintains that the present evidence does not allow the identification of feathered headgear crowning Aegean warriors. She thinks instead in reed-capped warriors at the service of Near Eastern powers in ‘Asiatic’ towns, displaced warriors ‘prompted’ by “the fall of the Hittite empire, together with some climate changes (id., 2015: 70; 2017: 278). Emanuel (2015: 5) argues in favor of “transculturalism” and identity-signaling aspects of material behavior involving part of Sea Peoples serving on Egyptian garrisons. Verduci (2019) provides an up-to-date state of evidence and distribution and stresses that the headdress cannot be linked exclusively to ‘Philistines’ or Aegeans. Cf. Knapp, 2021: 25 ff.

1997: 188-190). Recurrent face-to-face basis of interaction leads to a process of schismogenesis where adornments (head attire in the case) might embody a system of self-conscious differences and demarcation of disparate identities and viewpoints. It should not surprise us thus to consider through relief illustrations the Egyptian emic angle of representation and rhetoric of 'foreignness' in "[…] barely distinguishable mass […]" (Roberts, 2009: 68) of fighting and nonfighting components or the artisan's design choices for differentiating sub-group identities (Sweeney; Yasur-Landau, 1999; Roberts, 2009).

The point of revisiting of what looks like a childish token of an earlier literature, which seemed to have had fallen out of favor, is to shed light in persistent legacies connected with the Philistines, one of the Sea People groups (see below). This is specially the case in studies on pottery with Aegean stylistic connections, the so-called 'Philistine pottery' (i.e., bichrome decoration and 'Philistine bird' decoration) and other cultural elements or ethnofossils that continue much the long research tradition of the area (Dothan; Dothan, 1992; Yasur-Landau, 2010; 2012a; 2012b; 2018).[86] General interest soared recently with a 'Philistine DNA' sampled directly from ancient bones from Ashkelon (Feldman *et al.* 2019; cf. Knapp, 2021: 50-55 for recent review of aDNA and isotopic studies relevant to the area and period) (**Box 7**).

Box 7 – The Wars of Rameses III

A further example of such flights of interpretation is the land battle depiction of women and children on ox-drawn wagon in the heat of battle of the Year 8 of Ramses III at the Medinet Habu (**Fig. 4.3**). Yasur-Landau (2010: 191; cf. Sweeney; Yasur-Landau, 1999: 138-139) imagines from the reliefs a situation akin to that portrayed in Ford's movie *The Grapes of Wrath* (1940): "[…] caravans of whole families with all their belongings, trailing along the routes in search of a new home […] further south in search of better opportunities." An entire mass of nomadic families was imagined, amalgamating Aegeans and northern Syrians and Canaan women accompanying the warrior feathered-hatted men. They crossed western Anatolia and Levant to arrive at Egyptian's gates in order to finally settle (cf. Drews, 2000: 190, that, instead, argues that the reliefs represent a "desperate resort" of local population to a Pharaonic *razzia*; also, Ben-Dor Evian, 2016: 163; 2017; 2018 for a suggestion they represent Asiatic town-dwellers).

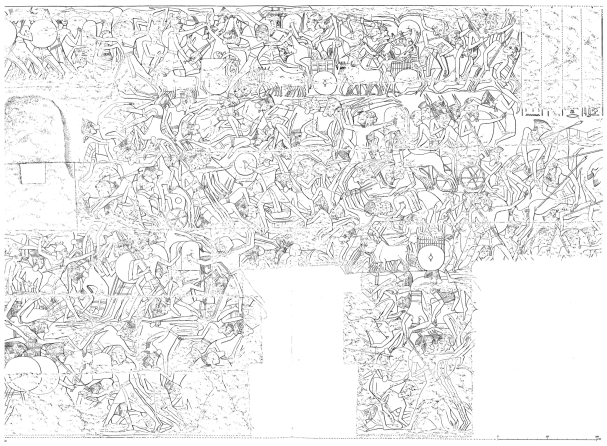


Fig. 4.3. Land battle scene at Medinet Habu. In: Nelson, 1930: pl. 32 (left end).

The migration along a terrestrial route – "[…] some 2,500 km, which would take 513 hours of non-stop walking in a straight line over flat land" (Knapp, 2021: 24) – is viewed through a modernist lens as an act of refugees 'flooding' the gates of 'Fortress' Egypt.

[86] As regards the Naue II type dagger of Megiddo, Shalev (2004: 64) says that it "[…] appear to be a local imitation of an Aegean tradition arriving from Crete via Cyprus, is part of a typological and technological tradition which

Naue II type swords

A specific class of material entangled in these narratives is the 'cut-and-thrust' swords of Naue II type or Type II hereon, an offensive weapon made of bronze named after the German archaeologist Julius Naue's (1903) and his work on *Die vorrömischen Schwerter aus Kupfer, Bronze und Eisen*. The status of swords and material culture of war in the archaeological literature is tantamount to the favoritism accorded to 'exceptional' pieces of metalwork (Molloy, 2011; Lehoërff, 2018). The primary historiographic role accorded to warfare, tools of combats and other evidence that bear testimony of elite symbolism and violence in shaping the political and cultural history of different societies throughout the ages may be a major factor as well. Both factors thrust the renewed interest in the theme of material culture of war in recent 'bloodiest' – sometimes heroicized – accounts (Keeley, 1996; Molloy, 2007c; Drews, 2017; Horn; Kristiansen, 2018b; Lehoërff, 2018; Crellin, 2019; cf. also Meller; Schefzik, 2016; James, 2016).

Bronze is a copper-based metal alloy mixed with tin in the optimum range around 10% for producing casting material hard and resistant enough to hammer working (Kuijpers, 2018a: 103, fig. 6.3) and use, in the case, as an offensive weapon. The color of the cast within this range of alloy is the typical yellow copper (golden) when polished that, in the patinated state today on museums display, show the characteristic green tonality (Mödlinger *et al.* 2017; Kuijpers, 2018a: 109-110). Swords are weapons designed to perform some technical functions and then in the user's point of view certain measurables variables of the 'metalleity' (Kuijpers, 2018a: 96-97) define the 'use of sword' in a hand-to-hand combat. In this work, 'swords' are technically defined as pointed cutting weapons with minimum length of 30 cm from point to point and intended for thrusting and slashing movements (Desborough, 1964: 67; Kilian-Dirlmeir, 1993: 105; Molloy, 2007b: 91-92; 2010: 404, n. 18; Lehoërff, 2018: 160 but see Drews, 1993: 193-194 serving of Col. D. H. Gordon's system to differentiate swords from knives, daggers, dirks and rapiers). As far as swords of type Naue II goes, there are some polythetic diagnostic features used to designate this fully-fledged type that, if taken individually, do not appear only with the type's existence.

These can be listed as: a) handgrip casted with the blade; b) system of hafting which fixes the plates of the hilt with raising edges (flanges) all along the handgrip, preventing them

reached the coastal region and the valleys of Canaan at the end of the second millennium B. C., with the arrival of the 'Sea Peoples'." Cf. Silberman, 1998; Sharon, 2001: 557-600 for useful accounts; see also, Middleton, 2015; 2018a; 2018b; Wallace, 2018: 370-373; Knapp, 2021: 13-31 for critical takes on the migrationist approach.

to shift sideways during use, with or without pommel extensions; c) ears at the hilt's butt; d) rivet fastening across the shoulder and pommel tang (grip-tongued) (then the German and Italian names for the general category that the type belongs, *Griffzungenschwerter* and *spada da lingua da presa*); e) rounded or inclined shoulders that allow the bearer's to grip it with the hilt and better control of sword's movement; f) double-edged and straight-sided blades converging only in the upper part of the blade towards the point (swelling of the blade's outline, the 'leaf-shaped' blade is localized to swords from Central Europe); g) midrib flanked by 'blood-channels' or grooves, 'steps' or fine ridges ('faux-midrib' cross-section of Albania and northern Greece (Thessaly and Macedonia) and Western Greece (Aetolia-Acarnania, Achaea, etc.)) Molloy, 2016: 350; 2018: 91); h) thickened biconvex lenticular or pointed-oval cross section (classic model typical of the European swords); i) stout construction, what means these swords are heavier in comparison to antecedent specimens of the typological series (10-20 cm longer than the bronze swords from the native Aegean tradition, for instance (Molloy, 2010: 421); j) balance point situated in the blade, allowing easier maneuverability and effectiveness of a blow (see diagrams showing the difference with Mycenaean-type swords Σταυροπούλου-Γάτση; Jung; Mehofer, 2012: 260, fig, 12; Jung; Mehofer, 2013; 177, fig. 4); k) average length of 55-70 cm (Molloy, 2018: 91) and weight range of 600-800 g. Taken together, all these characteristics make of it a weapon designed to deliver a thrust and blow a slash against an opponent in close fighting (Kristiansen, 2002: 320) (**Fig. 4.4**).

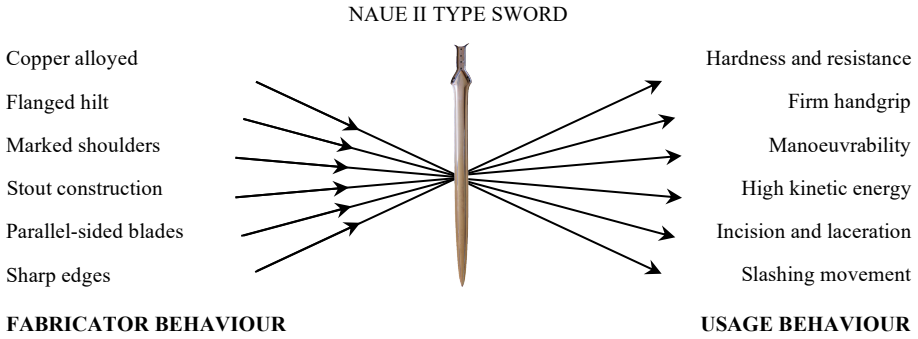


Fig. 4.4. Reciprocal connection of design choices, mechanical properties and user's movement channeled by Naue II type swords. Modified from Peixoto; Iacono, 2023: 153, fig. 2.

In view of these mechanical properties, this weapon types have been widely taken as a more efficient technique of martial combat with wide currency "[…] from the Rhine to the Orontes" (Jung, 2009a: 72). To start from the middle of the 2nd millennium BC through northern Europe and central Mediterranean as well as the Aegean, Cyprus Egypt and the Levant from the turn of the 13th-12th cents. BC, Naue II type became integrated as part of a military accoutrement for one-to-one combat (Snodgrass, 1967: 28-29; Sandars, [1978] 1985: 91-95;

Harding, 1984: 162-165; Drews, 1993: 192-208; Kilian-Dirlmeier, 1993: 103; 105; Kristiansen, 2002: 320-322; Jung; Μόσχος; Mehofer, 2008: 93-94; Georganas, 2010: 307; Pabst, 2013: 105-106; Suchowska-Ducke, 2018: 150; but see Molloy, 2005; 2010: 421-422; 2016c: 349-354 for a view of continuum taxonomic evolution of cutting swords and swordsmanship in the Aegean).

A sign of the type's popularity besides its wide geographical distribution is its longevity and broadly standardization in metric an alloying range as a standard model of sword that live on well into the IA and iron technology (Cowen, 1955; 1961: 211; Foltiny, 1964: 255; Snodgrass, 1967: 28-29; 36-37; Lemos, 2002: 117; 125; Drews, 1993: 204; Dickinson, 2006: 147-149).[87] But what are the links and nature of these interactions during the period in question? Interestingly, this far-reaching spatial spread is markedly similar to ranges of interaction that have a causal effect in the diffusion of warfare technologies, a strike of balance "[…] on a feedback circuit connecting the aggressor and defender […]" (Clarke, 1968: 121), where requirements of survival dictate the course of development – just as "[…] the medieval knight and the World War II battle-tank could best be countered only by the same equipment." (ibid., 121). However, as you may remember, Clarke, following Catling's lead, attributed these northern-looking objects to barbarian armed agents working as mercenaries. Could it be, then, that these different views could be combined? If so, how one could make different inferences of past mobility patterns and interaction networks from material patterns?

In the new "Bronze Age mobilities paradigm" (Sørensen, 2015), bronze weaponry has been seen as a blueprint of past social networks cemented through institutions of kinship and guest-friendship whereby people move across multiple spheres of interaction such as international travelling and journeys, trade networks in metal and circulation of specialists of various trades, fosterage and marital patterns and warfare, etc. (Kristiansen, 1998; Kristiansen; Larsson, 2005; Kristiansen, 2014; 2016; 2018b; 2018c; 2023; Kristiansen; Earle, 2015; Kristiansen; Suchowska-Ducke, 2015; Vandkilde, 2016; Kristiansen; Horn, 2018a; 2018b). The several thousand hundreds of swords and weapon technology have been imagined as emblems of 'movers' rather than 'stayers' (Woolf, 2016: 457) in the bronze trade systems, a symbol of major male-driven chiefly power, rank, and skilled martial lifestyle (Kristiansen; Larsson, 2005: 234; Kristiansen; Suchowska-Ducke, 2015; Earle *et al.* 2015: 645-646;

[87] Says Snodgrass (1967: 37) that "[…] from the mid-eleventh century to about the end of the tenth, there is there is hardly a single sword known from Greece which is not of this form, and of iron."

Kristiansen, 2018c: 24-28; 2022: 38-39; 2023; see **Indo-Europeanizing of Bronze Age Europe**).

Different current views are riveted in the Naue type II. By its physical affordances, they are considered to be "[…] the sword of the professional warrior *par excellence* […]" (Kristiansen, 2002: 323). In the core-periphery dynamics of Europe and the Mediterranean, they are particularly considered to mirror the gradual but diffused promotion of the institutionalization of warrior societies that, in the events around 1200 in the eastern Mediterranean, thrusted a dramatic uptake of violence followed by migrations (Kristiansen, 1998: 384-391; Kristiansen, 2016; 2018a; 2018b; 2021; Kristiansen; Suchowska-Ducke, 2015; Suchowska-Ducke, 2015; 2016; 2018). In LBA northern Italy, it has been suggested that the hoard of Pila del Brancón is a token of warrior tombs and and centralization of power and wealth under kinship units headed by young male sword-bearing warriors (Bietti Sestieri *et al.* 2013), or even loot of armed soldiers. In the post-palatial Aegean, these swords are embroiled in the phenomenon of the burials with multiple combinations of weapons and paraphernalia of dress in regions of NW Peloponnese, Cyclades (Naxos), and eastern Crete (Papazoglou-Manioudaki, 1994: 177; Βλαχόπουλος, 1999: 304: 2012: 60-66; 259-263; Papadopoulos, 1999: 273; Πετρόπουλος, 2000: 72 Papadopoulos; Kontorli, 2001: 136; Moschos, 2009a: 361; 2009b: 253-254; Cultraro, 2005: 25-26; Eder, 2003: 39-40; id.; Jung, 2005: 491; Deger-Jalkotzy, 2006: 168-169; Giannopoulos, 2008: 242-243; 2022; cf. Yasur-Landau, 2010: 58-86; 2012a; Pabst, 2013: 124-126; Steinman, 2012; Σαλαβούρα, 2015: 386-387).

Naue II swords provide a unique well-published dataset. Indeed, the type of flanged-hilted swords offer a transcultural and multi-period object with widespread distribution finding spots from northern Europe to the Egyptian Delta, and from peninsular Italy to the Near East Mediterranean strip coast. Taking together, the findings of all these regions so far published, there are more than 1100 of these types of swords scattered around museum collections of almost all countries of Europe (Suchowska-Ducke, 2015: 257) (**Fig. 4.5**).

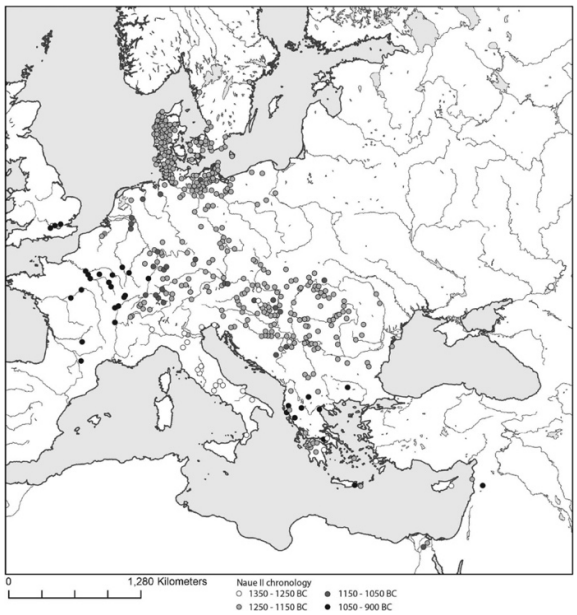


Fig. 4.5. Diffusion distribution of Naue II swords according to chronology. In: Kristiansen; Suchowska-Ducke, 2015: 374, fig. 5, cf. Suchowska-Ducke, 2016: 69, fig. 2; 2018: 153, fig. 4.

The selection of nearly all the data amassed of the study material of both sides of the Adriatic Sea builds on the analytical criteria of typological attribution of published evidence in monographies (e.g., PBF series) and accessible specialized publications or technical visits in museums where some swords as yet not published are on display.[88] The areas of study are specified within the boundaries of the modern Italian and Greek nation states. Within the Aegean it is included hence roughly the areas of today Greek modern state: mainland Greece up to Macedonia, Cyclades, Crete and the Dodecanese.[89]

How did they make it?

> He pointed out in an aside that these characteristics could perfectly well apply to a Western carpenter using tools with precise names – gauge, tonguing plane, moulding plane, jointer, mortise, jack plane, rabbet, etc. – but asking his apprentice to pass them to him by saying just: 'Gimme the thingummy'. (Perec, [1978] 1987: 110).

What artifacts are made of, which tools and what operational sequences were employed and by whom are routine questions of archaeologists' job and prime focus on things (Olsen, 2010: 22). By giving names to all this, they flesh out the reverse engineering of the making of material culture and restore the 'thingummyness' of manufacturing process that were certainly not accomplished by using words alone.

The millions of ancient bronze objects recovered in different shapes and sizes is indicative of the importance of the material both in past social systems and the sustained interest in the material going back to antiquarianism (Schnapp, [1993] 2020; Lehöerff, 2018: 127-128). However impressive the volume of items recovered may be, the circulation of metal was undoubtedly far bigger than de facto discoveries (Kuijpers, 2008: 23). Naturally enough the same applies to bronze swords.[90] What do the bulk of 'lucky' bronze objects surviving re-melting and grave robbery tell us of people who made them?

[88] AM, Canellopoulos Mus., PM and the Arch. Mus. of Tripolis. The two swords on display in the Arch. Mus. of Tripolis were analyzed, measured and photographed by the author.

[89] The writer critically acknowledges the problem of limiting the infrastructure of data colllection to the parameters of modern nation-state territory. However, the idiom of archaeological research and publication, professional organization, and public access to sites and material is largely dictated by symbols of state sovereignty. Hopefully, this bias may be mitigated by the expansion of the dataset within a larger geographical framework, as provided by the open network datasets here.

[90] Tentative estimations of circulation of swords and spears through the sword-bearing warrior were made for Denmark and Schleswig-Holstein (northern Germany) and then for Europe in the figure of "several hundred thousand" (Kristiansen, 2023: 102; cf. Horn; Kristiansen, 2018a: 3-4; Kristiansen, 2018c: 28-29; Bunnefeld, 2018: 204-207; Lehöerff, 2018: 159).

First things firstly, with the hindsight of archaeology, the inverse chain of production sequences must be reconstructed from actual material culture. It is often held that the world of bronze, by the nature of its combination of copper and tin unevenly distributed on Earth, articulate and link places, people and objects in a new political economical mode of macroregion trade specialization, long-distance exchange networks of supply distribution, resource mobilization and political power (Brumfiel; Earle, 1987b; Earle, 2002; Kristiansen; Larsson, 2005; 2007; Earle; Kristiansen 2010a; 2010b; Earle *et al.* 2015; Kristiansen; Earle, 2015; Suchowska-Ducke; Reiter; Vandkilde, 2015; Kristiansen; Suchowska-Ducke, 2015; Vandkilde, 2016; Kristiansen, 2018a; 2018b; 2023; Lehoërff, 2018: chs. 3-4). In the span of precocious early globalization or 'bronzization' (Vandkilde, 2016), a complex transregional mobility system galvanized entire Afro-Eurasian regions around the allure of bronze metal and commodity flows. In areas with no sources of tin as the Aegean, non-local resources in exploited deposits to the BA date must be obtained through extensive and hyper-regional circuits further in the West (Cornwall, Iberia) or East (Afghanistan).[91]

Ancient techniques and technologies to make bronze metals have been studied under many standpoints. The knowledge of the sequence of steps of the operation chain, smith's toolkit and degree of skills mobilized in bronze working is one object of enquiry of the science devoted to the study of these mechanical processes from the work of ancient bronze smithers itself, *archaeometallurgy*. Archaeometallurgy science is a broad church putting in one roof supporters of different interdisciplinary approaches, theories and methods to metal tools and weapons, from the science of material, metallography, to contemporary and experimentally derived data on production from ore to artifact (Le Fèvre-Lehöerff, 1992; 2004; Giardino, 1998; Ó Faoláin; Northover, 1998; Ó Faoláin, 2004; Wang; Ottaway, 2004; and papers in Uckelmann; Mödlinger, 2011; Roberts; Thornton, 2014; Lehöerff, 2018). Whereas the technological and mechanical properties of metalwork provided by material sciences hold a mechanical universality applicable to wide areas and periods of the BA, this descriptive side of the physicality of material should not conceal the fact that it involves a craftsmanship sharpened by repetition and experience (know-how) (Ottaway, 2001; Kuijpers, 2008; 2013; 2018a; Lehöerff, 2018; Molloy, 2019; Molloy; Mödlinger, 2020).

There is little evidence of workshop of swords and the reconstruction of the operational chain must rely on the accumulated experience of casting bronze objects. The production

[91] General maps of mineral ore sources in Europe and the Mediterranean in Harding, 1984: 44, fig. 6; Bouzek, 1985: 18, fig. 1; Broodbank, 2013: 69, fig. 2.6; Earle *et al.* 2015: 637, fig. 2; Vandkilde, 2016: 105, fig. 1.

sequence from mining of ore, smelting/melting, casting and smithing to render copper ore to finished tin-alloyed bronze objects is the result of a many-layered process over time of accumulated trial-and-error process of adaptation, invention and adoption (Ottaway, 2001). In such step-by-step sequence of operations, the degree of embodied motor control thought to be involved frequently appear in the form of direct action (hands-of knowledge), mediated or not by a specialist's supervision in workshops. Among prehistorians, the figure of the specialist in economic models of labor division and social inequality as much as the enchained relationships leading from acquired 'technological' knowledge, (ritual) control of craft metal process, social esteem to monopoly of access thereto have been assumed rather than proved in terms of bronze facts (cf. Brumfiel; Earle, 1987b; Kristiansen; Larsson, 2005 in long-held view going back to Childe's "detribalized" and full-time smiths; see discussions in Rowlands, 1971 updated in Kuijpers, 2008: 30-31; 54-57; 66-67; 2013: 140-142; 2013; 2018a: chs. 1-2; 10; 12; 2018b: 550-554; but see Molloy; Mödlinger, 2020: 198; 202).

Swords score highest in the ranking of most studied categories of weapons of the BA metalwork. In many respects, while one may accept, if loosely, an inverted relationship of object function in a broader social context and skill specialization as prima facie of outstanding social value and prestige for elite group display (Gardin, 1979; Roux, 2007: 160; Budden, 2008; Gallay, 2013: 26) (see **How did they use it?**), the reference proposition that grounds analysis on actual material is of the differences of skill in making and copying morpho-stylistic elements by direct or indirect contact (see examples in Roux, 2015; Furholt, 2018a: 312). In the case of bronze objects, it is possible to differentiate categories of ornaments, implements tools and weaponry for the reasons of labor input and possible risks involved in production (Northover, 1988: 132; Καγιάφα, 2006: 143, n. 40) (**Fig. 4.6**). As for morpho-typological variation, rather than assuming beforehand a single categorization of finished artifact types or that they were made single-handedly, it is worth bearing in mind that motor skills and gestures are not 'handed down' as a "closed packet" (Gosselain, 2011: 219) in linear order in one's learning process (Lave; Wenger, [1991] 2022; Wenger, 1998; Ingold, 2000: 142-143; 2011; 2013; Gosselain,

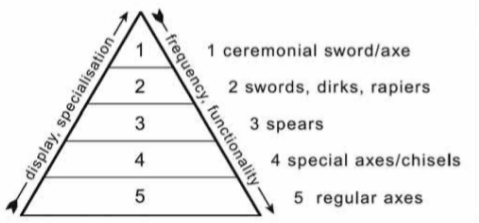


Fig. 4.6. Multi-tiered categorization of metalwork in a continuum of skill and display. In: Kuijpers, 2008: 56, fig. 5.1.

2008: 154; 2011: 212; 2018; Knappett, 2011; Knappett; Kiriatzi, 2016: 13), least artifacts one dimensional structures.[92]

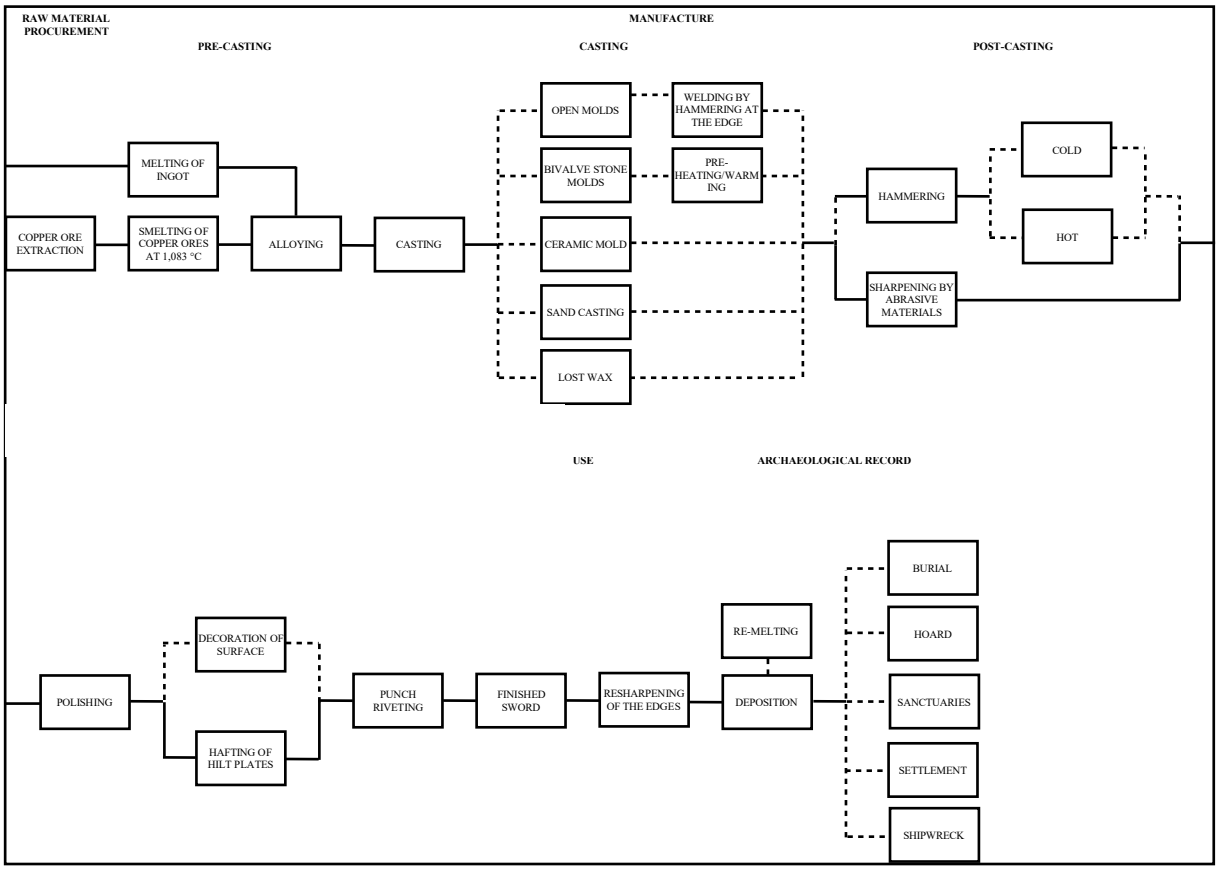
Once broken down the aggregate components of the operational chain in methods and operations, phases and stages, skillset, the culture transfer of intermediate products, traits or techniques between groups are foregrounded as plausible suggestions. As for the skill attainment, it might correspond to a 'tiered' organization of smiths specialized in particular itens and ranges of trade of metalwork (Rowlands, 1971). Ingrained and temporally stable motor habits, easibly modified features of production systems and functionally equivalent choices of technical behavior then become inter-connected with the archaeologically salient or less salient aspects of material culture in the entailing learning-apprenticeship framework of transmission (see examples in Gosselain, 1992; 1998; 2000; 2008; 2011; 2018; Roux; Corbeletta, 1990; Roux, 2007; 2016; Roux; Matarasso, 1999; Matarasso; Roux, 2000).

The manufacturing of bronze swords is as time-consuming task that may be required different degrees of skill and specialist's job.[93] In spite of our relatively poor understanding of the details of manufacturing techniques of European and the Aegean bronze sword manufacturing, the smith's art lies within the universal limits inherent in the physicality of the material, sensual perception and skill. Armed with the technological and experimental data knowledge currently at hand it is possible to reconstruct regularities of technological production grounding skillsets and diagnostic traits of cultural choices in a workflow of use life from copper extraction and treatment and bronze casting and forging – specialist' and everyday smith's toolkit, embodied knowledge of operations and sequences (Le Fèvre-Lehöerff, 1992: 144, fig. 1; 2004; Bingelli *et al.* 1997; Giardino, 1998: 113, fig. 1; Ottaway, 2001: 88, fig. 1; Kuijpers, 2008: 81-106; 105, tab. 8.1; 2013; 2018a; 2018b; papers in Uckelmann; Mödlinger, 2011; also Mödlinger, 2011; Molloy; Mödlinger, 2020: 178, tab. 1; 193-198; 203, tab. 2; Lehöerff, 2018: ch. 3; Orfanou *et al*. 2022). Within this general work flow of bronze metal, special reference is made to LBA sword production, contemporary

[92] See concepts of *work-nets* in Latour, [2005] 2012 and *technological mobility* as "[…] a technology that in and of itself requires mobility to integrate its various components" (Knappett; Kiriatzi, 2016: 8).

[93] With the ethnological insights of Roux & Corbetta (1990; Bril; Roux; Dietrich, 1995; Roux; Matarasso, 1999; Matarasso; Roux, 2000; Roux, 2007; 2016; see also ch. 1) for wheel-throwing, coiling techniques, bead production, and stone knapping in mind, we agree with Kuijpers's (2008: 31; cf. id., 2013; 2018a: chs. 1; 3; 10; 12; 2018b: 554; see also discussion in Orfanou *et al*. 2022 for the site of Șagu) that the distinction between craft specialist and non-specialist should be placed on the quality of production of finished products, the investment and duration of apprenticeship of "[...] skill (mastery of a set of knowledge and/or motor habits that confer special hability" to fashion objects rather than on the economic organization (domestic or workshop production), intensity (part-time or full-time), or social status of specialization, even though the separation of tasks within a community group should be implied in the notion of the exclusiveness of specialized skills.

metalworking craftsmanship, experiment and restoration work from casting in a single piece to finishing and surface treatment.[94] Overall, whether or not the work was divided among different locations, workshops, or permanent installations, workers would have employed a variety of



tools of different shapes and materials.

The main stages of bronze sword working process can be roughly divided in four main stages: 1) copper ore extraction or raw material acquirement, 2) pre-casting, i.e., smelting and alloying or melting, 3) casting and 4) post-cast treatment (**Fig. 4.7**).

Fig. 4.7. Flow chart with the reconstruction of the chaîne opératoire sequence of bronze sword manufacture in Europe and the Aegean and lifetime. Drawing author.

Copper (Cu) is a chemical element that form a reticulated crystalline structure with regular physical and mechanical properties. In pure state, copper is a soft metal that can be further wrought and hardened. It can be also achieved alloying copper with other metals as arsenic (As) or tin (Sn) in small proportions. Copper occurs natively or in ore deposits and tin in the form of cassiterite in mineral or alluvial deposits.[95] Copper mined ores go through a

[94] NW Europe (Ó Faoláin; Northover, 1998; Ó Faoláin, 2004; Molloy, 2019); Central Europe (Siedlaczek, 2011; Mödlinger, 2011; Bingelli, 2011; Born, 2001: 180-224); and Italy (Fantini *et al.* 2005; Pellegrini; Scacchetti, 2014; Bietti Sestieri *et al.* 2014; Cavazutti; Barbieri, 2014; Iaia, 2015; Barbieri *et al.* 2015; Volante, 2020).

[95] Native copper exists in Tuscany and copper ore supplies can be found in Sardinia and, in peninsular Italy, in the entire zone of Alpine regions, the Tyrrhenian coast strip (Liguria, Tuscany and Lazio) and Adriatic side of the

process of beneficiation to removal of gangue and non-desirable particles and purification in reductive or oxidizing atmospheres, accordingly to the presence of sulfur (copper sulfide) through roasting that react with the oxygen. Tin can be extracted from cassiterite with reductive fire techniques (cf. Giardino, 1998: chs. 5; 9-10; Kuijpers, 2008: app. 5 for definitions of technical terms in the extraction and melting process). Early metallurgists experimentally leaned these hard facts and thus were able to realize by melting copper and tin in varied ratios they could obtain a new material for myriad practical employments. Bronze in the roughly alloy 1:10 ratio is sufficient to shape specific tools where hardness is requested.

Pyrotechnology is the mother of metallurgy. Copper metal has a smelting point at 1,083 °C. Temperatures exceeding 1300 ºC can be easily reached with relatively simple firing techniques and control of the air flow through tubes with nozzles blowing air right beneath the crucible in pits with coated walls (Bingelli *et al.* 1997; Cavazzuti *et al.* 2010; cf. Kuijpers, 2018: 127, n. 13). According to the varying degree of alloy mixing proportion in the crucible, copper can be melted at lower temperatures, an advantage in terms of fuel in extraction and firing methods. It takes around 15-20 minutes to few hundred of grams of bronze inside the crucibles to the metal became molten and the molds, in case they were made of refractory stone molds, needed to be pre-heated or at least warmed next to fire (Bingelli, 2011: 17) before pouring the molten metal inside it to avoid solidification. The bivalve molds are blocked by valves located at their margins. It is then safe to assume that the requirements of controlling of the temperature constrain the stages of pouring the liquid metal and casting it to the desired as-cast shape within the casting medium to occur in close physical locations, since the bronze coagulate fast, in matter of seconds.

The casting medium could have been made from different materials as sand, stone, clay or bronze and techniques implemented by the material vary accordingly. Sword casting technologies and functional constraints have been a relatively well-researched topic amid bronze weaponry (cf. Born, 2001; Mödlinger, 2011; Mödlinger; Uckelmann; Matthews, 2011; Molloy; Mödlinger, 2020; for overviews). Specific techniques and sequence of operations of the bronze-smith swords in the period of investigation in Italy and Greece, however, remain controversial. Archaeological traces of evidence of production of activities of bronze technology are recurrent in settlements of the Po Plain (Le Fèvre-Lehöerff, 1992; 2004; Iaia,

septentrional Apennines, Calabria and north-east Sicily, whereas tin deposits are attested only Tuscany and Sardinia (Giardino, 1998: 116-117; 134-136). In mainland Greece, raw copper sources were early explored in Laurion (SE Attica), while in the Cyclades, in the western islands of Siphnos, Kythnos and Seriphos (Dickinson, 1994: 28-29; Broodbank, 2000: 79-80; 80, fig. 19).

2015: 80; Molloy; Mödlinger, 2020: 191). Since the late 90s, experimental reproduction of metalwork has been mainly using the archaeological evidence from northern Apennines Terramare settlements of northern Italy (Bingelli *et al.*, 1997; 2014; Cavazzuti *et al.* 2010; Barbieri; Cavazzuti, 2014; Pellegrini; Scacchetti, 2014; Barbieri *et al.* 2015; Iaia, 2015) and central Italy (Volante, 2020) as the closest spatial analogy for the Apennine Peninsula bronze industry over the Middle to FBA period.

Few sword casting molds are known in Italy compared to the quantity of over hundreds of bronze sword findings over the centuries between the Italian Middle to FBA (Bianco Peroni, 1970; Salzani, 2005). The general scarcity of these pieces has been object for long of many reflections on the social and political context of the mobility of metallurgists in peninsular Italy (Bietti Sestieri, 1976-1977: 216; Peroni, 1983: 252-253). To the writer's knowledge, no sword mold is preserved in the LBA Greece (see Harding, 1984: 259) and experimental knowledge is underexplored.

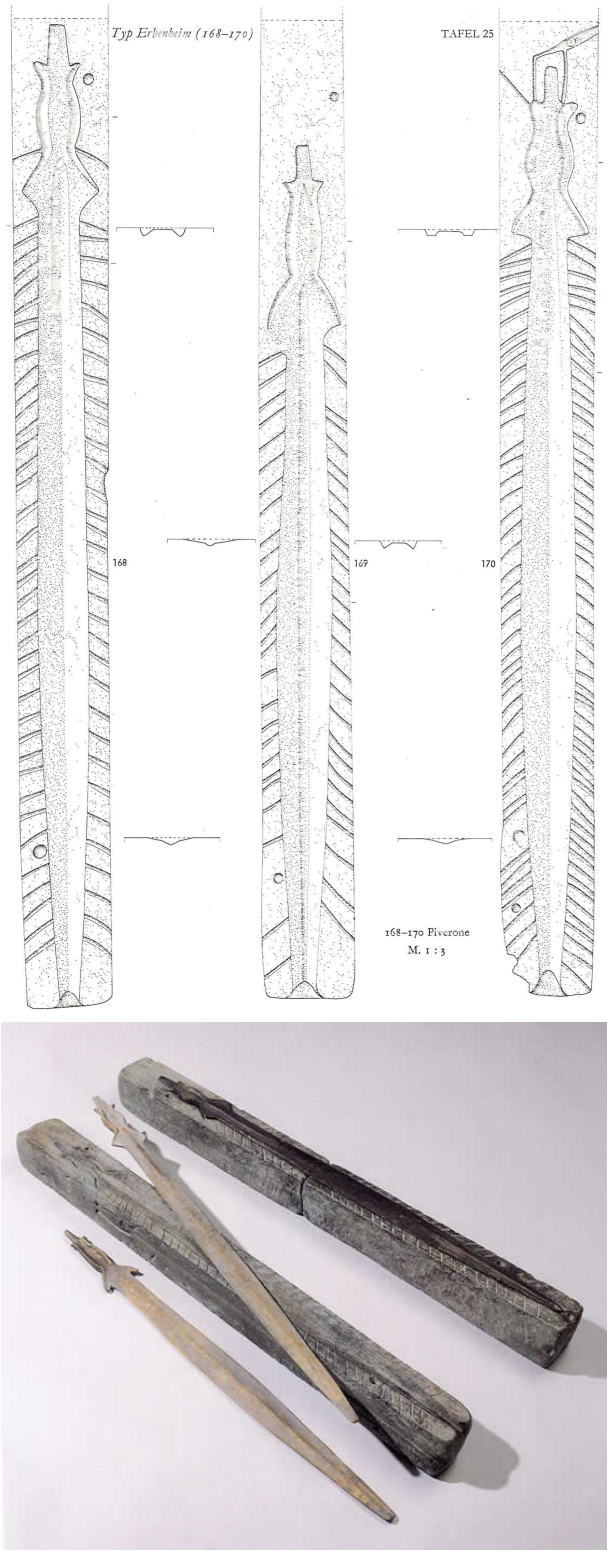


Fig. 4.8. Casting stone molds from Piverone. In: Bianco Peroni, 1970: pl. 25; Mandolesi, 2006: 174.

Stone sword molds are known in Castione Marchesi (National Arch. Mus. of Parma Inv. No. 2 136) (Bianco Peroni, 1970: 14, no. 15; pl. 2, 15; Le Fèvre-Lehöerff, 1992: 183, no. 23), Piverone (Arch. Mus. of Turin Inv. No. 75004)) (Bianco Peroni, 1970: 72, nos. 168-170; pl. 25, 168-170), one fragmentary chlorite(?) piece of tanged sword of Frattesina (National Arch. Mus. of Adria Inv. No. 17517) (Le Fèvre-Lehöerff, 1992: 206, no. 77) and Sabucina in Sicily (Albanese Procelli, 2000: 77-

80, figs. 3; 4, 1).[96] Stone molds abound for other class of objects as axes and daggers.[97] The molds from the type Erbeinheim swords of Piverone (NW Italy) are made from two long paralepidids with quadrangular cross-section on which surface of three sides matrixes have been carved. These pieces, dated to the FBA period, offer the closest analogies of casting techniques in stone matrix to the case in study (**Fig. 4.8**). On the matrix of one of the blocks there are cut-vents, which is a method devised to avoid the risk of out-gassing (Bianco Peroni, 1970: 72, pl. 25, 170; cf. Giardino, 1998: 66; Born, 2001: 203; Ó Faoláin, 2004: 84; Bingelli, 2011: 17-19; Jung; Mehofer, 2013: 182; Lehöerff, 2018).

The fabrication of molds respects the volume and geometry of the intended finished product, selection of the appropriated stone type and dimension of the block size in view of the dressing of the specular forms and negative in a series of consecutive moments (Le Fèvre-Lehöerff, 1992: 136; 149, fig. 13; Barbieri; Cavazzuti, 2014).

A sparse scatter of statements exists in the literature and opinions differ with regard the sword casting techniques.[98] Experiments entertained by Italian researchers have been replicating bronze manufacts by single cast in two-piece sword molds with different rock types (e.g., sandstone, detrimental and magmatic, see respectively Pellegrini; Scacchetti, 2014; Barbieri *et al.* 2015: 95; Volante, 2020: 163; Bietti Sestieri *et al.* 2013: 167; 169, fig. 12). Again, however, the paucity of finds in general has led many scholars to think about other casting molding techniques in a wide area of reference including those that leave few

[96] Cf. Le Fèvre-Lehöerff, 1992: 174, anx. 2; Pellegrini; Scacchetti, 2014 for plot distribution maps of molds in northern Italy; cf. also, Jung; Mehofer, 2013: 182. In Bronze Age of Central Europe, matrixes on stone molds of *Griffzungenschwerter* were found: 1) in a deposit in Heilbronn-Neckaragtach, Germany (Baden-Württemberg), two prismatic sandstone pieces 74 and 72,5 cm long, respectively, carved in all four sides, out of which one specular form of fusion of sword without midrib, L. 55,5 cm can be reconstructed (Landesmuseum Württember Stuggart Inv. No. 53/144a 1. a 2) (Paret, 1954: 8; pl. 6, 1-2; Schauer, 1971: 186, no. 550, a-b; pl. 86, 550, b-c; cf. Bingelli, 2011: 14, fig. 8; Siedlaczek, 2011: 111, fig. 1). The pieces are held together by sort of pins made from organic material inside holes in both ends of the matrixes. The pouring was made through the hilt and venting channels exist in both longitudional sides; 2) a fragment thereof in sandstone of Font, Kanton Fribourg (Switzerland) (Mus. Fribourg Inv. No. 5239) (Schauer, 1971: 177, no. 527; pl. 79, 527; cf. Mödlinger, 2011).

[97] There is one bivalve mold from Coriano (FC) in the Arch. Mus. Antonio Santarelli (Prati, 1976: 296, fig. 2; Bianco Peroni, 1994: 83, no. 673; pl. 42, 673; Le Fèvre-Lehöerff, 1992: 185, no. 27) and dozens more in the Polesine in collections of museums of Frattesina, Adria and Rovigo (Le Fèvre-Lehöerff, 1992) and the Arch. Mus. of Modena and the Civic Museums of Reggio Emilia (Barbieri; Cavazzuti, 2014).

[98] Catling on the sword of unknown provenance of the CM (1956: 103): "… presumably cast in a bivalve mould, and perhaps finished in the forge […]". The sword of Krini-Drimaleïka (PM Inv. No. 3327 α). "[…] must have been cast in a two-piece mould, such as those found in Italy for the Erbernheim group […]" (Papazoglou-Manioudaki, 1994: 177). For the type as a whole (Jung; Mehofer, 2013: 182) or for specific swords: Allerona type from Torlonia Collection (Lake Fucino) (Bietti Sestieri, 2003: 99) and swords from Palaiokastro (Cultraro, 2005: 20 Σαλαβούρα, 2015: 495). Koui *et al.* (2006: 55; 56, fig. 56) state macroscopic and microscopic analysis of the sword of Tyrins hoard (AM 6228a) was manufactured by open molds casting and forging the two parts together. But Jung & Mehofer (2005-2006: 124) consider that "the intensive corrosion process may be responsible for the fact that the swords nearly split into two halves." Giannopoulos (2008: 169) assumes "*Es ist davon auszugehen, dass die Herstellung dieses Schwertyps auch in den Bronzewerkstätten Achaias in zweischaligen Gussformen erfolgte*."

archaeological traces such as sand casting (Goldmann, 1981; Carancini, 1991-1992: 248; Giardino, 1998: 64; 222, n. 18; Seibel; Ottaway, 1998; Wang; Ottaway, 2004: ch. 3; Pellegrini; Scacchetti, 2014; Barbieri; Cavazzuti, 2014; Iaia, 2015; Barbieri *et al.* 2015; Molloy; Mödlinger, 2020: 191; 195; 202) and lost wax (Lehöerff, 2018). Experiments with sand casting have successfully replicatied varied classes of objects including swords in a fraction of time and caloric expenditure as opposed to stone casting production (Pellegrini; Scacchetti, 2014; Cavazzuti; Barbieri, 2014; Iaia, 2015: 82; Barbieri *et al.* 2015: 99; 100, fig. 5; Volante, 2020: 162-164). Unfortunately, there yet a lack of experiments of casting with clay molds.[99]

There is always a possibility to verify through metallographic examination and the (crystalline) microstructure of the cast object the method of molding as well as other aspects of manufacture in post-cast treatment, but this has been so far generally little explored (but se Seibel; Ottaway, 1998; Zimmerman; Wagner; Osimitz, 2013; Wang; Ottaway, 2004).[100] However, in a long way from a final statement on the matter, at least the influence of the mold in the quality of the casting-product in aspects related to cooling rates, clay content and permeability of the media have to be considered (Seibel; Ottaway, 1998: 61-62; Wang; Ottaway, 2004: 9-10; Zimmerman; Wagner; Osimitz, 2013).[101] Be as it may, the control of these innumerous parameters make of it a task calling forth multiple specialisms.

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[99] Detailed description of experiments using clay molds is provided in experiments by Ó Faoláin & Northover (1998; Ó Faoláin, 2004). Kuijpers (2008: 88-89) is of the opinion that "clay molds were probably the best option to cast objects like spears and swords because the elaborate long form can easily be made into clay" (Kujpers, 2008: 88-89). However, clay molds must be done for every single casting using the same template, but "… clay-based mould could take weeks because it is more likely to warp, distort or crack during drying due to its greater length" (Molloy; Mödlinger, 2020: 202). It has been also noted the shrinkage of the metal in comparison to the matrix that engender in the sequence of manufacture significant differences in the morpho-metric patterns of the objects (Ó Faoláin; Northover, 1998: 72; Ó Faoláin, 2004: 81; cf. Molloy; Mödlinger, 2020: 198).

[100] Metallography deals with the structure of the wrought metal assessed by reflected light microscope. Alloyed metals present in their microstructure specific organizing patterns of the grains that are indicative of the process of plastic deformation and heating the piece was submitted in the *chaîne opératoire*, and that directly impact their mechanical performance (Giardino, 1998: 26-33; Renfrew; Bahn, [1991] 2020: 345).

[101] Metal analysis of provenanced Naue II swords of Mycenaean are currently been carried out by Matthias Mehofer of the Vienna Institute for Archaeological Science (VIAS) as part of the project "War and peace between Mycenaean Greece and Bronze Age Italy" (see https://www.oeaw.ac.at/en/oeai/research/prehistory-wana-archaeology/mediterranean-economies/war-and-peace-between-mycenaean-greece-and-bronze-age-italy), whose eponymous monograph is expected to be published soon. In the absence of further detail of analytical results, we may observe either the ascertained Italian provenance of the raw copper material and maybe of its producers and users (warriors) raised by Jung & Mehofer (2005-2006: 134) both for the Naue II swords of Mycenaea and Ugarit. As for the technical aspects, we may note through Jung & Mehofer (2013: 183; also Mehofer; Jung, 2017: 396) "[…] the very good quality of the Italian swords. They are intensively annealed and hammered. Nearly no shrink holes are visible. By contrast, several of the Mycenaean products have shrink holes and are not so heavily hammered." Shrinkage holes, bubble- or blow-holes or, still, casting voids are created by the release of gas or moisture from the mold, a problem accrued in casting in long molds where, depending on the molding temperature and pouring position, the opposite end of the way of the molten metal may trap internally by solidification great number of porous cavities, making of the weapon unreliable to be 'in the hands of someone' in combat as shows the sword of Thames at Battersea fractured in the hilt in the alignment with such cavity measuring 2.5 × 5mm (Coghlan, 1971: 72; Ó Faoláin; Northover, 1998: 77; Ó Faoláin, 2004: 90). Anytime soon, the Serraglio, Eleona,

Pouring is a crucial moment of the manufacture process and in which the molten tin-bronze alloy will be poured through small runners of the matrix, from the tip-to-hilt or hilt-to-end or end-tip.[102] Placement of the runners, casting pouring position, cooling rates and solidification of the melted metal are delicately intricated to the temperature, dryness and gas-venting in the matrix, hence the posterior quality of the microstructure of the casted metal (Le Fèvre-Lehöerff, 1992: 136-138; Kuijpers, 2018a: 112-116). The choice will determine the location of the weakest point of the piece, since the quality of the cast lessen at the end of the mold. In view of this, it is reasonable to assume casters choose to place the casting jet in the hilt and not in the blade, a judgment compatible with the evidence available (Bianco Peroni, 1970: pl. 25, 170; Carancini, 1991-1992: 248). Few minutes are sufficient to remove the as-cast piece from inside the negative matrix. The bronze cools quickly.

Post-casting is the final stage of the working process of the as-cast condition of the metal into its desired final state through a series of operations. It might have included different actions, like grinding to remove wasters, flashings, casting jets and seams, cycles of cold hammering for the work hardening of the blade or parts thereof and heating (annealing) to restore the crystalline structure of the line of flow of the metal,[103] rivet punching to fix specular

and Langada Archaeological Project (SELAP) (Vitale, 2009; id. *et al.* 2016; id.; Blackwell; McNamee, 2017) will come with full provenance and technical results of LBA bronze items with European pedigree on typology alone of the island of Kos, including an earlier Naue II (T. 21) (Vitale, 2009: 1236). Since 2015, a multidisciplinary project coordinated by the Interuniversity Research Center for the study and promotion of Prehistoric cultures, technologies and landscapes (CRISP – https://www.dssbc.unisi.it/en/node/803) and convolving the MANU, the Civic Mus. of Cetona and the University of Siena have been carrying out techno- and typo-morphometric studies on the 3 Cetona swords of Calzoni early excavations in Antro della Noce in the MANU (Volante, 2020: 150-151). Cf. Volante, 2020; Volpi; Dallai, 2020 for data results of only first of the group (MANU Inv. No. 01080).

[102] "*Für ein fertig bearbeitetes Schwert, das ohne organische Griffeinlagen beispielsweise ca. 600 g wiegt, wurde im dem hier vorgestellten Versuch ca. 1 kg Bronze erschmolzen. Ein Metallüberschuss ist nötig, da die Bronze nicht nur in den eigentlichen Formhohlraum, sondern auch mehr oder weniger Spalten der zusammengesetzten. Formhälften ausfüllt. Zudem musste genügend Material für den Gusstrichter berücksichtig werden*" (Siedlaczek, 2011: 114-115).

[103] "[…] a reduction in thickness of 60% leads to an increase in hardness from 100HV to 235HV in a 10% tin-bronze alloy" (Kuijpers, 2018a: 9; cf. ibid., 103, fig. 6.3). Signs of hammering have been noted in the Bacchiglione sword (Zampieri, 1973: 10). Metallographic analysis carried out in BA swords from Olmo di Nogara and Muscoli hoard amply attest hot- and cold-forging cycles and that vary with the different sections of the sword (Angelini, 2005: 522-523; Canovaro, 2016; *et al.* 2019).

hafts,[104] forging of the flanges by hammering[105] or compression ('folding'), burnishing and polishing[106] of its surface with abrasive stones ('rubbers') of fine granulation cutting and non-cutting techniques (chasing the channels or 'steps', e.g., with stone scraper in Iaia, 2015: 89 or fine ridges on the blade). In few cases, fine-working surface decoration with finishing tools is performed.[107] To conclude, sharpening the blade edges using whetstones and the sword is ready to use. Overall, the approximate sequence has been estimated to occur over 3 weeks (Northover, 1988: 132), approximately 20 hours total only for working out the stone molds with reasonable reductions up to 30% of the time according to the degree of craft experience (Barbieri; Cavazzuti, 2014).

In addition to the sword manufacture, with no further mechanical work on the metal piece, there were perishable materials and decorations enveloping the finished object with aesthetic value. The golden rivets as in Narde (T. 227) fastening the hilts (Salzani, 1989: 38, fig. 16, 5) are an exceptional example to sign. Hilt-plates were made variable organic material (of wood, leather, bone or ivory) as document vestiges of ivory hilt plates of a grip-tongue bronze sword in the sealed Room 32 of the Citadel House Area at Mycenae (phase VII-LH III B Middle) (Krzyszkowska, 1997: 147; Jung, 2006: 177-179) and traces of wood were mentioned in the sword of Krini-Drimaleïka (PM Inv. No. 3327 α) (Papazoglou-Manioudaki, 1994: 177).

[104] In principle, rivet-holes can be obtained by different methods of perforation, in the casting medium or by drilling, widening it, removing the metal with a sharp instrument or punching with an awl. This step in the order of manufacture process is substantiated with several findings. Firstly, by the unfinished castings as of the Tiryns treasure (AM Mus. Inv. No. 6228a), Siteia (The Fitzwilliam Mus. Inv. No. GR.94a.1906). Secondly, macroanalysis performed in swords of the type. The grip-tongue sword of Mycenaean (AM Mus. Inv. No. 1017) shows indicative bulges marks of a punching after casting (Koui *et al.* 2006: 55-56; 56, fig. 7), whereas the sword from Ugarit in the Mus. of Lattakia (Mus. Inv. No. M /231) rivet holes with funnel-shaped cross section and irregular circular format, signs according to the authors of the opening of the rivet with a sharp instrument after the casting (Jung; Mehofer, 2005-2006: 112; cf. ibid., 113, fig. 2). Bumps of metal around the orifice indicate the use of a drilling in the sword of Krini-Agios Konstantinos (PM Inv. No. MH654α/M5432) (Κασκαντίρη, 2016: 187-188). A Cetona type from Vibo Valentia (T. 156) indicates holes all were opened in the same side (Jung *et al.* 2021: 384). Cf. also replication of rivet punching after casting in Iaia, 2015: fig. 8, b. But see Volante, 2020: 160 for a contrary opinion for the exemplar in MANU (Mus. Inv. No. 01080).

[105] If this is true, hammering marks appear on the sword of Ugarit (Jung; Mehofer, 2005-2006: 113; fig. 2, 1).

[106] E.g., polishing lines near the pointed edge in the Mycenaean sword (AM Mus. Inv. No. 1017) (Koui *et al.* 2006: 55; 56, fig. 7).

[107] In the absence of direct data of finishing of casted metals, theoretical strategies and technical choices should be comprehended within universal techno-material constraints (Le Fèvre-Lehöerff, 1992: 138-139; 158, fig. 34; 2004; Lehöerff, 2018). Catling (1956: 103) raises that the "[…] very shallow impressed grooves, perhaps [were] incorporated in the original casting" of one Cypriot sword in the CM. There are flanges in the sword mold of Frattesina (Le Fèvre-Lehöerff, 1992: 206, no. 77) and Κασκαντίρη (2016: 187) affirms for Catling's Group I sword of Krini-Agios Konstantinos (PM Inv. No. MH654α/M5432) that "*το περιχείλωμα της λαβής είναι έντονο και διαμορφώθηκε πιθανώς στο ίδιο το καλούπι.*". Features that obstruct the unmolding, as it is for me the case of the fine ridges, should not be assigned to the stage of carving the negative in the matrix of stone or sand molds.

A further accessory to the handle worth to mention is the golden wire of the sword of Kouvaras (Stavropoulou-Gatsi, 2009: 417, fig. 731-732; Σταυροπούλου-Γάτση; Jung; Mehofer, 2012: 255, fig. 6, a).

When not in use, swords may hang in scabbards. Traces of scabbard are clearly preserved on the sword of Krini-Drimaleïka (PM Inv. No. 3327 α) (Papazoglou-Manioudaki, 1994: pls. 26; 27 b; 28, a). Metal studs in Kallithea-Spenzes (PM Inv. No. 318) (Papazoglou-Maniodaki, 1994: 182) and Lousika-Spaliareika (PM Inv. No. 4650) (Πετρόπουλος, 2000: 76; Giannopoulos, 2008: pl. 48, 48) and Liatovouni (Douzougli; Papadopoulos, 2010: 30, fig. 8 upper left and right; 33-34) may indicate it as well.

To perform the multiple tasks for production of bronze objects some multi-purpose tools from a variety of materials served crafters in segregated spaces or production loci (Kuijpers, 2008: 32) or workshops and different moments of the *chaîne opératoire*. These included refractory materials made from inorganic materials and high-silica content and craftwork. Pickaxes and mass, grinding stones, crucibles, blow-pipes, tuyères, tongs, clamps or pliers to pick up heated implements, crucibles or even the casting molds, hammers, anvils, punches, awls, chisels, grinders, polisher and burnisher and, possibly, scrapers would have been used through smelting or melting furnaces or pits, open fires, or, in case of hammering techniques, furnaces large enough for the heat treatment and, maybe, stationary stones as workbenches with anvils.

Casting jets and droplets, slags and melting pits with microscopic high levels of copper (Cavazzuti *et al.* 2010) are virtually archaeological retrievable residues of such activities.

From a non-discursive and embodied perspective of skilled practice, one is allowed to imagine more from the material engagement of cognition, body and physical environment (Renfrew, 2004; Malafouris, 2004; 2013; see CHAPTER 3 with full bibliography). Prospectors 'reading' the soil coloration for mineral sources above ground and casters the color of the fire to assess proper temperature and metalworkers the color of the piece to judge copper composition (Mödlinger *et al.* 2017; Kuijpers, 2018a:101 ff.); the flow of air of bellows directly to the crucibles in order to increase upwardly fire temperature to melt; the vibration of a green branch stirring in molten bronze (Kuijpers, 2018a: 67); the high pitch tone resulting of the hardening of the blade while blow-hammering metaphorically translated into the saying that "'the metal needs to relax'" (Kuijpers, 2018a: 49; 122); the changing color of the metal in annealing treatment inside the furnace (Kuijpers, 2018a: 123. Tab. 6.4) or the "[…] dancing rainbow effect, with the colours rapidly flickering over the surface of the metal" (Molloy, 2019: 24). "*Lorsqu'une coulée stratéegique se déroule, les voix se taisent. Seul le crépitement du*

métal en fusion remplit le silence" (Lehoërff, 2018: 234). Gestures and sensual perception of visible signs are archaeologically irrecoverable, but the artifact themselves may glimpse these fragmentary patches of its lifecycle of craftsmanship metalworking (see Kuijpers, 2013; 2018a: ch. 1; 3-4; 6 for seminal discussions).

How did they use it?

Bronze objects should be socially stemmed differently in relation to other objects, especially in regions, as in most parts of Europe, where the raw copper material and bronze metalworking was an allogenous industry (e.g., Peloponnesus: Καγιάφα, 2006). The preservation of Naue II swords today may be bounded and biased precisely by that high social esteem and the high-skill investment in the production of a specialized object, regardless the fact of the small fraction this number may represent today.[108] The events connected to the life-cycle leading to the final deposition of the multitude of particular stories of these sword implements are of paramount importance in taking into account the variables conditioning their preservation in the archaeological record (Lehoërff, 2018).

Fig. 4.9. Drawing by Y. Nakas of T. Θ of Achaean Klauss. In: Paschalidis, 2018: 473, fig. 898.

Archaeologists tend to go about defining the nature of items of prestige in specific ways, like restrictive raw material access, specialized production and symbolism imagined in ideational terms, but true is that it lies more on functional contexts of distribution and circulation of goods than in any specific relationship elicited from material facts (Gallay, 2013). From the point of view of production instead of consumption patterns, we may fairly assume a direct relationship between technical skill, number of skilled craftspeople in specialisms and the social value of craft (Kuijpers, 2018: 42-45)

The type in study was most likely a key equipment formatting new peripersonal spaces and subjectivities of male individuals in life and death (**Fig. 4.9**). The pattern of contexts of deposition across the Adriatic corridor indicates the type of swords stood out as an article of

[108] "One can also note that the hundreds of thousands of Greek Hoplite warriors historically attested along with the millions of Roman soldiers known from our sources have left fewer weapons than the Bronze Age inhabitants of Europe." (Molloy, 2011: 78; cf. also Lehoërff, 2018 for war objects generally).

ritual deposition or funerary furniture and probably in regions like NE Italy and W Greece were sociocultural resources mobilized by elites in signaling a warrior *persona* identity and display of power and prowess within the group community regardless of the fact of the real use of these weapons in combat (Giannopoulos, 2022: 131) (**Fig. 4.10**).

Fig. 4.10. Pie chart of the general circumstance of finding of swords in study in Italy (left) and Greece (right). Drawing author. Cf. Καγιάφα, 2006: 149, fig. 2 for all bronze itens for the whole LHIII C Achaea.

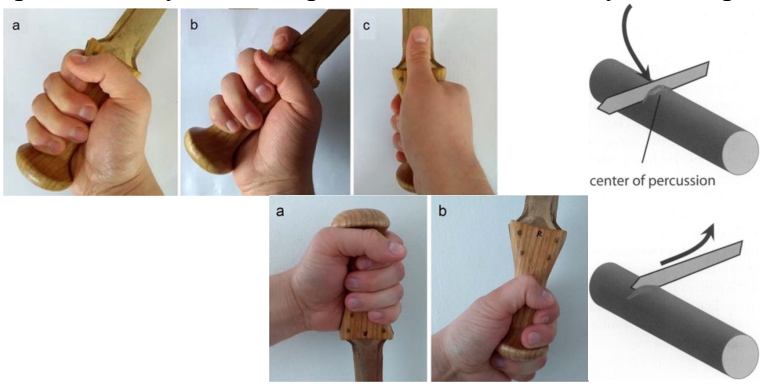
Possible iconographic representations of Naue II type swords have been mentioned, mainly dated to LH IIIC Late and early SM, in vases and sherds representing warriors of Lefkandi (Euboea) (Popham; Sackett, 1968: 20, fig. 39), Thermon (Aetolia) (Wardle; Wardle, 2003: 151; 154, fig. 9; Yasur-Landau, 2010: 87, fig. 3.27; Moschos, 2009a: 367, n. 104; 2009b: 251, n. 132), while some others have been reported in the cemetery of Voudeni (Moschos, 2009b: 253) and Kalapodi (Phocis) (Withley *et al.* 2017: 43; cf. Verduci, 2019: 137) (**Fig. 4.11**). Unpublished fragments warriors with helmet and swords of 12th-11th cent. BC are on display in PM of a scabbard of sword.

Fig. 4.11. Depictions of warrior with (Naue II?) swords in LHIII C krater of Lefkandi-Xeropolis (right), on sherds of krater in the Silhouette Style (middle) of Voudeni and Kalapodi (left). In: Popham; Sackett, 1968: 20, fig. 39; Wardle; Wardle, 2003: 151; 154, fig. 9; Whitley *et al.* 2017: 43, fig. 51.

Archaeological remains preserved directly on some of the sword in study indicate they were encased in scabbards made of organic material, as in the case of Krini-Drimaleïka (PM Inv. No. 3327 α) (Papazoglou-Manioudaki, 1994: 175. fig. 3; 181-182; pl. 26, a-c; 27, b; 28, a), wood and leather and decorated with metal strips and studs forming in the upper part an

eight-spoked pattern and possibly the metal studs in one sword found in Lousika-Spaliareika (PM Inv. No. 4645) (Πετρόπουλος, 2000: 76; 90, fig. 41, no. 4645).

Sword function is also enriched by the correspondence of affordances of the material and design choices. Morpho-stylistic properties of the sword directly implicated in the bearer's performance and bodily perception, which in situations of interpersonal combat are vital, a trade-off of crafter's awareness and choices in the structure of mechanical principles within which they must operate somehow (Kristiansen, 2002; Molloy, 2007a; 2007b; 2008; 2010; 2011; 2019; Malafouris, 2008b; Gosden, 2009; Lehöerff, 2018: ch. 4). Hand techniques for gripping are multiple in theory with the possibilities afforded by the shape of shoulders, hilt



that affect the control of movement of the sword's bearer in delivering a strike (Molloy, 2010: 417-418, n. 121-122; 2007b; Clements, 2007; Hermann *et al.* 2020a: 117; 2020b: 1061-1063; Kristiansen, 2002: 320-322) (**Fig. 4.12**).[109]

Fig. 4.12. Different grips in a BA sword (left, top (a-c: hammer grip, saber grip, thumb grips), bottom (a-b, reverse and pommel grips) and center of percussion of Naue II swords. In: Hermann *et al.* 2020a: 117, figs. 5.50-51; 2020b: 1074-1075, fig. 26-27; Molloy, 2010: 419, fig. 16; cf. Kristiansen, 2002: 321-322, figs. 1-2 .

Use-alteration traces on swords are directly associated to combat action employed by Bronze Age fighters in offensive and defensive movements and the efforts made to repair edge damage (Siedlaczek, 2011: 118). Macro- and microscopic observations are as old as earlier reports of the artifacts of unknown provenance. Roberti (1932: 300) observed in one sword in the MarTa (Mus. Inv. No. 3493) that "*I due tagli presentano non poche intaccature forse prodotte da mano vandalica.*" A grip-tongue sword from the Ugarit in the Mus. of Lattakia (Mus. Inv. No. M /231) bears evidence of re-sharpening of the grooves in the tip and below the hilt (Jung; Mehofer, 2005-2006: 113) as one exceptional Catling's Group I sword from Krini-Agios Konstantinos (PM Inv. No. MH654α/M5432) (Κασκαντίρη, 2016: 188). A group of the

[109] The decrease in the length of the rivets from handguard to handgrip and, hence, the ascertained varied thickness of the original hilt-plates noted for swords in our dataset (Papazoglou-Manioudaki, 1994: 177) may suggest a further functional trait to adjust a firm grip.

swords of Pila del Brancón hoard in the Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 26487; 26489; 40289; 40291-3) were bent, fired and broken, substantiating what scholars have for long recognizing as 'ritual killing' of weapons (Bietti Sestieri *et al.* 2013). One out of the three swords of the Antro della Noce sul Monte Cetona in MANU (Mus. Inv. No. 01080) analyzed bears marks of impact of slashing movements (Volante, 2020: 161).

Recent research on intergroup violence has opened up a strand of investigation that in the future could associated the diachronic pattern of wear formation of weapon studies with regional contexts of fight training (encultured) (i.e., diagnostic edge's marks such as bolts, notches, and bulges and scratches on the blade surface and clustering pattern of these marks formed on swords by biomechanical movement while in close-range combat (see e.g., Dolfini et alii 2019a; 2019b; also the 2013's *Bronze Age Combat Project*: Hermann *et al.*, 2020a; 2020b). Hermann (*et al.* 2020a; 2020b) published detailed analysis of eight swords in the dataset in study in collections of the Pigorini Museum (Mus. Inv. No. 23 210-1; 48 137; 32 927) and the Venice Nat. Arch.l Mus. (Mus. Inv. No. IG.VR. 26 487; 40289; 40291; 40287-91) where such use-alteration marks are clearly documented. There is no doubt then that these swords were put to its technical function. Conversely, no signs of use in combat were observed in the macroscopic analysis of the Vibo Valentia (National Arch. Mus. "Vito Capialbi") (Jung *et al.* 2021: 384).

Data collected in the field of combat studies may offer complementary or contrasting results for inferring the economic and social context of mobility of individuals with specialized warrior skills. Use-alteration features are taken for evidence of routinized training combat practices in a large-scale trend in Late Bronze Europe in regions of Britain, Ireland, Denmark and Italy for instance (Hermann *et al.* 2020a; 2020b). It can be that with the progress of research it can be stablished that swords moved with their users provided multiple lines of evidence such as object typology, provenance source and so on. At the present moment, however, this remains circumstantial evidence at best of such warrior mobilities from region to region.

History of research and state of the art

For more than a century, scholars have been perfecting good typological parallels for discerning processes laying behind these spatial patterns such as 'in situ evolution,' migration and invasion or direct influences and transfer of technological or stylistic traits. As should be expected in such cases, the criteria of typological seriation vary from mind to mind and cross-cut features influencing cutting and thrusting performance and other "typological niceties"

(Harding, 1984: 163), from the shape of the hilt and/or blade, pommel tang, number of rivets and so on. To name a few, *Sprockholfftype*, Catling's groups or Kilian-Dirlmeier's *Gruppen* A, B and C (see **Tab. 4.2** and **Tab. 4.3**). For the Aegean and Mediterranean region in general the classification by Catling and Kilian-Dirlmeier are usually adopted.

Without a pinch of surprise for weapons galvanized by a concern with maneuverability and efficiency, most publications concentrate on typo-chronological markers of shape and decoration. Measurable variables as weight, point of balance, cross-sectional thickness, angle of the cutting edge, distal taper just to stay in much cheaper data retrieving techniques were not recorded. These measurable attribute data, however, could lend greater weight to technological and cultural questions concerning regional workshop practices, design and performance choices and combat use. Together with other techniques of copper mineral source provenance through isotopes and laboratorial analysis of the material composition and metallographic structure, macroscopic and microscopic, they provide a range of fine-grained 'life' of objects, casting method, cycles of post-cast treatment of as-cast pieces, etc. (see Harding, 1984: 163-164; Kilian-Dirlmeir, 1993: 94; Kristiansen, 2002: 320; Molloy, 2005: 116; 2007a: 11-12; 2010: 414; Jung; Mehofer, 2005-2006; Jung; Μόσχος; Mehofer, 2008 for major developments on this). Contrary to this, typologies have been multiplied, reshuffling morphological traits in different ways and order of priority as shape of the hilt, blade design, cross section of the blade and number of rivets, total or in the guard, as to provide less ambiguous subgroups.[110]

[110] E.g., Kilian-Dirlmeir (1993: 94) stresses the inaccuracy of the main traits of the grouping of Catling's Group II and III with regard to the criteria for membership as pommel ear curvature, average length and presence/absence of blood channels and fine raised ridges. Agreeing "[…] *daß morphologische Merkmale wir Klingenquerschnitte und Ausbildung der Knaufohren nicht in konstanten Kombinationen an bestimmte Schwertformate gebunden sind*" (ibid., 94), we reclassified some of the exemplars accordingly (see below).

Sprockhoff type	Cowen (1955)	Catling (1961)	Bianco Peroni (1970)	Schauer (1971)	Schauer (1974)	Kilian-Dirlmeier (1993)	Italy	Aegean (Greece)	Western Balkans (Albania)	Cyprus	Near East (Anatolia, Levant and Egypt)
Sprockhofftype IIa	Nenzingen	Group I (Fish-tail Hilts)	Cetona	Reutlingen	Reutlingen	A	25	9	3	9	2
			Frasinetto[111]	-			3				
	Erbenheim	Group II (Spurred Hilts) Early	Erbeinheim[112]	-	-	B-C	3	39	5	-	1
		Group II (Spurred Hilts) Developed									
Sprockhofftype IIb	Letten	Group III (Spurred Hilts)	Allerona	Stätzling	Stätzling	C	26			1	
-	-	Group IV	-	-	-	-	0	3	-		4
		Unknown					3	16	5	-	7
TOTAL							54	67	14	10	14

Tab. 4.2. Cross-referencing of Naue swords across Europe and tentative quantification of types in Italy and the Aegean.

CLASSIFICATION			CATLING (1961)						KILIAN-DIRMEIR (1993)										
				II					A					B	C				
			I	*EARLY*	*DEVELOPED*	III	IV	?	*1*	*2*	*3*	*4*	*5*		*1*	*2*	*3*	*4*	?
HILT	Pommel Ear Curvature		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
		“Fish-tail” (V-outline)	**X**						**X**	**X**	**X**	**X**	**X**						
		Flat		**X**	**X**														
		Straight				**X**													
		Vestigial					**X**												
	-																		

[111] Frasinetto type is defined by smaller swords and slender tangs, narrow and high base of blade, broad midrib and very sloping shoulders (Bianco Peroni, 1970: 64 ff.). Schauer (1974: 31) was of the opinion it should be included in the Reutlingen family.

[112] Italian Erbeinheim forms are assessed through negative impressions of the molds of Piverone (see Fig. 4.8) and as a group type sharing spur extension, sinuous outline of grip, angular shoulders, wide base of blade and leaf-shaped blades (Bianco Peroni, 1970: 72 ff.).

	Pommel Spur			**X**	**X**	**X**	X							**X**	**X**	**X**	**X**	**X**	
	Outline																			
	Triangular			**X**																
	Rectangular																			
	Narrow						**X**													
	Small			**X**			**X**							**X**						
	Long				**X**										**X**	**X**	**X**	**X**		
	-	**X**																		
NO. RIVETS	Guard	2										**X**	**X**	**X**				**X**		
		3																		
		4								**X**					**X**	**X**				
		5																		
		6																		
	Total	2-5					X							X[113]						
		5-7				**X**														
		5-8	**X**																	
		7-10		**X**	**X**															
BLADE DESIGN	Cross-section	Stepped								**X**										
		Rhombic									**X**									
	Offset blade edges									**X**					**X**	**X**		**X**		
	Blood channels	**X**			**X**											**X**		**X**		
	Ridges		**X**	**X**								**X**	**X**				**X**	**X**		
	Würfelaugen																	**X**		
	Outline																			
	Funneled							**X**												
	Parallel-sided edges	X	X	X	X	X			**X**	**X**	**X**		**X**		**X**	**X**				
	Leaf-shaped											**X**			**X**			**X**		
LENGHT	Short	< 50 cm					**X**													
		50-55 cm													**X**					
	Medium	55-60 cm	**X**																	
		60-65 cm																		
		65-70 cm																		

[113] Suchowska-Ducke (2018: 152) notes that the number ranges from 2-8 to 10 in the group but she has in mind the total number of rivets, while Kilian-Dirlmeir only the number of rivets in the guard.

	Large	> 70 cm		**X**	**X**														
		> 80 cm																	

Tab. 4.3. Chart with general qualitative variables and occurrence of morphological traits diagnosis according to the main typological classifications of Naue II swords. Drawing author.

J. D. Cowen (1955; 1961; 1966 *contra* Müller-Karke, 1962; Schauer, 1971: 149) tracked down the origins of this type of sword ultimately to Central Danubian Tumulus Culture (antecedents of Sprockhoff's Types Ia and Ib). In a production center located in what is now roughly East Central Europe, a parallel typological evolution driven by a trial-and-error process took place in Sauerbrunn and Boiu specimens. Some decades later, this view became less and less controversial and a growing consensus has formed among contemporary scholars about its origins would lie in Central Europe or northern Italy.

As we noted for the artifactual distribution of this European typological category (Naue II type swords), a small section of the general picture occurs in today Italy and the Aegean (peninsular and insular Greece). Chrono-typological synchronism suggest the Adriatic Sea was an important route of penetration of these swords into Greece (Jung, 2005; 2006). Taken all together, the bulk of these discoveries and the multiple morpho-stylistic parallels shows that the NW corner of the Italian Peninsula is not a secondary center of production or receptive region in the earlier stages of the series. The continuous sequence of typological antecedents since the MBA and specific concentration of distribution of the most popular types in NE Italy seem to point to local production of these swords. This would make of the region a strong candiate for identifying any initial direct influence abroad in the Mediterranean, particularly given the natural connections linking temperate Europe and the Aegean (cf. Suchowska-Ducke, 2015: 261; 262, fig. 4; 2016: 76, fig. 3; 77; 2018: 147, fig. 7; 148).

Italian flange-hilted swords of Allerona type (Catling's group II and III//Kilian-Dirlmeir's group B and C) have relevant analogies to the specimens found in Aegean context in a more multi-directional *milieu* of influences (Bietti Sestieri, 1973: 406; Sandars, [1978] 1985: 97-100; Harding, 1984: 164-165). The type is chiefly characterized by a rectangular extension in the pommel, flat in cross-section, that helped in the pommel fastening, a morphological feature with some antecedents in sword manufacture tradition in Mycenaean-Minoan area (Bouzek, 1985: 130; Kilian-Dirlmeir, 1993: 104; pl. 10, no. 52; cf. Pabst, 2013: 110-111). In the Italic peninsula, the areal distribution of the type falls in northern regions of Italy (Veneto) as well in central (Marches, Abruzzo) and southern (Apulia).

Absolute dating in copper-based metal is not possible and dates have been worked out by relative dating methods in a usual linear conception of the archaeological time. Degree of oxidization on the surface of the metal, comparative and chrono-typological methods of closed and stray finds and artifact-by-artifact parallels to other contexts within and across the Apennine Peninsula and the Aegean and without in the Transalpine Europe offer the mainstay of such approaches (Carancini; Peroni, 1999; Jung, 2005; 2006). Aegean-Italian

synchronization of these artifacts ground thus on the association of these objects with other materials found in closed contexts and relative synchronous stratigraphic levels (Jung, 2005; 2006). The earliest variants of related types both in today Italy and Greece[114] are dated to the RBA 1/LH III B Middle (Bianco Peroni's Cetona type/Catling's Group I/Kilian-Dirlmeir's *Gruppe* A) (1340-1210 BC) and later developments from the end of RBA 2-FBA 1/LH IIIC Early-Advanced (Bianco Peroni's Allerona type/Catling's Group II and III/Kilian-Dirlmeir's *Gruppe* B and C) (1210-1100 BC).[115]

In the early 1960s, Peroni (1961) and Foltiny (1964: 252-254) listed published and unpublished Sprockhoff type IIa swords from the East of Alps, the Carpathian Basin and north, NE and central Italy. Bianco Peroni's (1970) contribution in the PBF series presents a catalogue with 395 bronze swords found all in Italy among which almost 1/4 are constituted by *Griffzungenschwerter* swords of the Recent and Final Bronze Age (cat. nos. 89-189). Italy's most popular tanged and flanged swords corresponding to Naue II type series, Cetona (Bianco Peroni, 62-64; pl. 19-20, 135-147) and Allerona types (ibid., 66-70; pl. 21, 153; 22-23, 159-163) make up around 1/5 of this number. Since the publication of the catalogue, other findings made mostly in northern regions of Italy, with greatest concentration in the region of Veneto and stray finds in the southernmost posts in Italy (**Fig. 4.13**),[116] have been piled up (Bouzek, 1985: 124, fig. 59; 129, fig. 62; Pabst, 2013: 106, fig. 1; 107; fig. 2; 137-141) (**Appx. A** with full bibliography; **Fig. 4.14**).

[114] All but one all of the Crypriot specimens of Naue II swords known are attributed to Catling's group I and the contextual evidence allows to place them in a timeframe starting from the early 12th c. BC onwards (Matthäus, 1985: 363 ff. with bibliography; see below).

[115] The earliest evidence of the use of Naue II swords in the Aegean is provided by an indirect testimony of ivory plates of Room 32 of Mycenean dated to the LH III B Middle (see Krzyszkowska, 1997: 147; pl. 58, k; Jung, 2006: 177; pl. 15, 2).

[116] Specific fragmented pieces of hilt and blades in the Lipari hoard of the RBA period in Messenia (Sicily) (Bernabò Brea; Cavalier, 1980: 746, cat. nos. 82-84; pl. 291, 82-84; 748, cat. nos. 117; pl. 294, 117; 295) have been tentatively attributed to the Cetona type and others in the group could be attributed as well with base in blade profile features as midribs and steps (Carancini; Peroni, 1999: 56, 24; pl. 29; Jung *et al.* 2021: 361, n. 100). Blade fragments in the Pila del Brancón hoard (Salzani, 1994: 84, fig. 1, 4; 7; 1998: 1, 144; Venice Nat. Arch. Mus. Inv. No. IG.VR 27790; 26491; 40290) probably from the types in study were not computed given the precedence of the type attribution. A badly fragmented hilt from Punta di Zambrone in Calabria (Jung *et al.* 2021: 354, fig. 9, 11; 382, cat. no. 38) is a borderline of the class or type of object in discussion. However, as the assignment is not but uncertain business, all these pieces were not taken into account. The condition of preserved and fragmented swords given in the tables is made on the basis of the distinction between pieces for which general intrinsic attributes of outline, design features and measure values can be roughly reconstructed from those that not.

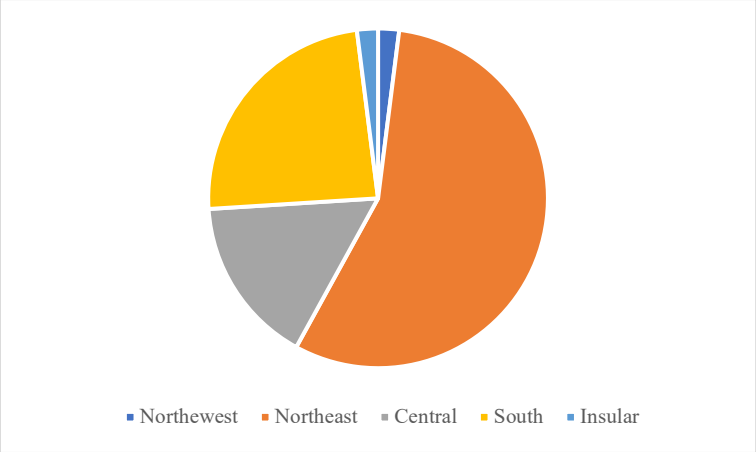


Fig. 4.13. Pie chart with the distribution of Naue II type swords within modern administrative regions of Italy. Drawing author.

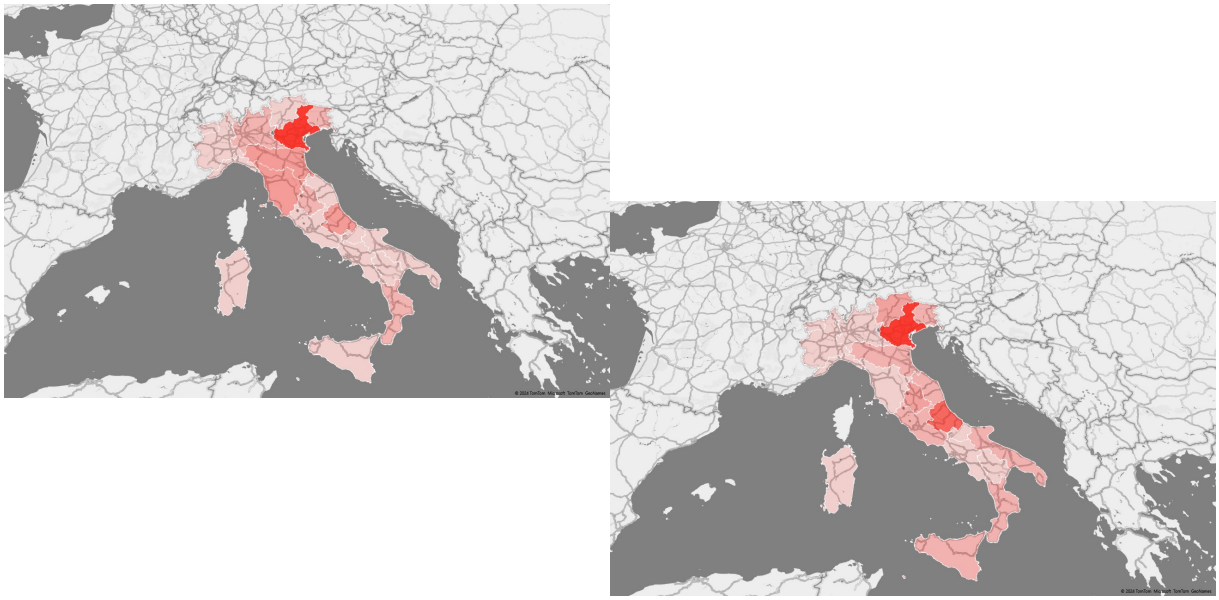


Fig. 4.14. Choropleth map of Cetona (left) and Allerona (right) type sword in Italian peninsula (13th to 11th cents. BC). Drawing author.

Half a century ago, Catling (1956: 130, fig. 1; 1961: 116, fig. 1; 1964: 113 ff.; 1968 see also Cowen, 1961: 213, fig. 6) listed around 30 of this type across peninsular and insular Aegean, Cyprus, Levant and Egypt. Since then and up to now, many other discoveries within and outside the Peloponnesus but still in the Aegean, with or without context of discovery, published or not (and sometimes re-published with illustrations), have allowed us to place new dots on the map.[117] A notable quantity of these swords, almost 1/3 of all known swords of other regions of Greece, were found in the ChTs of Achaea region, the highest density of site finds

[117] Suchowska-Ducke (2016: 70) figure of "[…] at least 50 swords of Naue II type have been found in the Aegean and around 29 in the Near East" is out of date.

in the eastern Mediterranean with the exception of East Crete[118] (**Fig. 4.16**). The region of Achaea displays one of the largest concentrations of metal finds[119] in the mainland, being, however, a land devoid of copper raw material. In it, the concentrations is markedly higher in Patras[120] and Dyme regions,[121] inside the so-called 'warrior tombs,'[122] funerary monuments with weapons of military symbolism and suggestive of rank status in the Aegean of the LH III B/C period (cf. Bouzek, 1985: 119, fig. 55; 122-132; 124, fig. 59; 126, fig. 60; Kilian-Dirlmeir, 1993: 94-105; pl. 34-39; pl. 65; Sherratt, 2000: 96-98; Pabst, 2013: 106, fig. 1; 107; fig. 2; 137-141; Basakos, 2016: 32, fig. 3 for general plot distribution maps and lists; also Papadopoulos, 1978-1979: ch. 2; pl. 1; Moschos, 2002: 16, fig. 1; Paschalidis, 2018: 2-3, fig. 4a-b for archaeological site distribution maps of Achaea) (**Appx. B** with full bibliography; **Fig. 4.16**).

[118] Up to now, and to our knowledge, a total of 16 out of 25 in NW Peloponnese broadly (Elis and Arcadia) swords have been mentioned for the entire Achaea region, 5 of which still wait detailed publication, 4 in Voudeni, 7 km NE of Patras (3 of which is currently on display on PM), Achaea's largest cemetery with a total of 78 ChTs and Elaiochorion-Lousika (Σαλαβούρα, 2015: 381-384; Κασκαντίρη, 2016: 358; 429; Paschalidis, 2018: 7; 13; 417; 417, n. 858; Giannopoulos, 2022: 160; cf., however, Jung; Μόσχος; Mehofer, 2008 86; Moschos, 2009a: 360, n. 71; Moschos, 2009b: 253, n. 140; Βλαχόπουλος, 2012: 62; 259-260; 261 erroneously reporting 17). The allegedly Naue II sword from the unpublished material of Mitopolis ChT burial excavated in the pre-WW2 period turned out to be a dagger (Giannopoulos, 2008: 207; 2022: 139).

[119] Over the BA Achaea, but with the majority share in the LH III Achaea, "*Περίπου 660 μεταλλικά ἀντικείμενα ἔχουν καταλογογραφηθῆ ἀπὸ τὴν Ἀχαΐα, προερχόμενα ἀπὸ τουλάχιστον 25 θέσεις. Σὲ σύγκριση μὲ τοὺς ὑπόλοιπους νομοὺς τῆς Πελοποννήσου, στὴν Ἀχαΐα ἔχει βρεθῆ τὸ 3,7% τῶν μεταλλικῶν ἀντικειμένων κατατάσσοντας τὸν νομὸ στὴν 3η θέση ὕστερα ἀπὸ τὴν Ἀργολίδα καὶ τὴν Μεσσηνία ἀπὸ ὅπου προέρχεται ἡ πλειοψηφία τῶν μεταλλιῶν εὑμάτων. Στὴν πλειονότητά τους (92%) τὰ εὑρήματα προέρχονται ἀπὸ νεκροταφεῖα, ἐνῶ ἕνα μικρὸ ποσοστὸ τῆς τάξεως τοῦ 4% βρέθηκε σὲ κάποιο οἰκισμὸ (Τεῖχος Δυμαίων, Παγώνα στὴ Πάτρα, Λαταρράκτης Δρακότρυπα, Αἰγείρα, Χαλανδρίτσα). Ἕνα ὑπόλοιπο 4% ἀποτελεῖται ἀπὸ τυχαῖα εὑρήματα ἢ ἀντικείμενα ποὺ ἀνήκουν σὲ ἰδιωτικὲς συλλογὲς καὶ δὲν γνωρίζουμε τὴν ἀρχαιολογική τους συνάφεια*" (Καγιάφα, 2006: 133; 149-152, fig. 1-7).

[120] The concentration of archaeology sites in the region is notable: "[…] one could come across every single one of the settlements in one day and return to one's base before dusk, perhaps using a carriage along the plain[…]" (Moschos, 2002: 18).

[121] Fragments that cannot be assigned to a type or class were not taken into account. One unpublished sword's blade reported in Vrysarion (Kato Goumenitsa, Kalavryta region) cannot be assigned to Type II and it was not included in our analysis (see Κυπαρίσσης, 1926: 131; Papadopoulos, 1978-1979: 166). The same is true for the small fragment of Naxos (Kamini) (Βλαχόπουλος, 2006: 450; pl. 97, no. 3564) and Tourlada Palaiopyrgos (Kleitoria), for which neither the category of weapon can be assigned with any certainty (see Σαλαβούρα, 2015: 498, fig. 3).

[122] For the definition and discussion, see Papadopoulos, 1999: 267; Papadopoulos; Kontorli-Papadopoulou 2001: 128; Eder, 2003: 38-40; Deger-Jalkotzy, 2006: 152; Giannopoulos, 2008: 201 ff.; 2022: 130 ff; Basakos, 2016: 23, n. 1; cf. Dickinson, 2006: 72-75; 204-205. Over the many warrior tombs currently known in Achaea, 16 in the LHIII C period harboured Naue II bronze swords (Papadopoulos, 1999: 267; id.; Kontorli-Papadopoulou, 2001: 134; Moschos, 2002: 29; Deger-Jalkotzy, 2006: 170-171, tab. 9.3; Giannopoulos, 2008: 238; 240, tab. 3; 2022: 138-139; 147, fig. 2; Steinmann, 2012: 240-243), 3 in Grotta, Naxos (Βλαχόπουλος, 2006: 98-99; 60 ff.) and eastern Crete of LM III C period has at least 5 burials with Naue II swords, indicative of the character of late warrior burials, and other more without ascertained provenance of Siteia and Messara plain (Kanta, 2003: 180 ff.; Deger-Jalkotzy, 2006: 163-165; Basakos, 2016: 24-26).

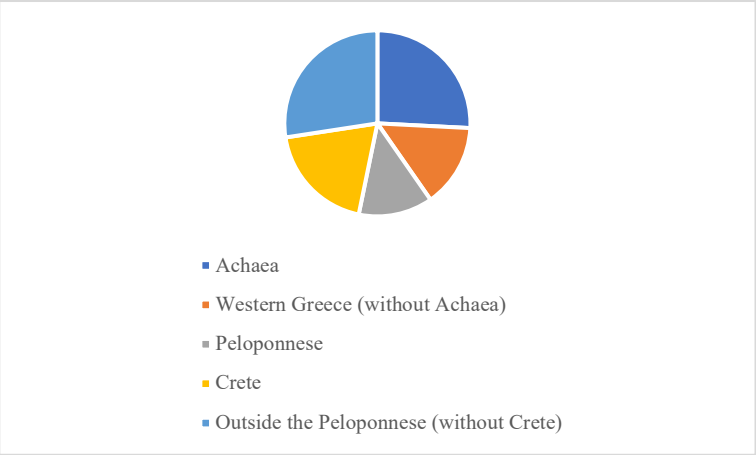


Fig. 4.15. Pie chart with the distribution of Naue II type swords within modern administrative regions of Greece. Drawing author.

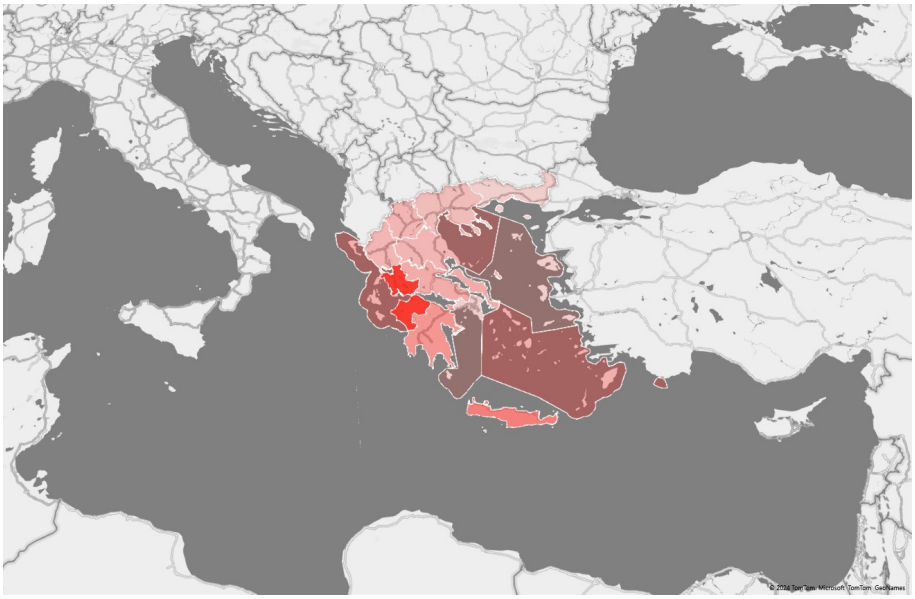


Fig. 4.16. Choropleth map of Naue II type swords in peninsular and insular Greece (13th to 11th cents. BC). Drawing author.

As repeated in many occasions, the phenomenon of new assemblages of weapons and in the Aegean is a facet of a broader circum-marine trend of 'northern-type' objects in the western Balkans and the East Mediterranean (see Bouzek, 1985: 210-211, fig. 102; Kilian-Dirlmeir. 1993: pl. 65 for distribution maps). To the picture previously known, we should add the swords from the tumulus-burials in Albania (Hammond, 1967: 320 ff.; 1971; Kilian-Dirlmeir, 1993: 94-99), Cyprus (Courtois, 1972; Matthäus, 1985), Levant (Syria and Israel) to Egypt (Schaeffer, 1956; cf. Bouzek, 1985: 122 ff.) and other regions (here not included) as North Macedonia and Bulgaria. An unpublished sword found near the Cape Gelidonya shipwreck, off the south coast of Anatolia in Turkey (Bass, 1991), is more one a dot that should be placed on the map (**Appx. C**).

It is quite common to find in the literature more or less unsubstantiated claims of northern invaders, imports of some of these specimens, or the local production in indigenous workshops for Italy,[123] the Aegean[124] and northern regions from Greece and the eastern

[123] See e.g., Schauer (1974: 31) for swords of Allerona, Casale sul Sile, "Lago Trasimeno", San Benedetto in Perillis and "Apulia" (Bianco Peroni, 1970: pl. 21-22, 153-7). Document of Calabrian invaders lies in the swords founded in Madonna del Piano (Albanese Procelli, 1994: 164) "[…] *che dovevano forse anche alla superiorità technologica in campo bellico il buon esito del loro insediarsi in um ambiente allogeno*".

[124] Cf. Desborough (1964: 68) acknowledged that "[…] almost certainly a European and not a Mycenean […]" pedigree of the Nauer Type II swords in Greece "[…] many of them […] no doubt made in Mycenaean area and used by Myceneans". Snodgrass' (1967:29) earlier remarks were that "[…] the bulk of the actual examples found in Greece were probably made locally". Catling's (1968: 98) later suggestions is "[…] that Group II had been devised in Greece, by Greek armourers, in response to the stimulus created by the appearance of Group I." Bouzek (1985: 122) considered the sword of Mycenaea (AM Inv. No. 1017) an European import, whereas "[…] nearly all European-type swords found in the Aegean and Cyprus were produced by local bronzesmiths […]" (ibid., 132; cf. Kilian-Dirlmeir, 1993: 104, n. 50). Kilian-Dirlmeier (1993: 104) hypothesized *Gruppen* B and C were products from local workshops and Drews (1993: 204) that "[…] they owed much to non-Greek swordsmiths." Dickinson (2006: 204) considers that the earliest Type II swords in Greece and other metals are imports from northern Italy. Moschos (2002: 26; 2009a: 376-377; 386) echoes both opinions of the presence of Italian metalworkers in Achaea and local metal workshop production in the regions. Koui (*et al.* 2006: 56) allude to the possibility that the similar composition of swords of *Gruppe* A/Group I from Greece and Albania analyzed in the study to be a product of the same workshop. In order to facilitate reader's path and parallels, the following hypothesis regarding specific Aegean swords were sorted out according to the geographical origin of the finding or its regional significance.
Mycenae (Peloponnese): Cowen (1961: 214; cf. Foltiny, 1964: 254) states for the sword of the acropolis of Mycenae and possible from Mouliana T. B that "[...] I feel sure has come from Central Europe[...]". Σπυρόπουλος, 1972: 169, bearing specifically in mind the sword from the Tsountas' hoard, was for the opinion of the existence of a center at Mycenaean and maybe in other centers in the Mycenaean world: "[…] *καὶ δὴ καὶ τῶν Μυκνῶν αὐτῶν ὡς κένδρου παραγυγυγῆς ξιφῶν τύπου* Naue II*, ἢ τοὐλαχιστον κένδρου διακνήσεώς των πρὸς τὰ ἀρκαῖα τμήματα*[…]"; and later in his monograph: "[…] *αἱ ενδείξεις τῶν μορφῶν ὁπλισμοῦ κλπ. δὲν είναι βασίμως ὑπὲρ τῆς ἀπόψεως τῆς εἰσβολῆς μᾶλλον καὶ ὄχι ἐκείνης τῆς διὰ τοῦ εμπορίου κλπ. διακινήσεως εἰς τὸν μυκηναϊκὸν χῶρον* […]" (ibid., 212).
Kos: Sandars (1983: 53) raises for the sword of Kos, Langada (T. 21), in the Arch. Mus. of Rhodes, the possibility of intruders or "sufficiently" acculturated Mycenaeans. Jung (2009a: 75) and the SELAP team concur in ascertaining a non-Aegean provenance of the sword of Langada (T. 21), maybe of a pirate (Vitale, 2009; id. *et al.* 2016: 273; id.; Blackwell; McNamee, 2017: 250).
Western Achaea: Papadopoulos (1978-1979: 183, n. 98; Papadopoulos; Kontorli-Papadopoulou, 1984: 224, n. 34) agrees to position of the existence of Achaea workshops and the following swords are mentioned as local production: Kallithea (PM 318), Klauss (ANM Inv. No. 10186) Lousika-Spaliareika (PM 4650). In a more non-committing way, he later puts that "[...] the occurrence[...] so far recorded […] must be regarded 'almost certainly' as imports from Europe […] and must be interpreted as strong indicator of […] local leaders […] [that] could afford to acquire either from abroad or from local workshops new types [...]" (Papadopoulos, 1999: 273; Papadopoulos; Kontorli-Papadopoulou 2001: 136. Καγιάφα (2006) argues in favor of the local workshop production in LH IIIC Achaea. Papazoglou-Manioudaki (1994: 179) suggests that the Achaean swords of Achaea Klauss (ANM Inv. No. 10186) and Kallithea (PM Inv. No. 318 and, to a lesser degree, No. 319), could be even had manufactured in the same workshop. In common, these swords bear on the blade the design of narrow midrib flanked by fine ridges. Giannopoulos (2008: 169; see also ibid., 174) also goes for the same opinion with regard to Kilian-Dirlmeir's (1993: 96 ff.) *Gruppe* B and C, *Variante* 3 (and also the sword of Krini-Drimaleïka in PM (Mus. Inv. No. 3327 α) "[…] *die meisten der bisher in Griechenland gefundenen Griffzungenschwerter Erzeugnisse ägäischer Werkstätten. Darauf weisen Elemente hin, die für mitteleuropäische Schwerter unüblich sind, wie die zwischen den Knaufohren zipflelförmig hochgezogene Zungenbrücke oder die feinen plastischen Grate auf den Klingen.*" Pabst (2013: 112; cf. ibid., 113, fig. 3, 1) sees in the spatial distribution of these exemplars "*Eine spezifisch ägäische Werkstatttradition der Stätzling-Schwerter* […]" and Molloy, 2016: 352, fig. 13.5; 2018: 93, fig. 6.4 for distribution map of swords with this specific blade design. On the sword from Krini-Agios Konstantinos (PM Inv. No. MH654α/M5432): "*Όπως με πληροφόρησε ο R. Jung, η ανάλυση του χαλκού του ξίφους του Αγ. Κωνσταντίνου κατέδειξε ότι πιθανώς δεν είναι προϊόν μυκηναϊκού εργαστηρίου*" (Κασκαντίρη, 2016: 354, n. 974).
Eastern Achaea: Petropoulos (2007: 260; cf. Moschos, 2002: 29) believes the sword from eastern Achaea (ANM 842) a western import. Giannopoulos (2022: 145, n. 78) that PM sword from Krini-Agios Konstantinos and "[…]

Mediterranean.[125] For many years, the heterogeneity of opinions went by scholars introducing their own subjectivities in observing some specific details of similarity and difference. In the last decades, more objective means of evaluating source and origin of these objects become available. A range of sensitive chemical equipment (Atomic Absorption Spectrometry (AAS), ICP-AES, ICP-MS, and lead isotope analyses) and non-destructive techniques of major, minor and trace element[126] coupled with microscopic analysis of material structure have been increasing the dataset of all these Naue II type sword across the Adriatic corridor. All in all, these microanalyses have characterized the metal alloy composition of swords in central, southern and northern Italy (Hook, 2007; Giumlia-Mair; Albanese Procelli; Lo Schiavo, 2010; Jung; Mehofer; Pernicka, 2011; Volpi; Dallai, 2020) and mainland Greece (Mangou; Ioannou, 1999; Koui *et al.* 2006; Jung; Μόσχος; Mehofer, 2008; Mehofer; Jung, 2017). However, they have fueled the uncertainties about the significance of the range of variation of alloy

some of the later Naue II swords from Achaia" as imports. Paschalidis & McGeorge (2009: 107-108; 108, n. 86) PM 292 and PM 4977 "[…] derive from the same workshop" and swords from Kallithea (PM 318), Lousika-Spaliareika (PM 4650) and Klauss (AM 10186) "[…] from the same production centre […]" that would comprise the existence of more than one workshop in the region. Furthermore, Paschalids (2018) concludes comparanda of swords from Achaea and east Crete "[…] suggest a possible local production and distinction into two typological 'schools' if not workshops".

Arcadia: One sword from Palaiokastro (Sparta Mus.) has been considered an import from Achaea or Argolid, in which any case locally produced in Greece (Demakopoulou, 1969: 228; Demakopoulou and Crowel, 1998: 274; Paschalidis, 2018: 417). Σαλαβούρα (2015: 495; cf. also Cultraro, 2005: 20) advances the hypothesis two swords from Palaiokastro (exhibited in the Sparta Mus. and the Archaeological Mus. of Tripolis, upper floor) not only come from the same workshop, but from the same two-piece mold "[…] *προέρχονται όχι μόνον από το ίδιο εργαστήριο, αλλά και από την ίδια μήτρα*"]. To Cultraro (2005: 20) and Σαλαβούρα (2015: 499-500) all the Aegean specimens come from local workshops even if ultimately affiliated to an exogenous ancestry of sword-making tradition.

Elis: Two swords of the cemetery of Mageiras (T. 7 and 8) (Arch. Mus. of Pyrgos Inv. No. 3461 and Mus. Inv. No. 3491) have been paralleled with Achaea (Βικάτου, 2019: 253). With special regard to the later, Βικάτου (2019: 253-254) notices the presence of two steps running in the lower part of the blade.

Naxos: Βλαχόπουλος (2006: 260-262; 2012: 259-263) argues for the swords from the cemeteries of Aplomata and Kamini (MN 10207 and 9440) that "[…] *πιθανόν κατασκευάζονται στο Αιγαίο και μάλιστα από εξειδικευμένα κέντρα μεταλλοτεχνίας, όπως ίσως η Αχαΐα*" (Βλαχόπουλος, 2012: 259) linked to "[…] *η αυξημένη ζήτηση όπλων από τις τοπικές κοινωνίες οδήγησε στην ανάπτυξη ειδικευμένων εργαστηρίων*[...]" (ibid., 263).

[125] Opinions diverge here in relation to questions of type attribution, centers of production and way of migratory flux into other regions northern from Greece eastern Mediterranean. Hammond (1967: 320 ff.; 1971; 1977 *contra* Catling, 1968: 98 ff.) considers the importat in Epirus of swords a work "[…] by peoples from the north, whose chieftains were armed with battle-axes, spears, curved knives, shields, and baldrics […]" (Hammond, 1971: 235 but see Catling, 1968: 103-104). In Cyprus of the end of the 13th and early 12th c. BC, swords of the Naue II family along a line of other domestic of Aegean-ancestry materials may be an indicative of "[…] interactions of high intensity[…]" (Yasur-Landau, 2010: 140). This assertion typifies a long research trail of views biased towards migratory mobilities in the island rather than prestige-exchange, i.e., staged waves with whistle stops, career migration,[125] conquerors[125] and all that. That from T. 18 in Enkomi, for instance, has been considered as of belonging to a Mycenaean/Aegean warrior/mercenary (Catling, 1955: 34-35; 1961: 122; Sandars, [1978] 1985: 188; Yasur-Landau, 2010: 152). A consensus is formed on the sword with the cartouche of Seti in the Egyptian Mus. of Berlin (Mus. Inv. No. 20305), about the locally manufactured product of alien prototypes and the presence of warriors (Carancini; Peroni, 1997: 601; Bettelli, 2002: 134-136; Bietak; Jung, 2007-2008: 213; Jung, 2018 281).

[126] Cf. Giardino, 1998: 38-39; 130-132; Renfrew; Bahn, [1991] 2020: 362-369 for a review of the full range of methods.

composition and copper provenance (Cf. Koui *et al.* 2006: 54; Mangou; Ioannou, 1999: 82; Hook, 2007: 310; Giumlia-Mair; Albanese Procelli; Lo Schiavo, 2010: 473-474). In view of the likely range of compositional variation of copper-based artifacts as a direct consequence of regional circulation of raw material or finished products, recycling and use of scrap metal in local workshops, to answer what ore sources were exploited in LBA is not without interpretative issues.

Nevertheless, there is a reasonable argument that in the case of tools employed in life-and-death situations, smithers' might chose to give a varied treatment and melt primary copper in order to control the compositional recipe percentage and hence the mechanical properties of these artifacts, a fact that cannot be done after successive metal recycling (see Jung; Μόσχος; Mehofer, 2008: 88; more recently Orfanou *et al*. 2022; 2024 for the Carpathian Basin). There is a further additional argument one could make about the close attachment of swords to social prestige and personal identity of the bearer. The potential ritual practice of contexts of finds of many of these swords indicate symbolic meanings attaching deposition practice to different praxis. Usually, they were buried alongside the warrior's body or deposited after individualizing rituals of destruction and defunctionalization.[127] The probability to bronze swords ended up as scrap metal to be melted may be lower (but not necessarily) when compared to other classes of artifacts.

Within the framework of large-scale projects of chemical and isotope analysis of copper-based objects in Italy (MBA-LBA) and Greece (LHIII B-C), scholars have been able to point out an Italian copper mining provenance of some of the swords discovered in contexts of northern and southern peninsular Italy and the Aegean, contradicting in part the statements of an earlier scholarship.[128]

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[127] The bulk of discoveries of Type II swords in the Apennine Peninsula over the LBA occur mainly as stray finds or hoards in caves, river or lake beads, fortifying an interpretation of votive purposes of deposition (see Fig. 4.10, left) (Pettarin, 1996; Bettelli, 1997; D'Ercole, 1997; Salzani, 1987; 1994; 1998; 2002; Bietti Sestieri, 2003; *et al.* 2013). The Cetona type sword from the Muscoli hoard in the Nat. Arch. Mus. of Aquileia (Mus. Inv. No. 23232) was intentionally broken and may indicate ritual intentions of hoardening (Borgna, 2000-2001: 311; Canovaro, 2016: 20). Swords from the Pila Brancón hoard suffered an individual treatment of ritual 'killing' before deposition in wet environment (Bietti Sestieri *et al.* 2013: 159-161) (see Appx. A). In Achaea of the LIII C, all the swords reported with contexts were deposited in graves (see Fig. 4.10, right) (Papadopoulos, 1999; Papadopoulos; Kontorli-Papadopoulo, 2001; Deger-Jalkotzy, 2006; Giannopoulos, 2008; 2022; Steinman, 2012).

[128] Partial results of a batch of tests have been highlighting the complex pattern of connecting links of copper ore mining areas, production centers and circulation patterns for diverse bronze work, especially with regards to the Naue II swords. It has becoming clearer from the picture that emerges that northern regions of Italy in the southeastern ore areas of the Alps constitute a major copper supply though networks of exchange for the Po Valley (Trentino region) to southern peninsular provinces along the Adriatic (Jung; Mehofer; Pernicka, 2011 but without the data) and Tyrrhenian (Calabria) coasts (Jung *et al.* 2021) and Greece (Achaea: Jung; Μόσχος; Mehofer, 2008 but unfortunately without specifying the objects; Mycenaea: Jung; Mehofer, 2013; eastern Mediterranean: Mehofer; Jung, 2017).

The nature of movement and the pattern of interregional trade relations of the Aegean and surrounding regions elicit from bronze artifacts continue to be a pivot for archaeologists in the area over the last 10 years or so. Type II swords and the assemblage of metalwork findings in burial contexts of warrior tombs have been a focal point for the work of a younger generation of scholars (see overview of recent developments in Harding, 2022). On the other hand, earlier views connecting sword related mobility with the the 'comings' of family branches of the IE family language into different regions in the *Stammbaum* model root and branch have been re-ignated with the flood of aDNA studies (see **Ancient-DNA and Indo-European research**).

Kristiansen (2011; cf. 2016 172-179; 2018b: 120-127; 2018c: 40) has been advocating an archaeological scenario for the expansion of the IE languages within continental Italy (see

Indo-Europeanizing of Bronze Age Europe). The keystone of such reiterated construct of "[…] several huge exoduses […]" (id., 2016: 13; 2018b: 100; cf. Kristiansen, 2011: 175; Suchowska-Ducke; Kristiansen, 2015: 383) of 120,000 people is the theory of diasporic population movements southwards of Italian peninsula from the Terramare of Po Plain (Bernabò Brea; Cardarelli; Cremaschi, 1997a; Cardarelli, 2009; Danckers, 2017; Bettelli; Cardarelli; Damiani, 2018).[129]

There is a considerable number of likely provenances of the raw material copper of Cetona and Allerona type swords lies at the Veneto region in southern Alpine ore deposits (Pila del Brancón (IG.VR 26489; 26523 and 40288), Gazzo Veronese, Narde (Ts. 168 and 227) and Olmo di Nogara (T. 41)) as well as two specimens from Frosinone and Bisignano today in the BM (Mus. Inv. No. G71/dc1 PRB WG 1262 and G71/dc1/no6 PRB WG 1143) (Jung; Μόσχος; Mehofer, 2008: 100-106; Jung; Mehofer; Pernicka, 2011: 238-240). Canovaro (2016; *et al.* 2019) provenanced the lead composition of bronze objects of RBA-FBA hoards from Friuli-Venezia Giulia, including one Cetona type sword from Muscoli in the Nat. Arch. Mus. of Aquileia (Mus. Inv. No. 23 232) and concluded that copper can be tackled to mining areas in the north-eastern Italian Alps. Still in Italy, one RBA Cetona sword from Vibo Valentia (T. 156) was manufactures with raw copper material of Sardinia (Jung *et al.* 2021: 364, fig. 12; 367, fig. 13; 366-368).
In Greece of the LH III B-C range period, provenance studies have been shedding further light onto the regional complex pattern of metal circulation of the metal for the production of grip-tongue swords studies. The sword of Tsountas' hoard at Mycenaea (AM Mus. Inv. No. 2539) was produced with raw material from areas of northern Italy (Jung; Μόσχος; Mehofer, 2008: 94; 106, fig. 9; Jung; Mehofer, 2013: 178; 179, fig. 5; 180, fig. 6; Mehofer; Jung, 2017: 391, fig. 2; 392-393). Κασκαντίρη (2016: 354, n. 974) reports that analyses of the copper of the sword of Krini-Agios Konstantinos (PM Inv. No. MH654α/M5432) indicates an allogenous production. One LH IIIC Late sword of Lousika-Spaliareika (ChT 2) is reported to be an Italian (northern?) import (Mehofer; Jung, 2017: 396). Copper raw material seem also been imported from Cypriot sources for the specimen from ChT T3 in Portes shows and other bronze objects of the same warrior tomb (Μόσχος, 2012: 307; Moschos, 2017: 28). Chemical analysis of the metal of the sword of Kouvaras tomb, dated to the early SM period and in the Arch. Mus. of Agrinio (Mus. Inv. No. 1548), conclude it is an import of still indeterminate origin into Aetolia-Acarnania (Σταυροπούλου-Γάτση; Jung; Mehofer, 2012: 258, fig. 9; 259-261; 260, fig. 10).

[129] Such *en masse* migratory scenario is based on the significant decrease in the number of *terramaricoli* sites during Italian RBA chronology, especially in the settlements in the territories of Emilia (part of the modern region of Emilia-Romagna in northern Italy). Cardarelli (2009: 472-485) found a distant echo of these historical events in Dionysus of Halicarnassus's account of the Pelasgians migration that could have had particular repercussions in central-northern and central-southern parts of the peninsula along the Tyrrhenian and Adriatic coasts. A flow of refugees, individuals or small migrating groups – so the reasoning goes – were set in motion southwards by

Drews (2017: 161-167), by contrast links this migratory hypothesis to movements of a military elite sector from north/NE Italy in a sequence of archaeological events of warrior conquests. Drews' idea of an 'evolutionary edge' in military equipment is the backbone of his reconstructions of BA warfare history in general, a stretch of time punctuated by 'revolutions' represented first by foreign elites mounting two-spoked wheel chariots and later infantrymen wielding cut-and-thrust swords (see

Indo-Europeanizing of Bronze Age Europe with bibliography). Finally, a recent interpretation of the North-South population movement in peninsular Italy suggests it was paired by an out-of-Italy migration of the proportion of a 'biblical exodus' (*à la* Yasur-Landau), ex-mercenaries, warlike seafarers and commoners that took part in the 'Sea Peoples' attacks in the political instability throughout the Mediterranean basin towards the end of the 2nd millennium BC (Kristiansen; Suchowska-Ducke, 2015: 378-385; Kristiansen, 2016: 74; 2018: 155-157; Kristiansen, 2018a: 6-7; 2018b: 123; 2018c: 27; cf. Cline, 2014: 153; Jung, 2018: 276).[130]

Beyond the obvious caveats of ethnic or linguistic associations and event-based reconstructions, I develop on earlier views to organize an extensive scholarly literature from the late-1970-mid-1980s onwards. This may be of aid in making sense of disparate fragments of evidence regarding "exotic novelties" (Dickinson, 2006: 72) represented by the UB and human mobility dynamics associated with it at the end of the age of bronze. It should be noted that the reciprocal distribution of industries in the central Mediterranean and the Aegean over the postpalatial period has particularly attracted attention over recent decades. That has been so in particular because of the metal objects brought to light in excavations of Apennine Peninsula and/or purported Italian imports in contexts of the Aegean associated with the warrior burials accompanied with Naue II swords of the "Western Koiné" of Greece, western islands and mainland territories of the NW Peloponnese (NW/W Achaia, Aetolia-Arcania, Elis, Ionian islands (Meganissi) and Arcadia) (cf. Papadopoulos, 1999; id.; Kontorli-Papadopoulos,

negative pulls of climatic aridization and resource depletion caused by demographic pressure. Archaeologically, Italian scholars have been following the migratory trails brought about by this system collapse with general resemblances in shapes and decoration of pottery tradition (Bettelli; Cardarelli; Damiani, 2018 *contra* Iacono, 2019: 136-137; *et al.* 2021: 384).

[130] E.g., the scenario of of military attacks and conquest migration on the threshold of state-level societies has been particularly tinged over the last years with the evidence of a possible battlefield in the Tollense Valley, in northern Germany around 1200 BC (Jantzen *et al.* 2011; 2014; Lidke *et al.* 2018; cf. Kristiansen, 2022a; 2022b; 2023; Kristiansen; Suchowska-Ducke, 2015: Jung, 2018: 285-286; cf. Meller; Schefzik, 2016; James, 2016 cf., on skeletal remains bearing evidence of violence and conflict in the BA period, in Keeley, 1996; Lehoërff, 2018: 110-111).

2000; Moschos, 2002; 2009a; 2009b; Eder, 2003; Σαλαβούρα, 2005; 2015; Cultraro, 2005; Giannopoulos, 2008; 2022; Steinman, 2012; Βλαχόπουλος, 2012; Βικάτου, 2017; Vikatou, 2017; 2018; 2019; Σταυροπούλου-Γάτση; Jung; Mehofer, 2012).

These *topoi* of interests reprise attitudinal dispositions and intellectual affiliations of main interpretative schools of archaeology.[131] First, there are openly migratory interpretations of some form. Even if often than not migration does not take on its large-scale aspect, some readings of the phenomenon continue to support this extreme version, wave of refugee, incoming tide of immigration or the sort. Generally, however, the migratory mobilities come into being through individuals or small sectors of society who brought within their belongings weapons, pottery or ethnic markers of various sorts. All together assume people taking up a new home abroad as the main vector responsible for the traffic of technologies and hence archaeological spatial distribution of cultural traits. The migrants can be further subdivided as:

i) South-bound invasions constituted by

a) "[…] northern adventurers as individuals or in small war-bands" (Sandars, 1964; [1978] 1985: 94) uprooted from the Balkans and the hearth of the Danube by "[…] certain societies of a backward stock-raising and pastoral way of life […]" (id., 1983: 165) further up north beyond the Carpathians and into the Pontic steppes.[132] This is a view colored by later historical models of 'barbarian invasions' and take over (Bouzek, 1973: 172-173; 1985: 242-243; 1994; 2010: 40-42) or, comparably,

b) Displaced refugee populations in a protracted movement over the LHIII C. In this view of mobility of groups, are associated warrior groups linked to western Asia (Ben-Dor Evian, 2015; 2016; 2017; 2018; Suano, 2003: 93), foreign warriors of Italy/central Europe (Popham, 1994: 286-295), or mass migrants pushed in an outward-bound journey from the Balkans. The later view of population displacement prompted by climate change and the collapse of BA economy through the Aegean and the eastern Mediterranean is enriched by a battery of recent paleoclimatic evidence for a 3.2 ka horizon (Kaniewski; Guiot; Cam Campo, 2015; Kaniewski; Van Campo, 2017 *contra* Knapp; Manning, 2016; Middleton, 2018a; 2018b; Knapp, 2021: 40-45 (with full bibliography);

[131] Culture-history migrationist *v*. diffusionist and processual-functional explanations, in Sharon, 2001; see also, along similar lines, Jung, 2009b: 129; 2017: 24-25; also Knapp, 2021: 11 for the pitting of the "migrationist model" against the "mercantile model" for the southern Levant *c*. 1200.

[132] Cf. Hood (1979: 201): "What made these peoples move? The obvious expnation would be force: other and stronger peopkes wanting their lands– a commonplace of history, but one out of fashion among archaeologists at the moment, a reaction perhaps from the slaughterings and vast displacements of peoples of our own times?"

ii) Mercenaries and ex-mercenaries in the periphery of the state societies in the eastern Mediterranean who run for their own fortune after the 'Fall' of BA palace economies in exploring the reverse side of the pacific mode of reciprocity in war and piracy (Drews, 1993: 201 ff.; Bettelli, 2002: 134-136; 2004: 307-308; Eder; Jung, 2005: 486; Jung; Mehofer, 2005-2006: 134; 2013: 184-186; Bietak; Jung, 2007-2008; Jung, 2009a; 2009b; 2017; 2018: 284; Jung; Μόσχος; Mehofer, 2008: 94; Mehofer; Jung, 2017: 356-357; Vitale *et al.* 2016: 273; Vitale; Blackwell; McNamee, 2017: 250); and, in some cases scouting or escorting 'disenfranchised' and ethnically diverse individuals or families (e.g., "[…] seeking their fortune[…]" in Canaan, see Sharon, 2001: 601; see also Hitchcock; Maeir, 2014; Maier; Hitchcock, 2017 *contra* Broodbank, 2013: 466; Knapp, 2020);

iii) Itinerant bronze smithers or potters, full or part time, independent or attached specialists,[133] based with or without families from Italy into the Aegean or vice versa (Peroni, 1983: 251-262; Bergonzi, 1985; Bietti Sestieri, 1973: 408; 1976-1977: 205; 218-219; 1988: 28; 36-37; Carancini; Peroni, 1997: 600-601; Cultraro, 2005: 24);

iv) Displaced Mycenaean refugees in the post-palatial period. These groups found protection against further troubled migrations/invasions in strongholds and armed retinues in Achaean over the LH IIIB-LH IIIC transition (Papadopoulos, 1978-1979: 183-184; 1999: 273; cf. also Papazoglou-Manioudaki, 1994: 200; Papadopoulos; Kontorli-Papadopoulou, 2001: 136) or refugee sites of LM IIIC eastern Crete (Kanta; Kontopodi, 2011; Κάντα, 2014). Further, it has been posited the existence of Argolid aristocracies uprooted by internal social turmoil in LH IIIC Middle-Late period (Pabst, 2013: 124-126 *contra* Petropoulos, 2000: 72; Giannopoulos, 2008: 241-242; 245-246; 2022: 160-164);

v) Last but not least, a combination of all the formers, of trade, raid and settlement abroad in a diachronic sequence of mobility mercenaries paving the road of subsequent raiding and migration. The structure of migration suggested here is bigger, involving the movement of complete family groups and takeover of local rulership (e.g., Aegean mass migration process into southern Canaan via Cilicia and Cyprus in the 12th century see Sweeney; Yasur-Landau, 1999; Yasur-Landau, 2010: 282-334; 2012a; 2012b *contra* see Middleton, 2015; 2018a; 2018b; Knapp, 2021: 21-25; see also Kristiansen, 1998: 386-391; 2016: 177-179; 2018a: 7; 18-19; 2018b: 123; 2018c: 27; "[…] temperate European mercenaries and settlers[…]" in Kristiansen;

[133] "Attached specialists produce goods or provide services to a patron, typically either a social elite or governing institution" (Brumfiel; Earle, 1987a: 5).

Suchowska-Ducke, 2015: 384: 373-378; 384-385; id., 2015: 263-264; 2016: 74; 2018: 155-158).

Second, explanations that partly reprise themes of anti-(mass-)migrationism perspectives by advocating materialist preconceptions in new commercial-diffusionist frameworks, "good ideas" that boomed in trade exchange of raw materials, finished objects, techniques and models (Snodgrass, 1973: 210). Overall, they can be subdivided in:

i) Generalized interregional and decentralized exchange networks moving people, things and ideas together in new scales, spheres and dynamics of LBA socio-economic interchange and cultural emulation. In the distribution and contexts of material culture styles, an epochal transition is precipitated, typified by the emergence of freelance groups championed by private entrepreneurs in maneuverable boats (following Artz (1997; 1998): Sherratt; Sherratt, 1991: 373-375; 1993; Sherratt, 1992; 1998: 296-301; 2000: 85-87; 2003: 40-44; 2013; 2016; Bauer, 1998; 2014; cf. Sharon, 2001: 592-594 for critiques). Established in seaborne routes of commodity and supply channels, these people have been depicted as Cypriots who traded, in a "decentralised low-level trade" (Sherratt, 2000: 87), set of shapes and motifs of Cypriote White Painted Wheelmade III in southern Levantine coasts or an Aegean palatial sub-elite class 'showing off' Urnfield objects (Borgna; Càssola Guida, 2005: 504) in the *westernizing* 'pull' of stylistic influence and appeal in the post-palatial period of the 12th cent. BC (Iacono, 2013: 68-69; 2019: 205);

ii) Evolutionary social process of reorganization, stratification and rulership over the middle of LH IIIC Middle onwards, with special emphasis in Achaea. These times have been pictured as characterized by the transformative role of local and regional political structures headed by elites in the NW Peloponnese as Achaea, the "*westliches Tor Griechenlands*" (Giannopoulos, 2008: 254), holding sway in material exchange, production, consumption and power display of highly prestigious items associated with hunting and war and allogenous partners (Achaea of Phase 3 onwards and Elis (Moschos, 2002: 29-32; 2009a; 2009b; Eder, 2003: 40-41; 45; 49-50; Deger-Jalkotzy, 2006; Giannopoulos, 2008: 238 ff.; Arcadia: Σαλαβούρα, 2015); insular Aegean (Naxos: Βλαχόπουλος, 1999: 309-310; 2006; 2012: 263 ("τάξης ευγενών"); 2019: 142; Vlachopoulos, 2008: 530-531)[134] or 'literal' warriors who got involved in predatory naval activities abroad in the cultural spoils of Mycenean civilization (Giannopoulos, 2022: 168-173);

[134] "*Im Rahmen der Konfrontation der konkurrierenden Kleinfürstentümer der mykenischen Nachpalastzeit spielte der di- rekte, exklusive Zugang zu allerlei fremden Ressourcen sicherlich eine große Rolle*" (ibid., 246).

iii) Heterogeneous background of coming and goings of venturers and warriors, alliances and 'entangling' regional craft traditions across different scales and modes of interaction and exchange afforded in a sort of Third Space of post-collapse world (Cline, 2014; Molloy, 2016b; 2018; Middleton, 2018a; 2018b; Knapp, 2021; Iacono *et al.* 2020: 410).

In the scholarship of BA Europe, the Aegean and eastern Mediterranean up to the historic period, years of objections to the idea of "[…] 'marauding fleets and armies of hungry, displaced people […]' […]" (Fagan, 2004 *apud* Middleton, 2018a: 98), resonant to old and new Victorian "invasion fantasies" (Silberman, 1998: 271), have inflicted a hard but far from fatal knock to the migrationist schools of the areas. Most specialists dispense with primordialist notions of identity. But the reality is that the anti-migrationist mood veered discussions away from theoretical discussion of the whole issue (Dzięgielewski; Przybyła; Gawlik, 2010a: 9-10). When this is not the case, scholar learned to speak often in terms of mobility, but rarely in migration (Molloy, 2016b: 9-10). Still for the worse, the phenomenon has been casted into old large-scale conceptions and poor definition of migration as "[…] the movement of larger population […] (in the hundreds or thousands) […]" (Middleton, 2018b: 121).

Despite the recent attention made to widen the scope of the phenomenon of mobility and review its explanatory power in the terms of mechanisms thereby (Molloy, 2016b; 2016c; Middleton, 2018a; 2018b; Knapp, 2021), engagement with anthropological theory and social sciences in general is still shy. The plurality of mobilities frequently comes in the same basket of 'movement of people,' hence without clear definitions of agents, scales, levels and varieties in view of processes and phenomenology of archaeological realities. Woolf (2016: 439; see also Sørensen, 2015: 160; Broodbank, 2016: 29-30; Vandkilde, 2016: 112) aptly puts that "it is not enough to declare ancient populations mobile: we need to consider in what ways people moved and how different kinds of mobility varied […]". It is true that in a 'melting pot' of an interconnected world, to disentangle concrete evidence of directional connection is not a straightforward task. To decline to qualify it from the generalized picture of connectivity, however, risk to alienate the phenomenon. With regard to the latter stance of positions, by moving mobility to the background of systemic model of a world where interconnectedness is the norm, tend to immobilize it, paradoxically, in a sort of a-historical driving-force.

Notwithstanding this, the latter cluster of position may have been more successful in combining a range of mobilities in a coherent view of social and economic ensemble within which past actors operate, migratorily or not. Yet, theoretical and methodological consistence in archaeological identification of migration and other ranges of mobilities through their

respective expectations on material culture assemblages, related hypothesis and the means to validating it as to discriminate what should be regarded as circumstantial evidence at best.

As a matter of fact, the opposition exposed above could sound a forced one and a detailed picture militates for more shades of grey between them, since the former not axiomatically excludes the later.

To Sherratt and Bauer, the question is less about denying invasions and migrations as to place them in wider political economic horizons of seaborne trade and communication that may, or not, lead to the settling of regions by a freelance merchant class. Instead of imagining the identity-ness of an ethnic people on the move though the distributional phenomena archaeologists are invited to ask for structuring factors, i.e., the "[…] de-stabilizing elements outside the system (but within its geographical boundaries) […]" (Sherratt; Sherratt, 1991: 376) that "[…] flowed like water in the cracks and crevices surrounding existing (and previously perhaps more tightly controlled) systems of trade and communication" (Sherratt, 2003: 48).

Sandars combined in a cocktail of "nations on the move" (Sharon, 2001: 575), mobility of small bands of warlike groups from the poor North into the rich Aegean centers, axioms of culture historical diffusionism and her earlier views on the subject ("mercenaries and adventurers" (see e.g., Sandars, 1964: 259)), with cross-pollination of bronze workshops (e.g., "hybrid weapons" of Aegean pedigree, Mouliana Type F and Mycenaea Type G see Sandars, [1978] 1985: 93). Here lies a circumstantial account of time of crises of systemic inter-societal dependency, on which intermediaries, merchants, warriors, mercenaries and raiders of all mobility means play a significant role. This is especially so when the well-oiled engineered mechanism of trade breaks up and the negative spiral of system collapses (i.e., open season for piracy and freeboot) (cf. Artzy's (1997; 1998) "nomads of the sea"; cf. also Sharon, 2001: 591-592 for critical stances on the later).

Sandars and Drews have in common "the 'technological precocious barbarian devastation' model […]" (Silberman, 1998: 271). But whereas one might reckon with Naue II type as the former "[…] *fossil directeur* to the *Volksgeit* of the Sea People […]" (Sharon, 2001: 578), Sandars shares also with many recent scholars elements of a structural account of a world of inter-ethnic mingling of trajectories and private ventures in the NW Peloponnese, the Aegean and the Levant. These people have been dressed up as the main agents and destabilizing forces of many patches of explanation woven in overarching mosaic models of transformation throughout the eastern Mediterranean – and rendered oftenly by many strains of modern research in terms of the ethnica that bear testimony of the 'Sea People' activities (see **Sword-bearers on the move**).

In the line of Papadopoulos (1978-79: 175-176; 183), Moschos and Giannopoulos admit intra-mainland migrations the reception in Achaea of small numbers of newcomer refugees and even "[…] in some cases of the descendants of disenfranchised soldiers or mercenaries who were once at the service of one or more Mycenaean palaces" (Giannopoulos, 2022: 177-178). The same, if excluded the social enhancement of an existing class, may be proved true to Arcadia and Elis and to other regions as well (Σαλαβούρα, 2005: 41; 2015: 386-387; Σπυρόπουλος; Σπυρόπουλος, 2012: 261; but see Dickinson, 2006: 64 for intra-region concentration of population).

Jung, Vikatou and Giannpopulos *et alia* raise the question of individuals indulged in sanctioned and irregular movements and embarked in sea-based piratic activities throughout the Aegean and the eastern Mediterranean from the both sides of the Adriatic and Ionian corridor sea *koine* in places like the "island tomb" of Meganissi, east of Lefkas (Vikaotu, 2017: 369) and the "[…] 'warriorscape' of the north-western Peloponnese […]" (Giannopoulos, 2022: 182) in general. Supporting evidence of such a connection is constituted by bronze-knobbed headgear of Portes (Jung, 2009a: 89, fig. 2; Giannpopulos, 2022: 166-167) (**Fig 4.17**). It is cylindrical in shape (H. 15,8 cm) that still preserves the internal lining and is decorated with alternating horizontal patterns of bands of ribs and rivets.[135] In both contexts of LH IIIC Achaea, the tiara-like objects or helmet-headgear are associated with Naue II type swords (Deger-Jalkotzy, 2006: 170-171, tab. 9.3; Giannopoulos, 2008: 240, tab. 3; 2022: 147, fig. 2). This fact is a direct association unapparelled in other areas of eastern Mediterranean, for which main lines of evidence backing up assumptions of provenance of reed-caped people are constituted by tiara-like objects and

Fig 4.17. Bronze helmet of Portes decorated with horizontal bands and studs. In: Moschos, 2009b: 357, fig. 1.

[135] It bears strong resemblance with one known from earlier coming from ChT A of Kallithea (Yalouris, 1960: pl. 29, 1 (top); Papadopoulos, 1999: 272; Moschos, 2009b: 256) and probably had a military function.

iconographic representations on diverse media (Yasur-Landau, 2012a: 34-36; Emanuel, 2015: 9; Verduci, 2016: 139-141; cf. Knapp, 2021: 25-27; see **Sword-bearers on the move**).

The foci of material culture patterns vary under different eyeglasses of theory and method and that complicate the affair deeply. While nuanced and multivariate explanations are here to stay as norm, simplistic or abstract notions of mobility continue to have the upper hand. It is scientifically wiser in doubts like these to take a step back and enquiry altogether what qualifies an archaeological proof of the existence of the phenomenon and through what analytical tools it is possible to identify it.

With all these things in pursue, we briefly sketch below our working hypothesis.

Working hypothesis

Similarities and dissimilarities of material traces of production technologies may index sustained face-to-face interaction in different milieux and structures of learning shared by past social groups. Tracking mobility of bronze smiths through materialized aspects of technical action relies first and foremost on the inference that some forms of recursive movement and interaction might happen more likely at limited physical distances, where life is embedded in the "space of experience" of people (Gosselain, 2008: 168; 2016: 46). As for the acquisition of motor behaviors in general (Stark; Bowser; Horne, 2008a; Wendrich, 2012; Roddick; Stahl, 2016a), transmission of sword-making tradition, stylistic proficiency and technical variants of the manufacture process by smiths in the Aegean (Minoan/Mycenean) and Europe (northern Italian/Balkan communities) should be thought in the interplay of social networks of goods and people in actual and potential contexts of cross-community communication.

This interactionist perspective differs in many regards from the pessimistic assessments about human creativity by diffusionists through independent, individualist and mobile "[…] agent of diffusion in diffusionist explanations […]" (Rowlands, 1971: 214) *à la* Childe (Trigger, 1980: 68 *contra* Rowlands, 1971; also Ottaway, 2001). When it comes to complex production process such as metal production, diffusionists tended to nurture the idea that independent invention in two distinct culture areas is highly improbably. Even though reckoning with some incipient logic in the argument, we rather suggest, obeying a polythetic principle, that to avoid incurring in some vicious form of reasoning, that typological similarity should not be mistaken with technological 'package' transmission *in toto* or cultural rupture linked to population movement. Related occupational activities tend to concentrate in specific sectors of society along kinship line of practical knowledge transmission linked to learning

contexts of production.[136] In order to resist exchanging cherished wishes for hypotheses, archaeologists should consider in the case the specificity of the class of objects in study, local and eventual contemporary use of sword-making traditions and reciprocal influence of smithers that could produce similar artifacts with regard to many technological and design attributes without, necessarily, to account for more or less permanent forms of mobility.

In the earlier phases of inter-regional flows of LBA networks of the 13th cent. BC all the way from central Mediterranean and Europe to the East, a range of possibilities of exchange remain to one sustain the actual distribution of the sword in study in the horizontal relations between free agents of the BA trade system (Kristiansen; Suchowska, 2015: 321; Kristiansen, 2018a). They may document the travel in the bearer's grip or exchange hands as commodities or gifts between, let us say, merchants and chiefs down-the-line in prestige chain exchange, or last but not least, they may be produced by travelling agents with hands-on knowledge in how to make such pieces. Mobility of agents as traveling artisans,[137] traders or warriors is anyway predicted for deciding what political mechanisms of communication and socialization enacted the transmission of materials, gestures and postures linked to bronze working and swordsmanship tradition new to the Aegean world.

In later phases, the diffusion of post-casting techniques through common expertise of bronze making are sufficient factors to explain the dissemination of some morpho-stylistic traits of sword that mapped on long-dated commercial circuits of people, objects and models across the Adriatic. Among the range of possibilities, there are cross-craft polinization and interaction of crafters with different kinds of specialism (e.g., forging of bronze blade edges, a "[…] very precise and controlled work" (Molloy, 2019: 18; cf. Molloy; Mödlinger, 2020: 197)), hence other forms of mobility outside migration or mobility of finished products governing object's similarities within a given area. So, the uptake of demand for stylistic features of design in the post-palatial period may be met by travelling salesman responding to skill shortage (Dickinson, 2006: 120; cf. Bettelli, 2004: 304), more freely available and borrowing skills without direct interaction of smiths by consumer demand.

[136] Cf. *occupations subcultures* on the form of *activity or specialist subculture* in Clarke, 1968: 238, on which an "[…] exclusive occupations create differential subcultural solidarity within their micromeshed network when set against the looser web and mesh of intercommunication in the whole social fabric […]"

[137] To out knowledge at present, the late Morricone (1967: 139, n. 1) was one of the first to suggest to the bronze swords that the "*Più probabile mi sembra ebe l'Egeo e l'Europa centrale siano venuti a contatto per mezzo di scambi commerciali o per mezzo di artefici viaggianti*". Σπυρόπουλος (1972: 212) follows S. Marinatos, in that "[…] *περὶ τῶν πλανήτων χαλκέων, τῶν Τελχίνων, τῶν ὁποίων ἡ δραστηριότης καὶ μακρὰν ἀκτῖνα καλύπτει καὶ τῆς προστασίας μιᾶς θεότητος τυγχάνει πάντοτε, και εις τὸν αἰγαιακὸν χῶρον ἔχομεν μεμαρτυρημένην τὴν παρουσίαν καὶ δράσιν των*."

Going a step beyond the "instable dynamic equilibrium" identified by Clarke (1968: 121) in the impetus for the dissemination of weapon technology and effective novelty typified by the own Naue-II swords (see above), the analysis of manufactured objects individually reveals the latitude of craftsmanship multicultural traditions underwriting complex relational connections. This view of patterns of individual artifact distribution counters views often involving large-scale or aggressive population movement of the scope of core-periphery relationships (see recent discussion in Harding, 2022: 23).[138] The differential suitability of morphological features in being good or poor indicators of kinds of social transmission and interaction is needed to support hypotheses predicting the origins of these artifacts within or without the Aegean workshops. There are reasons to suggest they may point to different ends of migratory and non-migratory mobility nexuses of people, things and ideas.

Legions are the possibilities. Weapon-type prototypes may be moved through – and away to the original producer – and be exchanged hands as traded commodity or prestigious items in noncommercial circuits of value and cerimonies (Appadurai, 1986a: 21; see also Testart, 2001; Gallay, 2013) in the case they were allogenous to the local and regional technological pedigree. Contact may also inspire likely responses in cross-cultural circuits of communication (*sensu* "stimulus diffusion" (Kroeber, 1940; cf. Renfrew, 1975: 23). Artisans of different sword making traditions and degree of craft-specialism may borrow and copy highly visible elements and we may proceed to point out the feasibility of local application of extra-local swordsmith techniques (Molloy, 2005: 117; Βλαχόπουλος, 2006: 261). Ethnographic cases of direct and indirect transmission process are useful to elucidate how the practical command of technology may affect the dissemination of morpho-stylistic components by demand (Roux, 2015; cf. Furholt, 2018a: 312).

Although indeed manufacture and use styles may not be completely foreign to the areas in study (see Molloy, 2005; 2008; 2010), new styles can be fashioned calling for specific organization of gestures and bio-mechanical behavior. Kuijpers' (2008: 110) conclusions for the metalworking in Middle Bronze Netherlands that "[…] a single image of a bronze smith cannot be formed" may be adopted here. Once crafts and skills were mastered, slices of production sequences can be easily singled out and communicated without strong ties between practitioners as intermediate or finished products of the operation chain navigate across the Adriatic. The origin of an object and its archaeological deposition does not represent the

[138] It its worth remembering in this regard that Cowen (1961: 214) had clear in mind that reconstructing the long pedigree of flanged-hilted swords in East Central Europe is not by any means to "[…] suggest that all the sword of Naue II found in the Aegean have come from Central Europe."

complex information exchange in-between (Sindbæk, 2013: 82). Says Gosselain (2000: 189) that "[…] objects accumulate histories and have the ability to tell multiple stories about people."

My basic working hypothesis is that after the introduction of new techniques of bronze sword production in LH IIIB period by migratory means, manufacturers should be able to recognize how a feature is done and do the same, if this is chosen. The swords may have come either as in intermediate or finished objects by traders or metallurgists plying their trade instead of by mobile warriors as agents who served elites. This does not apply to the later post-palatial (LH IIIC) period, where non-migratory mobility seems to be the natural order of things.

It is cautionary to held varied alternatives at bay with the evidence at hand. Material compositional and structural analyses may further scientific support to the case of population movement in the coming years. The series of provenance-oriented studies of the last decades (see above for references) attribute the origins of copper of swords in the metalliferous areas of Alpine northern Italian (**Fig. 4.18**).

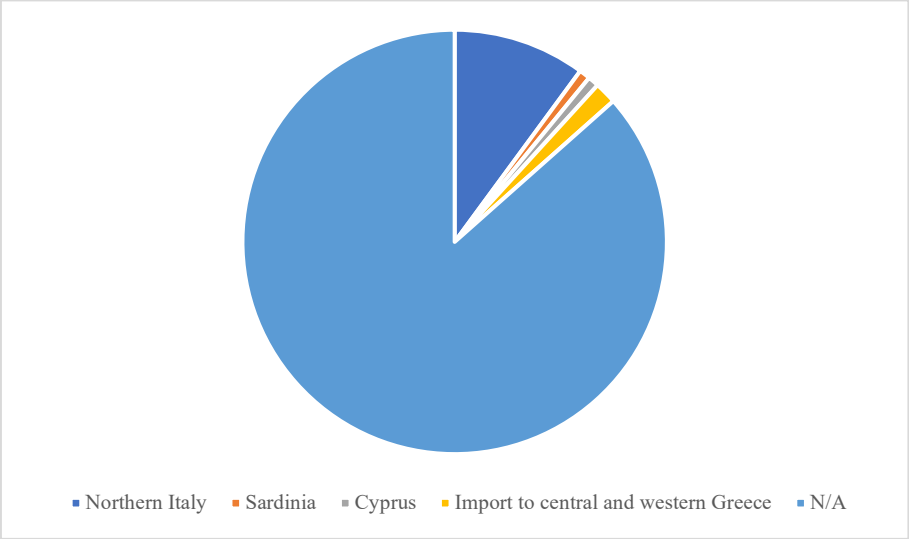


Fig. 4.18. Pie chart of provenance attribution of swords in study. Drawing author.

The multi-dimensional and polythetic distribution of typo-morphological and measurable traits provide a conventional archaeological proxy to hypothetize direct spatial relationships or exchange modalities. This is so done by restituting the overall sequence involved in bring into being of form and contextual framework of how these metal industries might have had been passed on.

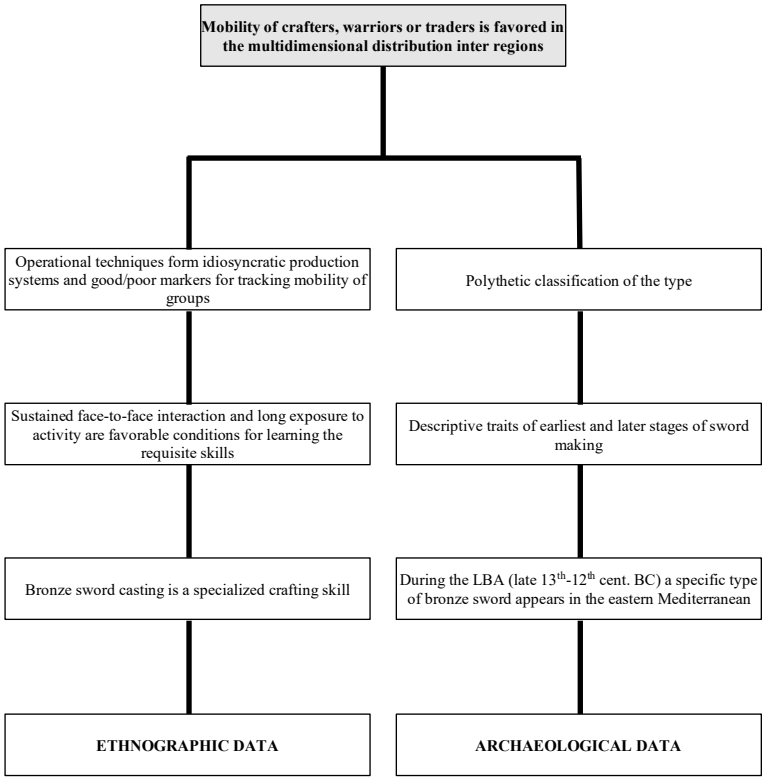


Fig. 4.19. Logicist diagram outlining the external reference and analogy to interpret the distribution of the type. Drawing author.

A question that appears is how observational and descriptive data of the archaeological record can be mobilized to support the present hypothesis. In a logicist diagram (**Fig. 4.19**), this would mean that a series of archaeological inferences should be linked, namely:

1) Description of the archaeological phenomenon significant for tracking learning modalities (e.g., polythetic distribution of technical traits);
2) Specific casting medium techniques may require specific skills (e.g., proposition derived from contemporary metalwork and experimental data on bronze production);
3) The complexity inherent in apprenticeship of casting swords leads to the assumption of craft specialization due to biomechanical and physical constraint (e.g., relationship of bronze sword casting and craft specialization or at least method-specific specialism);
4) Technological, morphological and stylistic traits indicates culturally specific series of body motor schemata and hence have greater likelihood of mapping shared practices across geographical distance (e.g., temporary or permanent forms of mobility).

Data analysis

The main interest in the technological characterization of objects and affinities thereof artifact variability lies precisely in their varied historical potential to document social network of interaction and materialized forms of identity (Stark, 1998b; 2008b; Gosselain, 2000; 2018; Knappett; 2011; Roddick; Stahl, 2016b; Roux, 2016). With the aim of using variability as a basis for network archaeology research (Brughmans, 2013; Mills, 2017; Prignano; Morer; Diaz-Guilera, 2017; Peeples, 2019; Brughmans; Peeples, 2023), we reclassify type-objects as nodes in pairwise relation based on tabulated information concerning their *chaîne opératoire*.

The fundamental question in establishing gradients of connectivity in the case of Type II swords is if different swords were the outcome of the use of the same mold. There is a great difficulty to trace swords back to these molds given the near absence of evidence, since at least for: 1) the non-standardized character of manufacture in pre-industrial communities; and 2) that many morphological features are not carved into the matrix of the mold (Bingelli, 2011: 15-17). To avoid the 1:1 relation of place of finding and production, networks graphs can be used to explore closer material affinities. These relationships may serve as a proxy of past production variability in culturally specific socio-technical contexts of learning and transmission. If we are able to demonstrate that biographical traces of technical behavior are diagnosis of carved molds rather than of subsequent steps of manufacturing process, we may proceed to trace the geographical movement of metallurgist, teacher or apprentices, or object as opposed to fleeting relationships, circulation of ideas, etc. (**Fig. 4.20**).

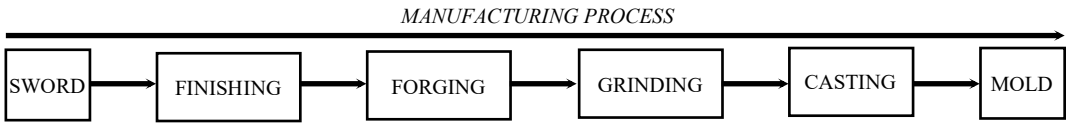


Fig. 4.20. From finished piece to mold along the production sequence. Drawing author.

We cannot rule out once and for all the possibility that another sword can be produced with a prototype. The question of importance here, however, is how this would affect the state of the evidence and the range of variability within the type group? Keeping in mind that the absence of evidence is not evidence of absence and our notion of time and efficiency are not necessarily applicable in the past, one could still argue undesirable traits of the metallographic structure as brittleness and ductility of casted objects in sand casting would require longer time rates in post-casting phases to improve it (Seibel; Ottaway, 1998: 61).

That said, however, sand casting is very difficult to prove since the evidence is "dust in the wind" (Seibel; Ottaway, 1998). Those who argue in favor of sand casting or ceramic molding have to cope with the non-existence of any prototype, even more difficult if these models were made from organic material as wooden templates as in the case of the Irish clay-based molds (Ó Faoláin; Northover, 1998; Ó Faoláin, 2004 but see Harding, 1984: 259), which anyway puts again the matter in a stalemate. Of course, we should concede also the possibility of the co-occurrence of two or more casting techniques as of different rock types accordingly to type of object, ecological circumstances of source materials and level of skills in the production of engraving them on stone matrixes. Fact is that the weight of evidence of BA bronze casting production in the eastern Po Valley goes in favor for a stable technique throughout the centuries (Le Fèvre-Lehöerff, 1992: 133-134; 139-140; 2004: 269).[139]

Jung & Mehofer (2013: 182) refer to casting damages in the hilt section of Greek swords probably resulting from inadequate emulative transfer of techniques in long clay molds without vents, an information that the detailed publication metallographic analysis shall confirm. Be as it may, it is only a hypothesis wanting detailed results of the crystalline structure of these swords and, in view of this impasse, we would rather suggest that bronze swords in study are complex design forms that took shape in the course of carving in large two-piece stone molds, were non-replicable pieces of work demanding high-degree specialism skills.

The engraving of matrix for complex and slender geometric forms swords that frequently exceeds 60 cm poses specific problems in the point of view of metal technology and techniques (Le Fèvre-Lehöerff, 1992: 138; Born, 2001: 204) (**Fig. 4.21**).

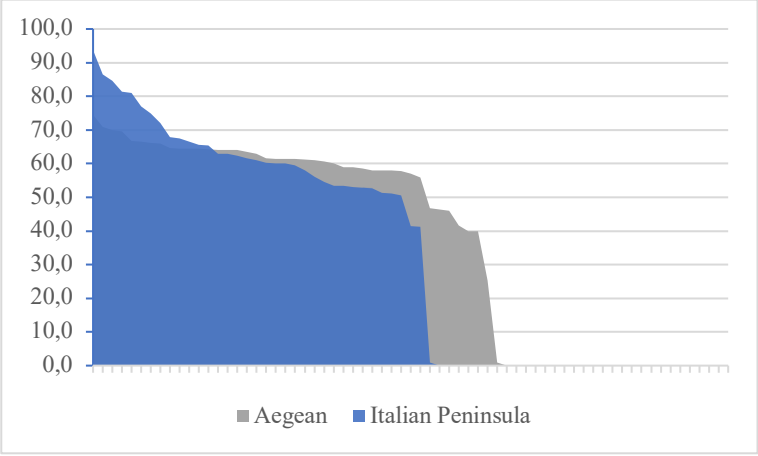


Fig. 4.21. Area chart with ranked normalized length distances of all Naue II swords from the Italian Peninsula and the Aegean. Drawing author.

[139] Out of a corpus of 160 molds amassed from the period 1800-900 BC in the Po Valley, 91% are made from stone (Le Fèvre-Lehöerff, 1992: 134).

It is a common understanding that these large paralepidids may require high-degree specialism to be worked into two-valved pieces for producing an identical object on both sides of single casting. With time of use as a receptacle of molten metal, these works tend to damage their negative imprint by presenting flaws that would have been transferred to the finished object, bend apart occasioning the flow out if the molten metal or simply break.[140] Through what markers one could get the negative of the original carved piece? With the present, and largely scarse, state of knowledge about bronze sword production, one may proceed to point out those intrinsic properties that were not obliterate or deeply altered by further processing.[141]

The most basic morphometric properties are the best proxies of the earlier stages of the metallurgical operational chain sequence since it does not make sense in the craftsmen's design choice to spend energy in a mold confection for only later alter many basic properties impressed on casting. A list of these parameters to which we have virtual access with the swords in hand can be established for the examination of good and poor markers in the order of production stages, design choices, procedural methods, techniques, tools and related skills (Budden, 2008: 4, tab. 3; Roux, 2016: 316, tab. 4.1; Kuijpers, 2018a: 75, fig. 4.2).[142] All in all they constitute a helpful tool for discerning meaningfully social interaction differences with regard to form and composition that cut across typologies in the order of production and attribute visibility (Carr, 1995b: 186, tab. 7.5; Clark, 2001: 12-14; 15, tab. 2.1; see ch. 1) (**Tab. 4.4**).

[140] Bingelli (2011: 17) reports that a well-constructed and treated mold of sandstone can perform ten to twenty and plus casts […]". Pellegrini & Scacchetti (2014; cf. also Bingelli, 2011: 19) observe in their testing experiments that "[…] due to repeated castings of molten bronze in the moulds, when the metal temperature exceeds 1300 °C, the negative of the object carved in the stone tends to lose its details because of the fragility of the material, especially on the edge of the blade. Another remarkable aspect is the deformation undergone by the stone, which occurs in the exact moment when it comes in contact with the molten metal. The two half shells tend to sag and they do not fit together, which is essential for succeeding in the casting process, so that continuous maintenance is needed."

[141] Hardening treatments hardly length the blade (Ó Faoláin; Northover, 1998: 78; Ó Faoláin, 2004: 94). Blades, for instance, can have their height and width altered in up to 2-3 and 5 mm in the working of edges, respectively (Bingelli, 2011: 20). Conversely, Siedlaczek (2011: 116) observes the cutting edges can be compacted close to six times in thickness (1,7 to 9 mm).

[142] The descriptive terminology is based on the conceptual traditiom of the *chaîne opératoire* in footsteps of lithic studies (Roux, 2016; 2017; Gosselain, 2018). A technique is the conjugated movement of action and instrument in the transformation of matter (Leroi-Gourhan, 1964: 164). "*Une méthode se définit comme une sequence ordonée d'opérations fonctionelles exécutées par un ensemble de gestes élémentaires qui peuvent être réalisés selon des techniques différentes*" (Roux, 2016: 63).

Visible sign	Description	Method	Technique	Tool	Scale	Practical knowledge	Observation	Degree of expertise	Quantity of time	Physical visibility	Actualistic observation
Metallic artifact	Chemical and physical attributes	Alloying and melting components	Preparation of the copper-composition for pouring	Crucibles	Chemical analysis. Macroscopic characteristic such as weight and color of the cast	Control of alloy mixing that will affect the castability and workability of the as-cast piece, bronze shiny and color; exact charge, temperature, contraction, material segregation and permeability of the casting media	Loss of molten metal, hence of kinetic energy in use. Quality of cast (gas uptake, oxide formation, blowholes inclusions, etc.)	Strong	Moderate	Low	
Length from tip to end, handgrip, width), proportion of parts, presence/absence of pommel ears and/or spurs in the hilt. shoulders curvature, blade outline, profile and cross section	Morphometric attributes	Sketching out long and heavy specular blocks and engraving the negative of form	Carving	Hammer, chisel and awl	Macro and microscopic characteristics	Attention to material properties' (size, shape and) and control for the details of sword profile, symmetry of bivalve pieces, etc.	Crack of the piece by the force and direction of impact. Bend apart of the molds on casting and waste of the sword blank. Deformation produced by the	Strong	Many	Low-high	

							thermal shock resulting in imprecision of the impression				
Surface	Macro and microscopic attributes	Pouring the molten metal in the runners	Pouring	Crucible and mold	Gas bubbles and porous areas (macroscopic)	Control of the casting temperature, reductive atmosphere, shrinkage of the molten metal and position	Absorption of gases and flaws, bending apart of the mold	Moderate	Few	Low	
Finished piece	As above	Grinding and smoothening irregularities and removal of casting jets in the blank piece and primary	Fettling and removal of cast jet	Hammer, anvil support, grinders and whetstone	Multi-directional and long scratches (macroscopic)	Control of application of force and tools	Breakage of the parts being struck	Strong	Many	High	

		treatment of surface									
Metallography	As above	Hardening by plastic deformation and annealing cycles	Forging	Hammer, anvil support, pliers or tongs	Dendritic structure, slip lines within the metal grains or twinned grains (microscopic), hammer-marks (macroscopic)	Cleaning the casted piece, hammering and annealing that alter the microstructure properties of the metal	Breakages under strain, heat treatment or combat Overheating (hot-short)	Strong	Many	Low	
Grooves, 'blood channels,' steps or fine ridges	Design and morphometric features	Chasing by material displacement	Incision	Pencil, chisel, punches and scraper	Smooth or scaled edges (i.e., distinction between impressions on casting and post-casting)	Control of movement and precision of the details	Quality of relief or low relief execution	Strong	Many	High	N/A
Decoration of surface	As above	Retouching or material displacement	Incision or engraving	Pencil, chisel	Specular symmetry of design in relation to the axis, smooth or scaled edges.	As above	As above	Moderate	As above	High	N/A
Number of rivets and organization handguard/grip	As above	Punching, drilling or enlarging holes	Perforation	Awls or sharp instruments	Cross section (bump marks, funnel-shaped, etc.) of perforation	Perforation of rivet-holes with regard to affixing hafts	Hilt breaking by the force and direction of the impact of the blow	Weak	Few	High	

					and format and vestiges of organic material						
Flanges and pommel ears angle, width	As above	Hammering and compression by angular displacement	Forging and shaping	Hammer	Metallographic structure	Plastic deformation of the outer parts of the hilt	Breakage under excessive stain	Weak	Few	High	
Blade surface	As above	Treatment by friction	Polishing	Grinders, polishers and burnisher	Bronze surface shine and texture, microscopic characteristics, small scratches	Removal of remaining unevenness on the surface	Regularity of surface evenness	Weak	Few	High	
Cutting edges	As above	Hammering and sharpening of the blade edges	Forging and sharpening	Hammer, anvil support, rubbers and grinders	Macro and micro-structure, Vickers Hardness (VH) test	Attention to the responsiveness of material bellow the breaking limit, narrowness of blade edges and regularity of line	Regularity of evening out blade edge line and hardness of piece	Moderate	Few	High	

Tab. 4.4. Key attributes for examination of earlier production stages. Source of illustrations (from top to bottom): Cavazzuti *et al.* 2010: fig. 3; Volante, 2020: 173, fig. 74; Barbieri *et al.* 2015: 98, fig. 2; Bietti Sestieri *et al.*, 2013: 168, fig. 12; Ó Faoláin; Northover, 1998: pl. 5; Iaia, 2015: 88, fig. 8, b-d; Molloy, 2019: 20, fig. 3.

As we have been emphasizing so far, mechanisms effecting the distribution of diagnostic traits of the technical behavior operate in networks of social relationships of diverse nature and modal distances. Similarity network is a suitable conceptual and mathematical tool to investigate the relationality invoved in the polythetic trait distribution in different levels of the sword making tradition. Technological boundaries are a cumulative phenomenon of knowledge transmission within limited geographical perimeters of physical space and filiation of tutor and apprenticeship in shared learning social contexts. The topology of these similarity networks charts the differential embeddedness of "strong" and "weak ties" (Granovetter, 1973) nurtured among past actors in cross-community information exchange and learning of skills. That is, in an individually based analysis of the dyad relationships it may be possible to indicate, based on an inverse relation to the geographical distance of the site depositional context, similarities in speciments of subsets governed by migration and co-residence, while for others mechanisms of interchange may apply.

In formatting network data for more than one hundred swords of the dataset, resultant attributes were selected with regard to external (dating and subregion) and intrinsic properties of sword objects. The latter represent visible expressions of an ordered sequence of procedural operations and stages of sword-making. As we have seen, these are operationalized to code information connected to and 1) preparation of the copper-based raw material (copper geographical provenance, tin content); 2) casting (e.g., morpho-metric traits); and 3) finishing (blade profile and design). Edges (E) indicate the presence of the same attribute in two or more findspots represented by vertices (V) (v_1, v_2, v_3, … v_g).

As the technological characterization of these attributes is contingent on states of preservation, quality of documentation and the seemingly infinite possibilities of compilation of data attributes, a simple denominator humble down the vagaries of sources of information into feasible visible expressions of sword technology accessible mainly not *in loco*. In few cases as of the original length some sort of reconstruction may be attempted projecting normalized distances to the metric distances of missing parts with selected swords of the same depositional context.[143] Diagnostic attributes (binary, categorical and numerical) are identified for every dyad of sword objects with standard value 1.0000. Continuous attributes as tin content

[143] That is, through the formula x = (l/L) × 100 (x = length of the fragment sword from the blade tip to the junction with the hand guard or from distal to terminal ends, L = total length of sword) and y = (x − l00)/L (x = length of the fragment sword between two points in question, L = total length of sword) can be used in order to verify if the length of the missing fragment match another preserved and, finally, to calculate the reconstructed length of the fragmented sword with the formula y + L (projected length of missing part plus total length of preserved sword). If y (l/L) × 100 of sword^n n equals y (l/L) × 100 of sword^{n-1} of the same depositional context or similar group, then the normalized measures of both are comparable in terms of the reconstruction.

and measurable variables of length in each sword-to-sword comparison are normalized in terms of percentage of the sword length or tin content to indicate weak (0) or strong relationship (1) (**Tab. 4.5**).[144]

Attribute	Type	Value
Dating	Interval	Any interval of years within the LH IIIB-LH IIIC Early/RBA1, LH IIIC Early-Advanced/RBA 2-FBA 1 and LH III Late-SM/FBA 2
Location	Categorical	One of the modern regions and administrative units in Italy or Greece
Copper provenance	Categorical	Veneto and Trentino-Alto-Adige (TAA)/Sardinia (SAR)/Cyprus (CY)/Imported (excludes unprovenanced swords)
Alloy range	Binary	Average per cent tin in normalized distance between a pairwise relationship (excludes)
Measurable variables	Binary	Each pair of normalized distance of total length greater than 0,85
Blade cross-section (vertical plane)	Categorical	Lenticular (Rhomboid)/Rhombic/Faux-midrib
Blade design	Categorical	Blood channels/Ridges/Steps/Double steps/Steps distal half
Pommel ears	Binary	Yes/No
Spur	Binary	Yes/No
Blade outline (horizontal plane)	Categorical	Paralleled sides/Leaf-shaped
Number of rivets	Binary	Total/Structure (number) grip:guard

Tab. 4.5. Attributes compiled from the database (after Östbon; Gerdin, 2015: 314, tab 1).

To network the dataset of a series of swords possessing specific properties and continuous dimensions in different states of preservation, date and place of finding, a screening of our body of evidence is necessary to select eligible specimens in our database (see Appx. A and B). All exemplars assigned to the Type II are included into the graph independent of the noise of missing edge information, state of preservation and quality of documentation. In the management and analysis of data, it was considered only population members for which the original length is recorded, or, hypothesized with a certain accuracy as to allow the recording of its intrinsic properties of interest. Within this large set, specific sub-types/groups of interest of the principal classificatory systems for the Aegean/Mediterranean are Catling's Groups I-III and Kilian-Dirlmeier's A-C groups and variants. The swords of Group IV (Catling), later and without typological comparison outside the Aegean, or those too damaged and for which it is not possible the attribution to one of the classes of the type were not taken into account.

With the progress of research, it is possible that data quality will increase, altering some node position and properties of the total network, especially those brought to light in regions of West Greece over the last few years. The fragmentary nature of archaeological data in

[144] With the formula $X = (n_1/n_2)$ where n_1 = number of sword$_1$ with lesser value, n_2 = number of sword$_2$ with greater value and later binarized with cutoffs of 85 and 90%, respectively.

network analyses based on the archaeological record should always be taken with caution given that the connections one can draw in the graph is a function of data accuracy (see Bruchmans; Peeples, 2023: ch. 5) and similarity measures. Co-occurring connections in pairwise relationships, however, is the first step to construct more reliable similarity networks (see discussion in Peeples and Roberts, 2013; Östborn and Gerding, 2014; Prignano; Morer; Diaz-Guilera, 2017). Thus, the sum of edge values is expressed in a weighted adjacency matrix of size of v × v. I direct readers to the open online suplementary material linked to this analysis.[145]

A first global overview of the network studied, with the parameters of pairwise (undirected) relations defined, organized under Kamada-Kawai algorithm[146] shows the pattern of a densely connected (**Fig. 4.22**).

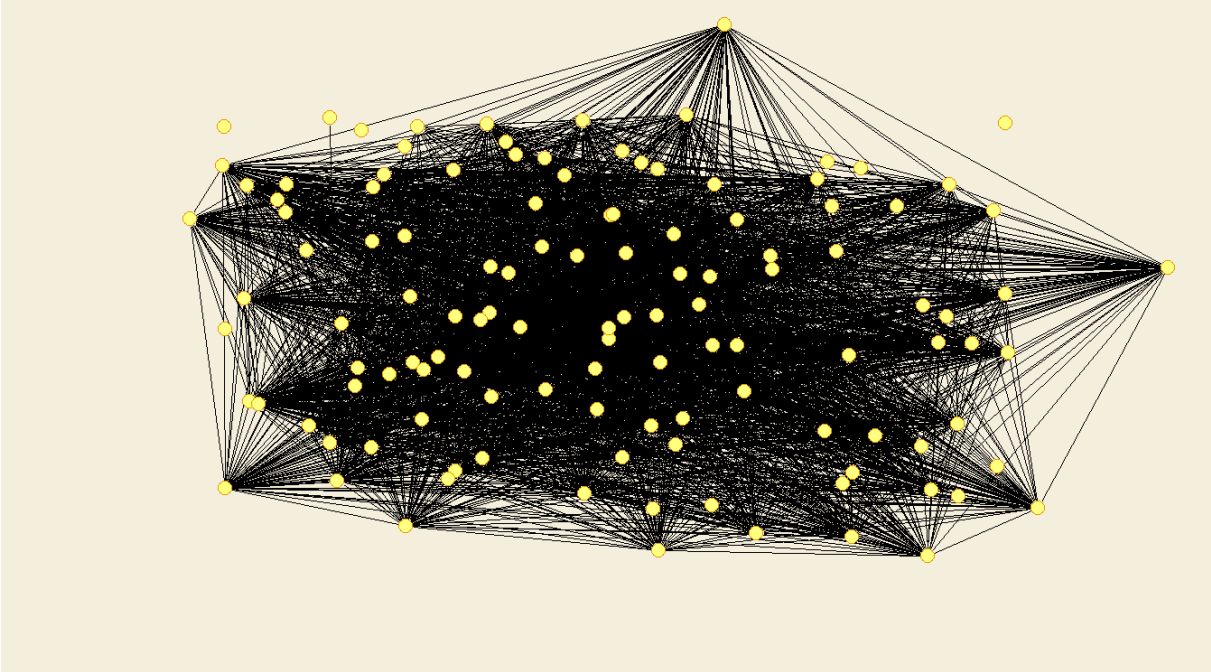


Fig. 4.22. Global view (graph only) of the network studied with 3180 lines. Drawing author.

Network software packages in general offer a wide range of analytical tools for exploring the measures of similiarity in networks. The methodological options to choose from is a matter of the features of interrelatedness and display in question. In the tables report below, some topological structures of the network start to become clearer as through the distribution of the weighted edge values (**Tab. 4.6**).

Line Values	Frequency	Freq%	CumFreq	CumFreq%

[145] See https://osf.io/w83nf/?view_only=dae20f84c2e74bd787fd2ed67ba405fe.
[146] Kamada-Kawai is a command that searches optimal distribution of nodes based on the distance of these nodes on the graph (de Nooy; Mrvar; Batagelj, 2005: 17; Brughmans; Peeples, 2023: 207).

(	...	1.0000]	162	5.0927	162	5.0927
(	1.0000 ...	2.0000]	291	9.1481	453	14.2408
(	2.0000 ...	3.0000]	618	19.4279	1071	33.6687
(	3.0000 ...	4.0000]	781	24.5520	1852	58.2207
(	4.0000 ...	5.0000]	627	19.7108	2479	77.9315
(	5.0000 ...	6.0000]	445	13.9893	2924	91.9208
(	7.0000 ...	8.0000]	174	5.4700	3098	97.3908
(	8.0000 ...	9.0000]	61	1.9176	3159	99.3084
(	9.0000 ...	10.0000]	15	0.4715	3174	99.7799
(	0.1070 ...	0.1606]	7	0.2201	3181	100.0000
Total			3181	1000.0000		

Tab. 4.6. Line value frequencies.

If asked to provide *m*-slice score[147] distribution at steps of 1.0000, the resulting is as follows (**Tab. 4.7**).

m	Num	Threshold
0	21	0.000 or less
1	4	(0.000-1.000]
2	1	(1.000-2.000]
3	8	(2.000-3.000]
4	7	(3.000-4.000]
5	3	(4.000-5.000]
6	11	(5.000-6.000]
7	20	(6.000-7.000]
8	27	(7.000-8.000]
9	6	(8.000-9.000]
10	13	(9.000-10.000]
	121	

Tab. 4.7. M-slice.

The ten highest values for inter-locality connections are constituted by specimens from the Achaea, Verona and the South Aegean (**Tab. 4.8**).

Rank	Line	Value	Line-ID
1	97.96	10.00000	v97.K-Drim.v96.AKlau
2	94.61	10.00000	v94.L-Spal.v61.K-Spen
3	98.97	10.00000	v98.Portes.v97.K-Drim
4	2.1	10.00000	v2.AdNsMCet.v1.AdNsMCet
5	110.109	10.00000	v110.Mageiras.v109.Mageiras
6	89.79	10.00000	v89.Kamini.v79.Aplomata
7	45.41	10.00000	v45.PdBran.v41.GVero
8	79.62	9.00000	v79.Aplomata.v62.K-Spen
9	45.44	9.00000	v45.PdBran.v44.PdBran
10	97.79	9.00000	v97.K-Drim.v79.Aplomata

[147] *M*-slice gives identify clusters bases on the distribution of the value of multiple lines (de Nooy; Mrvar; Batagelj, 2005: 109-110).

Tab. 4.8. Ten highest edge values.

The weighted degree[148] distribution is as follows (**Tab. 4.9**).

Vector Values		Frequency	Freq%	CumFreq	CumFreq%
(...	0.0000]	38	31.4050	38	31.4050
(0.0000 ...	0.0535]	82	67.7686	120	99.1736
(0.0535 ...	0.1070]	0	0.0000	120	99.1736
(0.1070 ...	0.1606]	1	0.8264	121	100.0000
Total	100.0000			121	

Tab. 4.9. Weighted degree centrality scores at selected thresholds.

The betweenness centrality[149] is as follows (**Tab. 4.10**).

Vector Values		Frequency	Freq%	CumFreq	CumFreq%
(...	0.0000]	21	17.3554	21	5.0927
(0.0000 ...	153.3333]	20	16.5289	41	33.8843
(153.3333 ...	306.6667]	28	23.1405	69	57.0248
(306.6667 ...	460.0000]	52	42.9752	121	100.0000
Total		121	100.0000	3181	100.0000

Tab. 4.10. Betweenness centrality scores at selected thresholds.

Following these general hints of connectivity, we can set some parameters on graph display to easy our path by adding, for instance, a partition to cluster vertices of the central Mediterranean (blue) and the Aegean (green) in weighted connections with value greater than 8.0000 compounded with the weighted degree each node (the larger the node, the more connections are incident to it) (**Fig. 4.23**).

[148] Weighted degree is the sum of the edge values into a node (de Nooy; Mrvar; Batagelj, 2005: 125).
[149] The maximum variation involved in the shortest paths between nodes – the *geodesics* in network jargon (de Nooy; Mrvar; Batagelj, 2005: 131-132).

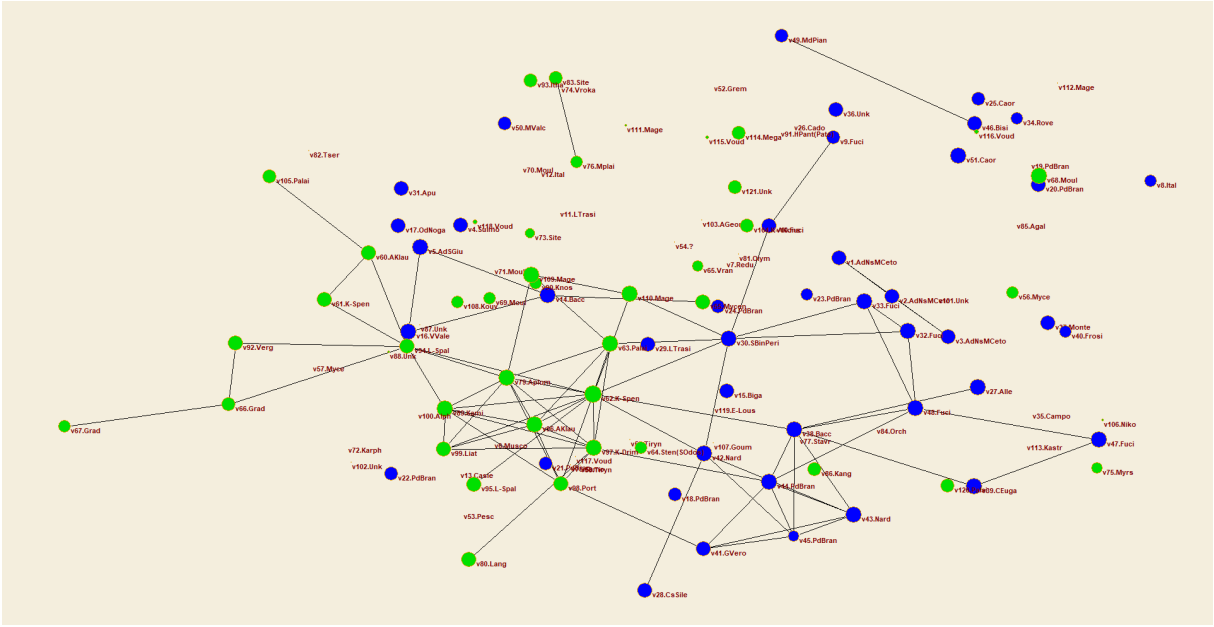


Fig. 4.23. Graph with vertices partitioned by region with line values not greater than 8.0000 removed. Drawing author.

To avoid or at least mitigate the compression of temporal snapshots involved in the presentation, we can produce time intervals for longitudinal comparison of Italian-Aegean connections centered with a cutoff of edges with value greater than 8.0000 on the division of Aegean chronology by means of different coloration of nodes which are or not contemporary (**Fig. 4.24**). There are few earlier specimens in the Greek Mainland and Islands well dated to the LH IIIB, attesting the introduction of type that will surge later in the subsequent LHIII C onwards. This temporal precision is a necessary condition for causal connections with proxy archaeological data. However, it should be borne in mind that date and the datation are distinct matters as the attributes of an object follow different rhythms and lines of trajectories over time (Olivier, 2008: ch. 8). Typo-chronological assumptions should not lead us to think some characteristics of the type pinpoint absolute dates, a difficult accrued by stray finds or fragmentary specimens without clear context.

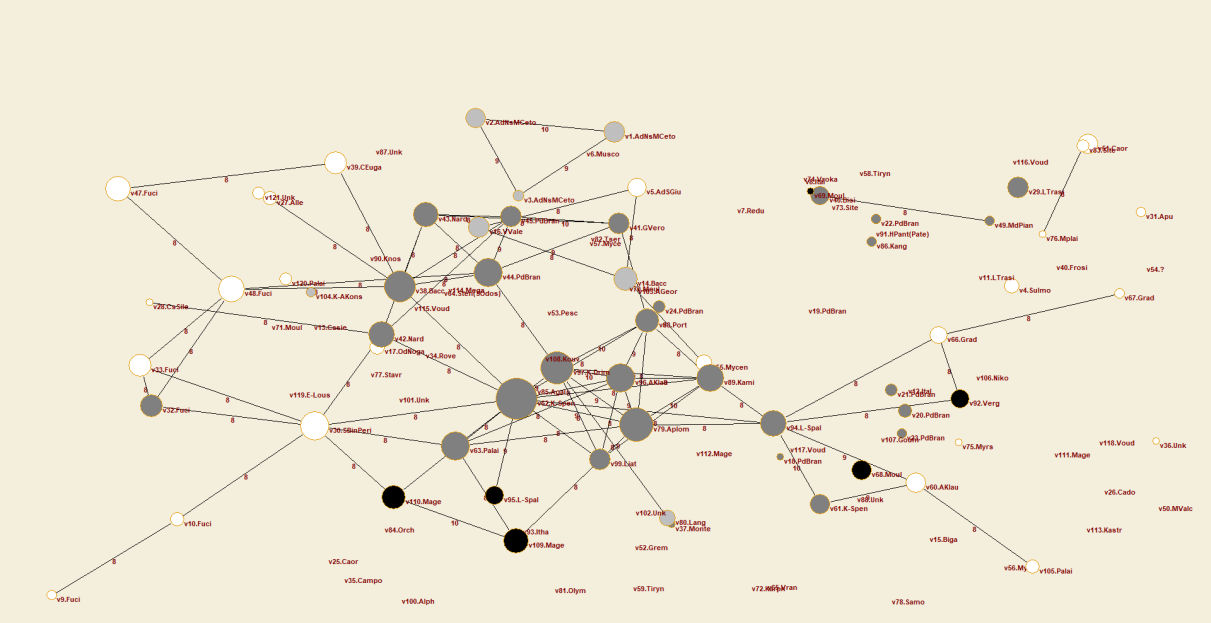


Fig. 4.24. Temporal plotting of nodes according to the time interval LH IIIB-LHC III Early/RBA1 (light gray), LH IIIC Early-Advanced/RBA 2-FBA 1 (dark gray) and LH III Late-SM/FBA 2 (black) and unkown dates (white). Drawing author.

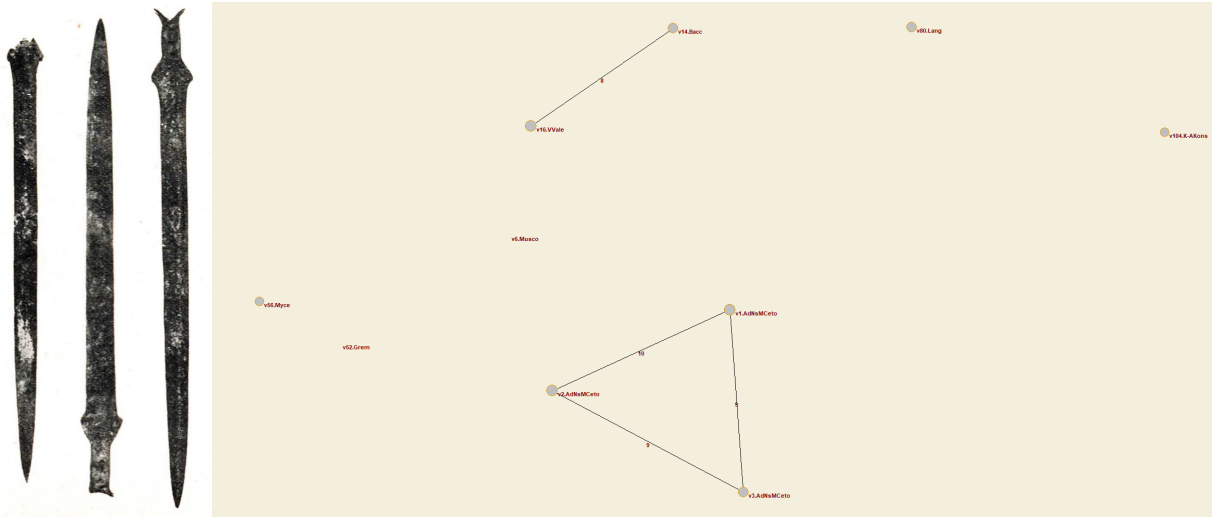
If material network of similarities would just confirm already known or intuitively based insights of parallels of previous scholarship, it would still be valuable addition to knowledge. But the sinoptic display of the co-occurrence of aggregate variables with the systematic processing of information of shared attributes re-direct your eyes to some of unexpected possibilities of connection of much of the dataset that deserve explanation. Moreover, the analysis is grounded on an open database that can be adjusted accordingly with the progress of research, publication of old and new specimens, etc. Network analysis, however, is not a substitute for a diligent analysis of possible historical connections and the gist of our argument is to demonstrate the analysis should never dispense with an investigation of value of similarities identified.

Take as illustration the fragmented specimens of the type Cetona named after the depositional context in Antro della Noce (Bianco Peroni, 1970: pl. 19, nos. 135-137) today displayed in the MANU or the ones found in the votive hoard deposit of Pila del Brancón in the Venice Nat. Arch. Mus. (Inv. Nos. IG.VR 26523; 40293; 40292; 40289; 40291) (Salzani 1994: 84, 6; 1998: 67-68, figs. 1-2, 145-147). In the coetaneous depositional events of both contexts, swords were found luckily in preserved conditions (MANU Mus. Inv. No. 01080 and Venice Nat. Arch. Mus. Inv. No. IG.VR 40288) that offer good parallels (Bianco Peroni, 1970: pl. 19, 135; Salzani, 1998: 70, fig. 3, 143). Using the pieces of information of registered morphometric attributes as lengths, curvature of handguard, mean range of weight and many

attributes of blade design features as lenticular cross section, steps along the edges (also common to Central European forms), number and organization of rivets, it can be reasonable hypothesized here that they were originally casted and finished in the same piece mold or local workshop tradition in Tuscany and Veneto.[150] Variations with regard to length and width, profile or should in many cases be accounted in terms of fettling,[151] plastic deformation of the blade edges in work hardening (Bingelli, 2011: 20), randomized choices along the polythetic organization of production, re-sharpening and as well as to slights differences of reported values.[152]

The Cetona group is indeed a paradigmatic case in which network analysis emphasize object similarity. By taking findspot location as a function of a partition filiation, the local view of network below reflects the pairwise relationships weighted by the sum of all values incident to a node (

Fig. *4.25*). The attributes, types and values, informative of interconnected steps of sword production, might be interpreted for the swords in study as behaviorally meaningful in terms



of group affiliation and shared production loci.

Fig. 4.25. Swords of the Antro della Noce (left) and segmented view of a subnetwork, dated to the initial time interval (light gray) of the swords showing values greater than 8.000.

Other cases may include Bacchiglione (v14.Bacch) and Mycenaean (v55.Myce) and also possible the Cetona group (v1-3.AdSCeto) and Vibo Valentia (v.16.VVale), which share

[150] The copper-provenance of two Cetona swords of the Pila del Brancón hoard to areas of the southern Alps (Jung; Mehofer; Pernicka, 2011) give further weight to this local circuits of production and distribution.
[151] For clay mold materials, see experiment results in Ó Faoláin; Northover, 1988: 77, tab. 2; Ó Faoláin, 2004: 92, tab. 5.3.
[152] Examples are legion here, but it is appropriate to allude slight differences of registered measures of the swords of Cetona in MANU (Calzoni, 1933: 98; Bianco Peroni, 1970: 62; Volante, 2020: 170, fig. 69) and of the type Cetona in the Pila el Brancón hoard (Salzani, 1998: 69; Hermann *et al.* 2020: app.). The differences range in the order of 2 to 21 mm.

in the earlier stages of the diffusion of the type in the Aegean of the LHB III/ many significant techno-morphological attributes over different production stages as alloy range, similar proximal-distal length threshold organization of the number of rivets, blade design and pommel shape (**Fig. 4.26**). We could tentatively suggest for these specific cases production was made by related lineages of craftmanship.

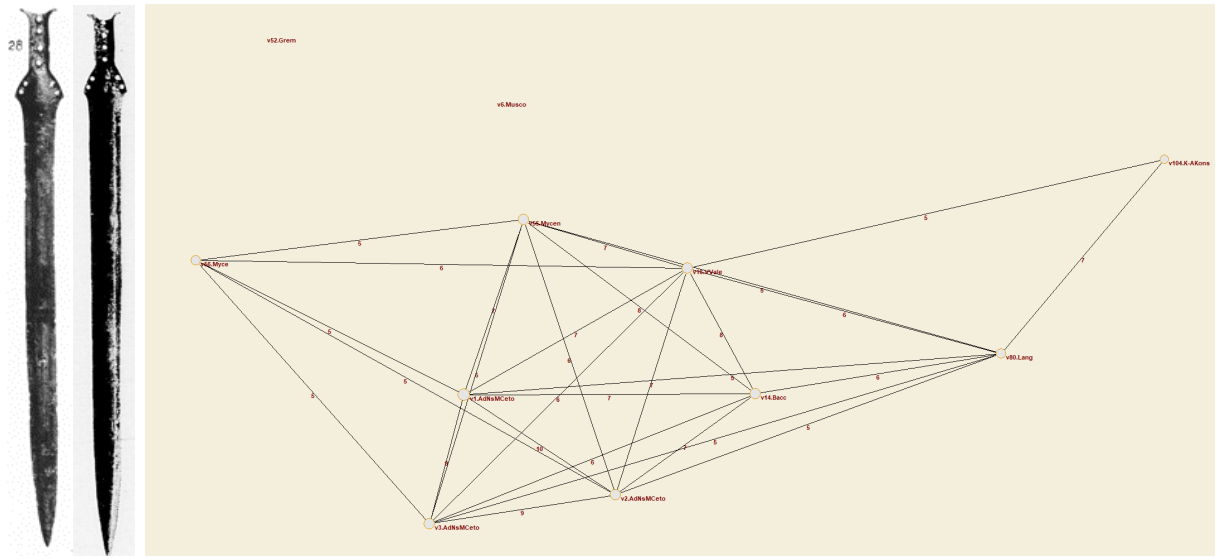


Fig. 4.26. Naue II sword of Mycenae and Bacchiglione (left, from left to right) and graph set with removed lines with values lower than 5.000. In: Foltiny, 1964: pl. 76, 28; Zampieri, 1973: 10, fig. 1.

Conversely, other morpho-stylistic features of sword design do not reflect deep-seated facets of technical identities take in isolation. Relief ridges on the blade is a further point drawing of Aegean-Italian links and they uptake in the Allerona class and subsequent Italian sword types a case of Aegean craftmanship influence in the Type II.[153] They have been frequently serving scholars to fortify the case for local Aegean workshop activities in Western Greece (see note 124). But these morphological features are not a sufficient criterion to decide between imported or locally made artifacts. They may, instead, suggest a different variety of mobility process, corresponding to different levels of similarities in the distributional space related to casual or mediated interaction in cross-community encounters, exchange modalities

[153] On the Aegean precedence of ridges, Catling (1961: 120; cf. Schauer, 1971: 149, n. 8) notes that "[…] Aegean armourers were past masters at embellishing weapons in relief […]". Bietti Sestieri's (1973: 393-394; 406) inclusion of two fragments of the Poggi Beni hoard (Bianco Peroni, 1970: pl. 24, nos. 167; 176) is partly paralleled to Allerona type swords of (Mus. Pigorini Inv. No. 61 529) and Casale sul Sile (Ligabue Collection) (Bianco Peroni, 1970: pl. 22, 154-155) in view of ridges as well as the outline of the handle. Molloy (2016: 350; 2018: 91) says Naue-II swords with 'faux-midrib' cross section (contrasted to 'classic' elliptical cross-section), i.e., midrib flanked by ridges "[…] are clearly a stylization of the midribs of earlier Type Di swords common throughout the Aegean".

or even circulation of finished products or diffusion of highly visible post-casting design techniques.

Consider the Achaean swords featuring fine ridges on the blade design in Kallithea (PM Inv. No. 318) (Yalouris, 1960: pl. 27, 1-2; Papadopoulos, 1978-1979: 296, fig. 320, c-d and 332, fig. 356, c-d), Klauss (AM Inv. No. 10186) (Papadopoulos; Kontorli-Papadopoulou, 1984: 222, fig. 2; pl. 29, b-d), and Voudeni,[154] Graditsa[155] further up into the North in Thessaly(?) (Ash. Inv. No. AN.1927: 1383-4), Central Macedonia in Vergina (Πέτσας, 1961-1962: 146, α Kilian-Dirlmeier, 1993: pl. 34, 232),[156] Aetolia-Acarnania in Kouvaras (Arch. Mus. of Agrinio) (Σταυροπούλου-Γάτση; Jung; Mehofer, 2012: 255, fig. 6, a), Central Greece and Crete of Th A of Mouliana (AMH Inv. No. 999) (Kilian-Dirlmeier, 1993: pl. 37-38, no. 247-249).[157] There is also two unpublished sword to add to our plot map, and in the second case no even previously reported. The first is on display in the Arch. Mus. of Tripolis (Inv. No. 5529). The second, on display in the Canellopoulos Mus. (Inv No. X788).[158]

It can be argued in these cases not all incidences stand for long but instead indirect exposure of artisans to different practices. If we visualize the network distribution of faux mid-rib swords in the light of the data of betweenness centrality, we may postulate a small world or scaled-free architecture (Barabási, 2002; Sindbæk, 2007; 2011; Östborn; Gerding, 2015). Thus, while the diffusion of the type operated in an earlier thrust of direction diffusion in a regional scale of the Aegean in the LHB/LB C Early, later on the topology of the graph takes on structure of preferential subregional attachment of links to particular set of small hubs in the post-palatial Aegean world (**Fig. 4.27**). Skilled artisans are indeed the "prototypical human connectors" (Malkin, 2011: 27) of the material similarity of the LBA Mediterranean world operating accordingly to changing political circumstances.

[154] Unpublished (T.?) on display in PM.
[155] Kilian-Dirlmeier, 1993: pl. 37, no. 245-246 and, possible, of an unpublished fragment of blade whose "[…] section resembles that noted (13) [AMH Inv. No. 999] instead of the normal ellipse with blood channels" (Catling, 1956: 176).
[156] The sword, however, is not in the same group in Kilian-Dirlmeir's classification as it possessed, oddly in the light of Catling's groups, fish-tail hilts.
[157] Swords from the south-tumulus in Albania have also been reported with the same feature in Kilian-Dirmeir's (1993: pls. 38-39, 251-254) *Gruppe* C, *Variante* 3, with the main diagnostic feature "*parallelseitige Klinge mit feinem, plastichen Graten, die unterhalb des Hefts zu den Schneiden hin ausbiegen*" (ibid., 97). Cf. Giannopoulos, 2008: 171-173 and the Stätzling swords with "*Klinge mit rapierartigen Rippen*" in Pabst, 2013: 113, fig. 3, 1; 139-141, lists 2 A-B (with description of blade cross section).
[158] The object has no information of provenance and until now it has been not come to anyone's notice in the form of publication. We assume, based on the formal similarities and the best parallels available, it is context of finding if any should lie with other specimens of the subtype, so one more line should be placed on the lists of swords with this blade design in the Aegean.

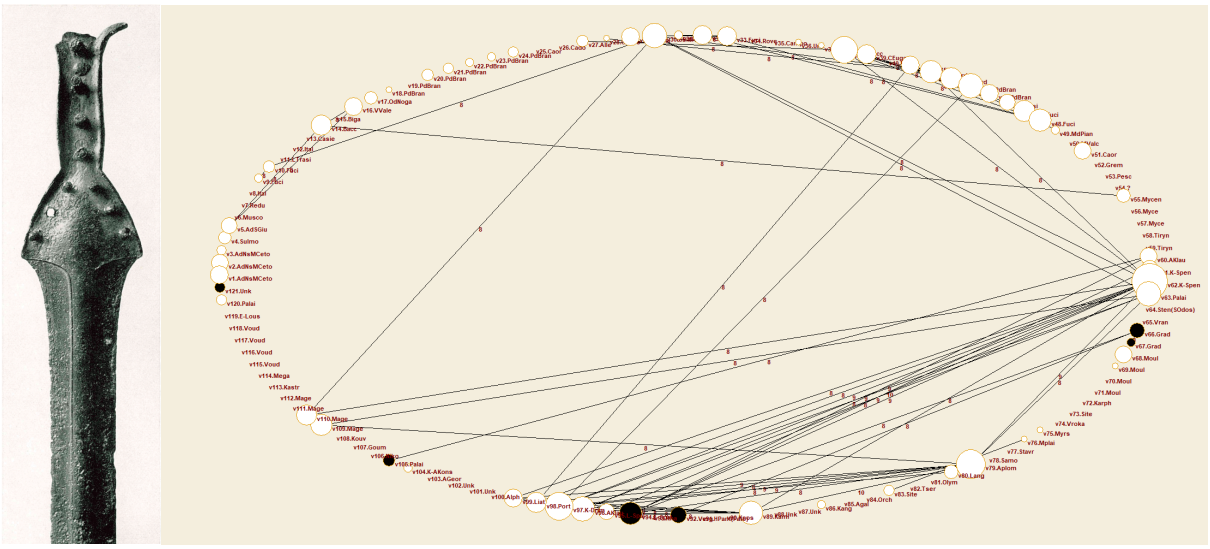


Fig. 4.27. Close-up view of fine ridges in the sword of Kallithea-Spenzes (ChT A) (left) and faux-midrib distribution graph (black vertices) with removed links lower than 8.000 and weighted degree of nodes. In: Yalouris, 1960: pl. 27, 2.

As it has been noticed before, the Arch. Mus. of Tripolis harbors two Naue II bronze swords from the Palaiokastro cemetery. However, scant bibliographical information there is, it looks some typo-morphological features have been swapped between both (Σπυρόπουλος, 1997: 29; 31; Σαλαβούρα, 2015: 495-496). The first (Mus. Inv. No. 5529), is 63 cm long, has 10 rivets (6 × 4) total and with fine ridges on the blade alongside a pronounced midrib. The second one (Mus. Inv. No. 5531), is smaller (41,5 cm), with 8 rivets (4 × 4) total, swelling at handgrip, leaf-shaped outline of the blade with stepped midrib and grooves running only in the proximal part of the blade and parallel to the midrib. With regard to the first, it has been noted the great similarity to start the length of another exemplar the same cemetery on display at the Sparta Mus. (Demakopoulo, 1986: 22, figs. 1-2; Cultraro, 2005: 20; Σαλαβούρα, 2015: 495; (see note 124). The differences on blade design do not militate against the hypothesis. As we have been stressed, they may pertain to the broad latitude of choices of post-casting techniques in the Aegean-Urnifield LH III C interface (**Fig. 4.28**).

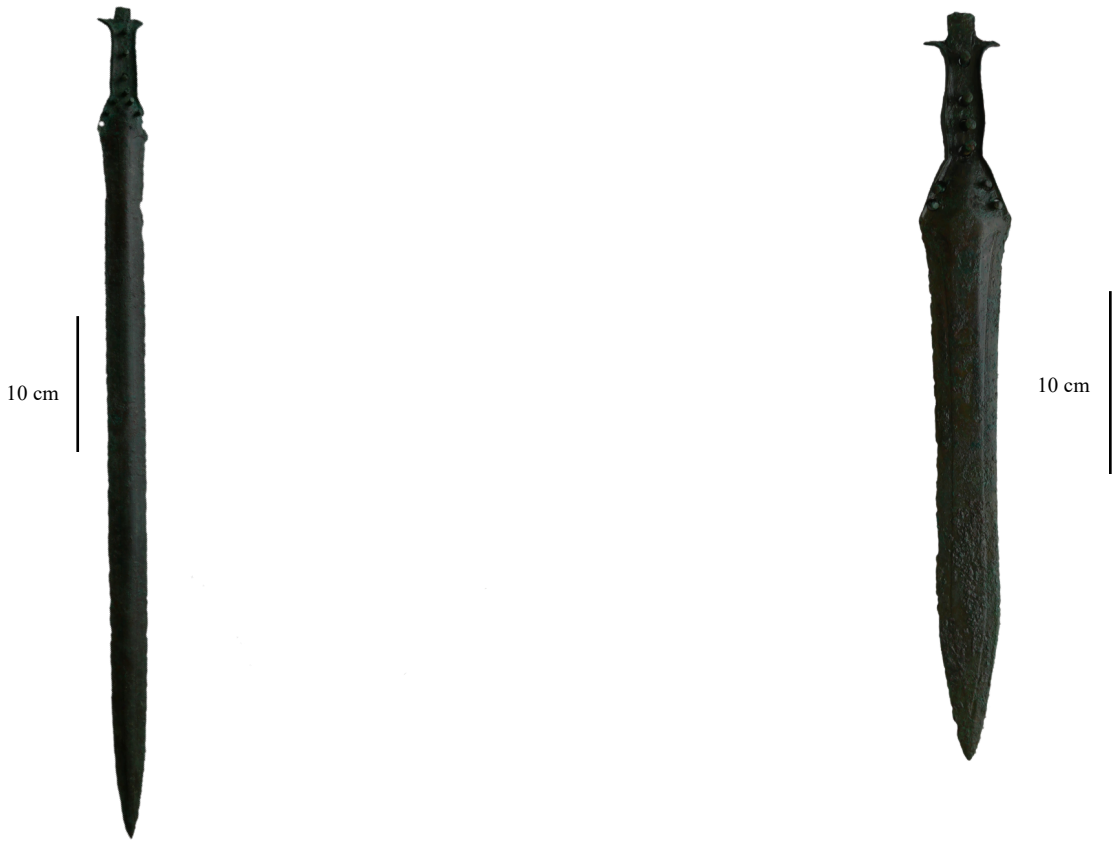


Fig. 4.28. Naue II swords in the Arch. Mus. of Tripolis (Mus. Inv. Nos. 5529 (right) and 5531 (left)). Photo by author.

A further example of posited post-casting techniques and blade feature cross-cutting connection across typologies and geographies is the presence of steps and double steps along the midrib. Steps in general running in all the length of the blade are common in swords in BA European swords (Jung; Μόσχος; Mehofer, 2008: 91-92 with bibliography). A list of swords with double steps would include the swords from the Pila del Brancón hoard (Venice Nat. Arch. Mus. Inv. Mus. No. IG.VR 26487; 26491 and 40289) (Salzani, 1994: 84, fig. 1, 1; 7; 1998: 68, fig. 2, 147). The specific typo-morphological trait of a pair of steps in each side of the midrib running only in the lower distal part of the blade towards the tip occurs in Narde (Nat. Arch. Mus. of Fratta Polesine) (Salzani, 1989: 34, fig. 12) and Pila del Brancón in fragmented specimen (Venice Nat. Arch. Mus. Inv. Mus. No. IG.VR 26491) (Salzani, 1994: 84, fig. 1, 7) and may include, still in the Italic Peninsula, one in Frosinone (Schauer, l974: pl. 9, 2) and, in the western façade of the Adriatic, Kallithea (ChT B) (Papadopoulos, 1978-1979: 296, 320, a; 332, fig. 356, a) (AM Inv. No. 319), possible one in Nikoleika (ChT 4) (AM Inv. No. 842), one of Lousika-Spaliareika (PM Inv. No. 4645) (cf. Giannopoulos, 2008: 170), Meganissi (Arch. Mus. of Lefkada Inv. No. 4606) (Βικάτου, 2017: 174, fig. 6; 175, n. 18; 2018: 409, n. 63) and Mageiras (Arch. Mus. of Pyrgos Inv. No. 3491) (Βικάτου, 2019: 248).

The occurrence of this feature and others militate in favor of a close involvement between partners of Achaea and Western Greece and Venice in the Northeast of the Italic Peninsula in the LHC Middle/RBA2 onwards (**Fig. 4.29**).

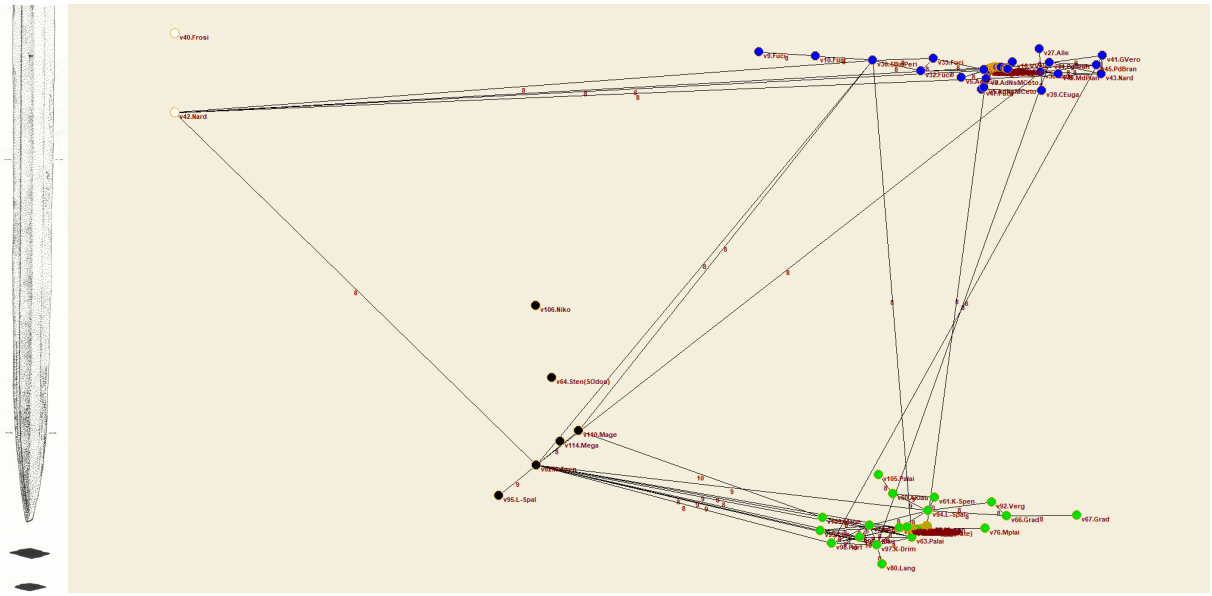


Fig. 4.29. Drawing of steps in the sword of Kallithea-Spenzes (ChT B) (lef) and distribution of steps at distal half with removed links lower than 8.000, and intersected partitions. In: Papadopoulos, 1978-1979: 332, fig. 356, b.

This reciprocal influence is reflected on the k-score[159] and weighted degree through color and vertex size, respectively (**Fig. 4.30**). Again, however, the multiple courses of action compressed between technique of production of the as-cast object and aesthetic of the finished product is not strong enough to demonstrate migratory mobilities. Instead, this pattern could be more related to forms of cross-community exchange and interaction generated by trade contacts or by requirements advanced to the producer.

[159] K-score is a technique recommended to detect cluster in graphs in which each vertex has at least a selected threshold of number of connections inside the cluster (de Nooy; Mrvar; Batagelj, 2005: 70-72).

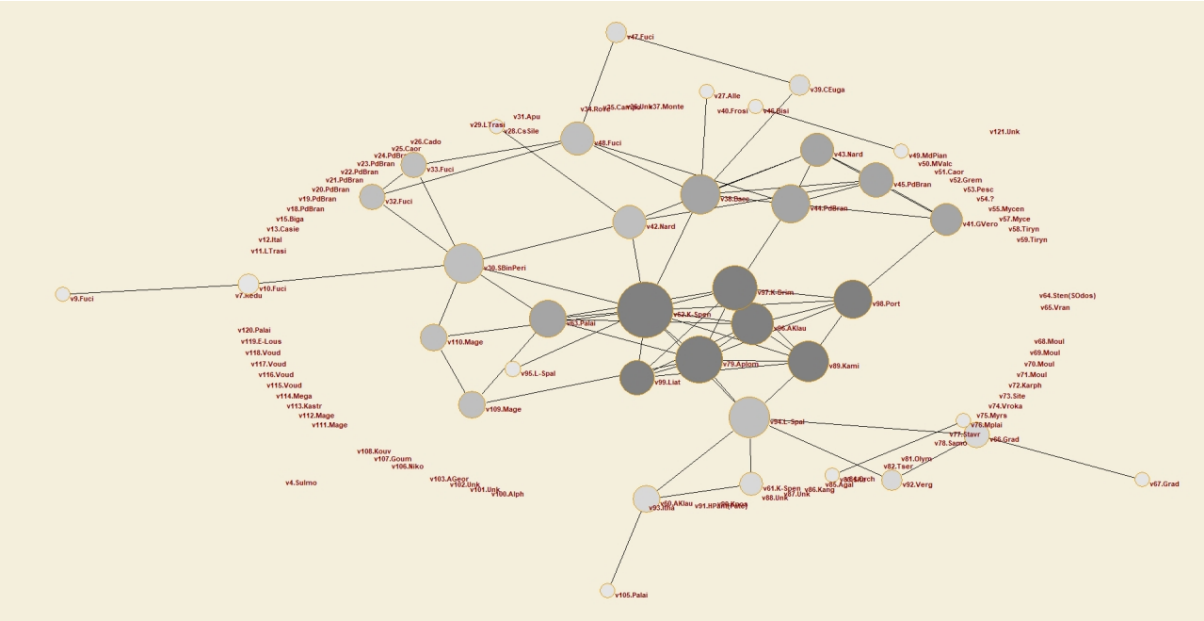


Fig. 4.30. Graph with vertices of LHIIIB-C Early/RBA1 (time interval 1) removed lines below the threshold of 8.0000 and inside clusters, k-score and weighted degree.

Wrapping up the case of diffusion of Type II swords in the Aegean region, we can conclude with regard to their production that migratory mobility in the form of attached or independent specialist might be only part of the answer, and most for few specimens dated to the earlier part of the time interval studied. Given the focus of research privileged on manufacture aspects in the Aegean and Italian swords in isolation, we are not able to falsify the hypothesis of warrior mobility as vectors of diffusion of this class of bronze objects. However, the uptake of the type generated by the demand of a martial lifestyle can still be evaluated in the light of the multidimensional trait distribution. The complex visualization and statistical method afforded by network analysis is only the tip of the iceberg, but they stress the fact that diffusion of these swords should take into account a full range of connections made by trade and social interaction across the Adriatic *koiné* over the LBA Mediterrenean.

Epilogue: season of migration to the South

Aspirations and anxieties of both migrant groups and host societies the global flow of migration patterms map onto the geopolitical ties of colonial conquest and resource draining, military interventions and historical structures of labor market (de Haas; Castles; Miller, [1993] 2020; Albahari, 2015; Le Bras, 2017; de Haas, 2023; Del Grande, 2023). The image of faceless 'barbarians' "[…] trying to enter 'Fortress Europe'" by sea routes in overcrowded flimsy boats or *El Norte* in caravans or hikes across the Sonoran Desert in Arizona – or way to the North

(*en el camino*) across the Saharan and Central American countries – are conjured up in public imaginary of such events through media press and archaeologists should not be dismissed as exempt from it. Since the mid of the 20th century, specialists of international migration have been pointing to a reversal of emigration/immigration global trends that have consolidated Europe and US final destinations. The phenomenon has been also accompanied by a significant attitudinal change of externalization of borders and politicization of the issue with old post-1989 fears of East-West 'flooding' replaced by South-North migrations. The Middle Sea is now the gateway separating two different geographies and politics of mobility systems. Anonymous masses of people appear in the form of 'waves' or straight 'arrows' making their way North in a truly "season of migration to the North" (Salih, [1966] 2003). The often-propagated Mediterranean 'migration crisis' has been exacerbating long-nurtured feelings of livelihood insecurity of ample sections of middle class and the upsurge of nativism and securitization of the issue framing the migrant as a homeland security threat (see **The 'refugee crisis'**). Is it conceivable to think colonial misconstructions of migration percolate through the archaeological discourse in the context of our own time?

The accumulation of a material infrastructure of interpretative legacy on the eastern Mediterranean past is contingent to the unfinished history of colonialism and that fact is no lesser true for the social history of archaeology and its middle-class interests through the centuries. Ideas are made concrete into books and buildings and hardwired into the backbone of 200-or-so years of archaeological concepts and metaphor of an extraordinarily complex issues. The overwhelming 'burden' of the disciplinary past can work as a detaching experience when classifying potsherds, meticulous metric attributes become an end unto themselves. Concepts emerge from the complex interrelationship of gatekeepers and gateways through institutions that help to build up while making flesh of old ideas about past mobilities and identities. To speak out against solidified concepts and terminology inside the classical tradition (if through the margins) without overlooking the Great Tradition of western scholarship (Renfrew, 1980) is far from being straightforward.

As we have outlined, the discussion of mobilities in the decades around 1200 BC does not revolve only around the distribution of luxury items as the Naue's II swords. They are one piece of many materializing the discursive scholarly strategies of storytelling. Says Silberman (1998: 272; cf. also Patterson, 1995: 143) that

> Narrative presupposes that both storyteller and audience share a single perspective, and therein may lie the connection between the intellectual and ideological dimensions of archaeology. To generalize beyond specific, highly

> localized data, archaeologists must utilize familiar conceptual frameworks and it is from the political and social ideologies of *every* generation that larger speculations about the historical role of the Sea Peoples have always been drawn.

Interpretations for the period studied go from near complete distrust of 'migration myths' on the part of 'diffusionists' and the idea of seaborne movement whereby main routes and access give to areas of beak-bulk of trade to the blind faith in in the idea stirring of 'nations on the move' in the melting pot of the post-palatial world. In the limited explanations of change, they become signifiers of present stances with regard to mobility, conveying specific images of causative agents of trouble and flight in the times of the 'Great Aegean Migration.'

At the juncture of c. 1200 BC, a broad historical setting of transformations is underway, putting an end to the LBA "intersocietal network" of the Aegean and eastern Mediterranean (Monroe, 2009). "The hall-mark of the times is movement" (Sandars, [1978] 1985: 198, see also Dickinson, 2006: 66 for a likely statement). No wonder that movement takes a chief importance in changing times since both share principles of becoming (Ingold, 2011). A mix of factors appear to combine to trigger these movements in the "perfect storm" (Cline, 2014: 11 but see Knapp; Manning, 2016). Earthquakes, climate change, refugee crisis of displaced individuals, sea and land raids and pillage by multi-ethnic peoples 'on the margin' of regional economies played a chief role in the cumulative spiral of the Collapse (e.g., 'systems collapse' explanation *sensu* Renfrew, 1979, see also Cline, 2014: 160-170; cf. Drews, 1993: ch. 7).

But what sort of movement, modes, distances and what different sort of embodied experiences the "[…] static dots on distribution maps […]" (Sørensen, 2015: 158) index? Who moves, how and under which historical conditions, to where, for how long and why? Looking through the frame of literary evidence for much of the period on focus it would be naïve to either have a total faith in or dismiss migratory-related events. The overreliance on systemic large-scale models of change, on the other end, might push further away a retooling of theory and method for identifying, representing, explaining and humanizing mobility.

In the power balance of a trans-regional political economical system, it migh be that 'outlier' groups occupying peripherical or interstitial spaces in terms of exchange networks may carve out by means of a range of modes of interaction new societal positions. Mobility in close-by or far-distant localities can be seen thus as a resource for achieving new positions in changing networks and circumstances of the period, a turn of tables in new socioeconomical trends of highly connected systems and sociopolitical formations. Exchange relation networks

including trade of valuable among partners or *par les armes* were different of a continuously interaction-exchange nexus of modality processes of social activities.[160]

It may be that the "[…] liquid medium erases all trace of activities […]" (Ingold, 2011: 249, n. 4). To a large extent, however, archaeological methods can track down some trails of this past entanglements through the materialized form of past mobility and social interaction. As far as the dissemination of the Type II is concerned, there are multiple layers involved that map on intense historical record of trans-Adriatic connections. By means of behavioral versatility and opportunism human agents of the period, likely the "many-ways" (*polytropos*) Odysseus (*Od*. 1. 1) may have had reinterpreted environmental fragmentation and connectedness, by *trading* prestige objects and things-as-commodities as private entrepreneurs in some circumstances or *trading on* (freebooting) in another. If it is to be a winner in our historical narratives "on either side of 1200 BC – states Broodbank (2013: 471), so be

> […] the Mediterranean, or more accurately, the hugely dynamic, volatile and potentially destabilizing, power-diffusing cultural and economic practices that people living around and in it were able to promote, once interactions over its surfaces had reached a critical scale and velocity. (Broodbank, 2013: 471).

[160] Examples of modes of exchange such as commercial trade, "tournaments of value" (Appadurai, 1986a: 21), piracy, slavery and raiding abound in the Homeric epics, a product of a long oral tradition that might go back well into the BA, hence of relevance in our discussion. To cite *en passant* a few well-known passages: the guest-friendship (*xenia*) and gift-giving of Telemachus by Nestor at Pylos (*Od*. 4) and Menelaus and Helen at Sparta (*Od*. 15); the verbal exchange and exchange of armor between Glaucus and Diomedes (*Il*. 6. 119-236), leading one of the partners "[...] giving golden for bronze, the worth of a hundred oxen for the worth of nine." (*Il*. 6. 119-236[160]); Nestor's cattle raiding story (*Il*. 11. 656-761); Odysseus' slave, the swineherd Eumaeus kidnapped and brought to slavery while a child, reared up by Odysseus' father and mother, Laertes and Ctimene, and the first to receiving in his home the disguised king of Ithaca; and, finally, the recompensation of a misdeed in a guest relationship, Helen's abduction by Paris. cf., on the different views on the historicity of the Homeric poems, Finley, [1954] 2002; Snodgrass 1974; Morris, 1986; Sherratt; Bennet, 2016; see also debate and discussion in Nakassis; Galaty; Parkinson, 2016.

CHAPTER 5."TUPY, OR NOT TUPY THAT IS THE QUESTION"[161]: ANCIENT HISTORY OF AMAZONIA

> *A impressão dominante que tive, e talvez correspondente a uma verdade positiva, é esta: o homem, ali, é ainda um intruso impertinente. Chegou sem ser esperado nem querido — quando a natureza ainda estava arrumando o seu mais vasto e luxuoso salão. E encontrou uma opulenta desordem… Os mesmos rios ainda não se firmaram nos leitos; parecem tatear uma situação de equilíbrio derivando, divagantes, em meandros instáveis, contorcidos em sacados, cujos istmos a revezes se rompem e se soldam numa desesperadora formação de ilhas e de lagos de seis meses, e até criando formas topográficas novas em que estes dois aspetos se confundem; ou expandindo-se em furos que se anastomosam, reticulados e de todo incaracterísticos, sem que se saiba se tudo aquilo é bem uma bacia fluvial ou um mar profusamente retalhado de estreitos.* [The overwhelming impression that I had, and perhaps this corresponds to a fundamental truth, is this: man there is still an impertinent intruder. Neither awaited nor desired, man arrived when nature was still arranging its most vast and lavish salon, encountering there an extravagant disorder. Even the rivers have not yet formed their channels, they seem to be fumbling for some kind of equilibrium, descending and diverging in unstable meanders, contorting in draws and oxbows where isthmuses continually break apart and rebuild themselves in the futile formation of islands and lakes for a mere six months. These rivers even create new topographic forms in which the defining aspects of land and water are confounded. The waters extend themselves into lawless bayous, without one knowing whether this is a river basin or a sea dissected with straits.]
> (da Cunha, *Impressões gerais*, [1909] 2019, p. 39, translation of Hecht, *The Scramble for Amazon*…, 2013, p. 239).

[161] Quote from the *Manifesto Antropofágico* by the vanguard poet Oswaldo de Andrade (1928: 3).

Introduction: two men on a boat

In capitalist modernity of today, boats, air flight, bus, and car rides and a bit of feet's work can afford locomotion in less than 24 hours, hopefully, through more than thousand kilometers, from a *locus mediterraneus* to get to nowhere in particular in the Amazon rainforest. However, the online representation of Google Maps may conceal a gap with the Europeans' imagery of *Ur*-Nature in the New World. The pervasive wonders and monstrosities of the Indies that took root in Amazonia intertwine themes of the early creative cartographies of European surveyors, adventurers, scientists, and later, sci-fi writers (Holanda, [1959] 2010; Gondim, 1994; Hecht, 2013).[162] The set sail across the 'place-idea'[163] of Amazonia and, for that matter, away from stereotypes that images frequently conjure may be all but friction-free, if one is willing to leave behind Gauguinesque dream world clichés of colonial settings and the symbolic language of western identity and civilization grounded on 'orientalizing' others (**Box 8**).

Box 8 – Gauguin and Tahiti

Gauguin's and much of the nineteenth-century imagination in Europe and U.S. were nurtured in dozens of colonial exhibitions and world's fairs such as *Exposition Universelle*, held in Paris over the later part of the century. They constituted ideal stage for a Victorian moral lesson of present states in which the national expansionist agendas gaining life in a sort of natural heritage tale of colonial domination by which the domestic past of imperial powers was displayed side-by-side with exotic attractions of overseas colonies (Hinsley, 1981; Díaz-Andreu, 2007: 377). World's fairs were no less important in feeding high subjective expectations of the destination to wider audiences, being cheaper and less strenuous physically, "[…] the price of passage a mere cup of exotic coffee" (Childs, 2013: 68), but nonetheless not less compelling to real trips.

After 63 days sailing from Marseilles to Tahiti, Guaguin, April the 1st 1891, landed in Tahiti wearing a Bufallo-Bill hat (Error! Reference source not found.) on his head, the spelling of exotic destinations inside his mind, and hold in hands a suitcase with a handful of photographs of colonial ethnography and European art reproduction (Childs, 2013; Foster, 2014). In his in his travelling draft manuscript *Noa*, Gauguin (1893 : folio 11) writes that "[…] *la civilisation s'en va petit à petit de moi* […]".

Fig. 5.1. Gauguin. Notes manuscrites; figure d'homme; sculpture maori; coupure de presse; tahitienne. c. 1893-4, folio 119 recto Album Noa-Noa, 31.5 x 23.2 cm, Musée d'Orsay. Photo (C) RMN-Grand Palais (musée d'Orsay)/Hervé Lewandowski. Paris, musée d'Orsay, conservé au musée du Louvre.

[162] As for instance Julio Verne ([1881] 1977), Sir Arthur Conan Doyle (1912) and Vicki Baum ([1945] 2022) and imperliast agendas and political ecologies in the tropical lands.

[163] Childs (2013: xiii) defines it conceptually, with the colonial Tahiti in mind, as "[…] pervasive conventions that mix geographical fact […] historically sanctioned myth, and idiosyncratic elements of personal desire".

The mythicized eye needs not to single the waters of particular latitudes of the South Seas to stare through the looking glass of civilization to delineate the frontiers of emergent identities, essences in colonial regimes and spearhead *mission civilizatrice* in national sovereignty ideologies. In the *terra incognita* of the Americas, it is quite common to find fantastic geographies that position the New World tropics as a reverie of the Old World's early explorers, where facts, moral signifiers and mythical motifs flow together. *Visão do Paraíso* [Vision of Paradise] (Holanda, [1959] 2010) is one of those brilliant pioneering works that delves deep into the *histoire des mentalités* of colonizers, who charted in the Americas the Edenic images of the Garden of the Hesperides, the golden cities, and the Tale of the Amazons, all intertwined with the legacy of the Bible and classical antiquity (Gondim, 1994; Barreto, 1999-2000; Barreto; Machado, 2001; Hecht; Cockburn, [1990] 2022; cf. "nobility archaeology" over the Empire of Brazil (1822-1889) in Ferreira, 2010; Barreto, 2011; Marshall, 2005; Schwarcz, 1993; Silva, 2024: 110 ff.).

However, codes of collective imagery can change signs and turn centuries of mythmaking Eden-on-earth motifs and conventions in their head in the introduction of new complex moral economies for the humid tropics. "Amazonia," past and present, after the arrival of the first Europeans, has routinely been casted in the images of an ideal polarity bouncing from green luxuriance to hell, humid desert, or bountiful garden (Hecht; Cockburn, [1990] 2022; Roosevelt, 1991; 1992; 1994a; Viveiros de Castro, [1996] 2002; Whithead, 1996; Fausto, [2000] 2010; Barreto; Machado, 2001; Stahl, 2002; Neves, 2006: 22; 2012; 2022; Noelli; Ferreira, 2007; Erickson, 2008; Rostain, 2016; Le Tourneau, 2019). The natural source of utopian legends and discourse on essences of the Indian nature of the Amazonian environment opposed eighteenth century European political philosophers, naturalists and historians in opposite camps as Rousseau and Comte de Buffon.

In *The Scramble for the Amazon and the "Lost Paradise" of Euclides da Cunha* (Hecht, 2013) examines the discourse on essences that made the Tropics the Tropicalism (after Said's (1978) Orientalism) of Western minds. After working for the Peru-Brazil joint boundary commission in the Upper Purús,[164] some 1,000 km from the Amazon channel, Brazilian writer Euclides da Cunha produced a variety of essays with the intention of compilling some of them together in *Paraíso Perdido* [Lost Paradise], an unfinished project of epopee of rubber tappers

[164] In the last battle for the modern outline of Brazilian nation in guerrilla warfare, diplomatic adjucations and negotions (this time with Peru over 1/5 of Amazonian territory), in the aegis of Rio Branco, Minister of Foreign Affairs.

in the backwaters of national imagination (see Box 3).[165] To Neves (2012: 268; 2014: 70; 2021: 208), da Cunha's writings are infected with an idea spread among naturalists, travelers and explorers of foreign breed. Noelli & Ferreira (2007; see also Whithead, 1996; Barreto; Machado, 2001: 243; Gondim, 1994; Ferreira, 2010; Silva, 2024) aptly frames it in a long legacy that in different forms reiterates the main tenets of the 'theory of indigenous degeneration' in figures of scientist-explorers as von Martius and Varnhagen of the *Instituto Histórico e Geográfico Brasileiro* [Brazilian Historic and Geographic Institute] (IHGB), Barbosa Rodrigues, von Ihering and Goeldi of the *Museu Botânico de Manaus* (1883-1890), Paulista Museum in São Paulo and MPEG in Belém (Schwartz, 1993; Lopes, 1997; Treece, 2000; Ferreita, 2010; Silva, 2024) and later North Americanists of the Smithsonian Institute. In principle, it credited nothing of great accomplishment to the indigenous societies and to the environment of the tropics a deterrent to social evolution.

For Euro-American popular and scientific imagination over centuries, enduring prejudices regarding aboriginal life essentially replicate the idea of Native Americans' primitiveness debated in opposite ends of stock images of the noble or ignoble savage Indian (Deloria, 1969; 1973; 1995; 1998; 2002). Popular theories that early history of North American archaeology had gone on some pains to dispel were typified in the long debate, rife in the nineteenth century and with die-hard supporters even today (e.g., Giorgio Tsoukalos *et al.*), on the Mound-builder construction in the Midwest of the United States east of the Mountain Rocks. It is one of the foundation myths of white America in that these monuments were accorded to non-Indian stock the construction of massive earthworks, contributing to the epistemological uprooting of native populations (Silverberg, 1968).

In a typical example of allochronic practices and colonial construction of alterity (i.e., "denial of coevalness" Fabian, 1983: 32), the Other-as-Indian becomes walking indigenous statues of the present. Such notions of vanishing anachronism were key to legitimizing epistemic exclusions, dispossession and genocide of the Native Americans at the time white settlers pressed hard into lands westward of the Apache Mountains. As indigenous groups were objectified in the authoritative scientific utterance, they were placed and plotted on the 'primitive' and 'savage' slot, faraway in the hierarchy of Western's Time: "'they are archaeology still alive'" (Morris, 1933: 74 *apud* McGuire, 1992: 824).

[165] A set of these essays are reunited in the section "*Terra sem História* [Land without history]," the first section of *À margem da história* ([1909] 2019; see Hecht, 2013: ch. 12).

As anthropology and archaeology became professionalized in U.S. universities, public research institutions and museum departments – and as physical contact between East Coast researchers and Indians progressively rarefied, with issues of 'Indian affairs' in western territories shifting away from the clerks of foreign policy departments – natives of North America have been deemed to be uncreative peoples capable to carve a history of their own. They were considered to be stuck in the Stone Age, doomed to die out, and to lose the integrity of their historiographies as part of nation's natural heritage with the forward march of progress (Willey; Sabloff, [1974] 1980: 12-33; Trigger, [1980] 2003; 1986; [1989] 1996; Hinsley, 1981; Wolf, 1982; Patterson, 1995; Gosden, 1999; McGuire, 1992; 1997; 2004; Thomas, 2000; Diáz-Andreu, 2007). It is undeniable that such persistent notions found their way in unilinear causal sequence Savagery-Barbarism-Civilization by evolutionary enthusiasts into the scientific designs of the Bureau of American Ethnology (BAE) of the Smithsonian towards the end of the nineteenth century (see Hinsley, 1981: chs. 5-6 for a brilliant account) and, as of the early twentieth century, in the Classificatory-Historical Period of North American archaeology (Willey; Sabloff, [1974] 1980; Lyman; O'Brien; Dunnell, 1997a; 1997b; cf. also Trigger, 1986; [1989] 1996).

As neo-evolutionary research gained traction in the US from the mid-20th onwards with a new generation of evolutionists in social anthropologists of the stem of White and Steward and cognate ecological approaches in anthropology (cultural evolutionism and cultural ecology or multilinear evolution, see Willey; Sabloff, [1974] 1980; Morán, 1990: chs. 2-3; Whithead, 1996), old myths of the Noble/Vicious Savage were not dispelled by the deans of neo-evolutionism. The message of the march of progress come through archaeological thinking even in stronger scientific tones. The view of an upper limit of complexity set by moral-laden classification of cultural evolutionary ideas continued to be preserved in essence via their students, undercurrent of influences in the yet-to-born New Archaeology (

Fig. ***5.2***).

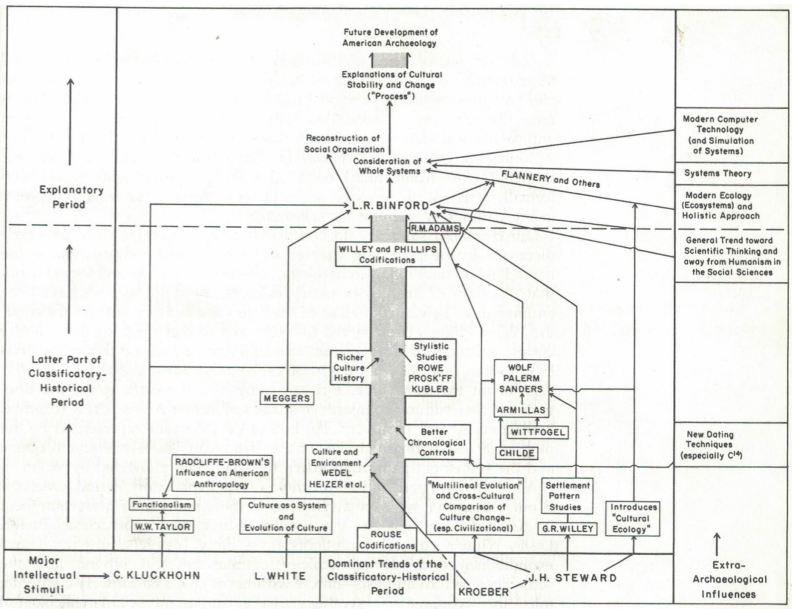


Fig. 5.2. Chart with main influences of new archaeologists' ideas. In: Willey; Sabloff, [1974] 1980: 189, fig. 120; cf. Gosden, 1999: 95, fig. 5.3.

As the 1960s wears on, processual archaeologists rise to exert hegemony over the US archaeology for the next decades, the authoritative discourse of positive knowledge continued to perpetuated earlier attitudes towards stewardship over indigenous heritage that went hand in hand with alienating policies by hegemonic groups of archaeologists in the US and Latin America (Trigger, [1980] 2003: 61-62; [1984] 2003; 1986: 201; 205; McGuire, 1992; 1997; 2004: 383; Thomas, 2000; Patterson, 1995: ch. 5; 2010; Schmidt and Patterson 1995b). Concomitantly, White-Native American relations, in particular with US archaeologists, strained as long-held Native American objections and pleas of self-determination fell on deaf ears.

The work of Vine Deloria Jr., a Standing Rock right activist, is a magnificently critique to ideologically saturated image of the Indian in American anthropological thought. In the mordacious essay "Anthropologists and Other Friends" (Deloria, 1969; see also Biolsi; Zimmernan, 1997a; 1997b) and *God is Red* (1973), he takes issue with the "anthros" alienated to any practical concern to the lives of real Native peoples and the breed of archaeologists for which "[…] the only real Indians were dead ones" (ibid., 1973: 33). As articulator of the reality of Native peoples from the "backwaters of the American life" (ibid., 23) to the center of national politics, Deloria captured the rising tide of complaints that reach a crescendo with the American Indian Movement (AIM) and the wave of protests over the federal states of the country in the early 1970s as the occupation of Alcatraz Island in 1969 (ibid., 14-18); the invasion of grave digging in Welch, Minnesota in 1971 (ibid., 30-32; cf. Ponsor, 1971), the

capture of the Bureau of Indian Affairs in Washington in 1972 (Trail of Broken Treaties) (Deloria, 1973: 3-7) and the armed protests of Wounded Knee in South Dakota in 1973.[166]

Blocked by intransigence buried deep beneath universalizing language of science, anti-hegemonic strains of US society made their voices heard, raising support in society by and large to a new legislation on reburial of human remains in the late 1980s (National Museum of the American Indian Act (1989) and NAGPRA (1990)). We have to wait long years to find a broader trend of changing attitudes, challenge of the view of self-proclaimed unbiased agenda of scientism, ethic issues and the socio-politics of archaeology started to be seriously appreciated by new critical approaches (e.g., Shanks; Tilley, [1987] 1992; Patterson, 1995); and years longer to archaeologists start in picking out threads of postmodern theory in fully-fledged post-colonial scholarship (Schmidt; Patterson, 1995b and papers therein; Gosden, 1999; 2001; [2001] 2012; Liebmann; Rizvi, 2008; Lydon; Rizvi, 2010b but see the South American background in Latin America in Haber, 2016).

Expressing through a mixed heritage of nurtured strains of thought of amateurs and scientist-explorers and professionals and early theoretical pockets, at the time these models were invalidate in the US archaeology, lowland rainforest and societies threading upon them emerge to North Americanists of the middle of the 20th as nurturing shallow ties to the land and history, typified in the earlier statement of Varnhagen ([1854] 1978: 30 *apud* da Cunha, 1992a: 11) that "'*de tais povos na infância não há história: há só etnografia*.'"

Naturally enough variants in the image of Indianness in the American neotropics emerged in concert with the colonization process of South America as a whole and the newest iteration in neo-colonial reincarnations. The modern history of archaeology around these latitudes of the 'new' hemisphere cannot help to be influenced by the currency of old-stock values about past and present of Amazonian Indians.

The six volumes of the *Handbook of South American Indians* (HSAI) published by the BAE, organized by Steward over 1940s is a pillar on which such ideas of culture classification, geographical transmission and historical development under the influence of environmental determinism rest (see critical views in Noelli; Ferreira, 2007: 1247-1250; Fausto, [2000] 2010: 11 ff.; Silva, 2024: 122-124). The inter-areal compendium of mainly ethnological references inaugurated a 'standard model' (Viveiros de Castro, [1996] 2002: 320-324; Stahl, 2002: 39-

[166] All these events are reported in the Indian newspaper *Akwesasne Notes* (Roosevelt, New York), published from 1969 through 1997. Available at: <https://www.aidhp.com/items/browse?collection=1&sort_field=Dublin+Core%2CTitle&sort_dir=a>. Accessed 11 Dec 2023.

42) of ethnology and archaeology throughout by which culture-area typologies are confounded with historical developmental stages.

Through its contributions to the HSAI, Steward (1948a; 1949a; 1949b) formalized in a scientific model an old tradition that uniformly places the Amazonian tropical rainforest environment and lowland societies in a peripheral area relative to the highland civilization of Peru and Mesoamerica, seeing them as tributary to adjacent regions within a context of 'flat' time-depth and limited agricultural potential (see e.g., Roosevelt, 1991; 1992: 57-58; 1994a: 2-3; Neves, 1998: 625; 1999: 220; 2006, 2012; Fausto, [2000] 2010; Noelli; Ferreira, 2007).

Steward laid the groundwork under the guidance of a paradigm that combines in a typological analysis organizing geographical patterns (cultural areas), diffusionism and evolutionary stages conditioned by environmental constraints upon technological aspects of cultures. The whole South American continent was 'scrambled' into a socio-political classification of configuration and dynamics of cultural development of societies, much as it had been done for the North American archaeological areal syntheses under the auspices of a revigorated cultural evolutionism (Willey; Phillips, 1958; cf. Willey; Sabloff, [1974] 1980: 170; 175-176).

Rainforest lowlands and Amazonian Indians fitted in the "strikingly uniform" (Steward, 1948a: 885) Tropical Forest Culture mold and ranked mid-way between social evolutionary stages of, on one end, 'submarginal' or 'marginal tribes' of hunter-gathering economy in peripheral areas scattered over the *sertão* scrubland and Central Brazil and, on the other, Circum-Caribbean chiefdoms and Andean states. The Forest Culture type is portrayed by Lowie (1948: 1) as an inventory of cultural traits of ethnohistorical and ethnographic present of tribes in the Amazonia. Dugout canoe, cotton hammocks, pottery, root cropping cultivation and absence of architectural and metallurgical work got distributed by agents of diffusion on boats and ease of riverine movement within contiguous geographical area.

For the late 1940s and the twentieth century, archaeological research in Amazonia can be considered an offshoot of US archaeology. Through official institutions in Brazil sponsored by the Smithsonian, largely informed or strongly influenced by the intellectual agenda of Steward, collaborators and emissaries as the couple B. Meggers and C. Evans sent to the delta of Amazonas to test the former's hypothesis of devolution Circum-Caribbean to Tropical Forest sequence.[167] The background environment of corrupting humid latitudes is the subtext

[167] Steward (1948a: 848) believed that the indigenous groups of the TFC were a product of migratory flux from the Circum-Caribbean regions in a local struggle of adaptation. Cf. Prous, 1992: 427-428; Neves, 1999: 220.

of a pervasive view of shallowness or faint imprint of pre-Contact indigenous occupations, characterized essentially by a pattern of small-scale socio-political organizations and highly mobile groups in exploring cycling resources and shifting agriculture, predicted in the paraphrase with the ethnographic present (see e.g., Type 2 of "areas of limited agricultural potential" in Meggers, 1954: 803). By casting matters in such determinist shapes as much, the agents of Washington museums' clearinghouse were plagued then by pessimistic conclusions about sources of social and cultural change that ultimately ignored indigenous heritage influences. Ergo the posited poor soils of the rainforest became a fertile ground to the blossom of the historical approach of German ethnologists and Boas in the turn of the nineteenth century to germinate and normative ideas of migrationism and diffusionism spread as a black-box explanation.

Diffusionist accounts unfolded the history of the region in terms of the 'irradiation of down-graded tropical barbarism by higher Western civilization' (after Childe, 1958: 70). Whatever cultural innovation and development happened in 'history before history' of America, it had to be attributed to external sources. Andean state societies played the leading role of agents of cultural inception in the prehistoriography of Amazonia. As the conception of *Ex Orient lux* built the cultural chronologies of the European continent before the radiocarbon dating (Renfrew, 1973), I christen this idea *Ex Andes lux* to allude in equivalent terms to the fact that the area was framed as a recipient of cultural diffusion and migration.

This marginality of position and low status put down a firm root in an ecological deterministic view of the tropical rainforest environment and its deleterious effects in the constitution of socio-cultural complexions, demographic growth, political centralization and economic specialization of the indigenous communities of the region. Meggers' agriculture-centered classification of types of environments in the world is typified by the lower expectations of agriculture potential of the Amazonian soil, lesser antiquity and inability of pre-colonial native communities to achieve *monumental* accomplishments without alienigenous (trans- or inter-continental) impetus of cultural or demic 'influences' (Roosevelt, 1991; 1992; 1994a; Noelli; Ferreira, 2007). As it has been repeatedly noted (Roosevelt, 1991; Noelli; Ferreira, 2007), the neo-colonial attitude towards the Third World countries of Latin American countries in the ecological perspective on cultural growth of Meggers (1954; 1960; [1971] 1987; [1972] 1979) reprojects into the past the political economy of the present. Typologies of environmental barriers to cultural progress were raised to "[…] a force at work to which man through his culture must bow" (id., 1954: 809). Eventhough Meggers is not guilty directly of served US officers in Latin America, as of other precursors in the pre-war period

(Patterson, 1995: 60; 78), "[...] *para Meggers*[...] *a história corre unilateralmente, do Sul para o Norte* [...] *tornando-se mais desenvolvida e menos atrasada à medida que avança."* (Noelli; Ferreira, 2007: 1257).

The deterministic school subsumed biological and cultural dynamics, environmental constraints, level of local adaptation in the core of culture and development in the line with the evolutionary categories. By taking the status of refugees of colonial expansion in interfluvial areas (Roosevelt, 1992: 130) for ahistorical tribal realities and essences of primitive cultures, these ideas contribute to a constitution of a *doxa* and founding idea nurturing a joint partnership between the government of US and Brazil of the 1960s, the PRONAPA (National Program of Archeology Research, 1964-1968), set to provide the cultural chrono-sequence backbone in the East Brazilian Highlands and Atlantic Coast as well as determine the direction of movement and diffusion. The plan of training and action of 'pronapians' was bound to systematically rise the net archaeological sites known in Brazil in order to extend the coverage of sampling and enable the comparability between regions of the country (Meggers; Evans, 1965; Evans, 1967).[168]

In a delayed and long early phase of the Classificatory-Historical Period (Willey; Sabloff, [1974] 1980) in Brazilian archaeology with wide reverberations still today (Barreto, 1998: 574; 2000: 47; Neves, 2010: 569), PRONAPA structure acted as a main gate-keeper of funding and self-legitimization guild of professionals in a burgeoning field in the leaden years of the military regime in Brazil (1964-1985) (Funari, 1995; 1997; 2002; Noelli; Ferreira, 2007; see Silva, 2024: 45, n. 32; 141).

[168] By means of surface collection and stratigraphic excavation of small pits (1×1, 1,5×1,5 or 2×2 meters) in artificial levels of 10 cm.

Meggers' *Amazonia: Man and Culture in a Counterfeit Paradise* (1971) illustrates the moral and political feats of the rainforest environment by two telling examples. In the first, the polychrome tradition, a 'horizon style' that spreaded like wildfire from the Andean highlands and Marajoan culture in the tip of the low Amazon epitomizes the cultural degeneration of an intrusive model of civilization (Meggers, 1971: 148-149; Meggers; Evans, 1958; 1970: 101-102; Meggers, 1971: 206). In the second, the jungle barriers stand against the possibility of the Inca Empire to extend its grip deeper into the Amazonian Forest (Meggers, 1954: 811; 1971: 166-167). In the lowland neotropics, we are told, the soil is poor in nutrient when not infertile, scarce in protein and fat resources, temperature high and climate unpredictable to civilization thrive beyond certain levels. In the waiting room of history, the end point of a fast-paced migration and a diffusion across space (between different setting of culture areas) is at the same time a 'step down' and hence devolution along the (evolutionary) time line (**Fig. 5.3**). The same sits on the present of "[…] surviving indigenous groups [that] perpetuate settlement and social behavior adopted at least 2000 years ago" (Meggers, 2001: 304; cf. Heckenberger; Petersen; Neves, 2001: 329).

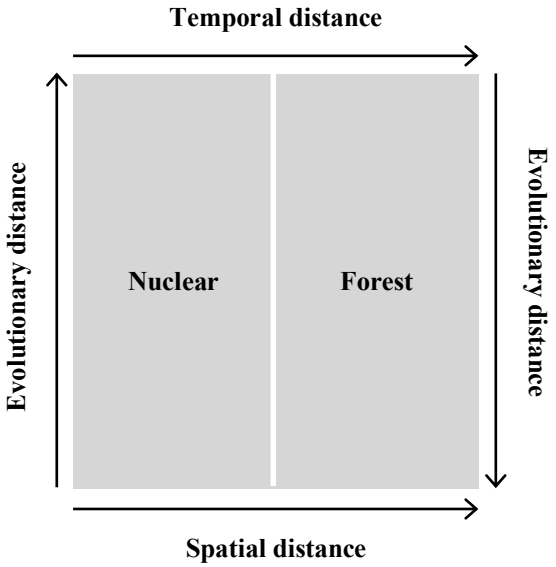


Fig. 5.3. Diagram illustrating the evolutionary thought of Meggers. Drawing author.

In the Western Hemisphere of the seventeenth through the eighteenth centuries, the homogenous sign of frontiers of expansion and conquest is the sign carried by the 'stone age people' inhabiting it in the atavism of primitive eras. The category of *el indio*/*los* indios (Bonfil Batalla, 1972; [1987] 2019) cannot be divorced from the binomial colonizer-colonized relationship that first brought it about and that persists in former colonial states in what have been termed "internal colonialism" (Césaire, [1955] 1978; see also discussion in archaeology in Diáz-Andreu, 2007: ch. 10; Ferreira, 2010: 24-25). The colonial history of Brazilian Indians through the nineteenth century is punctuated by the frontiers of conquest of colonial expansion and subjugation, time and again, of its native peoples (cf. Hemming, [1978] 2008; [1987] 2009; Treece, 2000; Le Tourneau, 2019: chs. 3-4 for a historical overview). As we have been seeing, the process is a reiteration of stigmas incarnated in the people of the Amazonia.

During the Brazilian authoritarian regimes in the 20th century, the 'scramble for the Amazon' led to major – and dramatic – projects of national development including tax exemptions, subsidies and creation of investment funds. This unfortunate 'March to West' exemplified of Brazilian internal colonialism, with dire consequences to the indigenous communities (Davis, [1977] 1978; Hecht; Cockburn, [1990] 2022; Le Tourneau, 2019: ch. 4).[169] Anthropologists S. H. Harris ([1977] 1978), M. P. Gomes ([1988] 2012: chs. 2-3) and M. C. da Cunha (1992a; 1992b; [1994] 2012; see also Munduruku, 2012: ch. 1) note in respect to state indigenous policies in Brazil, over the republic period over the decade of 1970, paternalist, positivist, western-centric beliefs of society and the civilizatory process were prevalent. Assimilationist models of Indian integration and liberal notions of identity and citizenship used to depict an upward trajectory of progress of national economic development.[170]

[169] The 1,515 pages of the Figueiredo Report produced by the public prosecutor Jader de Figueiredo Correia in 1967 amply testifies the crimes commited against entire tribes, massacres, poisoning and infection among other crimes (Davis, [1977] 1978: 33 ff.).

[170] Comissioned by UNESCO "[…] to write a celebratory account of the incorporation of the indigenous communities into the wider society" (Treece, 2000: 1), Darcy Ribeiro (1970: 8) exposed the mythologizing devices of the national integration in confrontation with the real conditions of indigenous peoples at the intersection of the multiple frontiers of civilization.

> *Assim, o estudo que pretendíamos realizar do suposto processo de assimilação das populações indígenas no Brasil moderno resultou na conclusão de que o impacto da civilização sobre as populações tribais dá lugar a transfigurações étnicas e não a assimilação plena.*

The upside down of expectation and change of direction mirror the paradigmatic revision of the conception in the subsequent years with the expression of other mood, first in dispositive of law in international forums and the consolidation of a new indigenous policy in the country. Changing attitudes toward industrial development and beliefs in economic and social betterment coupled with the educative character of the Brazilian indigenous movement in the intervening period (Munduruku, 2012) helped to reaffirm fundamental rights of ancestral peoples in the country and identity of these populations along divergent lines of previous reifying signifiers of culture of the 'Indian.' (**Box 9**).

Box 9 – Citzens' Constitution

The Constituent Assembly and promulgation of the Federal Constitution of 1988 (BRASIL, [1988] 2013) is a reflex of this rupture in the exit gat of the jackbooted rule and re-democratization of Brazil (see Hecht; Cockburn, [1990] 2022). New conceptions of multiculturalism and pluralism gained ground in the legal recognition of cultural heritage preservation (arts. 215 and 216) and land right plead to indigenous and traditional groups, as well as principles of bio and socio diversity with the Chapter VI "Environment" (Santilli, 2005: ch. 2) (**Error! Reference source not found.**).

Fig. 5.4. Krenak, president of the União Nacional Indígena (UNI) at the plenary pulpit of the National Congress. He iconically painted his face with jenipapo while discoursing in defense of rights and lands of authochtonous peoples. In: Guran, 1988: 92.

In the dispositions of chapter VIII "on Indians" (BRASIL, [1988] 2013, arts. 231º and 232º, caput), it is stated that

Indians shall have their social organization, customs, languages, creeds and traditions recognized, as well as their original rights to the lands they traditionally occupy, it being incumbent upon the Union to demarcate them, protect and ensure respect for all of their property.
[…]
The Indians, their communities and organizations have standing under the law to sue to defend their rights and interests, the Public Prosecution intervening in all the procedural acts.

More than never in the last decades the "administrative version of anthropological thought" (Hoxie, 1992: 973 *apud* Biolsi; Zimmerman, 1997a: 13) is in need to be examined. The impending challenges of the frontiers of expansion of capitalism over the last decades have been threatening to tame many of the Amazonian territories and push its indigenous populations aside "[…] to fade gently into history" (Deloria, 1973: 27). As of the present hour, the logging of many parts of the Amazonian Forest is accrued by predatory draining, agro-pastural deforestation, illegal mining and development programs (see Le Tourneau, 2019: chs. 6; 7; 9

with up-to-date discussion and bibliography for the Brazilian Amazonia).[171] These pressions over natural resource extraction have been rising indigenous plight. The *Marco Temporal* thesis with potential deleterious to indigenous lands is a case in point in the judiciary sphere of the conflict, with possible throwbacks in the rights granted by the Constitution of 1988.[172] The gold rushes in territories of the *Terra Indígena Yanomami* (TIY),[173] in the state of Roraima, another front of attack actively publicized by national and international media in the late 1980s and at the present time.[174]

How Amazonia is presented to globalized public consciousness in recent years is also symptomatic of the critically important role asserted to the region as a study in contrasts in the era of the Anthropocene.[175] This is also a result of the raised international awareness of global responsibility under the auspices of UN (e.g., 1972 Stockholm Conference, Brundtland Report or "Our Common Future" of 1987, Eco-92, etc.) and the first-hand political participation of many indigenous and forest's activits outside their local communities, publicly denouncing the continuous attacks to their rights and lands but also generally the impeding disasters to the Earth (see Hecht; Cockburn, [1990] 2022). Yanomami leadership and shaman Davi Kopenawa (Albert; Kopenawa, 2010) have been warning on the dangers of the falling over the sky over our heads. Krenak ([2019] 2020) emerges also one of the major spokesmen for morally reform of the current global ecological crisis. The alternative of our collective future rooted in the Amerindian indigenous worldview may also seemingly find resonance with authenticity

[171] Since the 1970s through 2018, the accumulated deforestation of Legal Amazonia figures reaches 775.000 km^2 (see Le Tourneau, 2019: 331, fig. 7.1).

[172] The thesis implies the demarcation of indigenous lands in the country. In one decision of Brazil's Federal Supreme Court (STF) in 2009 with regard to the *Terra Indígena Raposa Serra do Sol* (RO), ministers established the date of 5 October of 1988, date of the promulgation of the Federal Constitution, as the 'limit after which' indigenous claimants must have been occupying the land in petition (Gomes, [1988] 2012: 111-112; Barbosa, Cunha, 2018).

[173] The TIY was demarcated in 1992 and straddles an area of 9,665 ha in the states of Amazonas and Roraima in the North region of Brazil, at the frontier with Venezuela. Its population is of 31,223. See https://terrasindigenas.org.br/pt-br/terras-indigenas/4016.

[174] Only in 2021, 1,0000 ha were logged, resulting in cascade effects for many indigenous communities directly affected by the contamination of stretches of water by mercury and transmission of infectious diseases as malaria (see report of April 2022 in HAY; SEDUUME, 2022; see also RAISG, 2021). As I write these lines, public health emergency was declared in January 20, 2023.

[175] The notion of Anthropocene, formulate by the 1995 Nobel Prize in Chemestry P. Crutzen (2002) harness in a species-oriented definition to a new geological era the increasing effect of humans (Greek *ánthrōs*, 'human,' plus *kainós*, 'new') over the conditions of life in the planet. The use of the term has been extensively criticized, and other terms and start dates have been offered, in a trend to highlight the political dimension and environmental degration of capitalist modernity and colonialism: "Econocene" (Norgaard, 2013), "Capitolocene" (Malm; Hornborg, 2014; Malm, 2016; 2017), "Technocene" and the Industrial Revolution (Hornborg, 2016), still "Anthroponocene" and 1610 with the cooling of athmosphere (Lewis; Maslin, 2015a; 2015b; 2018), "Plantationocene" and "Chthluceno" (Haraway, 2015; [2016] 2023; Haraway *et al.* 2015). The Martiniquian Malcom Ferdinand ([2019] 2022: 80-81) coined "Negrocene" to engender the subaltern Other, their material, political and social plight and strategies of resistance in a decolonial future in colonialism, slavery and environmental destruction in the global era of capital exploration and "colonial inhabitation" (ibid., ch. 2).

demands and escapist attitudes of urban middle class sectors. In the face of the trail of environmental destruction and geoclimate degradation, Amazonian Forest epitomizes in a hegemonic environmentalism and consumerist relation to 'it is all one world' the culturally saturated encoding of indigenous Amazonia with the mirror of our own modernity (

Fig. 5.5).[176] The "colonial inhabitation" of our current times (*cene*/*kainós*), however, also involves rethinking from below the hold of slave ship of capitalist modernity (Ferdinand ([2019] 2022).

Fig. 5.5. Adneia, a Yanomami leadership in Palimiu by Mosse, region flagellated by illegal mining, in a powerful discourse in the exhibition *Broken Spectre*, recorded in June, 2021 (Mosse, 2022; cf. also Hay; SEDUUME, 2022: 2-3; HAY; ISA, 2024). Photograph © Richard Mosse.

If there is one major contribution of ethnobotanists, geographers and recent archaeological scholarship on Amazonian history is that there is no way of divorcing the ancient history of the Amazonia from the signature of autochthonous peoples (Neves, 2022; Iriarte, 2024).[177] The concept of a *longue durée* Amazonian history involves relationships that span multiple scales and temporalities that collapse false dichotomies between past and present (Kater; Lopes, 2021). The socio-environmentalism ideas that have flourished in the country since the second half 1980s have showed on another focus of discussion new conceptions of dynamics of biodiversity and citizenship with environmental preservation (if not only for Amazonia) (Hecht; Cockburn, [1990] 2022; Santilli, 2005: ch. 1; cf. Le Tourneau, 2019: 282-286). Its greatest merit is the association of environmental sustainability, food security and social equity of local (traditional and indigenous) peoples that advanced previous debates on

[176] The Summary for Policymakers (SP) of the Synthesis Report (SYP) by the Intergovernmental Panel on Climate Changes (IPPC) of the Sixth Assessment Report (AR6) congregates research and trends in climate change and global warming (IPCC, 2023). Human-induced activities are largely responsible for global warming in the last 50-year period. There is a high likehood that it will reach 1.5°C – or even 2°C in worst scenarios – with widely impacts in world precipitation, soil mostuire, species losses and food production (IPCC, 2023: 12 ff.). Climate scientits Lovejoy & Nobre (2018) argue that the 'tipping point' for the hydrological cycle equilibrium and consequential drier season and transformation of central, southern and eastern of the Amazonian rainforest in savahna is around 20-25% of deforastation (50% of the rain is recycled by the forest itself). Gatti *et al*. (2021) have noted that, as for the 2010-2018, the southeastern and eastern parts of Amazonia turned to a carbon sink.

[177] See e.g., https://amazoniarevelada.com.br/

environmentalism and environmental conservation in Brazil and the dauting challenges of global climate change.[178] The reiterated themes of the ancient history of Amazonia through the future of preservation of bio and socio-diversity find themselves related in sustainability policies for the Amazonian Forest and this social history could not be divorced from the history we are about to engage.[179]

Brazilian classicism

To compare 'incomparable' things is to eye new questions. Knowledge about the mechanisms of comparison is a two-way journey, where ways of looking to similarities and differences are equally significant to draw on new methods of data visualization, challenge the ideological stances of research agendas to ultimately counter mythologizing aspects of history. It would seem suspicious attempt to do so, from the part of a classical archaeology 'from the tropics,' paradoxically in a good position to be subversive beyond the purview of Eurocentric frames of meaning (Funari, 1989; 1995; 1997; Pappa, 2020), without incorporating empirical research of a "Brazilian archaeology from a Brazilian perspective" (Barreto, 1998). A 'Brazilian' archaeological perspective is understood along the angle of a double perspective. Firstly, a more inwardly focused of national institutional disciplinary context and the practical challenges archaeologists face in writing an alternative human history to the canonical history of Brazil (Cunha, 1992a: 9; 2012), revealing a deep-rooted Ancient History (Neves, 2006: 10) of indigenous people in lowland South America. Secondly, and cross-cultural in outlook, how current local interpretation and conditions of doing archaeology relate to wider international debates (Funari, 1989; 1995; Barreto, 1998: 573; 2000: 49; Neves, 2015: 9; Meneses, 2015: 20).

> A Brazilian archaeology exists, not because of its geographic boundaries nor because it is done by Brazilians, but because its institutions and professional community share a long history of theoretical handicap and misplaced foreign influences. (Barreto, 1998: 573).

[178] The movement was in tune with broader eco activism and environmental treaties and social movement and indigenous articulation in post-1988 Brazil such as the *Aliança dos Povos da Floresta*, the Altamira Gathering against the construction of Belo Monte Dam in 1989 (see Hecht; Cockburn, [1989] 2022: ch. 8).
[179] Cf. e.g., project "*Povos tradicionais e biodiversidade no Brasil – Contribuições dos povos indígenas, quilombolas e comunidades tradicionais para a biodiversidade, políticas e ameaças*" (http://portal.sbpcnet.org.br/publicacoes/povos-tradicionais-e-biodiversidade-no-brasil/).

The terms of this human ancient history, critical historiographical account and insight of theory and method are in dispute, nonetheless. To Neves (2011: 36; 2015: 11; 2016: 36), lowland South America is a ground testing for the general validity of mainstream archaeological models that postulate correlations of agriculture expansion and language family distribution. Instead, we would rather suggest with the Amazonian region in view that the interest lies other than in an exercise of experimentation at the margins of the Third World periphery. As the Mediterranean Sea of the late prehistory, Amazonia of pre-Columbian times is 'good to think with' and "rethink the metaphor" (Silliman, 2005: 56 in a Kuhnian vein) of continuity and change in which mobility and interaction are the natural order of things to environments that acted as frontiers of diffusion and the circulation of geographical patterns of diverse entities stretched long-term and large-scale practices in the Mediterranean and Amazonia breadth.

As a test of this approach, scenarios for the expansion of ceramic styles, such as the polychrome ceramics, are first examined epistemologically in an alternative ancient history of Amazonian indigenous people. Essentially, this approach benefits from network-based insights in a *longué durée* history *of* Amazonia, not *in* Amazonia (see **The kaleidoscope of connections**). The assertion of multiple temporalities of the landscape, the many histories of continuities and contingently ruptures weld a multi-scalar perspective rooted in the fluidity of contact brought by the river itself. A dynamic socio-cultural circumstance of interchange of indigenous practices is created by the nonlinear movement of the river and the mosaic composition of the things of the forest.

A keen eye is needed in an archaeology in Amazonia to short and long-lasting effects of materializing forms of memory of the past in the present (Olivier, 2008); and the multiple nature-culture relationships entertained in a non-Western-centered ontology of the forest (Viveiros de Castro, [1998] 2002; Descola, 2005). Countless Amazonian peoples have been cultivating the structure of the forest over millennia of agroforestry practices, generating new types of soil, earthworks and domesticating and dispersing tree species of the environment (Hecht; Cockburn, [1990] 2022: 57 ff.; Denevan, 1992; Petersen; Neves; Heckenberger, 2001; Heckenberger *et al.*, 2003; Balée, 2008; Erickson, 2008; Neves; Rostain, 2012; Clement *et al.* 2015; Rostain, 2016; Fausto; Neves, 2018; Levis *et al.* 2017; Furquim *et al.* 2022; Arroyo-Kalin, 2021; Cangassu *et al.* 2022; see see **Anthropofagism in classics**). For some time now, a number of socio-environmental proponents in different spheres of activities have been reflecting on the safeguard role of preservation performed by the indigenous lands and other protected areas in Brazilian Amazonia in face of multiple frontiers and economic agents of

deforestation (Nepstad *et al.* 2006; Soares-Filho *et al.* 2010; Nolte *et al.* 2013; Cristosomo; Alencar; Mesquita, 2015; Doblas; Oviedo, 2021; RAISG, 2021; cf. Le Tourneau, 2019: 341; Iriarte, 2024: ch. 10).[180] The human history of Amazonia is the *trait d'union* between period-divided realities, intersecting 'nameless' peoples of the pre-Colombian past and multitude of present indigenous people (cf. "non-contact archaeology' with isolated indigenous populations in Amazonia in Cangassu *et al.* 2022; also Hamilakis, 2011; 2016; Silva, 2024).

Polychromatic layers

The second case study of this doctoral work is intimately intertwined with the ethnolinguistic and archaeological question on Tupi/Tupi-Guarani origins and migrations in the lowland South America through the documented connections of polychrome ceramics. Also, it is connected, with the geographically circumscribed area of hydrography network of the Amazon Basin that provided a theater for weaving together in interaction and transmission pottery-producing practices in variegated patches of landscapes.

This "search for" the origins of the Tupi people is a linguistic concept par excellence. The overall ethnolinguistic Babel pattern distribution and the wide expanses of diffusion across space of linguistic stock and family languages have for long challenged scholars to come up with subcontinental 'solutions,' in the manner that the contested *Stammbaun* model of Indo-European research has been doing as early as the end of the eighteenth century (Arvidsson, [2000] 2006; Demoule, 2014). The foundation of much of what is perceived as cultural affiliation in the archaeological record has its roots in the historical-direct approach and the analogical criteria has been given primacy for asserting cultural frontiers of the ancients, in an implicit association with modern constructs of national consciousness brough about by new technologies of mass printing and public educational institutions (Anderson, [1983] 2008).

The diverse ethnonyms conferred by many chroniclers of the sixteenth century and observations of art, costumes and languages of the indigenous Tupian groups of the coast served as steppingstone to later thinkers apprehend the relatedness of these groups. Spatialized identities over a 4,0000-km long strip along the East Coast from the states of Rio Grande do Sul up to Ceará (see distribution in Fausto, 1992: 383-384) offered a convenient intersection

[180] The indigenous territories in the Brazilian Amazonia comprise as of now a total of 22% and, *in toto*, 13,75% of national Brazilian territory. Cf., on status of legal and administrative status of the process of demarcation of Indigenous Lands (T.I.), the website of FUNAI (https://www.gov.br/funai/pt-br/atuacao/terras-indigenas/demarcacao-de-terras-indigenas). For maps of protected areas and indigenous territories in pan-Amazonia (https://www.raisg.org/pt-br/) and T.I.s in Brazilian territory with a more frequent update, the site and regular publications of ISA (https://terrasindigenas.org.br/; see also Ricardo; Klein, 2023 (Dez/2022).

for the early thinking on the organizing principles that governed the taxonomic geography of groups. The first synthesis of history and origins that gained form in naturalists and ethnologists as A. D' Orbigny and Karl F. Ph. von Martius are key examples (see e.g., Noelli, 1996a; 1998; 2008a; Corrêa, 2014: ch. 1; Silva, 2024: 110-143 *passim* for an intellectual history of this early bibliography).

Key to concepts of geographical origins and migration routes is macro-organizing patterns of culture and identity linked to essentialist ideologies of past centuries that downplay the array of relationships of causality and patterns of material culture variation (see **Origins and migrations** with bibliography). As we have seen. there is a broad consensus that the rationale behind the idea of movement of whole populations is tributary to the experience of nation-state territorial sovereignty and the self-Other logics constitutive of the "bare life" (Agamben, [1995] 2005) of disenfranchised groups.

Discussions on cultural identity formation in ancient Amazonia have been suggesting promising avenues to account for the Arawak language dispersal and cultural 'ethos' (see for example debates in Hill; Santos-Granero, 2002a; 2002b; Heckenberger, 2002; 2005; Hornborg, 2005; Eriksen, 2011; Hornborg; Hill, 2011a; 2011b). As of yet, however, other cases of broad linguistic dispersal, as the Macro-Tupi in Amazonia and the Tupi-Guarani languages along Brazilian coast façade have not benefited so far from the same treatment in that they still "[…] view contemporary language distributions in Amazonia as fairly straightforward reflections of past migrations and the associated diffusion of material culture such as pottery" (Hornborg, 2005: 595; but see Corrêa, 2014; Belletti, 2015; 2016).

Long-established models of dispersal of Arawakan and Tupian languages have been postulating similar correlations of the demic spread of the Neolithic ways into Europe (Lathrap, 1970; Brochado, 1984; Noelli, 1996a; 1998; 2008a). As a matter of fact, examples of outside-oriented look to demographic-prompted expansions in general, i.e., the putative agricultural drawn-out expansion of Indo-European speakers, the Lapita complex in Polynesia and Bantu expansion in sub-Saharan Africa are not hard to find among Amazonists as they aim at creating a counter model of a cohort of associations in the perimeter of the neotropical lowland archaeology (Neves, 2011: 36; 39; 2016: 36).

Whereas it has been recently stated that Tupian expansions differ from farmer-language dispersal models (Clement *et al.* 2015: 5; see also Neves, 2012; Almeida, 2013), compounded by the fact that in the tropical lowlands of South America agriculture (cultivation, domestication of plants and animals) and sedentism cannot be lumped together into 'packages' of subsistence system strategies that give an 'edge' to some speech communities over others

(Neves, 2011: 39; Fausto; Neves, 2018; Iriarte, 2024), the epistemological implications of the underlying normative themes of population-centered approaches have not been properly addressed. The use of language similar to biology in explaining regional alignments of material culture conspires to conceptually draw cultural boundaries along symbolic lines of otherness, resolving the big question that it entails (but see Hornborg; Hill, 2011a: 8; cf. Zvelebil, 1996 for a critical engagement in respect to the Neolithic colonization Europe).

An arsenal of quantitative and qualitative tools and models of interpretation is available for archaeologists to research the meaningful action of material variability. This stems from the concern in archaeology with similarity and frequency of social interaction between pottery and craft makers in general in historical series within (site-specific) residence groups and between localities (see e.g., Stark, 1998b; Stark; Bowser; Horne, 2008b; Knappett; 2011; Knappett; Kiriatzi, 2016; Wendrich, 2012b; Roddick; Stahl, 2016b; Roux, 2016; Mills, 2017; Östborn; Gerdin, 2014; Collar *et al.* 2015; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024). Cultural practice reified in things embody the technical action of past potters made of flesh and engaged in the life story of learning trajectory communities (Wenger, 1998). If there is thus an equation in the domain of ceramic studies that is unthinkable to refuse is that "pots equal potters" (Roux, 2016: 365). However, inferences of patterns of relationships based on pots in the regional or populational level in that pots or dimensions of pots are taken as *pars pro toto* of cultural totalities is beset with problems.

With the evidence we have of the chrono-geographical distribution of the generalized process of diffusion of Amazonian polychrome pottery type, the dynamics of trait connections between the Middle Amazon and Upper Madeira rivers are examined for critical deconstruction. Here, we want to address some chief questions to be explored from a grass-rot perspective focused on *chaînes operatoires* (Roux, 2016; 2017; Gosselain, 2018), CoP (Lave; Wenger, [1991] 2022; Wenger, 1998; see note 21) and material network research (Brughmans, 2010; Knappett, 2011; 2013b; Mills, 2017; Östborn; Gerdin, 2014; Collar *et al.* 2015; Peeples, 2019; Roux, 2020; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024).

Firstly, there is a genealogically oriented question to the problem itself in the history of the Amazonian archaeology. How polychrome tradition – stylistic origins and spatial distribution – is embedded in archaeological hypotheses picturing alternative scenarios of migration, invasion, or colonization in 1st millennium AD Amazonia? Secondly, in which ways a polythetic analysis (Clarke, 1968; Furholt, 2014; 2019a; 2019b) and diversity of technical traditions of earlier representatives of polychrome ceramics up to date in the upper Madeira River and Central Amazon may prove of contribution to disentangle a multi-layered and

dynamic interactionist scenario of technological transfer in Late Holocene Amazonia? Do the wide geographies of morpho-stylistic types and components thereof track spatial mobilities of groups or, if anything, indicate continuous and homogeneous lineages of pottery-producing communities? Or, instead, is the technical tradition a multi-layered accumulation of traditions constituted in hubs of multi-ethnic and linguistic networks along river channels? What patterns of technological similarities can be framed as migration, and which should not?

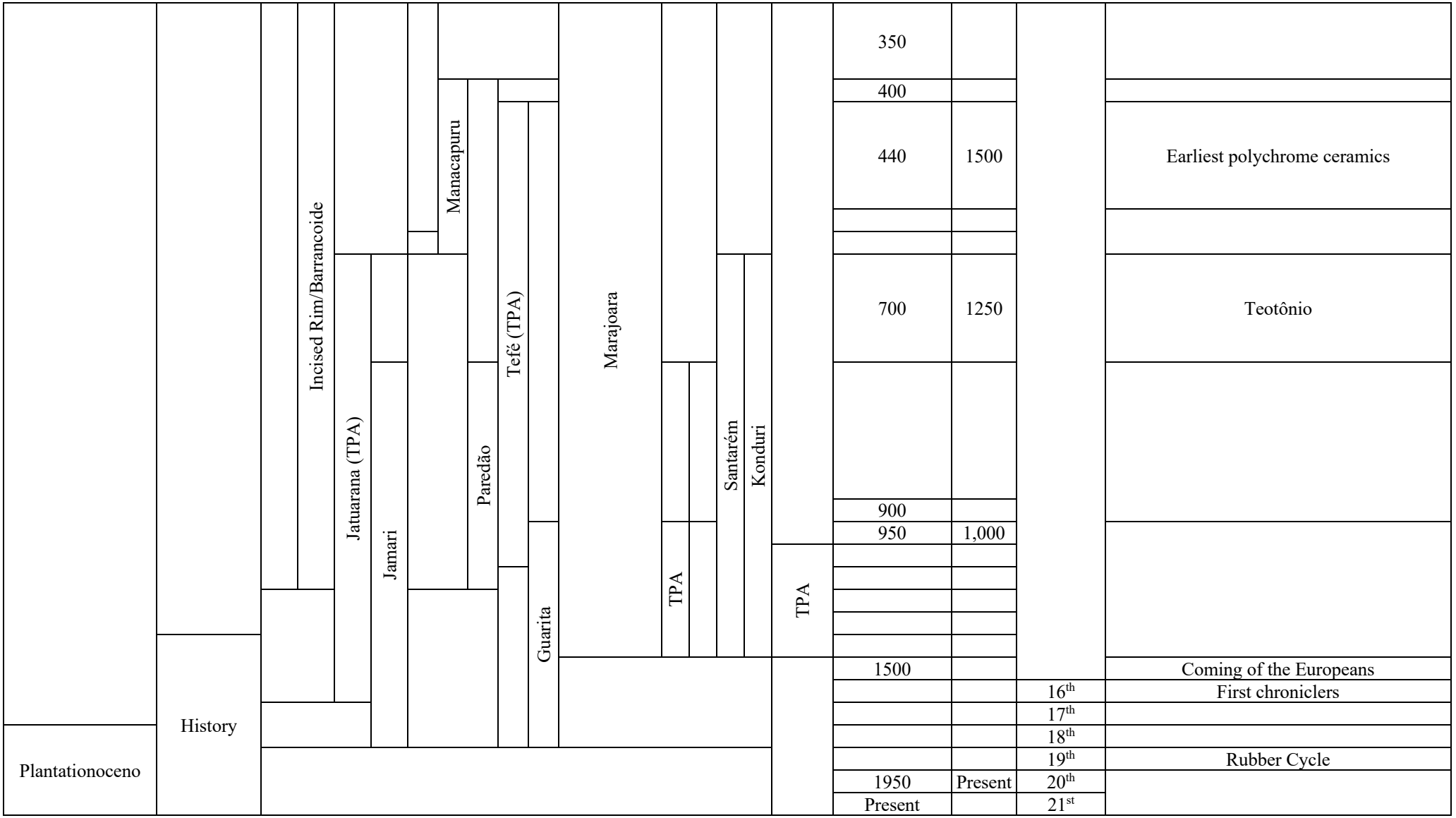
The gist of the argument here is that, when measured in terms of network, the complexity of the Amazonian ecologu may be defined as a structural framework of connectivity encompassing a full range of interaction situations, inter-group exchange and cross-community mobility. The Amazonian socio-behavioral and biological diversity thus becomes a matter of *relations*, in the circumstances of regional dynamics, human-environment, socio-material and relationships between localities. Thinking in terms of networks the multidimensional patterned evidence of the archaeological record shifts the scale of analysis from essentialist and normative approaches toward the stylistic change and stability of elements in the involving dynamics of learning/apprenticeship (see CHAPTER 3).

The hypothesis we want to explore with archaeological SNA (see below) is one in that the link between mobility and society is configurated in inter-relatable scales. This has broader implications for the region in study and the archaeology oriented to study mobility as expressed in diagnostic features of pottery *chaînes opératoires*. The specific structure of material similarities may be explained with the many variants of migration and mobility, i.e., high inter-settlement and *population circulation* (Schachner, 2012) or 'translocal' social relations (Furholt, 2018a) with the circulation of individuals or finished products and techniques in situations of direct or indirect transmission (Roux, 2015; 2020). It may be argued also that non-specialized and specialized modes of production underly different social mechanisms of co-residence and cross-community networks of exchange (Furholt, 2018a: 311-312).

"The cannibals are coming!"

The Amazonia Basin has a long record of human occupation history (**Tab. 5.1**).

Period		Ceramic complex								Absolute years			Major events
		Upper Madeira	Amazonia						West	BC/AD	BP	Cent. AD	
			Central		East								
			Amazon										
			Middle Amazon		Estuary	Lower			Upper				
Pleistocene	Paleoindian									1150 BC	13,000		End of Ice Age and human dispersal in Amazonia
										1050BC	12,000		
										9050 BC	11,000		
Early Holocene										8050	10,000		
Middle Holocene	Archaic									7050	9,000		
						Pedra Pintada	Taperinha			6050	8,000		Ancient ceramics of the South America
										5050	7,000		
					Mina Tradition					4050	6,000		Earliest anthrosols
										3050	5,000		
		Pocó-Açutuba		Pocó-Açutuba						2050	4,000		
Late Holocene	Formative					Pocó-Açutuba				1050	3,000		
										50	2,000		
										Anno Domini	1950		
							Incised Rim	Tupinambá Sub-Tradition of Amazonia		200			



Tab. 5.1. Chronological scheme of pre-colonial and colonial Amazonia with relative synchronism between Upper Madeira and Central Amazon and ceramic complexes in the Amazon basin with different methods of absolute year scales. After Prous, 1992; Roosevelt, 1995; *et al.* 1991; 1996; McEwan; Barreto; Neves, 2001; Neves, 2012; Neves; Watling; Almeida, 2020; Barreto; Lima; Betancourt, 2016: 50-51; Iriarte, 2024: 9, fig. 1.1.

The idea that the ancestry, original home and culture and movement of polychrome ceramics are conterminous with genealogical chains and movement of Tupian stock is highly doubtful. Without surprise for those acclimatized to old questions of cultural hearths and descent explanation championed by Indo-Europeanists in divergent strains of nineteenth-century humanism, Aryan romanticism and naturalism (Arvidsson, [2000] 2006; Demoule, 2014), the quest for the origins of the Tupis is from the beginning an instant magnet for self-trained amateurs, naturalists and explorers in the hemisphere.

Much ink has been spilled on the problem by the pen of ethnologists, linguists and, late-comers, archaeologists. Images and concepts, dynamics and patterns projected onto the past for explaining the Tupian languages distribution in South America, albeit true or false, constitute here the primary archaeological locus of the critique of the research history of Tupian origins. To manage a vast and still growing body of literature that gained later during the second half of the 20th cent. nation-wide and institutional-bred specialization, I will concentrate efforts from key publications authored by a host of archaeologists mainly from the 1960 onwards.

In archaeology, this debate on the Tupi origins and spread was shaped into the discussion of the Tupi-Guarani migrations, that is the great territorial expansion of *one* language family, as archaeologists generally tend to go about linguistics (Heggarty, 2014: 601-602). In broad strokes, Tupi is one of the four large linguistic stocks of South America. In 22 April 1500 AD, when Cabral and his fleet landed in the shores of Porto Seguro, there was a true Babel Tower of hundreds or maybe thousands of indigenous languages in the territory of what is now Brazil. Estimations for the number of languages in 1500 vary wildly, 5,000 (Mason, 1950: 163), 1,200 (and 495 only in Amazonia) (Rodrigues, 1983: 19; 1993; 2000: 24-25) or half of that (cf. Gomes, [1988] 2012: 180; cf. ibid., 42, n. 2; 202, n. 13). The great methodological difficulty here is of cross-referencing different data source of ethnolinguistic groups and genetic units at the time of contact prevalent still today with modern methodologies and official counts (Eriksen, 2011) (**Fig. 5.6**).[181] The hecatomb brought by Europeans in the form of epidemics, slavery and starvation drastically reduced the number of languages to more than 85% in Brazil to the half in the Amazonia.[182]

[181] The 2010 Brazilian census (IBGE, 2010) 270 languages were spoken, "[…] *dado incompreensível para os linguistas que já se debruçaram sobre o assunto*" (Gomes, [1988] 2012: 202, n. 13). A list of indigenous people, localization, linguistic filiation and population numbers as of 2010 is provided in IBGE, 2010. The numbers of indigenous languages of the 2022 Brazilian census have not yet been published. Cf. Ricardo; Klein, 2023: 9-16 for a multisource data of 790,000 indigenous people in 266 ethnies inside T.I. in Brazil. The number does not include data on isolated populations (see note 184).

[182] Today, the total number of spoken indigenous languages in Amazonia is of 240 (Rodrigues, 2000: 20), distributed in 50 families and isolated units (Epps; Michael, 2017: 934).

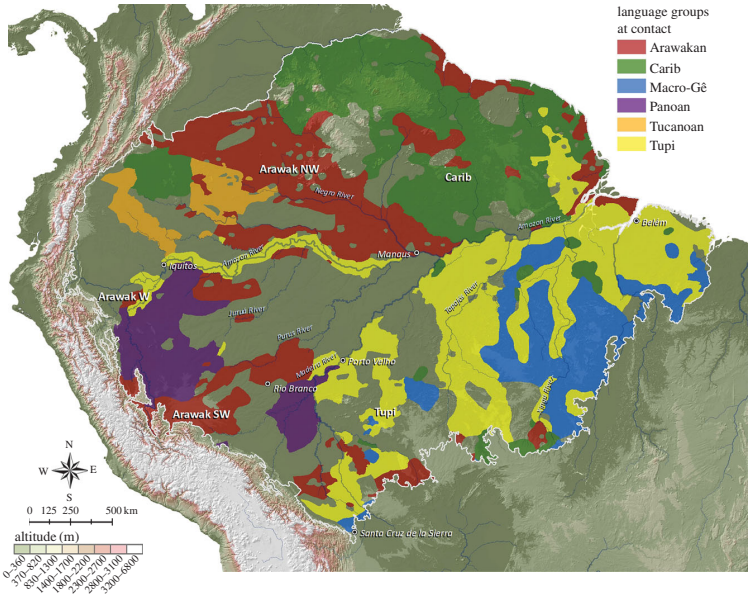


Fig. 5.6. Linguistic areal map at the time of contact of Amazonia. In: Clement *et al.* 2015: 6, fig. 3 (after data in Eriksen, 2011).

The effects of colonialism reduced 90% of native population of much of tropical regions and the global population in the New World hemisphere in one century and a half after invasion (Denevan, 1992: 371; cf. Cunha, 1992a: 14; Porro, 1995: 20-23).[183] Researchers even argue that varying rates of carbon dioxide in the athmosphere caused by depopulation and carbon sequestration in the Netropics dispelled the 'Little Ice Age' following Columbus (Dull *et al.* 2010; Nevle *et al.* 2011; cf. Iriate, 2024: 215-216) and the start of the Anthrocene (Lewis; Maslim, 2018: ch. 5; see note 175).

Of course, these numbers were based on demographic guesses of original population in the New World. There are differing methods, 'classic' by now, by Rosenblat, Kroeber and the Berkley School of estimation of density and distribution of native peoples in the Americas, Brazil and Amazonia (see discussion Clastres, [1974]: ch. 4; Hemming, [1978] 2008: app.; IBGE, 2000: app.; Denevan, [1976] 1992; 1992: 370-371; 2014; cf., on the Tupinambás in the sixteenth century, Fausto, 1992: 382-383; also Cunha, 1992a: 14; Clement et al 2015 for discussion). Estimates range in the order of a number under million or over millions: 1,500.000 Guarani in a 350 km² territory between the Paraguay River and the Atlantic façade and 4,5 million in projection for the whole native population (Clastres, [1974] 2020: 92); 2,431.000 in

[183] The Tupian speakers of the East Atlantic Coast were deemed extinct by the end of the seventh century. The population counts of the Tupiniquins, the group that greeted the men of Pedro Alvarez Cabral's fleet in 1500, are illustrative in this regard. In the seventeeth century, their number counts around 90,000 people (Hemming, [1978]: 729-730; IBGE, 2000: 222). Castro e Silva *et al.* (2020) confirmed with the genomic data of the self-declared Tupiniquins of Aracruz (Espírito Santo) a biological continuity with admixture of the original Tupian populations in Eastern Brazil.

Brazil (Hemming, [1978] 2008); 53,9 million in the New World (8,6 million in South American lowlands) (Denevan, [1976] 1992: xxviii, tab. 1); and 8-10 million in Greater Amazon (Denevan, 2014).[184]

Tupi-Guarani is one of the largest linguistic families of lowland South American, in a large stretch from the state of Ceará to the Paraná-Paraguay drainage basin ("[….] ~4000 kilometres between latitudes 0°S and 35°S at approximately 2.5 ka" (Iriarte, 2024: 40)). It was spoken by most of the indigenous population in the area, Tupiniquins, Tupinambás intercepted by the "Tapuias," the non-Tupis or "people of strange language."[185] These indigenous populations along the coast can be separated in two main linguistic blocks in an enmeshed history of generalization of nomenclature of specific groups with the etic lens of the settlers in the southeast of *terra brasilis* and Paraguay: the Tupinambá (also regionally distinguished in different groups as Tamoio, Tupiniquim, etc) and the Guaranis (cf. Edelweiss, 1947; Corrêa, 2014: ch. 1 for reviews of the term "Tupi" on the geopolitical entanglements of indigenous groups and Spanish and Portuguse colonizing strategies). Tupinambá, or Ancient Tupi (often only Tupi), and Guarani were the two (out of other 30) languages of one single linguistic stock (Tupi-Guarani) which were extensively registered during the colonial period (sixteenth and seventh centuries) by missionaries in a series of translations of Catholic texts, grammars, dictionaries, and even literary productions (Rodrigues, 1986: ch. 2). Geographically, Tupinambá and Guarani were distributed in the septentrional part of the country up to the mouth of the Amazon River and the Río de la Plata Basin, respectively. The languages of the

[184] In Darcy Ribeiro's (1957: 38; 1970) studies of the 1950s, there were an estimation of 100,000 indigenous people maximum in Brazil (between 68,100 to 99,700 people to be precise). The reversion was under way to the turn of the 20th cent. The 2022 Brazilian census counts a total of 1,7 million of native peoples, half of which in the Legal Amazonia. This number almost double the 896 thousand Indians computed in the last census (2010). The number of indigenous ethnic groups and languages are to be published, but we do know more than the half of the total number of people live inside homologated Indigenous Lands (IBGE, 2023). On demographic aspects of indigenous population in Brazil, cf. Guimarães, 2022a; 2022b.
FUNAI possess 120 registers of isolated indigenous groups in Brazilian Amazonia. Cf., on isolated indigenous populations in Brazil, Loebens; Neves, 2011; Ricardo; Gongorra, 2019; Amorim, 2022: 14, fig. 1; Cangassu *et al.* 2022: 139, fig.1).

[185] The result over 400 years of contact is an ethnolinguistic bazar which can be graphically illustrated by the cartographic project of the anthropologist Curt Nimuendajú ([1942-1944] 2017), the *Mapa etno-histórico do Brasil e regiões adjacentes*. The map has been recently adapted a digitalized from the originals and an edited version of 1981 by the *Instituto do Patrimônio Histórico e Artístico Nacional* (IPHAN). Nimuendajú's work, a very ethnohistoric synthesis of the knowledge of the homeland, linguistic affiliation, and migration of indigenous groups of South American lowlands, was commissioned by three different institutions along the decade of 1940 and resulted in three versions, three huge maps, two out of which still are held in Brazilian institutions (also digitalized). The last version, produced 1944 is divided in two parts measuring each 1,80m by 1,00 m and has scale of 1:2.500.000. Available at: <http://portal.iphan.gov.br/uploads/ckfinder/finder/arquivos/Mapa_Nimuendaju_2017>. Accessed 9 Sep 2020.

Tupi-Guarani family show phonological affinities between themselves, classified tentatively in subsets by Rodrigues (1984-1985).

Tupinambá language gained currency in the colonial system, and it was extensively spoken by the white settlers in the inland expansion. The bilingualism among the indigenous group and the Portuguese resulted in the emergence of a pidgin or mixed language stemming from the contact known as *Língua Geral Amazônica* (LGA) or *Nheengatú*. LGA was the language of the Portuguese expansion in the Amazon basin (17^{th}-18^{th} cents. AD) (Rodrigues, 1986: 102). When it comes to social organization, customs, and rituals of these indigenous groups on the coast – the graphic descriptions of ceremonies of cannibalism among the Tupinambás is a famous example – your main ethno-historic sources are writings from the 'one side' of the beach of engendered by the colonial encounter, chronicles and correspondences of European travelers, colonizers, and missionaries (second half of the sixteenth to the first quarter of the seventh centuries) (Fausto, 1992; Hemming, [1978] 2008). Consequently, the neat labels according to which we pigeonhole these past cultural groups such as "Tupi," "Tupinambá," "Guarani," sticking to our present discussion, based on linguistic and other cultural grounds should be treated with parsimonious.

The stock of which Tupi-Guarani is phylogenetic related includes other nine language families, three families of only one member (Arikém, Jurúna, Mondé, Mundurukú, Ramaráma, Tuparí, Awetí, Puruborá, Mawé) (Rodrigues, 1986: 41-46; Rodrigues; Cabral, 2012). It is known as proto- or macro-Tupi – or simply Tupi, being this a source of confusion. And along with Arawak, Carib, Gê as well as few or single representatives of linguistic families without supra-affiliations in linguistic stocks (or trunks) they put together a vivid picture of linguistic diversity in South America. While the IE earlier discussed is only one family language distributed in large tract of the world (see Fig. 2.1), in South America we have more than 40 linguistic families (Rodrigues, 1986). The Tupian linguistic stock encompasses 10 family languages (including Tupi-Guarani which computes a two-digit number of other languages) (**Fig. 5.7**).

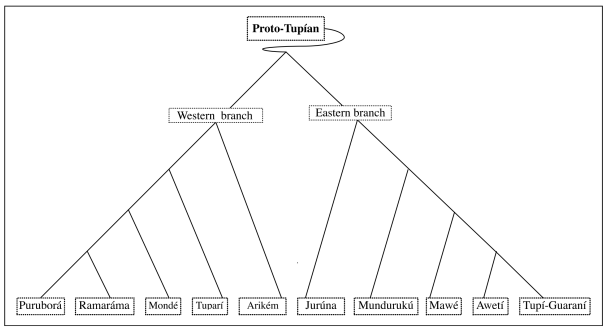


Fig. 5.7. Tree-model of the macro-Tupi. In: Rodrigues; Cabral, 2012: 496, fig. 1.

The debate of the correlation between both the distribution of archaeological complexes and linguistic families in South America lowlands replicates a fractal of wider patterns of divergent, generational and dynamics views hold by archaeologists of different nationalities,

background and socio-political circumstances. Ironically, scholars outside archaeology were the first to wonder if views on the Tupian question might fall under the chief influence of paradigmatic shifts in archaeology and its effects in the Indo-European research done by archaeologists (cf. Viveiros de Castro, 1996: 57). If this is true, one might legitimately acknowledge basic theoretical underpinnings in both models of set of material relations, representations of collective identities and historical narratives as well as real possibilities that exist in a cross-interdisciplinary dialogue for reexamining assumed symbolic constructions of identity and culture.

Painting and plastic decoration have always enjoyed privileged treatment in the tracing of the lineage of Tupi-Guarani speaking people over vast geographical expanses of East of South America with materials over "[…] *numa faixa de quatro mil quilômetros de comprimento no sentido SW-NE, com uma largura entre 500 e mil quilômetros* […] (Prous, 1992: 373; cf. Corrêa. 2014). Polychrome ceramics grouped in the eponymous complex tradition are a *trait d'union* of regions within and without Amazonia Basin and with indigenous tribes attested since the sixteenth century by travelers, chroniclers and missionaries in Brazil, Peru, Bolivia, Paraguay, Argentina and Uruguay (Brochado, 1984; Alves, 1991; Prous, 1992: 371-373). The correlation is due to the fact of a constellation of cultural traits encountered by Europeans started to be charted in the archaeological sites attributed to Tupi occupations from 2,000 years ago onwards and to, back in time, to the painted ceramics in the Amazon Basin (Brochado, 1973; 1984; Noelli, 1996a: 26-29; 1998: 655-656; 2008a: 663-664). Archaeologically, then the origin of Amazonian Polychrome Tradition (TPA) continues enlaced to that of the Tupiguarani Tradition[186] through many regional manifestations of much of the lowland South America (see recently Almeida, 2013; Neves; Almeida, 2014).

The terminology suggested by PRONAPA researchers, however, sublimated under archaeological categories (*Tupiguarani*), averting attention from a major anthropological issue of ethnic identification of the makers of the painted ceramics of the polychrome tradition with Tupi-Guarani speech communities (Chmyz, [1966-1969] 1976: 146; Brochado *et al.* 1969: 18 ff.; Pronapa, 1970: 12; Meggers; Evans, 1973: 51-53). The dissociation proved of little

[186] Tupiguarani ceramics are embroiled in the conception of a cultural tradition including lithic, body adornment and burial patterns associated to the ethno-linguistic classification of indigenous groups along much of the Brazilian coastline with the first travelers and chroniclers (Ancient Tupi later of Tupinambá and Guarani of the Tupi-Guarani family language) (Chmyz, [1966-1969] 1976: 146; Brochado *et al.* 1969: 10, n. 3; Pronapa, 1970: 12; cf. Alves, 1991: 43-51; Prous, 1992: ch. 11). The 'pronapian' proposal to mark Tupiguarani without the hyphen is to give primacy to a material-based (and most ceramic) taxonomy. The Tupiguarani ceramics generalize a group of pottery manufacture defined by coiled manufacture and surface treatment with painting and plastic decoration as the corrugated and brushed techniques.

contribution mainly due to the fact 'pronapians' declined to deal directly with the epistemological troubles of bridging archaeology and ethnology with the direct-historical approach while generally assuming as valid the general correlation Tupiguarani/Tupi-Guarani (Alves, 1991: 46-47). The inconsistency boils down to a view that endowed socio-cultural reality to units of culture-historical classification (Willey & Phillips (1958; cf. Dias, 2007: 63).

Meggers & Evans (1973) reviewed later this position by allowing themselves climb up the pyramid of speculations about homeland and emigration through the genealogical metaphor of the lexicostatistics and paleoenvironmental data. Drawing on the South-North population movement envisioned by Martius, d'Orbigny and Métraux (1927) in a shallowly compressed chronology and Brochado (1973) with C-14 dates of the PRONAPA investigations, they hypothesize a common *Ursprungland* of non-ceramists proto-Tupi in the margins East of the Madeira, who dispersed according to climatic fluctuations that upset the balance of ecological equilibrium of cultures adapted to forest niches. As "[…] *automates pavloviens qui, dès que le climat change, se mettent à fuir*" (Le Bras, 2017: 80), the movement of self-contained speech communities set in motion linguistic speciation. To the separation of the Tupi-Guarani branch 2,500 years ago is matched a long-range migration of polychrome ceramic in the Atlantic coast.[187]

A time-change and alternative in such linguistic juxtaposition is the reconstruction of a long-term history centered on the Amazon lowlands of central Amazonia in the work of Lathrap and pupils. Key to creation of isomorphism of pots, language and people is Lathrap's (1970) centrifugal or 'cardiac' model, as it came to be known, a demic diffusionist explanatory concept (Hornborg, 2005: 595; Hornborg; Hill, 2011b: 8; Neves, 2007: 120; 2011: 34; 2012: 153; Noelli, 2008b: 18). The "Neolithic Revolution" model of the neotropics pictures a demographic expansion promoted by agriculture-based economies in the alluvial setting of central Amazon. As a heart pumping blood, Lathrap pictured successive migratory waves along riverine channels of the Amazon River by speakers of different family languages (Arawak, Tupi-Guarani, Panoan, and Carib (**Fig. 5.8**).

[187] With the data from the paleocological record of southern Amazonia, Iriarte *et al*. (2017; cf. Iriarte, 2024: 41) have been positing climate change and expansion of humid forests in the Late Holocene as an environmental context favoring the expansion of agricultural systems and the Tupi-Guarani language family (Iriarte, 2024: 41; Iriarte *et al*. 2017).

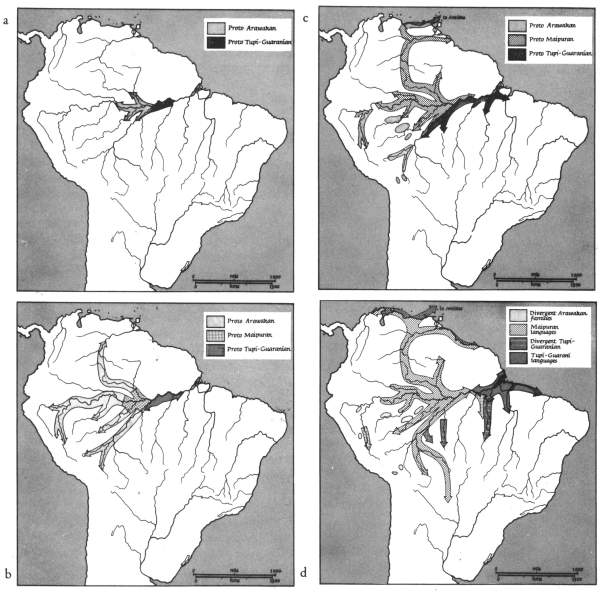


Fig. 5.8. Linguistic dispersals in Amazonia from 3000 BC onwards. In: Lathrap, 1970: 77, fig. 5.

Brochado's PhD thesis, *An Ecological Model of the Spread of the Pottery and Agriculture into Eastern South America* (1984) followed Lathrap and accomplished the tracking down of linguistic groups through defined ceramic styles along the cardiovascular floodplains of the main tributaries of the Amazon Basin. While working on a model of migration/expansion of only two groups of one family language of the Tupian stock, Brochado deemed necessary a demographic model for the entire South American lowlands.

The result is a remarkable congruence in prehistory of two ceramic subtraditions of the TPA of Central with Tupi-Guarani speakers in the Eastern South America. The route of people of Tupian speech peoples maps onto the splitting off two lineages of Tupi-Guarani family branch in a standard tree model of language change (

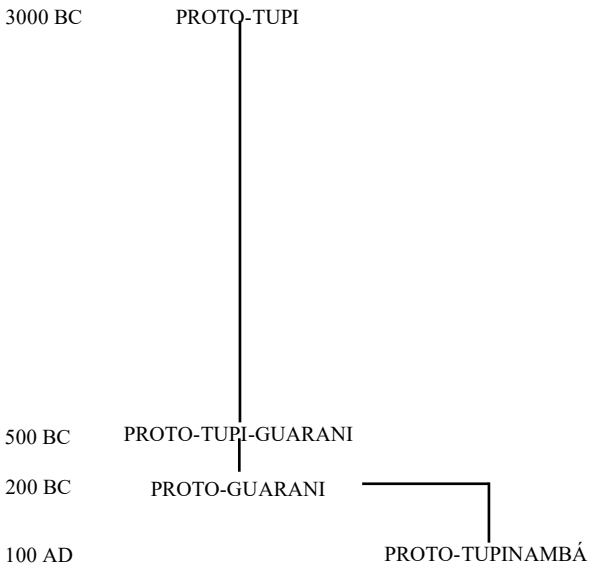


Fig. 5.9. Simplified tree model of language change based on the lexicostatistical work of Rodrigues (1958; 1964; 1984-1985) and Lemle (1971). Drawing author.

Fig. *5.9*). These two subtraditions of TPA start to diverge around 500 BC (Brochado, 1984: 320; 1989: 73), in line with the arborescent split model of linguists (Rodrigues, 1958; 1964; 1984-1985; 1986; Rodrigues; Cabral, 2012; Maria Lemle, 1971). Rodrigues (1964: 103-104) estimated the times

of the branching-off of the tree through a glottochronological calculation of a list of cognates from languages of the Tupi stock – i.e., Swadesh's lexical-statistical method: 5,000 years ago for the origin of the Proto-Tupi and 2,500 years ago for the splitting of the Proto-Tupi-Guarani. Brochado's (1984) expansionist model, very migrations out of the Amazonia, embraces in a two-pronged pincer the entire Brazilian highlands, the first up the Madeira-Guaporé river drainage system, and down the Paraguay, Paraná, and Uruguay drainages (Guarani), the second down the Brazilian coast from Northeast to the Tropic of Capricorn (Tupinambá) (**Fig. 5.10**).

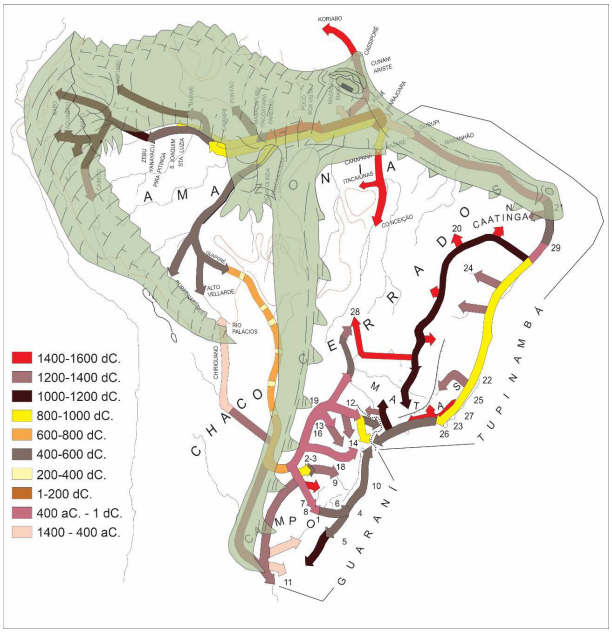


Fig. 5.10. "[…] the Brazilian Upland […] was held between the jaws of the cosmic Amazonian cayman." (Brochado, 1984: 9). In: Brochado, [1984] 2024: 357, fig. 23.

Noelli's ethnobiological informed Tupi expansion model (1996a; 1996b; cf. also id., 1998; 2008a) in the *Revista de Antropologia* (also Viveiros de Castro, 1996; Urban, 1996) is a sustained effort of work of Brochado and indelible mark of a historiographical perspective on the issue into the next century of Tupi/Tupi-Guarani research. At the core of the model of explanation there is a remote antiquity of Tupi-Guarani occupation in the territories later controlled by the Europeans, a minimum 2,000 -year-plus occupation, the unfolding of a slow and demographic-driven process of expansion of agriculturalist communities (Noelli, 1996a: 26-29; 34-35; 1998: 656; 660; 2008a: 663-664).[188]

[188] Long-distance migratory movements and commerce (Heckenberger; Neves; Petersen, 1998: 72) are left out. The similarity with Renfrew's (1987a; see Noelli, 1996b:109-110) model surely is not fortuitous and his trouble with the concept of migration, likely the British processualist (Champion, 1992: 215), either. In fact, the author opts for the concept of expansion instead of migration precisely because the latter is reduced to the scope of the event and, we are told, best fitted for describing the events occurring after the Portuguese colonial relationship with the indigenous groups (Noelli, 1993a: 10; 1998: 649; 2008: 660). On the other hand, Brochado (1984: 8; 356; 360; 364; 373; 1989: 65) had no problem at exchanging expansion for migration, colonization, or invasion in qualifying the Guarani and Tupinambá ceramic pottery distribution as result of 'site unit intrusion.' However,

Genetically colored perspectives on the routes of migratory hypotheses of Tupi-Guarani and Tupi uses similar language of early migrationist models and still present the isomorphism population = ethnolinguistic groups defined at a population level. Armed with modern genomic data of Native groups peoples in Brazil, Castro e Silva *et al.* (2020) have been positing 1) Amazonia-northeast Atlantic Coast wave of migration, and 2) south-bounded waves of migration before the arriving of the Europeans.

Polychrome ceramics

One of the most common elements of material culture of the neotropics, pottery served a range of domestic and ceremonial activities. Pottery in different shapes are utensils designed to function as cooking and serving food, transporting and storing and ritual performances. A specific class of material embroiled in narratives of population movement in lowland South America is the Amazonian polychrome ceramics named after the presence of painting of two or more colors (from the Greek poly- 'many' and chrome 'color') over white slip. Polychrome ceramics are a polychronic material containing multiple and longer histories of Amazonia of Pre-Columbian times.

As regards the standard definition of polychrome ceramics,

> The diagnostic trait is a white slip and polychrome (red-and-black-on-white) painting. Other relatively complex decorative techniques typically associated include excision, incision retouched with red or white before firing, and grooving. Incision or excision on a red slipped or white slipped surface is also characteristic, whereas in all the other horizon styles the decorated surface is typically unslipped. Vessel and rim forms are variable, but a cambered rim and an exteriorly thickened form with a squarish or rhomboidal cross section may be diagnostic. (Meggers; Evans, 1961: 379).

Few of those attributes describe other than aesthetic qualities of morphological features, geometric painted patterns on the surface and plastic decoration that can be dictated by innumerous functionally equivalent choices of the potter's habit ("isochrestic variation" Sackett, 1982; see **Culture, ethnicity and style**). Naturally enough stylistic elements may relate to symbolic grammars of composition in the interface of visual performances and preferences of consumers linked to context-dependent extrinsic traits of the time, place and function (Gardin, 1979; Skibo, 1992; Schiffer, Skibo, 1997; Schiffer, 1999; Roux, 2016).

Brochado (1989: 80) had clear in mind that Tupi-Guarani migrations were not a large-scale event leaving entire regions empty behind, framing migration as large-scale population movement: "*Os movimentos dos Tupi não eram exatamente migrações, no sentido de que as regiões de onde saíram ficariam vazias, pelo contrário, a população continuava crescendo até o ponto de obrigar a saída de novas vagas humanas.*"

Intrinsic artifactual properties, however, should not be mistaken for the techniques and operations and elements taken in isolation from the technical operations and skills. By viewing pottery variability and attribute correlation in those biases of ethnic style, however, is to retain an impressionistic level of description of similar-looking piles of sherds. In the case to study, polychrome ceramics are less a concrete thing to be plotted and more a material-semiotic category laying down 'facts' and governing the bounds of comparability in a normative view of culture as a hard brick (see "cultural brick theory" in Clarke, 1968) (**Fig. 5.11**).

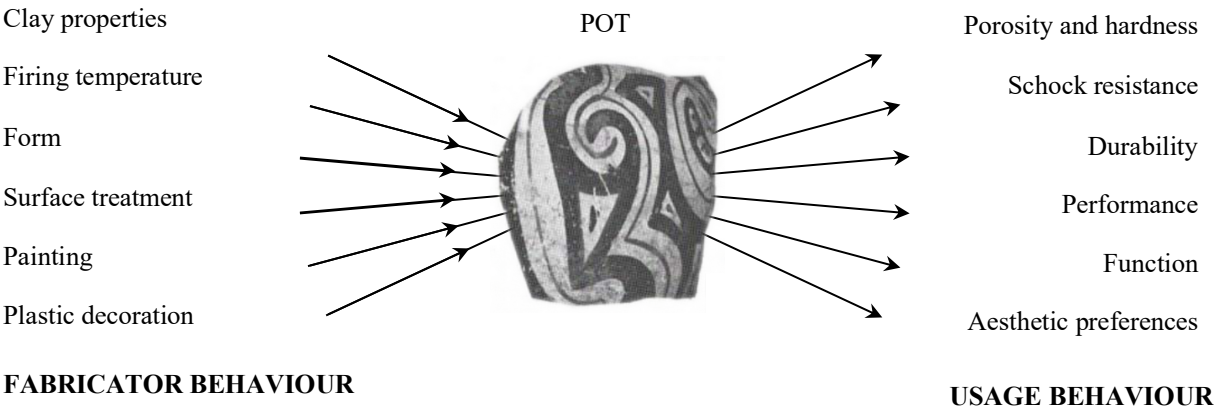


Fig. 5.11. Reciprocal connection of design choices, mechanical properties and user's movement channeled by pottery form. Drawing author (after Clarke, 1968: 135, fig. 19). Marajoara sherd (Meggers; Evans, 1961: 387, fig. 10, h).

Polychrome ceramics typifies a pan-Amazonian ceramic stylistic currency with extensions in river channels of Ecuador, Peru and Colombia in the Andean foothills to the mouth of the Amazon River well into the Contact period in the 16th cent. and afterwards (1500-400 BP).[189] The Polychrome Tradition of Amazonia is an archaeologically recognizable style of almost 1000 years of archaeological and historical record for which continent- and region-wide explanations have been accumulated for half a century (Meggers; Evans, 1961; Hilbert, 1962; 1968; Lathrap, 1970; Brochado; Lathrap, 1982; Brochado, 1984; 1989; Tamanaha, 2012; Neves, 2012; Almeida, 2013; Almeida; Neves, 2014; Belletti, 2015; 2016; Almeida; Moraes, 2016; Tamanaha; Neves, 2014; Belletti, 2015; 2016; Vassoler, 2016; Lopes, 2018; Almeida *et al.* 2018).

[189] Chronicler Gaspar de Carvajal (1894: 44) of the Orellana's expedition (1541-1542; on the expedition cf. Gondim, 1994: 78 ff.) down the Amazon River in the search of the "land of cinnamon", says that in the middle Solimões[189] among the Yurimaguas, between the Coari and Purus rivers:

> [...] *desta loza dela mejor que se ha visto en el mundo, porque la de Málaga no se iguala con ella, porque es toda vidrada y esmaltada de todos colores y tan vivas que espantan, y demás desto los dibujos y pinturas que en ellas hacen son tan compados que naturalmente labran y dibujan todo como lo romano*.

At least as earlier as the second half of the 20th cent., systematic archaeological research has been adding up local phases and subtraditions to a general affiliation category typified in an Amazonian style of painting decoration in linear geometric motifs. Bits and pieces scattered from the foothills of Equatorial Andes, Ucayali River in Peru to the Atlantic Brazilian coast in the estuary of the Amazon River, they make up a ceramic tradition in a long horizontal stretch.[190] Ait stands, TPA embraces 6,600 km over 364 (uni- or multicomponent) sites along the Amazon and its main tributaries (Belletti, 2015: 226-227; 251-255; 2016: 350-351) (**Fig. 5.12**).

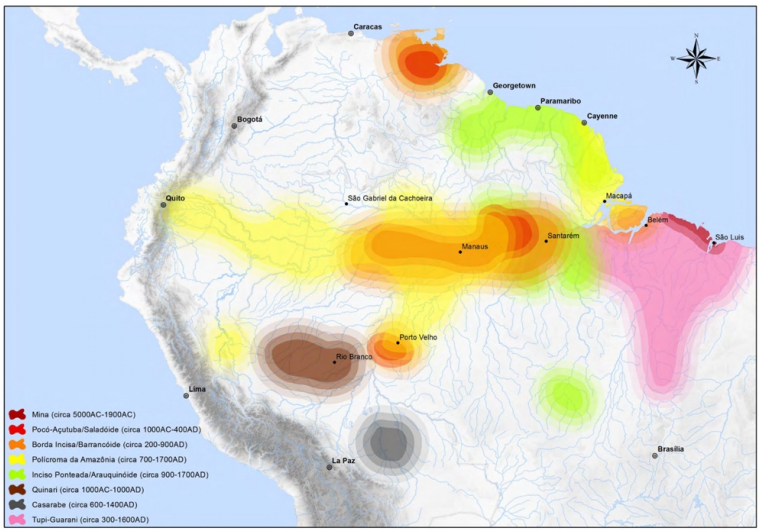


Fig. 5.12. Geographical "influence" of the TPA. In: Barreto; Lima; Betancourt, 2016: 51.

Since the issue of *Archaeological Investigations at the Mouth of the Amazon* by Meggers and Evans in 1958, a growing perception of far-reaching expansion of polychrome ceramics has attracted attention from specialists. Initially, under the influence of a paradigm that perceived the Amazonian ancient history as a receptacle of foreign influences, archaeologists envisaged the connections through very ambiguous terms of migration and diffusion. As research progressed, earlier views of foreign trait-bearers were debunked with the assumptions of historical linguistics implemented by the Lathrapian account revised chronologies and direction of movement. However, the relationship between static patterns and dynamic process continue to operate at broader scales of analyses and *ad hoc* explanations for material similarities and classification (see exceptions in Schaan, 2007; Barreto, 2010; 2016 for the Marajoaran polychrome ceramics). Is migration tied to the flux of stylistically declined

[190] Namely from east to west: Marajoara (Marajó Island), Guarita and Tefé (Middle Amazon), Jatuarana (Upper Madeira) and Napo (Napo River), etc.

technologies, movement of entire pieces or emulated techniques and pattern of diffusion-exchange mechanisms of inter-community interaction in multi-ethnic contexts?

The two main points of the directionality of links and vectors of transmission between localities map onto two areas of major archaeological research of the last three decades, Central Amazonia,[191] and Upper Madeira River.[192] The centrality of the first terminal point of comparison in the hearth of Brazilian Amazon lies first and foremost in the geographical role of the hydrographic network (see **Anthropofagism in classics**). The Central Amazon is a focal point of convergence between the Solimões, Negro and Madeira rivers. The systematic accumulated archaeological investigations also play a major role in defining this own gravity field since half century ago through Neves and collaborators with the protocols of the Central Amazonia (CAP, 1995-2010) and other salvage archaeology projects and environmental licensing programs as the Coari-Manaus Pipeline (2005-2009). The area of confluence in lower Negro and the Middle Solimões near the capital of Amazonas State, Manaus, was even couched in terms of a "microcosm" in the archaeological terms of theoretical models for processes in the Amazonian indigenous history (Neves, 2012: 13).

The importance of the opposite point, the Upper Madeira,[193] in SW Amazonia, lies in the resumption the state of Rondônia more than 30 years after the pioneer work of Miller of the PRONAPABA by PALMA (Upper Madeira Project, 2011-present) coupled with the salvage archaeology carried out in the last decade in the contexts of the hydroelectric plant constructions of Jirau and Santo Antônio in Porto Velho, capital of Rondônia. Southwest Amazonia is the channeling of a bird's eye discussion in a study area full of posited origins. The long-term sequence of the archaeological record of SW Amazonia tightly knit together the area with cultural sequences in other areas of Amazonia in issues of domestication, sedentism, ceramic production, political organization, and linguistic diversity. Southwest Amazonia has a continuity of human occupation during the mid-Holocene, filling the gap in the record which in other regions in the Amazon basin is left wide open (Neves, 2006: 30-31; Neves, 2007: 123;

[191] Central Amazonia is a large area roughly defined in the lengths and breadths of the state of Manaus, from the Low Japurá and mouth of Madeira, the mouth of the Branco River and the city of Borba (Neves, 2012: 22).
[192] The region of the Upper Madeira basin system, SW in Amazonia in the state of Rondônia, can be delimited, in one part, by the region in the stretch of the river with waterfalls, cataracts and rapids resulted from the encounter of Brazilian Shields and the Amazonian lowland to the the encounter of its main sources (Mamoré, Guaporé, Beni and Madre de Díos), up to downstream and tributaries near the city of Porto Velho (Almeida, 2013: 12).
[193] The Madeira River is the main tributary of the Amazon River, more than 3,000 km long. The Madeira basin system has one foot in the Andean slopes and the other planted in Mato Grosso State. The river is formed in the encounter of Madre de Díos and Mamoré drainage system basins, after they join forces with the Guaporé (straddling the international border Brazil-Bolivia) and Beni. It has 3,315 km of unraveled extension and encounters the Amazon River 1,450 km from the Atlantic coast. Madeira basin counts as main tributaries the Aripuanã, Ji-paraná, Jamarí (Machado) e Jaci-paraná.

2012; Neves; Watling; Almeida, 2020; Iriarte, 2024). Linguists have been agreeing the area is the focal homeland of many family languages, especially for our discussion the languages of Tupian stock (Rodrigues, 1964; Urban, 1992; 1996). The presence of the earliest representatives of the polychrome group in the area of the Madeira River, around 1000 km distant from the Amazon River's mouth mark the area as a hot spot for an archaeology of the origins of the Tupi.[194] The Upper Madeira region is an epicenter of domestication,[195] possessing a millennia-old record of practices of management of plants, local or exotic, domesticated going back to the early Holocene.[196] Therein is also the earliest evidence of *terras pretas* (Neves, 2006: 52; 2012: 120; Clement *et al.* 2015: 3).[197]

Starting out with a comparative technology analysis centered in the earliest polychrome ceramic components, we hope to prove a small contribution to qualify the range of connections inferred not only by from type multidimensional distribution but also of other poterry assemblages it is connected at a settlement level. A precisely defined time window may reduce considerable the temporal stratigraphy of Amazon polychrome. Chronologically, the case study lies within the scope of the earliest evidence up to 1099 AD affiliated to the polychrome ceramic tradition, the initial moment of a staged view of the distributional model theory of expansion of polychrome pottery (cf. Tamanaha; Neves, 2014: 58; Almeida *et al.* 2018: 203). This chrono-geographical range puts a timeline more or less of 500 hundred years and hence of several generations in a geographical distribution of sites through the Amazon Basin (see Belletti, 2015: 285, fig. 2.30).

How did they make it?

> […] first the hand grasps the clay in the way the clay affords to be grasped, then the action becomes skill, skill selects and effects results, and creative agency emerges from the results that matter. (Malafouris, 2013: 213).

[194] The displacement of the linguistic hearth of the Tupian languages and that of Lathrap and Brochado does not goes unnoticed (Noelli, 1996a: 30-31; 37, fig. 2; 1998: 657; 658, fig. 2; 2008a: 665; 667, fig. 33.2; 2008b: 32).
[195] Manioc (*Manihot esculenta*) and peach palm (*Bactris gasipaes*) (Neves, 2006: 35; 2007: 126; 2012: 119-120).
[196] Squash (*Curcubita sp.*), beans (*Phaseolus sp.*), and possibly leren (*Calathea allouia*)), semi and wild-domesticated (pequiá (*Caryocar sp.*), Brazil nut (*Bertholletia excelsa*) guava (*Psidium sp.*), as revealed by phytoliths and macrobotoanical remains (seeds, fruits, tubers, and roots) found in lithic tool and the soil in pre-ceramics deposits of Teotônio site (Watling *et al.* 2018; 2020; cf. Iriarte, 2024: 88).
[197] As noted above, these anthrosols on the rise starting from 2500 BP through the 1st millennium AD in much of Amazonia document a long record of sedentism in much of the Amazonia, event though the timing of formation is contingent on variable timing (Petersen; Neves; Heckenberger, 2001; Neves *et al.* 2004; Neves, 2006; 2012; Clement *et al.* 2015; Arroyo-Kalin, 2021; Iriarte, 2024).

Pyrotechnical products as ceramics abound in the archaeological record worldwide (Hunt, 2017). Deposits of clay are available everywhere to indigenous ceramic-producing groups shape it at their will in a logarithmic scale of pottery's agency, technique and skills (Childe, 1956: 37; cf. Shephard, 1965: 233). Pottery is a privileged artifactual category for archaeologists in humid tropic. In terms of preservation, it has been estimated that the soil may yield only a small 1/10 fraction of the total material exchanged in the pre-Columbian tropics (Lathrap, 1973: 173). Pottery often in the form of fragments (not whole vessel) is known to be an almost indestructible material in contrast to wood, fibers and feathers and constitute stock in trade of an archaeology of an area in that stone or metal material are scarce.

Present knowledge has that pottery became to be produced in riverine midden shells by 8-000-7,000 BP, the earliest date for the Americas (Tapeirinha and Caverna da Pedra Pintada near Santarém) and many other centers of production in later contexts in Pará (Mina), British Guiana (Alaka), Ecuador and Colombia (Roosevelt *et al.* 1991; 1996; Roosevelt, 1995). But things have not always thought so in the beginnings of Amazonian archaeology through the second half of the twentieth century, rooted in a long intellectual heritage and prejudices about past indigenous societies (Barreto; Machado, 2001; Noelli; Ferreira, 2007; Silva, 2024). Early ceramic findings in the Amazon basin were interpreted in the light of the broader culture history of origins and interactions in a staged route of influences originating outside.

Morpho-stylistic aspects of ceramic classification have always been prioritized in the recovery, collection and presentation of the so-considered aesthetically pleasant pieces in the Amazonia Basin brought to light in the first expeditions organized by national and international museums in the end of the nineteenth and early twenty centuries such as J. Barbosa Rodrigues in Micaranguera, L. Neto, D. S. Ferreira Pena and C. Frederick Hartt in the isle of Marajó and Maracá (Amapá) and E. Goeldi in the Cunani River (Amapá) (Lopes, 1997; Ferreira, 2010; Silva, 2024: 37-43; cf. Alves, 1991: 13 ff.; Prous, 1992: ch. 1; Barreto; Machado, 2001: 246 ff.). Form, surface treatment, decoration and temper were the mainstay method of the systematic archaeological explorations of ceramic-bearing contexts in the second half of the twentieth century. In Brazil over the 1960s and '70s, Fordian seriation popularized by the first generation of trained archaeologists of the country linked to PRONAPA and, posteriorly, PRONAPABA (National Program of Archeology Research in the Amazon Basin, 1974-1977) (Meggers; Evans, 1970; cf. Brochado, 1984: 59-69; Alves, 1991: 19 ff. for critical historical overviews).

Now, in the fourth generation of archaeologists of the country, too much water has passed under the bridge and our knowledge of ceramic contexts throughout the subcontinent.

With the hindsight afforded by the *chaîne opératoire* concept, our knowledge of the technical process of ceramic objects have increased considerably as well. Regardless of the fact that the assemblage of pottery technical traditions express variability of methods, functional equivalent choices and sequence of stages of pottery production, approaches oriented to the anthropological terms of ceramic interpretation have been left relatively unexplored. Impressionistic assumptions of asserted similarities dominate interpretation rather than explicit theories connecting the actual ceramic objects with the physical and cognitive dynamics of learning by emulation in tutor-apprenticeships dyads and geographical propinquity of social contexts effecting acquisition of skills (Gosselain, 2000; Gallay, 2011; Roux, 2016; 2017).

Physical-chemical, mechanical constraints and performance characteristics (see CHAPTER 3) of ceramic industry on potter's behavior are a relatively well-established process and the manufacture of polychrome ceramics can be comprehended within the general flow, principles and parameters of ceramic technology (Shepard, 1956; Rye, 1981; Balfet; Fauvet-Berthelot; Monzon, 1983; Rice, 1987; Schiffer; Skibo, 1987; 1997; Roux, 2016; 2017; Gosselain, 2018). (Rye, 1981; Rice, 1987; Roux, 2016; Gosselain, 2018 and references therein). From raw material procurement to the final surface finishing, in the perennial "[…] *dialogue entre le fabricant et la matière* […]" (Leroi-Gourhan, 1965: 132), ceramic technology may be regarded as a product of an entanglement of technical and design choices, tendency of *milieux*, matter-energy transaction, tradeoffs and reciprocal agency (Schiffer; Skibo, 1987; 1997; Schiffer, 1999; Malafouris, 2008b; 2013: ch. 9; Lemonnier, 1992).

There is nothing in pottery production in general to indicate unequivocal relation to a specialist job. Ethnographic inquiries attest it is usually a part-time activity in household-based organization of production without specialized facilities, with the direct supervision and guiding of an instructor, usually kin-related but in any case, socially related individual. At the moment, we have not reason to think otherwise in the Amazonian pre-Columbian times. Eventual technological and morphological patterns of manufacturing process, aesthetic quality and degrees of embodied motor control that emerged through the potter's hands allow us to give precedence to specialism (distribution of activities of craftsmanship within a social group) materialized in tangible remains before probing on circumstances of production, modes of transmission, mechanisms of distribution and use (see related discussion in note 93). Practical conditions of production and inter-place mobility vary from settlement to settlement, affecting the patterns of distribution of technological and stylistic similarities within a region.

"Heterogenous sociotechnical aggregates" (Gosselain, 2000: 190; 2008: 152; 2011: 219: 2016: 4; 2018) draw on different spatial scale of contact situation and knowledge

exchange. With an unpacking of the operational chain and technical singularities, we may hope, if anything, to distinguish the set of skills involved in the elemental operations, methods and sequences of actions and likely social interaction networks whereby the know-how transfer operated. In a strictly archaeological point of view, the analysis of historical hypothesis should first lend weight to visible attributes of ceramics and empirically evaluate the biomechanical difficulties implied in the skills of pottery learning and processes of technical behavior acquisition through co-socialization,[198] to later on formulate hypothesis of historical affiliation.

The manufacturing of vessels of diverse forms and decoration certainly may have required different degrees of potter's skillfulness in embodied habit and knowledge of cultural meanings within a social group's shared repertoire of methods, gestural operations and techniques.[199] To the archaeologist working with the material aftereffects of production process

[198] In many Amerindian societies, it is common to have examples of kids playing with the clay during the shaping stage, observing, emulating and embodying the manageable units of the *chaîne opératoire* of pottery-making over the years (e.g., Vidal, 2022: 122-123). In craft apprenticeship in general, the limits of play and work are fuzzy as skill acquisition is defined by increasingly engagement towards a notional center in legitimate peripheral participation (see examples in Lave; Wenger, [1991] 2022).

[199] The correlation of forming techniques as indexed by vessel form and size and the cultural situatedness of learning through skill investment is a case in point in ceramic studies in general (Gosselain, 1998; Roux; Corbetta, 1989; Budden, 2008; Budden, 2008: 2) and Amazonia. Silva (2000: 65; 77-79; 2008: 227; 234-236) intuits a correlation of Asurini production of bigger cooking vessel types (*japepa'i* and *jape'i*) and skill, time and experience in the practical structure of learning. Among the Asurini, the fashioning of the vessel's body is specially a time-consuming part of the manufacturing process (taking 10 days overall for the biggest types) and it requires dexterous movements on the part of potter's hands, inculcated in a protracted process of mother-daughter transmission in the bosom of the domestic unit, while raising and modeling the final form of the vessel out of the conical base and smoothing its surface, attentive to the amount of moisture applied in the clay, executed with the help of saliva, to avoid breakage in subsequent phases.

The relationship of segments of operational sequence production, in particular those attributes with higher learning costs, and ethno-linguistic identities is far from unequivocal. As a matter of fact, the reification of formal structures of classification and social concepts is somewhat of an old hat for prehistoric archaeologists (Shennan, 1989a; 1991; Jones, 1997; see ch. 2). Unfortunately, more often than not, Amazonists with few exceptions have been assuming rather than proving technical conservatism and intergenerational cultural transmission at the level of archaeological cultures (often defined in stylistic terms, cherry-picking ethnoarchaeological references to rework it journey into the past. By so doing, more cautionary tales of active use of technological elements in dimensions of identity at any technical stage of pottery production are passed over. In this instance, the Luo of western Kenya (Dietler; Herbich, 1989: 160; see also Hegmon, 1992; 1998: 275; Silva, 2000: 182; 2016: 47; Furholt, 2018a: 312) can serve as a counter-example by demonstrating the construction of personal or group identity may lie in whatever element and stage (i.e., temper recipe) of an object's operational chains and intersecting group boundaries at different geographical scales. In this work, we have been strongly highlighting the importance of testable expressions of a set of relations between dynamics of contexts of production, interaction, social proximity, information exchange and identities as defined by embodiment of practices in the techniques and methods of pottery-making. Archaeologists may rely on the stabilization of forming techniques, vessel sizes and complex profile contours or even the grammar of decoration (e.g., structure of polychrome decoration among the Bella potters, see Gosselain, 2011: 221) in affiliation terms of "lineages of practice" (Roux, 2016: 364) and locally or regionally declined tutor/apprenticeship chains, but circumspection is wiser to avoid collusion with linguistic lineages. Instead of prioritizing some technological traits over others, parameters of ecology and multiple networks of interaction involved in shared technology should be taken into account in a polythetic model of classification. As remarks Gosselain (2018: n.p.), the "[…] processes of identity construction and negotiation may also develop irrespectively of ethnic or linguistic boundaries, and that they may concern any component of the chaîne opératoire, independently of its post-manufacturing visibility or the nature of the skills involved."

and polythetic sets of skills of sociotechnical systems (Dietler; Herbich, 1989; 1998; Lemonnier, 1992), the patterned evidence of ceramic attributes provides insights of pottery networks feed by learning, regular and casual interactions, trajectories of change and mobility of its multiple components or finished products.

Notwithstanding the difficulties in restituting details of potting traditions in Amazonia of the pre-Colombian period, the experimental approach and ethno-historic and archaeological analogies may prove of use to the study of archaeological ceramics – that is not only ethnoarchaeological – potter's toolkit, bodily postures and spaces of practice and knowledge. With this in mind, we may be on the safe side in transplanting, via retrodiction, many findings of ethno-historical and ethnoarchaeological observation, especially of indigenous ceramic production in lowland South America.[200] In order to come full circle in "[…] *um ciclo, visível se se tentar refazer o sistema, invisível se se observar apenas seus efeitos e representações*" (La Salvia; Brochado, 1989: 5) of Amazonian indigenous ceramics produced around 2,500 years ago, a standard analytical vocabulary for ceramic traditionally used in Brazilian and Amazonian archaeology is adopted and developed.[201]

Overall, activities of pottery manufacturing process are embedded in daily and ritual activities, mutual cooperation – and other activities thereof and associated tools not necessarily exclusive to it. The completion of the productive activities can last from one week to 10 days (see e.g., DeBoer; Lathrap, 1979: 120, tab. 4.2). Multipurpose spaces within and outside domestic units may serve different sequences of an essentially non-specialized production activity. A set of individuals divided by social roles may have gathered to carry out different operations of the manufacture as the transporting of clay, gathering fuel, etc.

[200] Shipibo-Conibo in the Ucayali River (eastern Peru) (DeBoer; Latrhap, 1979; Belaunde, 2019); Guarani ceramics over coastal and southern areas of South America (La Salvia; Brochado, 1989: chs. 2; 4), the *Asurini do Xingu*, a Tupi-Guarani speech community of Pará (Brazil) (Silva, 2000: ch. 2; 4; 2007; 2008; 2019), the Tukano and Baniwa (Arawak) in the Upper Negro River, in NW Amazonia (Brazil/Colombia) (Lins, 2020; Oliveira, 2020) and Paiter Suruí (Tupi Mondé) in Rondônia, SW (Vidal, 2022).

[201] The ensemble of terms employed for regionally morphology, technological process and decoration aspects are adapted from the mainstay of ceramological studies (Shepard, 1956; Rye, 1981; Balfet; Fauvet-Berthelot; Monzon, 1983; Rice, 1987); and thus cross-checked in the main Latin American languages (Portuguese, Spanish), and French and English (Primera Convención Nacional de Antropología, 1966; Chmyz, [1966-1969] 1976; La Salvia; Brochado, 1989; Marois; Scatamacchia, 1984; Marois; Jelks, 1986; Scatamacchia.; Caggiano; Jacobus, 1991; Prous, 1992: 90-96; Marois; Scatamacchia; Serrano, 1994; Barreto; Lima; Betancourt, 2016; see in special reconstruction of archaeological operational chain of the IR ceramic of Central Amazon in Machado, 2005; 2005-2006; 2007; Lima, 2008: 176-189; 279-291; cf. also discussion of trait attribute classification in Moraes, 2006: 127-134). Modifications arise mainly from pottery technology studies and *chaîne opératoire* methodologies (Roux, 2016; 2017; Gosselain, 2018).

The main stages of pottery manufacture can be roughly sketched in four main stages: 1) raw material procurement; 2) pre-firing, i.e., clay procurement and preparation of the past, fashioning of vessel volume and surface treatment, 3) firing and 4) post-firing (decoration after cooling) (**Fig. 5.13**).

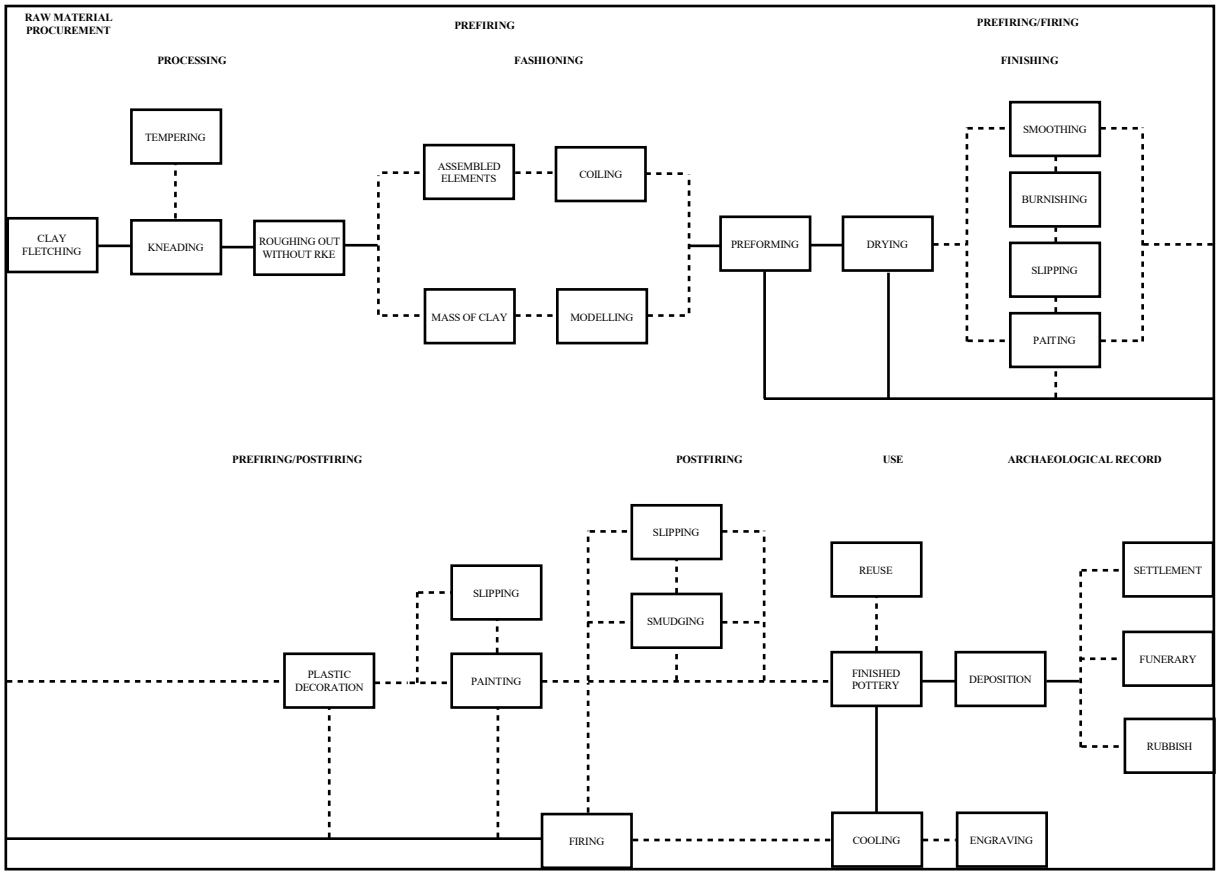


Fig. 5.13. Flow chart with the reconstruction of pottery *chaîne opératoire* sequences and lifetime of Amazonian indigenous ceramics. Drawing author after Roux, 2016: ch. 1; 2017: 105, fig. 8.1; Gosselain, 2018: fig. 1.

Clay is silicate composed of different minerals and granulometric properties. A minimum temperature of 400 up to 650-700 °C (Roux, 2016: 149) is required to the clay paste become ceramic with the loss of water and physical-chemical transformation of its components. Pottery wheel and kilns are not attested in the pre-Columbian contexts of the New World so that clays were manufactured without rotary kinetic energy (RKE) and fired at low temperatures.

Pre-firing stage include first clay fletching outside the village and close to the margins of rivers, lakes and in the bottom of *igarapés* in caravans that could travel kilometers to reach exploitable good sources and return with kilos of clay material in baskets ready to to be used or stored. *In loco*, potters may clean the paste by removing detritus that could compromise the final product with cracks and fissures. The preparation of the paste already in the village may

(or not) include tempering with the addition of non-plastic material of either mineral or vegetal material into the clay matrix with water in order to improve plasticity.[202] Shipibo-Conibo potters combine different types of clay (white, red and black) in recipients intended for use on the fire (DeBoer, 1979: 116; Belaunde, 2019: 15). In Amazonian archaeology, it is widespread the use of caraipé, the eponymous temper made from the ashes of the bark of a tree species (*Licania* spp.) and cauixí, a freshwater sponger found in lakes and *igarapés*, in different proportions and combinations with mineral, charcoal, grog, etc.[203] Caraipé is currently used by many potter groups in the fabrication of ceramics today. To obtain a homogenous paste potters kneading of clay like bread.[204]

These steps are followed by the stages of roughing out and preforming of the final geometric form of the vessel usually from a discoidal modelled base with the bare hands or coiled. Coiling technique without RKE (Balfet; Fauvet-Bertthelot; Monzon, 1983: 56-59; Roux, 2016: 79-84) is constituted by the superposition of coiled roughouts from a clay base on a support in superposed circles or in spiral. It is as ancient technique as the origins of ceramic production itself and the most common technique of fashioning of hollow volume used by pottery-producing indigenous Amazonians. The technique consists of puperposing coils, pinching of the coil joins, muscular pressure and drawing movements coordinate to thin the walls and 'rise up' the vessel profile through its sequential segment of geometrical shapes from bottom through rim (Shepard, 1956: 233; DeBoer; Lathrap, 1979: 117; La Salvia; Brochado, 1989: 116). Preforming stage operations comprise finishing by smoothing the joins of coils in thinning operations by continuous pressure or, before or after firing, polishing the surface with hard or soft tools in a process that reduce the porosity of the clay structure. These stages of fashioning can be intercepted by varied drying states of the paste (wet and leather consistencies) and modified accordingly.

Once fashioning and finishing operations are completed, the artisan initiates surface treatments of the inner/outer walls by friction or coating with varied sort of tools and methods and techniques of execution/application. Surface treatment may be aimed to produce practical and aesthetic effects of performance. The potter may rubber the surface of the vessel with hard

[202] Among the Assurini and Suruí potters clay are used without additives to the paste.
[203] The Shipibo-Conibo mix the types of clay with different tempers (caraipé, grog) according to vessel form, function (cooking and non-cooking) and parts thereof (DeBoer; Lathrap, 1979: 116-117).
[204] The effects of different type and amount of temper in physio-chemical properties as thermal and mechanical resistance, permeability and contour of the piece has been target by behavioral studies (Schiffer; Skibo, 1987; 1997; Machado, 2005; 2005-2006). With regard to the thermal resistance of organic tempers in Amazonia, Machado (2005; 2005-2006: 98) notes that the hollow spikes of cauixí is an insulator, while caraipé is in an intermediary position to good conductors as the mineral.

and soft tools indifferent stages of hygrometry of paste,[205] giving to it a shine aspect or slip made from different materials (clay in water in different textures, clay with oxide pigments and organic materials) by submersion, pouring or whipping. Slips, plastic or painted decoration can be executed in anterior or posterior phases of firing. Modeling elements could be done by material displacement of the clay and modelled appliqués/adornos from a mass of clay (anthro- and zoomorphous, geometric, buttons, etc.), handles and lugs and, in some cases, flanges affixed by insertion of attachment to the vessel surface or glued with clay slurry during fashioning or drying sequence, in wet or leather-hard paste.[206]

Paint colors are obtained from pigments of mineral (iron oxides) and organic (urucum (*Bixa Orellana*)) materials and can be applpied on vessel surface in fine and thick lines with brushes from feathers, stems stalks (babaçu or inajá) or plant stalk (e.g., Assurini (Silva, 2000: 71; 2008: 2019: 18) and potter's hair (e.g. Baniwa (Oliveira, 2020: 36) and Shipibo-Conibo (Belaunde, 2019: 20)). Before firing, vessels are separated for drying in the shadow, sun or next to the fire to avoid sudden loss water and consequentially fissures in the vessel.

Firing is the stage where the paste dehydrates and loses its plasticity to become irreversible ceramic, pottery or fired clay, a process that beginning in the threshold of 400°C (Roux, 2016: 149). Firing in open fires at low temperatures rarely exceeding 800-900 degrees is the norm of Amazonian indigenous societies as much as today in pottery-producing groups in America, Africa and Asia (Roux, 2016: 151). Dry seasons and no wind days are prioritized to dry fire pieces without damage in humid contexts as of the Amazonia (Deboer; Lathrap 1979: 116). The control of reducing and oxidizing firing atmospheres during combustion and post-combustion impinges on the color properties of the mineral pigments in the paste. Low control of oxidizing environments and direct contact with the flames result in less uniform fired pieces and fire stains and variations of color. Low firing temperatures in open fires and control of oxidizing environments are associated with porous and more breakable ceramic fabrics in use, hence a decreasing performance in mechanical shock resistance.[207] As well noted by many ceramologists (Rye, 1981; Schiffer, 1988; 1990; Schiffer *et al.* 1994; Roux, 2016), the artisan may take great care in avoiding permeability and heating effectiveness by transforming the surface before or after firing. Ethnographic cases in point make technical use of smoothing and

[205] Cf., on nomenclature of rubbing techniques of surface treatment in wet and leather-hard to dry paste, Roux, 2016: 129-132.
[206] These utilitarian and decorative elements are common in widely distributed archaeological ceramic traditions in Amazonia such as the Pocó-Açutuba, Incised Rim and Konduri.
[207] E.g., Prous, 1992: 94; Silva, 2000: 70-71; 2008: 248 but see Roux, 2016: 161 for the amendment that in technical terms, only virtual firing accidents should be accounted for significant differences between open firings and kilns.

burnishing or slipping the surface with organic resin (Silva, 2000: 70-71; 2008: 231; 2019: 18-19) or smudging the internal face of the vessel in capsizing it over wet wood (Vidal, 2022: 76).

Post-firing techniques take place immediately after the firing or after the cooling of the vessel. It may include decorative painting elements and application of resin from tree or bark with the pots still hot to melt the resin in seeking an impermeabilizing effect on the external and/or internal faces (e.g., *Tetragastis panamensis* and copal (*Protium glaucum*) in the interior of liquid storing vessels among the Shipibo-Conibo (DeBoer; Lathrap, 1979: 115; 120-121; Belaunde, 2019: 18; 25; 35-36); *jatobá* (*Hymenaea coubaril*) and titiva (*Inga* sp.) among the *Asurini* (Silva, 2000; 2008; 2019) and *jequitibá* among the Paiter Suruí on pots to be used over fire (Vidal, 2022: 77). Alternatively, the pieces may be covered with smoke in a firing without flame (smudging[208]) on the faces of the vessel. The blackening effect on the surface of the vessel resulting from it is typical of the lustrous pottery of the Paiter Suruí (Vidal, 2022: 76-79), and Tukano (combined with negative painting technique) and Baniwa pottery of the Upper Negro River (Lins, 2020: 42-43; Oliveira, 2020: 44-45).

In order to execute these multiple tasks, multi-purpose tools as the own potter's hands and tools made from a variety of materials, vegetal, animal and mineral and reused artifacts were served potters along different moments of ceramic production and, with the progressive drying, the hard states of the clay paste. The current degree of precision available allow us only to conjecture the range of possibilities as well as the ritual prescriptions of behavior such as silence, sexual and alimentary abstinence, menstruation and metaphors of bodily posture, woman body and vessel shape form (Lévi-Strauss, [1985] 1986; Silva, 2000: 61; 2008: 225; 2019: 9-10; Machado, 2005-2006: 102; Belaunde, 2019: 22; 32; Lins, 2020; Oliveira, 2020; Vidal, 2022: 121-130). Wood planks, vegetal baskets, matts, palm (*inajá*, or maripa palm) and tree (*pipibap*) seeds and leaves, bark, or gourd paddles, corn combs, tongue of pirarucu (*Arapaima gigas*) and rib of manatee (*Trichechus iunguis*) or tapir (*Tapirus terrestres*), cotton, bird feathers, human hair attached to clay handles or canes, tree and palm leaves, bones, shells and cobbles, small ceramic recipients and potsherds in recycling would may be used as tools along all the stages of the technical process. Expedient or purposefully made tools, re-used objects put to store the paste, paint break up the clay, shape the vessel profile, level out the top of coils, smooth and polish the vessel surface, support drying vessel, waterproof the interior of

[208] A variety of techniques achieve smudging immediately after the first firing or post-firing with the fixing of particles of carbon through smoke in reducing atmospheres (see Rice, 1987: 158; Roux, 2016: 136).

recipients, make plastic decorations, grind colored pigments and paint thin and thick lines through raw material procurement, domestic space and fire structures.

Many stages and characteristics of the activities of production can be indirectly inferred to the naked eye by the material consequences in a sort of encyclopedia of *chaînes opératoires* such as negative impression of the support on the base of the vessel, finger markers, the overlaying of the coils by the pattern of breakage of the potsherds, firing atmospheres by the pale and dark coloration of margins and core (see below). Experienced potters may recognize by color and texture of the soil, physical responses in fingers or the mouth potential clay sources to be exploited, plasticity of paste, etcetera (e.g., Luo (Dietler; Herbich, 1989: 151-152) and Asurini potters (Silva, 2000: 57-59; 2008: 224-225)). The sharp sound of dried ceramics indicates pieces ready to be fired…

How did they use it?

Production practices may provide reliable markers to track culturally specific patterns of utilization associated to a community's diet and etiquette of shared preferences of material consumption (Lathrap, 1970: 110; La Salvia; Brochado, 1989: 10; 26; 121). But rarely in archaeology the relationship of shape and function is easy to interpretatively discover. With the present knowledge at hand, it is hard to infer specific usages to the range of forms embraced in the polychrome type. In the absence of direct observation, archaeologists routinely deduce from geometry of artifactual form "*typologies déduites*" (Gardin, 1979; Gallay, 1986: 177-181; Roux, 2016: 274-277). Shepard (1956: 228-230) pioneered the correlation of structural classes as defined by the geometry of the contour (restricted, unrestricted and vases with "neck") with use-specific purpose in stirring the content with the hands inside the vessel, display and drying of food, retaining liquids and pouring the content.

In the South American lowlands, the reconstruction of shapes and function classes from ceramic sherds work mainly with the hindsight of ethno-historical sources (e.g., engravings, illustrations and accounts by the European chroniclers of the seventh century in São Vincent, Rio de Janeiro and Northeast as Staden ([1557] 2020), Thevet and Lèry) and other ethnographic accounts. Studies on Guarani and Tupinambá ceramics in the southern cone and eastern coast strip of the subcontinent bridge in part the production sequence with the formal properties and use-life of finished vessels (Brochado, 1977; 1991; Noelli; Brochado, 1998; La Salvia; Brochado, 1989; Brochado; Monticelli; Neumann, 1990; Brochado; Monticelli, 1994). With special focus on the accounts of early chroniclers, these were the lynchpin of the ethnographic

analogy directly with a 'snapshot' with cultural exemplars in the moment of contact and culture-history pre-/history continuum of language-based lineages of affiliation.[209] For TPA, the situation is not helped much by the sparse historical sources as in the encounter of Carvajal and the "Omáguas" in the Solimões (Porro, 1992; 1995) or often-held assertion of the absence of living polychrome potters.[210]

Brochado (1977: chs. 3; 5; 1991; Noelli; Brochado, 1998; cf. also Shephard, 1956; Balfet; Fauvet; Monzon, 1983; Skibo, 1992: 36; Roux, 2016: 276) demonstrated the proportion between height, maximum diameter determines the use the vase was put to use in the neotropics. With the help of ethnographic information compiled in the volumes of HSAI and chroniclers of Tupinamba and Guarani groups, general categories of vessel form (pots, bowls, jars and dishes) are identified with function (cooking, storing and consuming) in the archaeological record of the Tupiguarani ceramics in an agriculture-based cuisine system in which the manioc is its main ingredient in diverse recipes of flour, cake and alcoholic beverages (Brochado, 1977: 71-72) (**Fig. 5.14**).[211]

Fig. 5.14. Preparation of alcoholic beverages. In: Staden, [1557] 2020: 140, 38.

Use-alteration marks (Skibo, 1992) or biological residues are other useful methods for discerning function with the direct evidence of physical attributes of the ceramic artifact.

The fact is that ceramics are hardly a single class of object with specific functions or similar vessel forms be used for the same purposes. Further, production and consumption practice patterns in domestic and commensal events may create different registers and sets of

[209] In some cases, linguistic filiation to Tupian languages was one of the major drivers of comparison between ceramic assemblages of past and present (e.g., Tupi-speaking Paiter Suruí potters (Vidal, 2022) and Tupiguarani ceramics in Almeida 2013: 213-215). One might legitimately ask by the logic of the analogy if a direct historical comparison between ethnohistoric ceramics made by Romance-speaking potters back hundreds of years ago with pottery-producing groups of presumed Indo-European language connection is better off than one established with technological and sociological regularities in shaping vessels out of clay.

[210] One should pounder the place of the Shipibo-Conibo potters in the Upper Amazon in this picture, as we shall see presently.

[211] Root-crop cultivation is an angular stone to the expansionist model of "developed Tropical Forest agriculture" across the riverine areas in Lathrap (1970: 74). On the techniques and utensils involved in the preparation of manioc, see Lathrap, 1970: 48-53; Brochado, 1977: ch. 2.

use of tableware as in the case polychrome ceramics in the US Southwest (Classic/Pueblo III-IV periods) that build a condensed vestige of interaction structure over time (Mills 2016).

History of research and state of the art

Perhaps one of the perennial struggles of archaeologists' intellectual workshops is to come up with useful methodologies, concepts and general empirical expectations of mobility processes. Faced with the "methodological trilemma" (Burmeister, 2000: 540; see **Archaeology of mobilities**) of interpreting variability 'on the ground,' a great deal of Amazonian archaeologists has been hardly imagining human history of Amazonia outside the normative box. Poor engagement across pivotal interdisciplinary domains here with us for some decades now such as migration and network theories, experimental psychology, cognitive science and theory of learning and post-colonial research account in part for the failing of a reconciliation of multi-scalar approaches (see CHAPTER 3).

As a result of this, a *longué durée* history of indigenous lowland people may look good on paper but written with the ink of notional 'culture-area,' out-ward massive population movement, ethnofossils and all that. In a logic out of vicious necessity, by working backwards onto the past migrating 'nations' rolling like billiard balls (see CHAPTER 2), migration is used as an "[…] an axiomatic precondition of the phenomena observed" (Burmeister, 2000: 539; 2013: 231). But what is the nature of relations in contexts of production and transmission along the practice of techno-system traditions? Through which networks circulation patterns and pertinent variables of information move? It is not enough to state mobile states of ancient people, but it is necessary to qualify the varieties of mobility, movers and the patterned evidence the archaeological record may bear on (Woolf, 2016).

The first effort to constitute a single group for polychrome ceramics identified in Amazonia integrate in a network of relations with other areas is *Prehistoric Ceramic Styles of Lowland South America, Their Distribution and History* (Howard, 1947). In it, the basic methodological strategy is first to reconstitute a sort of genealogy of motifs to then reconstruct a 'kinship relation' and directions of cultural influence among units plotted in time and space coordinates. These units are classified by recurrent traits such as details of vase form, decorative elements and design patterns from a nested classification at different levels of inclusiveness, from the single trait, complex styles to division. The "Polychrome Divison" assembled six styles found in the upper, middle and low courses of the Amazon River (Napo, Miracaranguera, Santarém, Maracá, and Marajó) and Brazilian Guiana (Cunany) with a set of

traits such as polychrome painting, incised decoration and urn burial (ibid., 42-59). Howard (1947: 83-87) suggested a polychrome-non-polychrome chronological sequence for the Amazonian lowlands, the inverse of what Nordenskiöld (1930: 34) had proposed before.

Meggers and Evans (1958; 1961) re-organized these polychrome ceramics as a 'horizon style' within a four-fold typological scheme for ceramics in Amazonia according to morphological characteristics such as variety of rim and decoration in an exercise of descriptive taxonomy (**Fig. 5.15**). Zone Hachure, Incised Rim, Polychrome, Incise and Punctuate label successive 'layers' spreading from the western areas through major water channels into downstream Amazon. The time-chart of horizons and their geographical distribution document the mobility of groups in the form of *Volkswanderungen*. Albeit chronological revisions later added on it, this still stands as a point of reference to Amazonists to begin with (Prous, 1992: 428). The form of framing the lowlands as a recipient of exogenous influences is in line with the then-current agenda of anthropological research. In a migrationist/diffusionist model, two end points, 300 miles apart, of the polychrome horizon and locations of investigations of Mergers and Evans from 1948 through 1968, in the river Napo and in the Island of Marajó at the mouth of Amazon, were linked without "whistle stops" (cf. Stahl, 2002: 41).

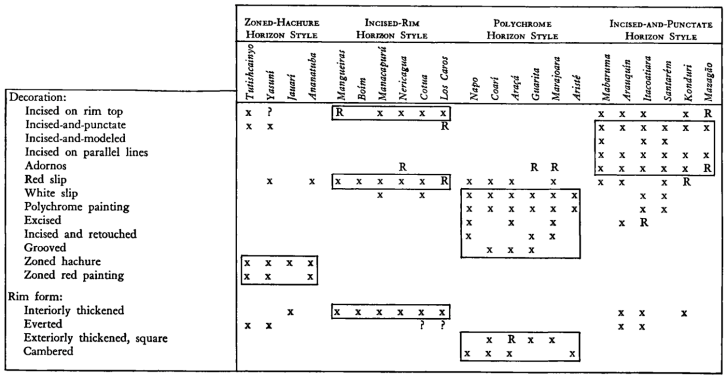


Fig. 5.15. Constellation trait of four horizon styles of Amazonia. In: Meggers; Evans, 1961: 374, fig. 1.

The chronology of Central Amazon is much due to the empirical work of the German-Brazilian P. J. Hilbert and M. Simões in the and 1950s and '70s, who conducted, respectively, excavations in the middle Amazonas (Solimões) and the lower Negro, in the framework of MPEG and PRONAPABA (Hilbert, 1959; 1968; Simões, 1974; Simões; Kalkmann, 1987). The former provided a stratigraphic sequence of succeeding ceramic complexes defined by technological and decorative elements for the Middle Amazon area, locally caged manifestations hooked up with the scheme of horizon styles of Meggers and Evans (**Fig. 5.16**).

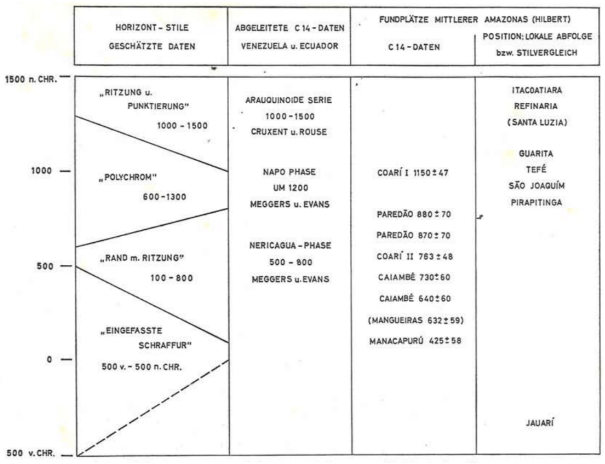


Fig. 5.16. Chronological sequence of the Middle Amazon River. In: Hilbert, 1968: 256.

The accumulation of radiocarbon dates imparted chronological depth and decompressed the cross-cut section of the data synthesized by Hilbert and Simões and transformed the diffusion in space of a 'horizon' in a transmission in time of a 'tradition'. In opposition to the views of Meggers and Evans as regards directions of influences, a new conception of the culture history of the area gained form over the next years.

Lathrap and his collaborators stressed the *longue durée* of *in loco* cultural development and reversal of currents of migration and diffusion into/out central Amazonia (Lathrap, 1970; Brochado; Lathrap, 1982; Brochado, 1984; 1989; Noelli, 1996a; 1998; 2008a). The Polychrome Tradition now nests two 'subtraditions' differing in trait constellation for the occurrence of anthropomorphic burial urns, temper, vase forms and pottery shapes. These subtraditions stand for a forked-road migration in a 'swarming' behavior of colonization according to which different populations waves were released from a single hearth along the floodplains of the middle Amazon and out of Amazonia towards southwest and east of Brazil. Out-migrating populations were posited to move over a process of fusion and fission similar to that of proto-speech community of agriculturalists in consonance with the proto-speakers of 'Guarani' and 'Tupinambá' (see above). Here, the explicit attempt is to connect ceramic typological evolution with ethnolinguistic relatedness according to the principles of the *Staummbaun* model root and branch (cf. Corrêa, 2014: 18; see **Bringing up things out of date**). In the words of Brochado & Lathrap (1982: 11), "[…] all of the ceramics of tropical America […] derive from a single invention of pottery […] [and] that traditions which appear

highly divergent in later periods in time, will converge as they are traced further back in time […]".

In terms of chronology, there are few absolute dates that range between 440 AD and 899 AD (7-9th cents. AD) for TPA-assigned contexts of occupation distributed in the middle and lower Amazon (Solimões), Negro and Upper Madeira (**Tab. 5.2**) (Hilbert, 1968; Tamanaha, 2012: 129, tab. 4; 2016: 369, tab. 1; Tamanaha; Neves, 2014: 55-58; 54, tab. 1; Neves; Moraes, 2012: 129; Belletti, 2015: 255-285; 2016: 352-354; see also Kater, 2018: 116, tab. 9; 277, tabs. 32-33).[212] The date in the Upper Madeira (Teotônio) is an outlier of the general pattern of dates concentrated in the beginning of the second millennium AD.

Site	Sample	Unit	Level	Uncalibrated dates (AD/BP)
Conjunto Vilas	Ceramic	S1068E1430 (F14)	80-90 cm	440 AD/1510 ± 30 BP
Conjunto Vilas	Ceramic	S1068E1430	20-30 cm	450 AD/1500 ± 30 BP
Boa Esperança	Ceramic	S1575W1248	30-40 cm	780 AD/1170 ± 30 BP
Teotônio (RO-JP-01)	Charcoal	N10001 E1003 unit	50-60 cm	700 AD/1250 ± 30 BP
Coari I (AM-CO-1)	Ceramic	?	0-15 cm	1150 AD ± 800 47 BP
Santa Rosa (AM-MA-9)	?	Cut 1	20-30 cm	825 AD/1125 ± 90 BP
Engenho Velho (AM-BL-7)	?	Cut 1	50-60 cm	880 AD/1070 ± 40 BP
Santa Fé	Charcoal	?	?	880 AD/1070 ± 60 BP
São Paulo II	Ceramic	?	?	895 AD/1055 ± 92 BP

Tab. 5.2. Earliest dates for TPA in the river channels of Solimões, Negro and Madeira. Modified from Belletti, 2015: 273, tab. 2.7; 275, tab. 2.8; 2016: 352, tab. 1-3.

In the wake of the 2nd millennium AD, particularly from 1100 AD situates the biggest concentration of the available dates, in the confluence of the Solimões and many other localities throughout the Amazon basin, particularly in West Amazonia (see e.g., Neves, 2010a: 466, fig. 197). To archeologists of the area, the turn of the millennium is a period of major transition associated with new settlement patterns and short-term duration of occupation.

In Central Amazonia, the bulk of polychrome ceramics in study were brought to light in the archaeological investigations of Hanke (1959), Hilbert (1968), Simões (1974; 1983; Simões; Kalkmann, 1987) and the collaborators of CAP (Lima, 2008; Tamanaha, 2012; Belletti, 2015).[213] They have been classified in the perimeter of various local phases and contexts of the Middle Solimões (Guarita and Tefé) and Low Negro River (Apuá). In the Upper

[212] There is a date interval of 40 BC to 80 AC for the site Vila Nova II in one of the tributaries of the Negro River, but as it has been highlighted by Tamanaha (2012: 30) the context is not accurate. To my present knowledge, it seems there is a great confusion among Amazonian archaeologists with regard to cultural attribution of potsherds of Coarí I and II, at the right margin of the Solimões River, brought to light by Hilbert (1968: 256; see Fig. 5.16) and radiocarbon dated (see Pennsylvania and Smithsonian Institution lists of C14 dates in Stuckenrath, 1963: 100; Singalove, 1964; cf. e.g., Brochado; Lathrap, 1982: 36; Heckenberger; Neves; Petersen, 1998: 77-78; Tamanaha, 2012: 128-129; Tamanaha; Neves, 2014: 56; Belletti, 2015; Gomes; Neves, 2016: 322, n. 5). The chronological position of the context and position of both contexts justify their inclusion in the analysis, as we shall see later. The potsherd material of excavations is in the Smithsonian.

[213] Cf. Neves, 2012: ch. 2 for description of grid and excavation in artificial units adopted by CAP and PALMA.

Madeira, polychrome sherds first appear in the description of investigators of the PRONAPABA in the 1970s by Miller (1978; 1987; 1992; 1999) and more recently have become the chief topic of scientific research of a younger generation of Brazilian archaeologists under PALMA (Almeida, 2013; Zuse, 2014; Silva, 2015; Vassoler, 2016; Kater, 2018; see special issue in *Bol. Mus. Para. Emílio Goeldi. Cienc. Hum.* vol. 15, no. 2).

The changes experienced by the Tupian problem in archaeology over the last three decades remain unprecedented. The CAP in the Lower Negro and Solimões rivers represents a great development for archaeological investigation in one area at the heart of Lathrap and pupils' hypothesis (Heckenberger; Neves; Petersen, 1998; Neves, 1998; 2006; 2007; 2009; 2010; 2011; 2012; id.; Petersen, 2006). For instance, excavations in one site of the area (Açutuba) show that the earliest polychrome pottery dates no earlier than 900 AD, much later than the 500 BC event of divergence of TPA/Tupi-Guarani in Central Amazonia (Heckenberger; Neves; Petersen, 1998: 75).

The chart of geo-historical distribution of polychrome ceramics indicate they are more recent in the middle and upper course of the Amazon than in its lower course. In the Upper Madeira River, these ceramics reach the 700 AD in Teotônio (Almeida, 2013).[214] The high antiquity of polychrome ceramics manifested in Jatuarana phase in the area represented a spin of direction in the weather vane of the debate on origins and movements of ethnic groups. All taken together, a process of a fast-paced and nonlinear demographic expansion/invasion starting from the Upper Madeira River into Central Amazonia has been evinced in the pattern of radiocarbon dates around the year 1000 AD (cf. Tamanaha, 2012: 128-131; Neves, 2006: 63-64; 2012: 228 ff.; Tamanaha; Neves, 2014: 55-58; 54, tab. 1; Tamanaha, 2016: 369, tab. 1 for dates along the middle-lower Solimões and lower Negro rivers; Almeida; Moraes, 2016: 411-413; 411, fig. 5; Kater, 2018: 277, tab. 33; 2020: 13, fig. 7; Neves; Watling; Almeida, 2020: 6, fig. 2 for the Upper Madeira; but see Belletti, 2015; 2016 for earlier dates in the middle Solimões (Lake Tefé), as will be considered presently).

In addition, circumstantial evidence of the building of defensive structures in pre-polychrome stratigraphic levels in sites in the area of confluence of Central Amazonia (sites of Lago Grande and Açutuba) and Lower Madeira River (Vila Gomes and Borba) has been correlated with a warfare-like scenario for the process of *dispersion* – "[…] not fully an expansion[…]" (Almeida; Neves, 2014) – of the polychrome pottery associated with the Tupi-Guarani or of the Tupian stock (Moraes, 2010; 2013; Moraes; Neves, 2012; Almeida; Moraes,

[214] The date lies 1000 years ahead than the date ca. 700 BC (2700 BP) reported by Miller, 1992: 224; 1999: 336.

2016: 412; Almeida *et al.* 2018: 200-201 *contra* Belletti, 2015: 367-370; 2016: 355). The Tupinambá (Tupi-Guarani branch) expansion in the Atlantic coastline of Brazil provided a mirror for this earlier episode (Neves, 2009: 142; 2011: 46; 2012: 252; 263; Neves; Petersen, 2008: 293; Almeida, 2013: 315-320).

The picture of Tupi-Guarani expansion has become even more complex with the dissociation of these polychrome pottery of the Upper Madeira from Tupi-Guarani-speaking producers and association, instead, with Tupian speech communities in a direct historical argument based on the nonexistence of speakers of Tupi-Guarani languages in the area in historical times (Almeida, 2013; 2016; Almeida; Neves, 2015; Neves; Watling; Almeida, 2020: 13-14). According to a recent ethnoarchaeological explanatory model, the expansion from the center of dispersion of the Tupi-Guarani language family in the SE Amazonia would have had occurred along a "hemorrhagic" pattern in interfluve areas (Almeida; Neves, 2015: 517; cf. Clement *et al.* 2015: 5, however postulating a SW origin for the Macro-Tupi and Tupi-Guarani). The relation of these polychrome pottery in the lower-middle Tocantins-Xingu interfluve area in the Lower Amazon and the polychrome specimens from the Upper Madeira remains to be addressed. But as stressed lately by Almeida (2013: 318-319; 2016: 181; Almeida; Neves, 2014: 178-179), in the footsteps of previous findings (Heckenberger; Neves; Petersen, 1998), the ceramics of the SE Amazonia probably is not a phylogenetic member of the TPA, but a parallel stylistic development with the horizontal transmission of exogenous traits coming from earlier ceramic substratum as the Pocó-Açutuba Tradition around the *Anno Domini*; and that style culturally and linguistically bounded with Tupi-Guarani groups.[215]

Pocó-Açutuba is of a large geo-historical diffusion in the Amazon Basin produced, it has been argued, by Arawak-speaking groups in extensive and fast-expanding interacting networks with autochthonous Tupian groups in the Upper Madeira around 500 AC. The Pocó-Açutuba ceramics are characterized by a series of technological and morpho-stylistic elements associated in earlier chronological position relative to ceramic assemblages of the Incised Rim[216] complex of Central Amazonia, phases Manacupuru and Paredão (600-1000 AD), in sites

[215] The chronological benchmarks for the Tocantins-Xingu area (200-1800 AD) might support the hypothesis that the ceramics of SE Amazonia are part of the Tupi-Guarani Tradition and, therefore, cannot be an evolved subtradition stemming from the TPA (Almeida, 2013: ch. 2; 2016: 173; Almeida; Neves, 2015: 514, tab. 1; 515, fig. 8; 513; 515).

[216] Defined by Meggers & Evans (1961: 378) as a horizon with ceramic complexes in the middle Orinoco and lower Amazon in the centuries of both sides of 500 AD, "the most distinctive […] is a broad, flat-topped rim, produced by interior thickening, giving a heavy, trianguloid cross section. The level or slightly insloping rim surface is usually decorated, typically with rather broad, incised lines."

of the middle and lower courses of the Amazon River.[217] Investigators of PAC dismembered an earlier ceramic phase, Açutuba to constitute a ceramic tradition in a long arc of Amazonia history, from the 1st millennium BC through 600 AD over "[…] *cerca de 1300 km, desde a foz do Japurá até Santarém, e, de norte a sul, de mais de 700 km, desde o baixo rio Branco até a região de Manaus*" (Neves *et al.* 2014: 150) (Lima, 2008; 2016; Lima; Neves; Petersen, 2006; Lima; Neves, 2011; Neves *et al.* 2014; Lima, 2016).

These ceramics analyzed fall within the regionally wide scope of virtual historical connections with pottery-producing groups of the Incised Rim ceramic complexes identified by Meggers & Evans (1961) and of the Barrancoid/Salaiod ceramics in the coast of Venezuela and Caribe. The discussion is oriented to culture-history relationships, in some occasions to cultural rupture and the appearance of new populational groups, others to broader linguistic correlations and forces of socio-economic transformation in the Amazonia of 3,000 years ago. There is a long research tradition going back to Nordenskiold (1930), Lathrap (1970) through Heckenberger (2002; 2005) of establishing cultural ties between ceramic assemblages of different patches of Amazonia and plant domestication, demographic growth and occupation of new areas by Arawak-speaking groups,[218] landscape management and formation of the TPI.

Much of the diagnostic markers of Pocó-Açutuba ceramics will recur much later in time here and there in multilinear vertical lineages of transmission. The fact is that the refinement of the chronological sequences of ceramics for the whole Amazonia and the large geographical distribution of techno-stylistic elements of pottery in a long chronological stretch have been 'confusing' the neatness of previous tied-bounded classificatory schema. The earlier realization of diagnostic ceramic features of later type-names thus has been creating a fluidity of classificatory categories reflecting the very convergence of watercourses of the Amazon (see Neves *et al.* 2014: 141 for the image). Modeled elements affixed to the vessel before firing, mesial flanges and red or dark-on-white painting typical of Guarita phase almost 1000 years earlier in the Pocó-Açutuba ceramics or the incision technique in fired pastes of the polychrome ceramics of Marajoara are cases in point (see e.g., Lima; Neves; Petersen, 2006: 44, tab. 2; Lima, 2008; Lima; Neves, 2011: 221, tab. 4; Almeida, 2013: 309, tab. 59).

[217] Trombetas-Nhamudá (Lower Amazon): Pocó and Boa Vista; Negro-Amazon/Solimões (Middle Amazon/ Central Amazonia): Açutuba, Hatahara, Osvaldo, and Lago Grande, Cachoeira, Jacuruxi and Nossa Senhora do Perpétuo Socorro; Middle Solimões in the lake Amanã: Boa Esperança.
[218] See Urban, 1992 for the immense geographical dispersion of the Arawak languages.

Eventual turnings of the arrow's direction and vectors of 'influence' that add up to a spin never challenge, however, the very existence of isomorphic relationships between peoples and pots (see Schaan, 2007; Dias, 2007 Machado, 2007; cf. Belletti, 2015: 393), lefting unexplored broader sociological implications of ceramic assemblages beyond the scope of shapes and decorations, the mainstay of the typological approach (Roux, 2016: 364).

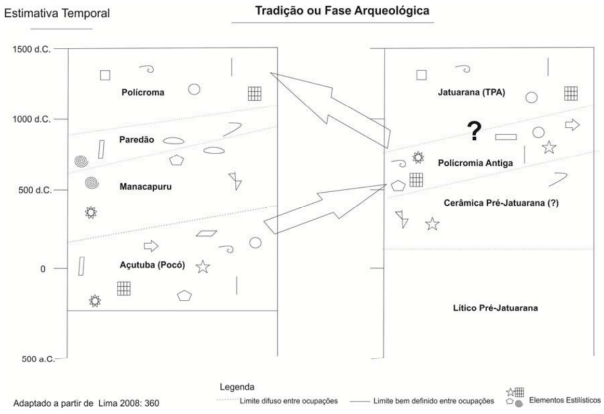


Fig. 5.17. The stylistic making of TPA in the Central Amazonia (left) and the Upper Madeira (right). "*Pré-Jatuarana*" now is recognized as Barrancoid. In: Almeida, 2013: 311, fig. 152.

To Almeida (2013: 286), the genesis of TPA style would sum up to a "breaking up into a million specks of light" as says the song in a "*confusão de cores nas margens dos rios da Amazônia*" of diverse regional trajectories, a passive proxy of regularity of interaction of groups of diverse origins. The Upper Madeira, the reasoning goes, was the departure point for the movement of the bearers of the tradition downstream "[…] *com o intuito principal de explorar o outro lado da moeda das relações amistosas de troca, que é a predação, a obtenção dos elementos exógenos à força*" (Almeida, 2013: 310). Teotônio's stratigraphy epitomizes the narrative of explaining patterns of temporal and geographical variations through the device of making the decorative element and inter-regional stylistic variability stand for the potter's influence and his/her migration (

Fig. *5.17*).

Of equal significance in the last two decades is the role played by warfare in understanding power configuration, social organization, and inter-community integration of the Tupinambás. On this, ethnology has been making important contributions in the last decades, notably on the role played by warfare and cannibalism in forming shifting social alliances in the wake of sociology's classic *A Função Social da Guerra na Sociedade Tupinambá* by Florestan Fernandes (Fausto, 1992; [2000] 2010; Cunha; Viveiros de Castro, [1985] 2017; Noelli, 2008b: 14, n. 2). Dense political fragmentation and cultural regional allignments are critical issues to be addressed in the future (Fausto, [2000] 2010: 80).

Three points merit particular emphasis insofar as archaeology is concerned. First and foremost a perennial question to cultural identity in archaeology. To what extent a widespread homogeneity of habits and material culture is an accurate reflection of social group realities? On this, cases of linguistic convergence areas in Amazonia can add an extra dimension of

complexity that further complicate the relationship between culture and languages (Epps, 2009; Epps; Michael, 2017). They demonstrate that high degree of material similarities operates regardless of multi-linguistic networks of exchange, fracturing inter-group division by ethnolinguistic schimogenesis and specialized production. Among the examples we can point out 1) the Omaguas in the middle Amazon and Yurimaguas of the Upper Amazon reported in the sixteenth century sharing polychrome ceramics but not speaking genetically related Tupian languages (Porro, 1992; 1995; Belletti, 2015: 394-400; see below); 2) the Upper Negro system in NW Amazonia (Sorensen, 1967; Epps,; Stenzel, 2013; cf. Rodrigues, 1986: 85-86 and references therein); 3) the Xinguanos in the Upper Xingu (Franchetto, 2001; 2011; Heckenberger, 2005 and references therein; cf. Hornborg; Hill, 2011a: 5; 11; Iriarte, 2024: 41-42); and 4) the Shipibo-Conibo ceramics produced in historic times by speakers of Panoan languages (see below).

Second: how decentralized social formations can be integrated in intricate and volatile networks of political alliances and exchange? Finally, how is it possible to envisage an ethno-historic and ethnographically informed studies on Tupi-Guarani-speaking groups in framing a subcontinental-wide mobility of groups, geographic distance and linguistic speciation in precolonial times (Urban, 1992: 93; Almeida; Neves, 2015: 502)? The bone of contentions here is that a 2,000-2,500-years long gap in time between the center of origins and the period of expansion of Tupinambá and Guarani people seem not explain well the cultural and linguistic similarities involved (Fausto, 1992: 382; Viveiros de Castro, 1996: 58-59).

Anthropologist and archaeologists have been stressing that warfare does not always operate as a tool for exploitation of wealth accumulation in the form of annexation of new territories and/or capturing slave labor (*pace* Carneiro's "circumscription theory" (1970: 735). Under the authority of the colonial state, warfare certainly served the Portuguese *divide et impera* strategy, both defeating indigenous enemies and providing slave labor in the form of war captives (Hemming, [1978] 2008: 79). However, among the Tupinambás, warfare and anthropophagic rituals associated to it were embedded in the fabric of relations and temporality (Cunha; Viveiros de Castro, [1985] 2017: 78; also Fausto, 1992); and Amazonists have start to see in the insatiable thirst for vengeance recorded in many ethnohistorical accounts a counter-balance mechanism of power centralization and a variation on the theme of decentralized productive landscapes (Neves; Petersen, 2006; Neves, 2007: 127; 2009: 163-164; cf. Neves; Rostain, 2012: 131-133; Rostain, 2016: 62-63; Neves, 2020: 218-220). This is an argument much in line with the inherent political instability and power-diffusing features of South American indigenous social organizations inhibiting the development of institutionalized

inequality pointed out by Clastres' *La Société contre l'État* ([1974] 2020; see discussion in Lehoërff, 2018).

Two major current hypotheses for origins and migration of the producers of polychrome ceramics in Amazonia merit some further comment. Neves (2011; 2012) and collaborators have been hypothesizing a peaceful multi-ethnic zone of contact in riverine areas of the Upper Madeira and Lower Xingu rivers between 'exogenous' Arawak and 'autochthonous' Tupian groups. These areas would be conduits of information exchange and stylistic transformation between discrete linguistic populations giving rise to the 'polychrome tradition'. The entire edifice lies on an agreed-upon proxy of techno-stylistic types and ancient ethnicities, though.

The interpretative jump made to a correspondence of historical-attested positions of indigenous groups and the population-genetic relations that lay behind stylistic transformation of ceramic assemblages are not self-evident. The same problem appears in the arguments which lend weight to a bellicose scenario for the expansion of polychrome ceramics from its Tupian and Tupi-Guaranian 'homelands.' Evidence bearing on this is open to debate since how this warrior *ethos* should be so is not clarified. How things changed in the political economy equilibrium between these groups of Lower Madeira and area of confluence of Negro and Solimões rivers? What explain the outward migration waves of producers of the TPA (cannibal carnage, as imagine some)? Technological innovations as better canoeing techniques (Almeida, 2013: 320) are alluded but not developed, making the canoe the Indo-European horse of migrationist theories Tupis. One may ponder how much of it is representative of the universe of the TPA (e.g., Belletti, 2015; 2016). Also, one may ponder the question on assertions "[…] that these groups dispersed in a dynamic and frenetic way, driven by the mainstream waterflow […]" (Almeida *et al.* 2017: 204; also Almeida, 2013: 317; 320) if the narrative raise the available evidence of spatial distribution of stylistic gouping to a great height and population movement is considered as atavistic condition for population movement redirected in the refracted lines of riverine channels (Métraux, 1927: 1; cf. Corrêa, 2014: 143).

A thread reprised many times by anthropologists and archaeologists working in Amazonia Basin under different paradigms and conception of the carrying capacity of the tropical forest is of the drainage basin being a sort of high-speed rail network, a channel of diffusion of culture traits or movement of people in prehistory and in the post-contact period (Métraux, 1927; Nordenskiöld, 1930; Howard, 1947; Meggers; Evans, 1958; 1961; Lathrap, 1970; Brochado; Lathrap, 1982; Brochado, 1984; cf. Neves, 2008: 360-361; Almeida; Neves, 2015: 504). The definition of this means of communication and travel impinges directly on the spatial 'maritime' mobilities of these groups. This is true no matter the direction of influences

of which polychrome ceramics is a case in point: stylistic diffusion from the Andes (Nordenskiöld, 1930) or Amazonia (Howard, 1947); and for migration waves from the Andes (Meggers; Evans, 1958; 1961) or the core of Amazonia (Lathrap, 1970; Brochado; Lathrap, 1982 Brochado, 1984; 1989). The definition of Amazonia as a culture area, the Forest Culture type consecrated by Lowie (1948) and Steward (1948a) in part relies on the focus of floodplains as vectors of communication and travel distributing cultural similarities far and wide. The plan of action of the pronapians listed the lines of shore and major rivers for tracking routes of influences and diffusion of people and ideas (Evans; Meggers, 1965; Evans, 1967; Meggers, 1985).

No matter how distinguished environmental perspectives get, they continue to rotate around the axis of this aquatic *habitat*. By stressing the higher protein inputs in the floodplain ecological niche, Lathrap and Brochado's theory reflects the reverse image of Meggers' environmental determinism, setting up an agonistic scenario of resource competition and territorial displacement.[219] In it, is as 'people' standing next to the other, waiting their (historical) turn to move up in the line of complexity and, by demographic growth, upper the line of the river itself, pushing neighbors into the periphery and a step backward in the chain of development. More serious, is that contrary to Heraclitus' River, the concept of culture always has been bathing in the same static river twice, thrice, four times…

A common simplification among specialists dealing with these issues is to polarize between 'pronapians' averse to any direct historical correlation beyond the purview of formal relations and those committed to a reconstruction of a long-term history of indigenous cultures in close dialogue with cultural and social anthropology of the area (e.g., Neves, 2010b; Corrêa, 2014). At the risk of adopting a polemical tone, we can evoke with Roux (2007) that the point of contention here lies not in the local field of application of ethnohistoristorical, ethnoarchaeological and experimental archaeology knowledge, but in the epistemological role and scope analogical inference is accorded in interpreting the limited data at hand. Hypotheses may tap in many local foci of analogies but must be related to generalities in the production and reproduction of pottery systems so to avoid the deadlock of projecting idiosyncratic wishful thinking onto the past.

The fixity with centers of ceramic diffusion (as in diffusionist approaches in general) or the concentration in ceramic types in large phylogenetic groupings are the wrong way to go about mobility for at least the following reasons: 1) it endows life to taxonomic categories

[219] "Displaced persons hypothesis" (Urban, 1996: 62).

through a series of taken-for-granted assumptions in order to reconstruct a history of ethnolinguistic significance, namely the definition of culture groups with evidence of pottery in a typical "initial-formation-subsequent-regionalisation" (Furholt, 2018a: 310) model; 2) reconstructions of the like are too ambitious and unfalsifiable (Demoule, 2014). As long as archaeologists limit themselves to speak the (cryptographic) tongue of ceramic typological description, the fate of "turning names into things" (Wolf, 1982: 6; cf. Hegmon, 1992; 1998: 266) will continue to befall migratory reconstructions or kinship arrangements of any sort. To say the least, the strong ascendancy of acculturation approaches to cultural identity in anthropological thought (Dietler, 2005; Silliman, 2005; 2009; 2012 cf. Cabana, 2011: 23) advise caution of treating analytical units as facts to start with. Where the typological thinking is at the same time the sharp instrument and the patient's flesh some vicious procedure will always give the cut.

Working hypothesis

> […] *centro de origem, rotas de expansão, filiação linguística, etc. Será que não conseguimos ir além das questões apresentadas no XIX?* (Corrêa, 2014: 87-88).

The identification of the underlying mechanisms of the spatial distribution of morphologies and decorative elements of ceramics in Amazonia is frequently hampered by one-dimension presentation of the dataset on maps or checklist tables and overfocus in poor indicators of interaction. The potential of interpretation of dimensions of meaningful historical relations of craftmanship remain largely unrealized and orphan of explicit reference propositions (e.g., review of "comparative technology" in the African continent in Gosselain, 2018). As long as attention is directed to macro-levels models of cultural phylogenetics, stylistic association shall continue to be mixed in the conception of mobility of people.

As discussed in detail earlier, the major limitation of the genetic-historical model that thrives on a traditional view of archaeological culture is the foundational myth of origins it lays upon, a genealogical taxonomy of ancestral states (**Fig. 5.18**). The logic of the typological thinking combined with ethnolinguistic filiation is of ceaseless new arrangements and accommodations of genealogical taxonomy of ancestral unities to re-work the association of ethnolinguistic groups and cultures in an archaeological sense of the word. Coupled together with trees of family language proto-origins, this leads inevitably to the reification of a nonlinguistic correlates of *Urvolk* and *Urheimat*, proto-home and proto-folk that come with the leitmotif *Völkerwanderung* into other areas.

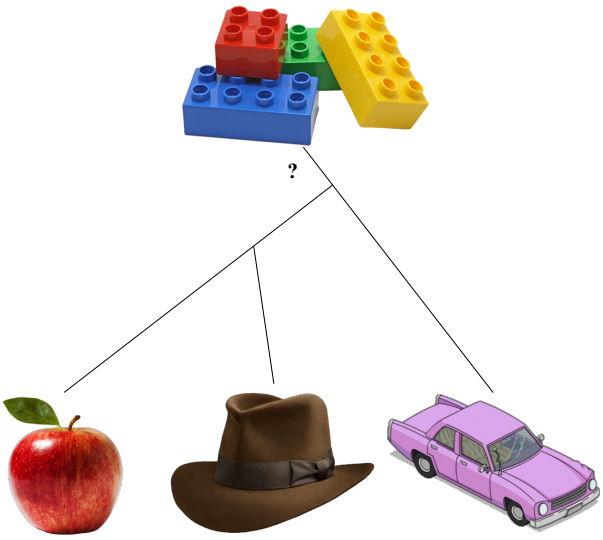


Fig. 5.18. How to reconstruct a proto-object in an arborescent model. Drawing author after Demoule, 2014: 521.

Long ago J. Fraser (1926) and E. Pulgram (1958: ch. 13) explicated a series of problems in reconstructing ancestral unity backwards in time with the tools of linguistic paleontology. Taking the assumptions of the method to its ultimate logical consequences, both showed how nonsensical would be reconstruct back in time proto-Latins living under a monarchic regime, worshiping Christian gods, going to war in horsebacks, smoking tobacco and drinking beer and coffee (Fraser, 1926: 268; Pugram, 1958: 148; cf. McNeal, 1972: 23-24; Renfrew, 1987: 82-83; Demoule, 2014: 531-532; *contra* Coleman, 1988: 449; Anthony, 2007: 87-89; 476, n. 7). If linguistic data does not authorize the fixation of units in time and space in the case of proto-languages, even less the linguistic correspondences with material culture. Fraser's (1926: 262) remarks on this regard are worth quoting at length:

> A few swords of a peculiar shape are dug up in the valley of the Seine; some skulls of approximately the same craniological character are found somewhere in the neighbourhood; it is known that at a date several centuries later than that precariously assigned to the swords and skulls a Celtic language was, in fact, spoken by a people settled in that region. With that material, and no more, the archaeologist constructs a fairly circumstantial, and even moving narrative of the invasion of the Seine valley about 1000 B.C. by a Celtic-speaking people provided with a swords and skulls of the pattern and shape of those just dug up from the earth.

Naturally enough these possibilities of ethnohistoric links are not infinite for the South American or Amazonian lowlands. My main point is that the source of ethnohistoric, ethnographic and archaeological information is way too vast to allow one cherry-picking what s/he is in need to in various combinations in the culture-historical reconstruction of the day to reach a dead end of "vacuous explanation" (Sharon, 2001: 579) in which the hypothesis is never disproved but accommodate in a vicious circle.

Metaphorically speaking, 'exogenous' stylistic elements in 'cultural types' are used by archaeologists to work out relations and bring life to new monster of Shelley's ([1818] 1992) Frankenstein. These groupings have been called "polythetic" assemblages (Almeida, 2013; Almeida; Neves, 2015), but at their core there is an updated 2.0 culture-history view in either a reinterpretation of Clarke's (1968; see **Culture, ethnicity and style**) polythetic classification or Anthony's (2007: 105) bundles of material culture and costumes (Neves, 2011: 37; 2012: 195; Neves; Rostain, 2012: 123). In a bird's-eye view of large-scale models of culture-historical reconstructions, ethnicity is conflated to languages and objects of shared ancestry in homogenizing and stable totalities, going back to mythologizing aspects of origins narrative of the intellectual strain of Kossina, (childish) Childe and Gimbutas (see CHAPTER 2). What needs to be explored is the scalar aspects of recurrence of associations in the "geography of practice" (Wenger, 1998: 130; cf. Gosselain, 2016a; 2016b: 201). Approaches should expand thus a quantitative and qualitative approach to chrono-geographical variability and patterning of the 'style of action' of *habitus* constituent of material "technological style" (Lechtman, 1977; Dietler; Herbich, 1998).

Below, I proceed to point an alternative view for the movement of the polychrome tradition. Consider the fashioning techniques as an example. We may postulate with the degree of detail and information available on the *chaîne opératoire* that there is not a rupture in terms of gestures, duration of apprenticeship and levels of skills as for wheel-throwing technique of coiling technique in general in the indigenous ceramics of Amazonia (after Roux; Corbetta, 1990). By virtue of coiling technique does not show any major constraint (bio-mechanical, cognitive or of raw material acquisition) for re-reengineering of the embodied habit in the transmission process,[220] and accounting the fact it is widespread in the Americas as a whole (Prous, 1992: 91), one might tentatively suggest new and visible techno-stylistic elements of

[220] Roux & Corbetta (1990; 2007: 160; Roux, 2016: 302; 307) estimate that while the expertise in wheel-throwing technique requires 10 years of practice, coiling technique can be taken place in 2-3 years. Furthermore, the gestures employed in coiling seem to be hardly unique to it as the movements of the hands are the same for other domestic activities (e.g., grinding, kneading, etc.), contrary to the asymmetry of the forearms relative to the potter's wheel rotation axis, bimanual control and pression in movement of the hands.

tradition as vessel form and decoration are insufficient technological parameters to create affiliation among potter groups in the terms of change in the structure of population.

These components of technique are easily learned by potters with the command of their trade and may be reproduced in response to aesthetic demands by consumers. Therefore, they will not imply, taken in isolation, long re-socialization of manufacturers or, as for technical investment, high value items. Additionally, the production activity *vis-à-vis* the low-bulk rates of production and local repertoire of technological styles available to shape similar morpho-stylistic assemblages, may give poor credit to mobility of a class of itinerant potters[221] and specific exchange modalities thereof (Renfrew, 1975; 1993d; Gallay, 1986: 183-188; 2013; Testart, 2001; Roux, 2016: 332-338), even less to mass migratory movements, population change or hoard of raiders bearing with them the visiting card of polychrome ceramics.

There are also key ethnohistoric discussions to the linguistic model of polychrome expansion that should be commented. They are illustrative of the diffusion of stylistic features through mechanisms of emulation among non-Tupian groups and transformation of cultural practices other than in genetic terms of transmission in the thousand-long register. The first relates to the chronicle of polychrome ceramics fabricated by the Yurimaguas in the area of Carvajal's "*aldeia da loza*" along the Middle Amazon River, in what archaeologically correspond to the Guarita phase. The tribe of the Yurimagua, according to a cross-referencing of ethnohistoric sources of the 16th-17th, did not speak a language filiated to the Tupi stock, hence neither the Tupi-Guarani family language, and participated in the 17th cent. in a regional commercial circuit of exchange with their painted ceramics and gourds and snail beads (Porro, 1995: 53-54; 43-44; 120-122).

The fact is that the polychrome ceramics is found through many phases of much of the middle stretch of the Middle Amazon floodplains into the historic record. Upon inspection, the geographical superposition of ethnohistoric of tribal territories and archaeological sources of polychrome ceramics is elucidative of the disassociation of sociolinguistic identities and the use of polychrome ceramics (Porro, 1995; cf. Belletti, 2015: 397 ff.).

The Omaguas (Porro, 1995: 48-50), Tupi speakers in the upstream Amazon represent an important chaining link to the spatial spread of polychrome traits. The Cocama-Omaguas tribal groups are an archaeo-historical connection associated with the Tupian languages and polychrome ceramics in the Upper Solimões and Amazon (Zebu, Naipo and Caimito phase

[221] As of yet, provenance-based networks (Mills, 2017: 387-388; cf. also Roux, 2016: 336-337; 2020: 17) linking clay sources to find spots for the type that may give credence to such correlation are not possible.

styles ceramics). In linguistic terms, this could represent the westerner branch of Tupi-Guarani family language distribution, thousands of kilometers to be traversed in a long-range westward migration (Urban, 1992: 83; 1996: 76: map 2), but the genetic (or not) relation with the Tupinambá in migrations and contact situation has been amply debated by linguists (Lathrap, 1970; Brochado, 1984; Rodrigues, 1984-1985: 46; 2000: 19; Urban, 1992; 1996; Gow, 2003: 71-72; Cabral, 2011; Neves, 2012: 248-252).

A further example is The Shipibo-Conibo polychrome pottery. The Shipibo-Conibo in the Ucayali Basin is a Panoan-speaking group of related people (Shipibo, Conibo and Shetebo). The ceramics of the Shipibo-Conibo are set against a heated debate of a millennial-long continuity with ceramic complexes of the Upper Amazon (Cumancaya and Pacacocha) and routes of contact and intrusive influences (Lathrap, 1970: ch. 12; Lathrap *et al.* 1985; 1987; DeBoer; Raymond, 1987). Stylistically, it bears similarities with the polychrome decorative style of Amazonia: color palette (red, black over white slip) and three-tiered scheme of line thickness (Lathrap, 1970: 184) in the composition of complex graphic designs (*kené*) in zoned areas of store and service ware (jars (*chomo*), mugs (*kenpo*) and bowls (*kencha*) (DeBoer; Latrhrap, 1979: DeBoer, 1990: 85, fig. 9.2; Belaunde, 2019: 51) (**Fig. 5.19**). This fact has been raising many questions regarding i) the historical connections of Shipibo-Conibo with other painted complexes of Amazonia (Poco-Açutuba, TPA in the Ecuadorian and Peruvian Amazonia, Tupinambá of SE Amazonia, Tupiguarani) and the Tupi-Guarani language (or presumed) groups that have been noticed in the floodplains of the Amazon and in the Peruvian and Equatorian Amazonia (Omaguas, Cocamas, Tupinambás and Guaranis); ii) the time period of the cross-culture stylistic communication (Jesuit and Franciscan missions, the fourteenth century, etc.) (Brochado, 1984; Almeida, 2013; 2016). If anything, these examples show the differential interaction network pattern that have causal effect in transmission and transfer of traits that should be take into account in the diffusion of ceramic

Fig. 5.19. Large Shipibo-Conibo jar (photograph © Martin Ccorisapra).

styles irrespective of ethnolinguistic bonds and pedigree (DeBoer; Raymond, 1987; DeBoer, 1990; Heckenbeger; Neves; Petersen, 1998: 72; Belletti, 2015: 387-388).

The fact is that the heterogeneity of movement of potters, technological knowledge and finished pots in the meso- and macro-region scale might lead to the impossibility to pinpoint 'sending' regions of a package of stylistic traits. The dynamics of culture change associated to the migration of ethnolinguistic people are not self-explanatory. Many ethnographical studies highlight, for instance, types of mobility and gradients interaction amenable to demonstrate material culture similarity in point such as regional *population circulation* through matrimonial alliances, re-settlement and mobility strategies of socio-economic exploration (e.g., Zuni in US Southwest in Schachner, 2012; cf. Cameron, 2013: 220; *translocal-hypothesis* in Furholt, 2018a).

As for the spatial distribution and circulation of finished products in the consumption domain, commercial and noncommercial exchange can be heuristically employed for distinguishing registers of economies of exchange and symbolic value for objects moving through their life-cycle as in inter-village specialization and social transactions of marrying partners and gifts which, in the case of the later, "[…] *les rapports entre les choses qui* commandent *la relation échangiste*" (Testart, 2001: 736; cf. Galay, 2013; Roux, 2016: 277-278).

Last but not least, knowledge transfer of technological styles and technical traits may be moved through by means of direct or indirect transmission outside migration, that is borrowing and copying of traits and tools crosscutting socio-geographical boundaries through consumer demand (e.g., white water jars among Muslin and Hindu potters of Indian district of Jodhpur, see Roux, 2015; see also id., 2020). Intra- and inter-site techno-stylistic variability may thus better fit a kaleidoscope of webs of pottery-producing region with potential *complex homogenous*, *simple* and *complex heterogenous assemblages* or *mixed assemblages* by which technical traditions, clay provenance and morpho-stylistic show complicated patterns and complex social fabric of human relations (Roux, 2016: 292-296; 2017).[222]

[222] Belletti (2015: 61; 404, n. 3; see also Barreto, 2010; 2016) proceeds to point out with "technological flux" in the Conjunto Vilas the presence of non-locally produced vessels or hybrid practices whereby diverse modalities as circulation of pieces and copying of elements, abduction of potters and trade may be suggested.

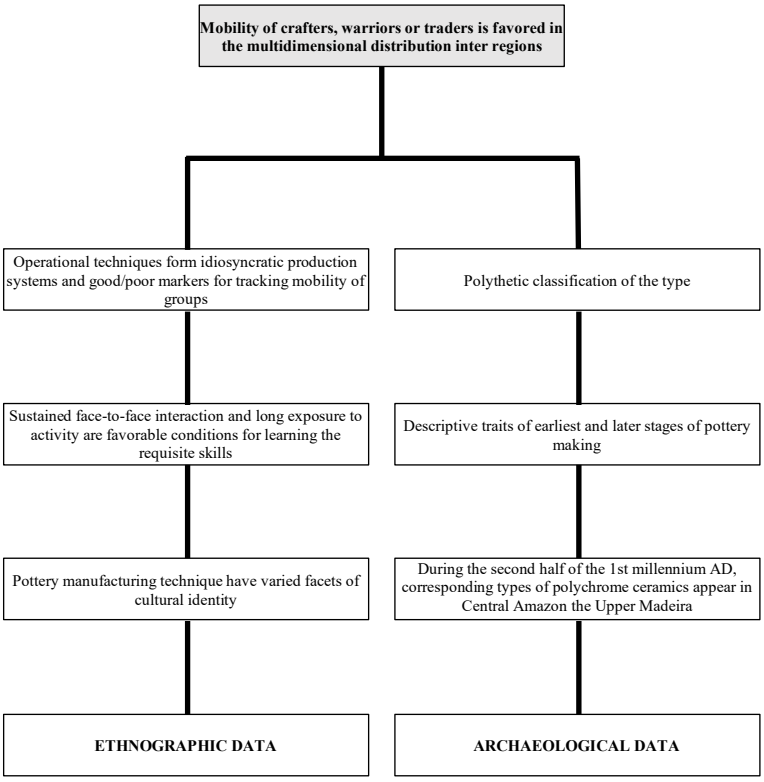


Fig. 5.20. Logicist diagram outlining the external reference and analogy to interpret the distribution of the type. Drawing author.

In order to address this, we propose a close understanding of material relations and the nature of technical action behind such patterns. Illustrating in a logicist diagram (**Fig. 5.20**), from the observational data stems a series of strains of interpretation for the archaeological phenomenon in study:

1) Characterization of the archaeological distribution of ceramic types (e.g., multidimensional distribution);
2) Material traces of pottery manufacturing techniques may or may not require co-residence (e.g., actualistic data on pottery production);
3) Pottery apprenticeship draws embodied-cognition in varied facets of cultural identity due to physico- and biomechanical constraints (e.g., relationship of stages of *chaîne opératoires* and knowledge acquisition);
4) Descriptive traits can be either good or poor markers for specific learning contexts (e.g., temporary or permanent forms of mobility, exchange, etc.).

Data analysis

As noted above, material networks help in exploring the polythetic distribution of artifacts by their potential to both store qualitative and quantitative information. Our method here relies on a 'morphological decomposition' of ceramic type-names to get at social affiliation of producers. Seeking to understand practices associated to apportioned stages of pottery-making behavior with technological style, cultural technology, and *chaîne opératoire* approaches (see bibliography in CHAPTER 3), we explore polythetic patterns of similarity in terms of social proximity (see Brughmans; Peeples, 2023: 34).

How do attribute resultants relate to locally specific ways of doing, movement of people, diffusion of technical traits (vertical or horizontal transmission) or circulation of recipients in exchange-based relationships? In the case of most of Amazonian indigenous ceramic producing archaeological contexts (as in Brazil and the humid tropics generally), it must be stressed that archaeologists are constrained to work with 'populations' of sherds, not whole vessel forms. Consequently, it is impossible to classify vessel morphology and ceramic sets but partial reconstitution of angles of the original profile based on diagnostic traits. One of such influent protocols of field and laboratory is the seriation method of classification (Ford, 1962; Evans; Meggers, 1967; Meggers; Evans, 1970; cf. Alves, 1991: 27 ff.; **Box 10**).

Box 10 – Seriation

Before C-14 chronology in the early 1950s, chronological positions between sets of unities made up of sets of artifacts established by sufficient conditions for membership were inferred by cross-dating with historical events of written records of Egypt and Sumer. The popular "Ford's method" (1954; 1962; Meggers; Evans, 1970) in North Americanist archaeology described the statistical standards to build time sequences for areas without epigraphic or literary means of chronological synchronization. Through the frequency mean or "battleship" curves, scholars told us about the rise and fall of popularity of artifactual types or diagnostic stylistic elements. An ontogeny of forms is thus generated, "cultural type" or trait such as the representation of death's heads, cherubs, and willow in gravestones in a colonial cemetery of New England (Ford, 1954: 50, fig. 3; Deetz, 1967: 31, fig. 5).

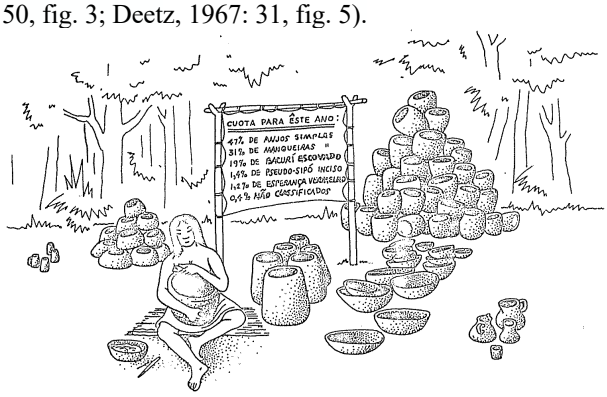


Fig. 5.21. Cartoon of an annual quota for the production of ceramics. In: Meggers; Evans, 1970 (drawing by George Robert Lewis).

Without an independent check on the validity of these sequences, they are far from being unequivocal. Firstly, because these workable typologies and genealogies lend themselves to quite different developmental trajectories of shape and composition and the reasons underlying its enculturation. The efforts 'to ready between the bars,' as it were, the process of invention, borrowing and migration through the purported "nonconformities" to native cultural norms (Ford, 1962: 8) relies in a "[…] commonsense interpretation that made those types like real, essentialist units" (Lyman; O'Brien; Dunnell, 1997a: 153; cf. Dunnel, 1978; cf. Bortolini, 2016: 655-657) (**Fig. 5.21**).

As noted by Lathrap (1962: 37-53; see also Brochado, 1984: 60-69; cf. La Salvia & Brochado, 1989: 115; Alves, 1991: 55 ff.; De Boer; Kintigh; Rostoker, 1996), the graphs of frequency established according to the hierarchical typological classification of 'types' and 'varieties' (Gifford, 1960; cf. Lyman; O'Brien; Dunnell, 1997a: 110-113; Dunnell, [1971] 2007) are an 'artifactual creation' of sampling, methodological parameters and classificatory principles. The restitution of totalities and the tracking of routes of diffusion were accomplished through fragments and high- and low visibility ceramic traits such as surface treatment and decorative elements, common technique procedures that could create a 'pairwise relationship' with noticeably different contexts in the Americas or Africa (Alves, 1991: 56).

The poor resolution of most prehistoric record of Amazonia does not allow the high chronological precision we may find in other archaeological contexts. Often, however, the collapsing of temporal variation in order to facilitate arguments of direct historical relationships as expressed by ceramic affinity makes harder the exercise of divorcing the history of communication flows. The cumulative causal effect through space and time of a full range of processes and/or relationships were essentialized in cultural constructs.

One of the major insights of network researchers in archaeology is that the similarity of artifactual assemblages and the mode of social interaction at the site level of use and discard should not be mistaken, as they usually are, to yield clue of direct interaction among people who used and consumed goods (Sindbæk, 2007; 2013; Mills *et al.* 2013a; 2013b; Mills, 2016; 2017; Peeples, 2019: 468; Brughmans; Peeples, 2023). The analytical utility of graph affiliation techniques is of archaeresearchers eye a systematic way to explore social exchange relations beyond highly impressionistic basis of description. Here, we propose a cursory experiment to a relatively small window of a long-scale and long-term pattern of production and consumption practices. With this in view, we suggest inter-site links of the earliest polychrome phases in sites spread in the Central Amazon and Upper Madeira can rely in qualitative data with regard to technological, morphological and stylistic components of ceramic assemblages in relative synchronous contexts at a site level of analysis.

To archaeologically address interaction in relational perspective, we need the material proxies of craft action during different but never infinity possibilities of arrangement in the concatenated sequence of transformation from raw material to finished product. Network analysis is particularly suitably for abstracting archaeological realities (see **Network to hang things on**). Ties and relations between sites via pottery data may draw on a full range of dimensions, like shared artifact types, ware or pottery attributes in multi-scalar spatial dimensions of practice (cf. Sindbæk, 2007; 2013; Brughmans, 2010; Brughmans; Mills;

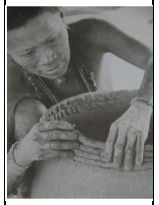
Peeples, 2024; Mills *et al.* 2013a; 2013b; Mills, 2016; 2017; Östborn; Gerdin, 2014; 2015; Collar *et al.* 2015; Peeples, 2019; Lulewicz, 2018; 2019; Roux, 2020; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024 for applications to archaeological data). Here, mixed measurable units of ceramic attributes are charted in graph diagrams collapsed into one-mode (defined by a set of nodes sharing these variable features) weighted network (the larger the tie, the more connections are incident to it (see discussion on non-binary networks Peeples and Roberts, 2013; Östborn and Gerding, 2014; Prignano; Morer; Diaz-Guilera, 2017).

In gathering network data, the analytical focus prioritized is on the shared technical behavior physically manifested in polythetic entities and sets aggregated at a site-level analysis rather than in geographically and historically varied locations. Data of relations is bundled in the edge weight of graph formats. As a result, we are less interested in producing expedient analogies of cultural affinity than in the polythetic distribution network of purposeful choices and expertise in different pottery practice communities. The breaking down of types into the "open aggregate" (Gosselain, 2011: 219) of *chaînes opératoires* might reveal that the set of technical actions and material effects co-vary multidimensionally with parameters of ecological circumstances, co-dependency relationships and specific structure of ties and patterns of networks of interaction. Typological boxes homogenize in subjectively defined units of artifact variation with the partial view afforded by sherds from parent vessels relations that might be better pictured as a complex web of social histories and interaction situations (Ulf, [2009] 2014: 510; cf. Burmeister, 2019: 231; also Lulewicz, 2018: 258).[223]

A table explicitly linking visible signs present in ceramics through different scales is useful for recovering the order of diagnostic traces more or less obscured in the cumulative production sequence and identifying taphonomic processes ultimatly editing archaeological visibility (see note 142). Combined in particular relationships, they potentially document technical aspects (Shepard 1965; Rye 1981; Balfet; Fauvet-Berthelot; Monzon, 1983 ch. 2-3; Rice 1987; Marois; Jelks, 1986; Marois; Scatamacchia, 1987; Marois; Scatamacchia; Serrano, 1994; Roux, 2016: chs. 1-2); differing performance characteritics (Schiffer; Skibo, 1987; 1997); and potter's level of expertise (Budden, 2008: 4, tab. 3; Roux, 2016: ch. 4; 316, tab. 4.1; 2017; see also Kuijpers, 2018a: 75, fig. 4.2 for bronze metallurgy). Taking together, they offer poor and good of resultant attributes in order to proceed a sociological reading of ceramic variability (Carr, 1995b: 186, tab. 7.5; Clark, 2001: 12-14; 15, tab. 2.1; see ch. 1) (**Tab. 5.3**).

[223] Cf. DeBoer; Kintigh; Rostoker, 1996: 275, fig. 7 for the example of a single Shipibo vessel segmented in graph diagrams of surface areas displaying zones that could go into different types of sherd count.

Visible sign	Description	Method	Technique	Tool	Scale	Practical knowledge	Observation	Degree of expertise	Quantity of time	Physical visibility	Actualistic observation
Chemical and physical attributes of clay paste	Granularity	Selection and preparation of the clay material and addition in the clay matrix of non-plastic elements	Sieving impurities, wedging and kneading the paste	Hands and feet	Macro, meso- and microscopic characterization (petrofabrics, petrofacies)	Elimination of entrapped air in the clay matrix and addition of coarser elements countering the shrinkage, hence deformation of the piece during drying and firing	Malleability and ductility of the paste, thermal and mechanical resistance, and regularity of surface. Voids or inclusions resulting in fissures and breakage	Strong	Moderate	Low	
Absence/presence of coil joints	Orientation and regularity of fractures and fissures, differential thickness of profile, etc.	Hollowing of form and thinning by coil joining with the use of muscular pressure or modelling discoidal and plastic elements	Shaping without RKE on assembled elements (coiling and slabing,) and mass of cay modelling)	Hands	Macro, meso- and microscopic observation	Attention to the force and pression applied and the regularity of parts (profile, wall thickness	Differential drying states of the coils, poor joining resulting in detachment or fissures or application of additional coils	As above	Many	Low-moderate	

Height, maximum diameter, structure (vertical plane) and vessel profile design; morphological parts	Characteristics points (E.P., V.T, I.P., C.P.), contours, curves and direction of tangents in the vessel profile, geometric shapes (solids, surfaces (and segments thereof), size, proportion of parts, volume, etc.	Shaping the final form according to the hygrometry of the paste (wet or leather dry)	As above	Hands, scrapers, cutting and shaving tools, etc	As above	, opening diameter, etc.)	Symmetry of parts of profile on vertical and horizontal section	As above	Many	Low-high	
Appliqués/appendages (e.g., adornos, handle, lugs and in some cases flanges), glue points, fingerprint marks	Plastic elements and insertion marks	Adhesion of modelled elements on wet or leather-hard paste	Fixation of separate elements on vessel	Hands	Macroscopic	Familiarity with the cultural grammar rules of motifs and composition	As above	High-moderate	Few	High	

Surface characteristics (e.g., shine, gloss, striations and facets, differential thickness, floating grains)	Inner/outer smoothed walls	Regularizing the surface by friction (smoothing and softening, burnishing, shinning), compacting elements on surface in different degrees of hygrometry of the paste	Rubbing	Hands, soft and hard tools	Macro, meso- and microscopic observation	Control of the regularity of movement in the application of materials and techniques	Impermeabilizing effect, abrasion resistance and visual perfformance	Moderate-low	As above	Moderate-high	
Surface (e.g., shine, gloss), difference of color to fabric, difference of color in contact line between the layer of coating and paste of ceramics	Layer of coating on surface	Coating with clay, mineral or organic material, before or after firing	Slipping/engobe	Hands, soft tools, etc.	As above	As above	Impermeabilizing effect and heating effectiveness Differential drying states of the structure or fluidity of coating resulting in peeling and cracking, or detachment of added elements	As above	As above	As above	

Color, width of low relief lines, topographic features (e.g., cleanness of lines, soft, raised or chipping (scalloped) edges, excess at the end of line, cross section shapes), uniformaization of motifs, glued points (modelled appliqués)	Graphic motifs with mineral or organic pigments and reliefs	Impression of plastic patterns (intaglio/relief) and modelling of elements by clay material displacement, removing of clay material (excising) or application of paints and modelled plastic elements	Impressing of marks or painting	Sharp tools, rollers, stamps, paintbrushes, etc.	As above	Precision of the details and execution of strokes, familiarity with the motifs and composition	Visual performance	As above	As above	High	
Pale (red and white) and dark color, stains (inner/outer surface and core)	Transformation of the paste into its final state	Oxidizing and reducing atmosphere in open firing without separation of fuel and recipient	Firing	Fuel	Macro, meso- and microscopic (i.e., dialotometry, mineralogy) observation	Control of rhythm of temperature incrise and the amount and circulation of oxygen during combustion and	Over or underfired products, breakage of the piece	As above	As above	As above	

						post-combustion					
Black surface on inner/outer wall and layer in cross section of fragment	Carbonization of vegetal resin in the first firing or carbon deposition on surface and pores during the completion of firing or after	Smudging	Coating	As above	As above	Control of temperature	Aesthetic cognizance	As above	As above	As above	

Tab. 5.3. Key attributes for examination of production stages of coiled ceramics. Source of illustrations (from top to bottom): Lins, 2020: 43; Belaunde, 2019: 26; photograph © Jesco von Puttkamer (1970); adapted from Heckenberger, 2005: 213, fig, 6.12; Vidal, 2022: 78, fig. 73; Silva, 2019: 18, fig. 14, a; photograph © Martin Ccorisapra; Oliveira, 2020: 35.

If we assume there are highly probable logics of spatial proximity governing how skills and knowledge get socially transmitted, attribute resultants of technical behavior should be coded in the differential social topology of "strong" and "weak ties" acting as vectors or bridges of diffusion of cultural information (Granovetter, 1973; see Roux, 2019b; 2020). Formal network tools provide chance to achieve the "[…] separation between cultural expression and deep structural dispositions […]" (Jones, 1997: 92; see also Gosselain, 2000: 182; Lulewicz, 2018: 258; 2019). Through reliable markers of stages of ceramic production, it may, ultimately, serve as a yardstick for evaluating if current models of population movement place more weight to that the evidence will bear.

The analysis concentrates at those sites that, subjected to systematic excavation, have brought to light the earliest polychrome ceramics to date culturally affiliated to the TPA, between the 5th up to 11th cents. AD (**Fig. 5.22**). But analysis cannot be divorced from the actual and virtual overlapping dating of ceramic industries present at those sites, at least for those about relevant percent total of pottery artifact assemblage or radiocarbon dates fall within our temporal threshold. This condition is important for ascertain relationship among practitioners in vertical deposits where limits are not clear-cut and in which ceramic assemblages share many components.

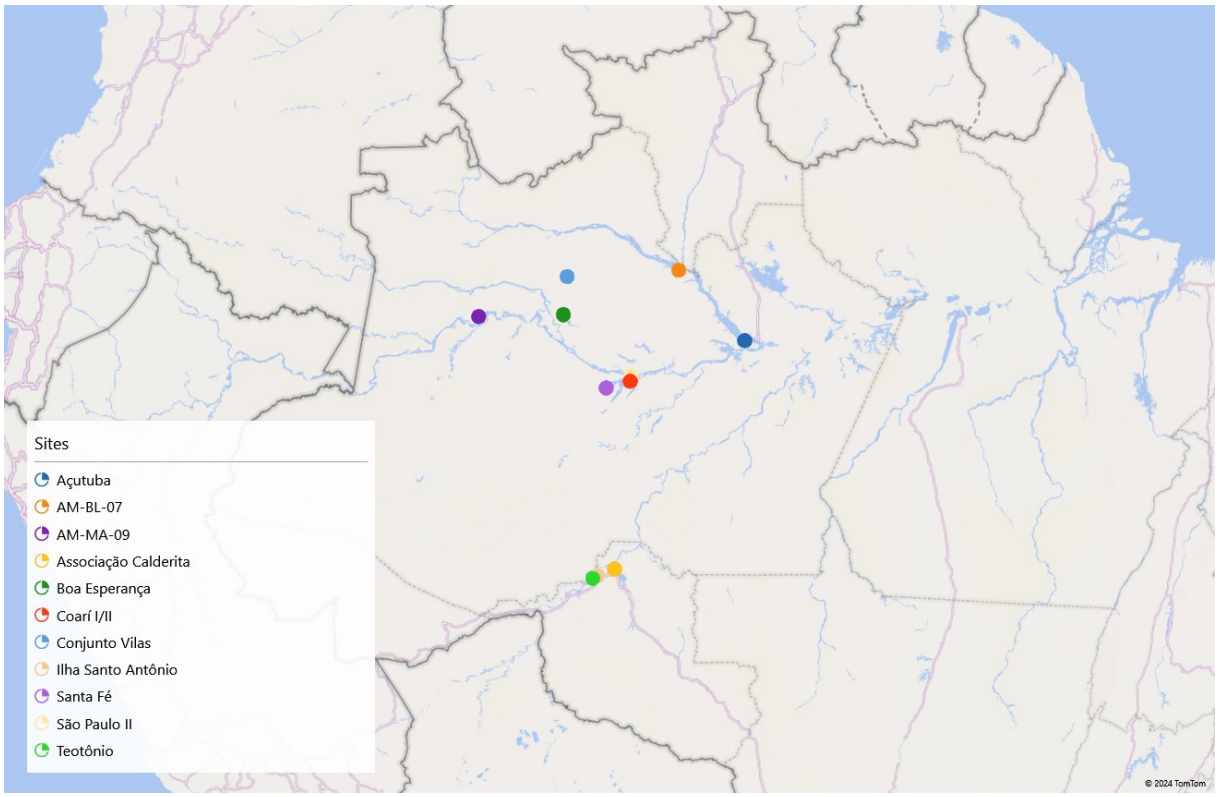


Fig. 5.22. Distribution of sites selected in the Central Amazonia and the Upper Madeira in the specified time window. Drawing author.

The encounters of potters, at least theoretically, their frequency and extension of interaction and the chain of learning/apprenticeship materializes conservative (or not) aspects of artifactual variability and potter's craft identity that are contingent on how difficult acquisition of certain skills

is (see discussions in Kiriatzi; Knappett, 2016). Situations of "hybrid" *chaînes opératoires* (Roux, 2020: 21) and cross-pollination of technical components and resultant traits of potting traditions in the course of time may be a regular reality across the vectors and nodes of ancient Amazonia. Co-occurring ceramic assemblages of revealed settlement occupations then are to be qualitatively described and presented side by side in the diachronic perspective of uni-componential and multi-componential alike (**Appx. D** and **E**).

Edges (E) are ordered in categorical scheme of manageable units in the form of binarized 0 – 1 data devised to facilitate a basis for classification and comparative alignments of shared repertoire of techniques in a pair of potting components, which are represented by vertices (V). Vertices are placed by site location and color-coded by geographical regions of the Central Amazonia and Upper Madeira. The etic variables qualitatively adapt to the context of Amazonia complex technological, formal and cultural dimensions of choices of techniques and methods of ceramic production, according to the principles of the *chaîne opératoire* approach (Roux, 2016; 2017; Gosselain, 2018).

The possibilities of intra- and inter-variability afforded by the plasticity of clay is unlimited. But not all variables and dimensions are of equal significance in the description of purposeful potter's choices, enculturation environment of craft traditions and identity markers of some sorts for the real-world contexts of pre-Columbian Amazonia (see e.g., Moraes, 2006: 131-134). In the range of possibilities of pottery data mining of Amazonian ceramics, there are many details of technical behavior to be observed, of which we could list mainly those linked to 1) temper usage[224] in nominal categorization (e.g., vegetal, mineral or animal, etc.); 2) fashioning and phases thereof of parts of the recipient,[225] i.e., a) shaping techniques; b) base form; c) morphology of vessel structure class;[226] d) presence/absence of neck;[227] e) shape of mouth in plain and side views; f) profile contour type from a vertical plane,[228] g) rim inclination and thickness, rim and lip morphology and lip finishing; h)

[224] It is hard to discriminate elements from the original mineral composition of the clay such as grains of quartz and hematite to the the intentionally added mineral, organic, sileceous or other elements to reduce the plasticity of the clay matrix. This is the essential rationale of the distinction between antiplastics and tempers in ceramic technological studies (Shepard, 1956; Rye, 1981: 31-32; Balfet; Fauvet; Monzon, 1983: 51; Rice, 1987: 409-413). As we have seen above, there are cases today in Amazonia -- as sure in other parts of the world as well -- where clay is choosen by potter groups without addition of antiplastics, so mineral elements already in the clay composition have a bearing on a still puporsefully selection of clay deposits through the observation of required characteristics of performance. Constrained with the capacity to say which is which, naturally present or added elements, I opt for not processing the data of rates of the identity of mineral material.

[225] Taking into account this conceptualization of part-whole sections from rim through bottom (after Scatamacchia.; Caggiano; Jacobus, 1991: 90): A) diameter mouth; B) maximum diameter; C) diameter neck; D) diameter base; E) height neck (distance from base of neck to lip); F) heigh body - distance base vessel and ground level; G) heigh maximum diameter; H) total heigh - distance from base to lip.

[226] E.g., relation of maximum/mouth diameter in which open vessels correspond to A = B and closed A < B.

[227] Defined in this work as a characteristic constriction of the contour marked by a changing of direction of the tangent in angle or curve (see note below) above the maximum diameter of the body (Shepard, 1956: 230, i.e., "independent restricted vessel"; see also Balfet; Fauvet; Monzon, 1983: 31).

[228] Shepard (1956: 226) distinguished 4 types of "characteristic points" to be observed in classifying a vessel contour: end points (E.P.) located at base and rim, vertical tangent (V.T.) where the tangent is parallel to the axis of the vessel, inflection point (I.F.) and corner point (C.P.) indicating respectively a degree of change of curvature (concave to convex or vice

proportion height/maximum diameter;[229] and i) volume in ordinal classification; 3) surface treatment in inner/outer faces (e.g., burnishing, smoothening and ordinal scale thereof, coating (clay, mineral and organic); 4) decorative techniques, elements and arrangements (plastic and painted elements, color, types, etc.);[230] 5) firing atmospheres[231] and 6) coating with resin[232] and smudging.

A few words are important with regard to the formal and decorative systems of description. To start with vessel shape, many of the coding systems for pottery description consist of developing a classification of the entire piece from top to bottom or segments of vessel in vertical and horizontal planes (see nomenclature in Shepard, 1956: 224-248; Gardin, 1976; Balfet; Fauvet-Berthelot; Monzon, 1983: 7-23; cf., on Tupiguarani ceramics, La Salvia; Brochado, 1989: 115-120; Scatamacchia.; Caggiano.; Jacobus, 1991: 90). Aware of the wide implications of adopting a new protocol in terms of the normalization of the entire corpus and the choice dictated by the nature of the processing of data, we restrict ourselves to note the presence (or not) of parts of the vessel along with the classification of contour type of Shepard (1956).

The same applies for the systematic description of graphic decoration, elementary units and composition synctatic (Shepard, 1965; Gardin, 1978; cf. Roux, 2016: 270-271). For the plastic and painted designs, we buildt on the protocols of plane geometry by Gallin (2002) and the classification system for achromatic decoration (Marois; Scatamacchia, 1984; Marois; Jelks, 1986; Scatamacchia; Caggiano.; Jacobus, 1991; Marois; Scatamacchia; Serrano, 1994). In common, they offer an open system for elementary graphic geometric unit classification, despite the fact that the definition of the smallest unit of concern (e.g., line, dot, etc) or their combination in a higher order of classification

versa) and inclination of tangent line. Their combination in a vessel profile determines segmentation in the structure of the shape and contour classes. Simple forms do not have angles. Inflected forms have a curve. Composite forms have angles. Complex combine eiher two C.P. e I.P. or one C.P. and I.P.

[229] Ratio of maximum diameter/total height of the vessel in that deep is H ≥ ½ B (index < 2), medium H ≥ 1/3 B to H < ½ B (index 2,1-3,0) and shallow H ≤ 1/3 B (index > 3,0) (Scatamacchia; Caggiano; Jacobus, 1991: 90).

[230] Researchers should avoid conflating of movement, instrument and mark in the descriptive terminology of decorative techniques (Marois; Scatamacchia, 1984; Marois; Jelks, 1986; Marois; Scatamacchia; Serrano, 1994). Inasmuch as possible and attentive to the fact that same impressions could be achieved with different techniques, we include the resulting attribute on vessel surface together with the specific instrument used (e.g., incised dual point and not incision). Bearing in mind that not all atribute of surface alteration is significant in terms of technique (motion plus instrument), we simplified some of the descriptive categories for plastic decoration, combining them in the principles of drawing and impressing movements, independent of the sort of instruments (e.g., punctating as a subcategory of stamping and grooved as a wide incision, even though, as noted (Barreto; Lima; Betancourt, 2016: 553), the technique does not operate just in material displacement as in the remotion of the paste as well) (cf. Balfet; Fauvet-Berthelot; Monzon, 1983: 97-99; Marois; Jelks, 1986; Marois; Scatamacchia, 1987). For analytical purposes, we mantain the somewhat artificial division between technique and aesthetic composition in describing decoration in achromatic and painted units. Decorative technique is thus understood as "the way in which an instrument is used to alter the surface of a ceramic object, creating a visual effect conforming to a preconceived, culturally determined plan" Marois; Jelks, 1986: 148; 162; see also Marois; Scatamacchia, 1987: 59; 81).

[231] The color of the pottey surface is usually not retained to be a good classificatory marker in view of that many variables involved, from the mineral composition of raw clay to the firing techniques, which can expose the same recipient to different combustion athomspheres.

[232] Resins are of difficult preservation in archaeological contexts and do not constitute a reliable property to binarize data.

could vary in the twilight zone of the subjective discrimination related to analytical decomposition of decorative arrangements.[233]

The absence of semi-whole or whole vessels prevents further detail on description of the general grammar structuring composition and arrangements of elements and thus in possibility to borrow the classification systems laded with structural analysis of the decorative scheme (e.g., for Tupiguarani ceramics, see La Salvia; Brochado, 1989: 98-101; Scatamacchia.; Caggiano.; Jacobus, 1991: 90-94; and Jatuarana phase vessels in sites of the Upper Madeira in Vassoler, 2006 for the Upper Madeira).[234] However, a full grasp of decorative systems necessarily involves to work from the ground up with the definition of elementary units of the system. The main concern with a morpho-lexical protocol of pottery shape and decorative graphic description lies thus in putting forward a standardized and cross-cultural scheme and less ambiguous reference analysis irrespective of local idioms of description, functional categories or types bounded to time and place.[235]

The picture of widely *répandue* of techniques, compounded with the extraordinary pottery variability we come across in Amazonian archaeology, the similarity criterion for many attributes mixes measurement levels that can be positively or negatively defined. Values are contingent on the quality of description and coded according to the presence/absence of attribute type or secondary variables thereof in the sense of a dissimilarity 'cutoff' to identify subgroups. Not all statitisc is a statiscally robust inference of presence or absence and frequency of the type in the sample collection is not recorded. Classes of attributes may receive more than one value in the parameter of a categorical classification of a techno-morphological and stylistic parameter.

The importance with all this is to develop an open system ideally flexible enough to navigate across bias of description and criteria of classification in allowing data collection and management in relational format (Brughmans; Peeples, 2023). To effectively establish a normalization of the grid of description for the pottery artifact assemblages a sustained dialogue with the templates employed to characterize intra-site assemblage of potting practices is required, keen to improve the economy of

[233] The element is here defined as the smallest decomposable linear or non-linear geometric unit of a decorative structure, mobilized in a great spectre of particular orientation, size and number in the composition of graphic patterns or motifs, associated and repeated in stlystic patterns, geometric shapes or biomorphous figures of the decorative scheme of the whole vessel. Simple and composite graphic elements imply in this work, respectively: 1) motif constituted by a single surface alteration; and 2) motif constituted by associated and repeated units of similar or diverse characteristics, orientation and/or size (after Marois; Scatamacchia; Serrano, 1994). In view of the fragmentary nature of the evidence, I choose to note the presence of significant elements of the aesthetic composition of ensemble (e.g., frame, figures identified as specific animals, etc.). Vague categories as "geometric" and "complex" motifs are indiscriminately included in the composite category because of the lack of clearly stated qualities to define the type, a difficult often founded in the typological description of decoration (Marois; Scatamacchia; Serrano, 1994: 5).

[234] Synctatic rules of artifact design have been deemed by archaeologists in general a more embedded facet of cultural identity and more or less conservative inheritance of situated contexts of learning for different types of evidence as in the structure of domestic spatial organization, vessel forms and decorative schema of painted vessels (DeBoer, 1990; Carr, 1995b; Clark, 2001; Gosselain, 2011: 221; 2016a; Roux, 2016; see ch. 1).

[235] Cf. e.g., on a standard terminology of techniques, implements and movements accomplished in the impressed decoration in African ceramics, in https://lampea.cnrs.fr/cerafim/.

categories (and clean the Augean stables of practioners' bias of habitus and classification criteria) and reference collection of techniques, tools and procedural knowledge. The present classification combines ceramic assemblage attributes (**Tab. 5.4**).

Attribute	Type	Value
Temper	Categorical	Caraipé/Cauixi/Charcoal/Grog
Forming technique	Categorical	Modelling/Plates
Base	Categorical	Pedestal/Annular, etc.
Neck	Binary	Yes/No
Mouth	Categorical	Quadrangular/Ovaloid/Poligonal/Irregular
Geometry	As above	Composite/Complex
Carination	Binary	Yes/No
Flange	As above	Yes(Labial/Mesial)
Handle	As above	Yes
Rim	Categorical	Everted/Inverted, etc.
		Expanded/Tapered/Thickened, etc
		Incised/Serrated/Impressed
Surface treatment	Categorical	White Slip/Red Slip, etc.
Painting	As above	Red on White/White on Red, etc.
Plastic mark	Categorical	Incised/Incised-impressed/Impressed/Engraved/Excised/Appliqués
Graphisme	As above	Geometric (Line/Dot/Curve, etc.)/Anthropomorphous/Zoomorphous
		Simples/Composite
		Frame
Smudging	As above	Yes/No

Tab. 5.4. Attributes compiled from the database (after Östbon; Gerdin, 2015: 314, tab 1).

A simultaneous display of edges is favored to highlight the existence of more than one ceramic component expressed in Amazonian archaeology as phases, local and situated manifestations of recurrent traits, or ceramic complexes (Lima; Barreto; Betancourt, 2016: 589) in the site deposit of multi-componential occupation. It should be borne in mind that these phases represent only a small fraction of diagnostic set of traits of the overall thousands of exhumed material of surface collections, test pits and excavation units. This is taken mainly as source of archaeological evidence to be decomposed into several ceramic attributes at those sites. A summary description of the diagnostic attributes as noted in the bibliography is found in binary data format. Pairwise relationships are weighted by the tie strength (i.e., edge value) in a weighted adjacency matrix of size $v \times v$.

Edges incident with vertices are color-coded according to the relation of greater or lesser antiquity of one over another. At the inter-side level, clustering methods will delimit the topology of the network, the set of subgroups that, irrespective of the physical distance and direction, display highly and weakly connected nodes. This multidimensional analysis of network of technical similarities connecting part of nodes at the intra- and inter-site levels assumes the fact that potters of different technical traditions shared similar spaces of cultural practice at those sites, hence had occasion to interact in a meaningfully "[…] world constituted not only of materials and artefacts but also of persons, actions and social relations. A history made of flesh, in other words" (Gosselain, 2016b: 205).

The temporal partitioning (*t* and *t+1*) of inherited traditions of pottery-making is quintessential for the network topology development. However, there are many problems embodied in the preparation of the archaeological ceramic data of Amazonia for longitudional analysis, not least in the chronological bonds of comparability of ceramic assemblages classified under phase- and tradition-names spanning long-length cultural deposits. Multicomponential sites are of special interest here in view of heterogeneous ceramic assemblage accumulated in layers of simultaneous and successive activities over long periods of occupation.

In pre-Columbian Amazonian multicomponent contexts, there are plenty of scholarly dispute over the slicing of time and the identification of discrete occupation evinced from ceramic data (Lathrap, 1962; DeBoer; Kintigh; Rostoker, 1996; Schaan, 2007; Dias, 2007). Assumptions and methods to that end have great implications over the interpretation of archaeological sites as synchronous occupations or resultant palimpsest of reoccupations (see also Meggers, 1971; Heckenberger; Petersen; Neves, 1999). Occupation here signs archaeologically distinct population with specific production practices and uses in time, which is beset with difficult and paradoxes, notably for cases where there are not clear-cut divisions of ceramic complexes. Let us consider the sites of interest for this work.

Coarí I and Coarí II are two nearby sites (Coarí I is a couple several meters NW of Coarí II) on ADE spots in the eponymous city of Amazonas. Surface collections and prospections were done in the 1950s (Hilbert, 1968; Hanke, 1959). Both contexts have been C14 dated and associated to pottery-producing groups affiliated to Paredão and Guarita phases in Cut 1 (Coarí I) and Cut 2 (Coarí II) (Sigalove; Long, 1964: 187, SI-33; Stuckenrath, 1963: 100, P-373; P-370). While the sites were originally separated in the *II.Horizont-Style* and *III.Horizont-stule* (i.e., *Rand mit Ritzung* and *Polychrom* (Hilbert, 1968: 97; see Fig. 5.16), later the components appear combined in each locality (see e.g., Stuckenrath, 1963: 100; Simões; Araújo-Costa, 1978: 70-71 but see Brochado; Lathrap, 1982: 36). The lack of stratigraphic information but by brief notes (Hilbert, 1968: 97-98; Sigalove; Long, 1964: 187; Stuckenrath, 1963: 100) is not of great help here, but it might be not a far stretch to suggest the sites may virtually represent a synchronous occupation and treat the sites as one node made of two diachronic pottery practices with mutual exposure of traditions.

Conjunto Vilas and Boa Esperança in the lakes Tefé and Amanã, respectively, typify the mixing of assemblages of multicomponent contexts. Conjunto Vilas site congregates four localities identified in the 1950s over a 1,5 km extension in the right bank of the Solimões River west of the modern city of Tefé, Amazonas (see Hilbert, 1968: 166, fig. 7; Belletii, 2015: 16; 19-20). Studying "*fluxos de tecnologias*" in ceramic assemblages of Conjunto Vilas, Belletti (2015: 61), in the footsteps of Hilbert (1962: 472; 474) earlier idea of gradual transition for the Caiambé and Tefé phases for the former eponymous site, hypothesis that the multicomponent occupation of the site could be an

outcome of a network of exchange, emulative practices and ritual celebration cross-breeding different diagnostic traits of different potting communities classified in the area (see also Gomes; Neves, 2016: 333 for the Caiambé phase in the lake Amanã in the 1st millennium AD).

The frequency seriation of Santa Rosa (AM-MA-9) is a paradigmatic case for a general typological approach to site history and asserted model of Amazonian cultural development and population movement. Initially, two ceramic components were identified with base on the overfocus on tempering elements (either siliceous sponge or tree bark), Apuá and Pajurá (Simões, 1974), but later they were combined (Simões; Kalkman, 1987). The events evinced from the stratigraphic distribution of types in the three excavation units opened by the PRONAPABA in the late 1960s through the early 1980s in the area of the Lower Negro (Simões, 1974; 1983a; Simões; Kalkman, 1987; cf; Heckenberger; Petersen; Neves, 2001: 333, n. 5) were attributed to either exogenous Pajurá elements in a Apuaú-dominated context brought by commerce (Simões, 1974: 179; 181) to a repeated history of occupation and population fleeing caused by environmental stress (see discussion in Meggers, 1991; 2001; DeBoer; Kintigh; Rostoker, 1996; Heckenberger; Petersen; Neves, 2001).

Açutuba locality (AM-IR-2) sits on a large 90-hectare of a riverine bluff at the right margin of the Negro River. It harbors 2,000 years of occupation, with eventual temporal gaps, and cultural deposits that reach a depth of 2.50 meters. Identified in 1994, it becomes one of the most archaeologically well explored sites in the context of CAP with the identification of four components translated into events of occupation.

Teotônio (RO-JP-01) site in the right margin of the Upper Madeira River is a node of river-borne communication in a geographically circumscribed area of waterfall. Over a period of around 3,000 years, the activities of pottery-producing groups had been condensated in the archaeological deposit well into the colonial period around 4 meters deep of multiple history of interaction and river-borne communication (Almeida, 2013; Kater, 2018; 2020). The thousand of exhumated ceramic material document diverse lineages of knowledge and skill in ways of how to do and use pottery. In Teotônio, there is not seemingly 'pure' occupation or defined limits to sign transitions of Barrancóide, Jamari and Jatuarana assemblages, for instance.[236]

Take also the site of Ilha de Santo Antônio studied by Zuse (2014) and Pessoa (2015). The Barrancóide ceramics were found in mechanical mixing with the more superficial Jatuarana, which

[236] The Dionísio ceramic assemblage, a regional phenomenon of upstream islands of the Upper Madeira with (Zuse, 2014), is present in Teotônio. The small sample of semi and whole vessels probably associated to burial contexts might be related to the facets of ceramic complexes and time window in study because the dates available range between 780 to 1000 AP (Kater, 2018: 114-115; 257-261; 2020: 11-12). For the time being, however, it does not possess any radiocarbon dates for the Teotônio site specifically or association with any archaeological layer and thus was excluded from the present analysis.

means it is hard to precise a precise spatial organization to any of these components or the transition, if any, of levels between both.[237]

In the case of the unicomponential site Associação Calderita, two occupations of Jatuarana subtradition set apart by 250 years were identified, with set of shapes and other attributes similarly shared. This could indicate that the site was "[...] *ocupado duas vezes por grupos com cerâmica muito semelhante ou, mais provável, pelo mesmo grupo*" (Almeida, 2013: 229).

All these brief examples above clearly show that temporal division is a relative business with archaeology's fundamental principle of superposition and the definition of events of occupation by different communities of potters goes into the amount and degree of continuities and ruptures observed in the ceramic technology in the sample total of the stratigraphic deposit. The fact is there are no uniformitarian laws in the amount of pottery variability (Lathrap, 1962; DeBoer; Kintigh; Rostoker, 1996) or temporal change with stratigraphic superposition as to determine time as an independent variable distinguished of other causes of change. The timing formation of cultural[238] and *terra preta* deposits to not obey strict rules of soil accumulation (Neves *et al.* 2004; Neves, 2012: 179; Iriarte, 2024: 113). In the absence of this independent variable without radiocarbon dates to discriminate occupation in appreciable duration of time, researchers are constrained to condensate a succession of depositional events as snapshots in a single picture. A more interesting view to commend is to retain that complex stratigraphic situations may be grouped into analysis and be a token of the coexistence and exposure of multiple practices and forms of interaction, if not of specific potters, at least of distinct social groups defined as potting communities with variable persistence over time.

There is a huge value in the technological characterization of operational sequence across different scales (local, regional and macro-regional) in relative chronological order to bring a longitudinal comparison to effect. The similarity networks obtained via ceramic attributes display the diverse array of relationships in the 'flow-line' production of potting communities. The Amazonian region is in stark contrast to those where network research fare well as the US Southwest, with large database collection with fine-grained chronological resolution (e.g., Southwest Social Networks (SWSN) Project) (Mills *et al.* 2013a; 2013b). However, archaeologists should be cognizant with the fact that the tightly packing of a wildly variety of events and activities of multi-generational potters' communities of practice generates 'noise' in terms of the breadth and length of variability. This artifactual creation of the system of classification should not be faced as an inherent archaeological deficiency of the archaeology in Amazonia lest it turns a convenient excuse to a pragmatic approach

[237] In reason of this the vertex of the site aggregates these two ceramic components.
[238] DeBoer; Lathrap (1979: 129) calculated for instance for secondary midden deposits of Shipibo-Conibo village in a 50-year period an accumulation of 7.5 to 15 cm.

with unworked basic assumptions of ideas of culture-historical epistemology and normative conception of material culture as a passive reflex of potter's mind.[239]

The present case study may be viewed just as a relational structure of sites connected by ceramic data, but it also represents an initial foothold in network research in Amazonia, pregnant with many possibilities of applications of quantitative methods and GIS data for modelling and testing theories and organizational structures.[240] As far I am aware, there is no application of network theory and method in the area. I direct readers to the open online suplementary material linked to this analysis.[241]

A first global overview of the network studied, with the parameters of pairwise relations defined, energized under Kamada-Kawai algorithm (see note 146) is as follows (**Fig. 5.23**).

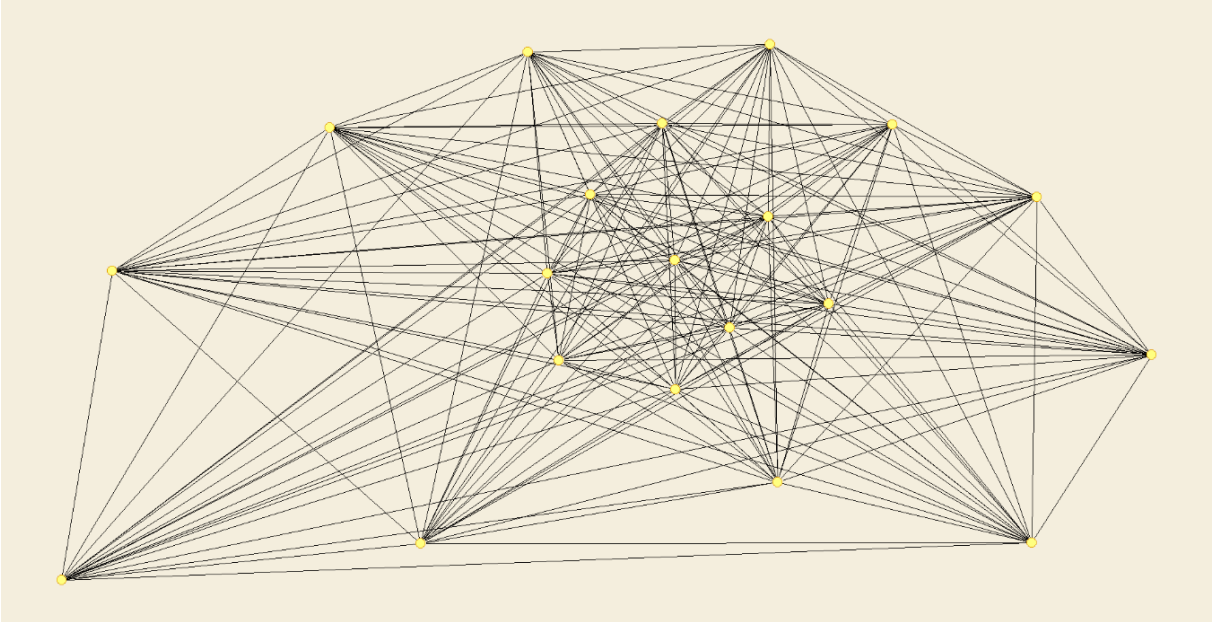


Fig. 5.23. Global view (graph only) of the network studied with 190 lines.

Colors were added both to vertices and lines to indicate geo-temporal relations. Black and white partitions indicate vertices of regions of the Central Amazonia and the Upper Madeira. Red and black lines show two-part division of the distance range of radiocarbon dates between the 3rd and 13th cents. AD. Below, the longitudinal network is split into two-time intervals (**Fig. 5.24**).

[239] It may be true that the proceeding of intensive fieldwork would bring about intra-site variability with higher chronological resolution with radiocarbon dated samples at regular intervals of a profile.
[240] Among many, clustering coefficient, centrality scores and similarity metric of nominal data (cf. introduction and applied examples in Knappett, 2013b; 2017; Östborn; Gerdin, 2014; Brughmans; Peeples, 2023; Brughmans; Mills; Peeples, 2024).
[241] See https://osf.io/8pj47/?view_only=7c184e1526de4d76b5f2e2ae597c56cd.

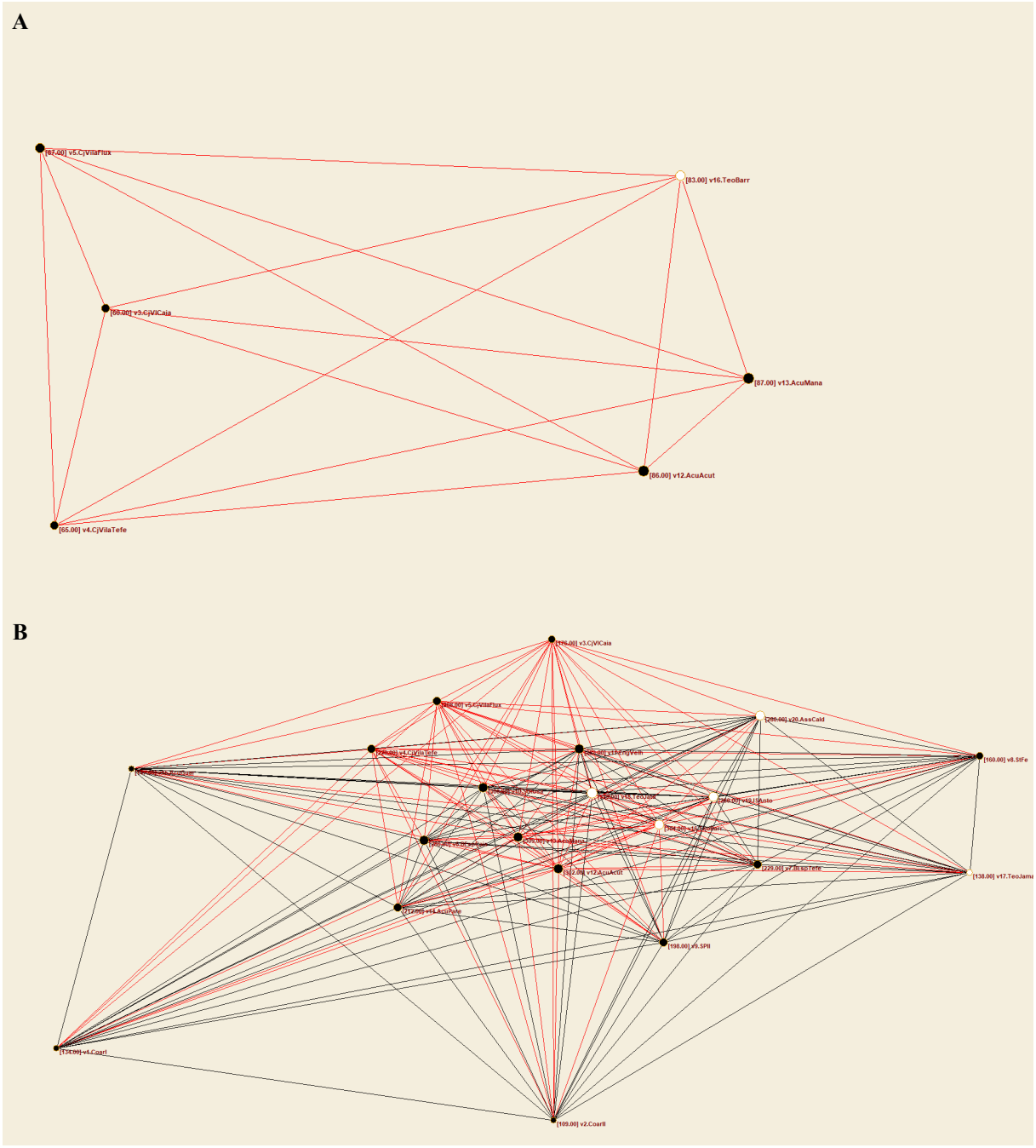


Fig. 5.24. Graphs split into two-time intervals (A-B) with vertices partitioned by region and size according to weighted degree, color-coded lines.

As we have stressed above, there are many approaches for analyzing networks that on can choose from. In the table report below, some topological structures of the network start to become clearer through the distribution of the weighted edge values (**Tab. 5.5**).

Line Values		Frequency	Freq%	CumFreq	CumFreq%
(...	1.0000]	1	0.5263	1	0.5263
(1.0000 ...	6.0000]	29	15.2632	30	15.7895
(6.0000 ...	11.0000]	70	36.8421	100	52.6316
(11.0000 ...	16.0000]	53	27.8947	153	80.5263
(16.0000 ...	21.0000]	22	11.5789	175	92.1053
(21.0000 ...	26.0000]	15	7.8947	190	100.0000
Total		190	100.0000		

Tab. 5.5. Line value clusters.

The weighted degree of incidences with the vertices is as follows (**Tab. 5.6**).

Vector Values	Frequency	Freq%	CumFreq	CumFreq%
(... 109.0000]	1	5.0000	1	5.0000
(109.0000 ... 182.3333]	5	25.0000	6	30.0000
(182.3333 ... 255.6667]	5	25.0000	11	55.0000
(255.6667 ... 329.0000]	9	45.0000	20	100.0000
Total	20	100.0000		

Tab. 5.6. Weighted degree centrality scores at selected thresholds.

Taking into account the data relative to the betweenness (see note 149) and closeness centrality[242] approaching to zero, it is indicated a strongly connected graph with minimum degree variation. This does not surprise us in view of the diffusion of pottery practices in the Amazon basin already noted in data gathering. So, no isolated vertex is likely to be found, either a go-between role or components in the network structure. Naturally enough the similatiry measures emerge as implications of the refinement of classification criteria implemented (see Brughmans; Peeples, 2023: ch. 5 on issues of data quality in archaeological network research). Many pages have been devoted to defining the visible marks of techniques and skill attainment; and the relative limitations of the data to be used were partly addressed by the choice of targeting uniformly the population through synchronous ceramic types, so reasons other than biased or sampling strategies should be considered in explaning of the network patterns.

The ten highest values for inter-locality connections are as follow (**Tab. 5.7**); and as it can be observed, they are constituted mainly by either inter-site or sub-regional ceramic assemblages.

Rank	Line	Value	Line-Id
1	16-18	26.00000	v16.TeoBarr-v18.TeoJatu
2	12-13	25.00000	v12.AcuAcut-v13.AcuMana
3	18-19	25.00000	v18.TeoJatu-v19.ISAnto
4	6-13	25.00000	v6.BEspCaia-v13.AcuMana
5	13-18	24.00000	v13.AcuMana-v18.TeoJatu
6	10-11	23.00000	v10.StRosa-v11.EngVelh
7	16-19	23.00000	v16.TeoBarr-v19.ISAnto
8	6-12	23.00000	v6.BEspCaia-v12.AcuAcut
9	12-18	22.00000	v12.AcuAcut-v18.TeoJatu
10	18-20	22.00000	v18.TeoJatu-v20.AssCald

Tab. 5.7. Ten highest values of edges.

[242] Closeness centrality calculates the distance of each vertex to all other in the graph (de Nooy; Mrvar; Batagelj, 2005: 127).

This topological characteristic across the longitudinal network can be observed if the parameters of line display were raised to the highest cluster of lines by removing values lower than 17.0000 and isolated vertices (i.e., vertices without connections at the defined threshold) (**Fig. 5.25**). Vertex and edge colors indicate region and the relation of greater or lesser antiquity of one vertex over the other in addition to weighted degree through vertex size. What the graph seems to indicate is again the strong connectedness of intra-site and inter-site topographies.

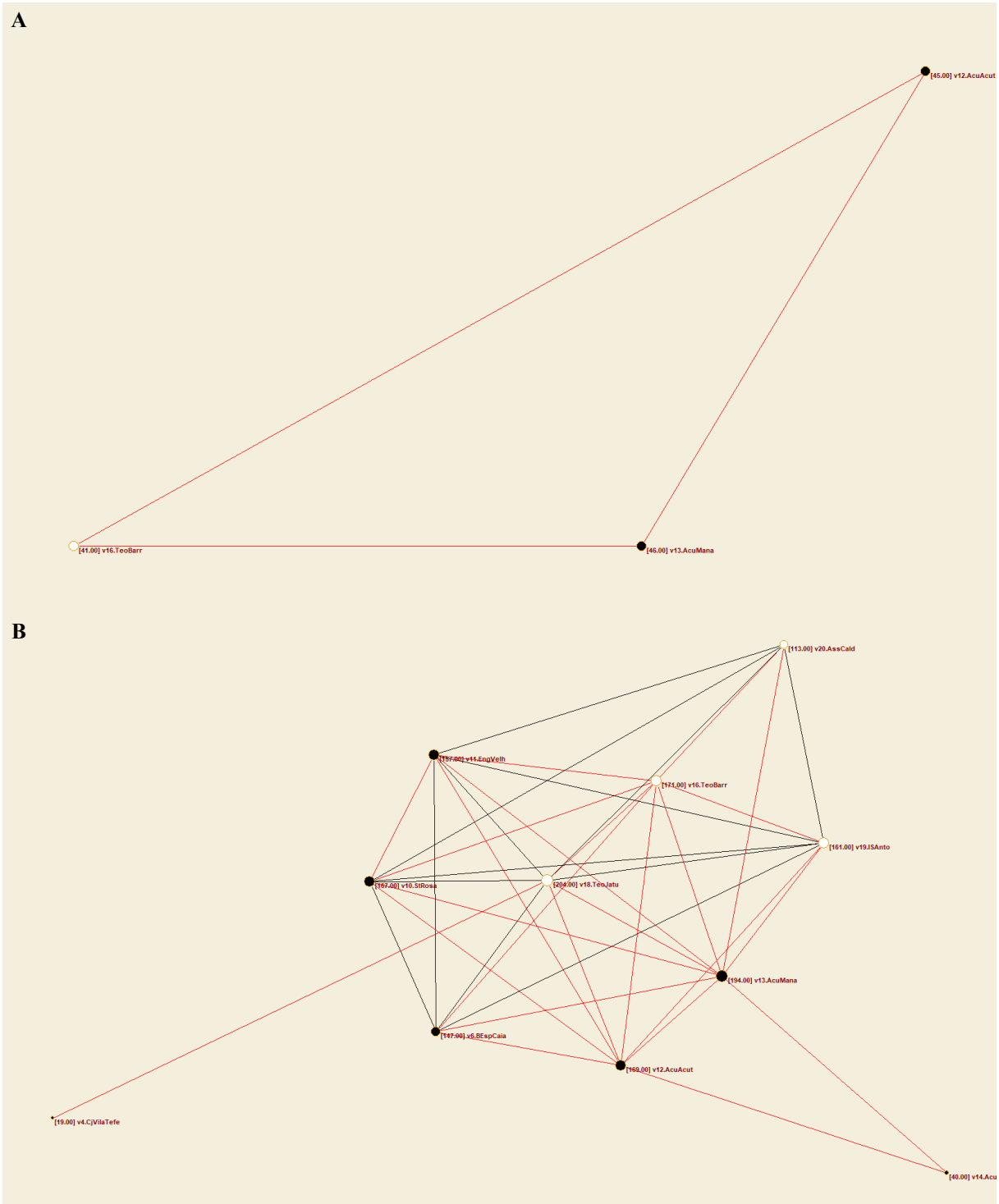


Fig. 5.25. Graphs with vertices clustered by region with line values and selected vertices not greater than 17.0000 removed, in the earlier and late periods (A-B).

In the case of the earlier period, the inter-region connection of Teotonio and Açutuba localities is a case in point. The components under focus have been clustered with specimens of the Pocó-Açutuba and the IR/Barrancoide traditions with wide diffusion in the Late Holocene Amazonia. The association does not seem fortuitous and might be embedded in a much larger network, advocating caution before put forward a straightforward explanation. The graph of the later period reinforces the image of a network without a clustering pattern of traditional ceramic typologies or regional groups.

With all the analysis in mind, it can be sustained no go-between vertex control the flow of information communication and exchange. That means that communication structure evinced from the network patterns suggest diffusion of 'influences' non-mediated by bottlenecks, even less direct influences. Thus, inter-regional modalities of migratory mobility processes seem the less probable cause of pottery trait distribution analyzed, especially for those connected to the type-name of polychrome ceramics. If there is such association in the past, the constant inter-societal potter mobility and interaction across scales seem to have had obliterated the distribution of such patterns. It seems more likely that in the case exposed multiple long-term events of mobility and inter-societal trajectories of encounters in contexts of marriage or ritual events generated opportunities for knowledge exchanghe activities. The patterns of small-scale population circulation had thus a homogenizing transformative impact in several aspects of material culture.

The interconnected archaeological communities of pre-Columbian Amazonia considered through ceramics were integrated by relations where the value of social ties mediates the exchange network. In view of the temporal resolution of the archaeological data aggregating wide expanses involved, the means of mobility afforded by highly connected topographies, cross-community alliances and strategies of interaction might be a major factor to account for this strong connectedness. It may be possible that with more data mined from different sites in a sub-regional outlook, in a similar time period, knots would emerge, typifying a scaled-free network architecture. As far as the long-distance connections are concerned, however, the graphs of pottery production point to other possibilities of connectivity to be allowed in the explanation of Amazonian archaeological record, differently of what have been routinely postulated so far.

Epilogue: on ants, humans and pyramids

> Prehistoriography is still a dialogue with the ghost of Childe. (Sherratt, 1989: 185).

In his inaugural lecture to the world-renowned chair of Archaeology in Cambridge, Renfrew (1982: 3) uses a cartoon by Charles Addams to begin an intellectual incursion into the new "archaeology of the mind" (**Fig. 5.26**, top left). The example illustrates the difficulty in distinguishing

intelligent behavior from material vestiges. Where to switch off our animality and turn on the lights of our humanity? What is meant to be human? The area is filled with shades of gray, of course, but the example is telling in another respect. It seems that the issues here are not simply about environmental engineering which animals and humans are capable alike (the "worst of architects" and the "best of bees" as said Marx ([1867] 1930: 169-170 *apud* Ingold, 2000a: 364)). Ants are building a symbol of hierarchy and inequality of monumental architecture and, therefore, marching for state formation. The cartoon plays with the fact ants are doing what they are not supposed to do or at least no planning to as bothering us in picnics (**Fig. 5.26**, top middle and right).

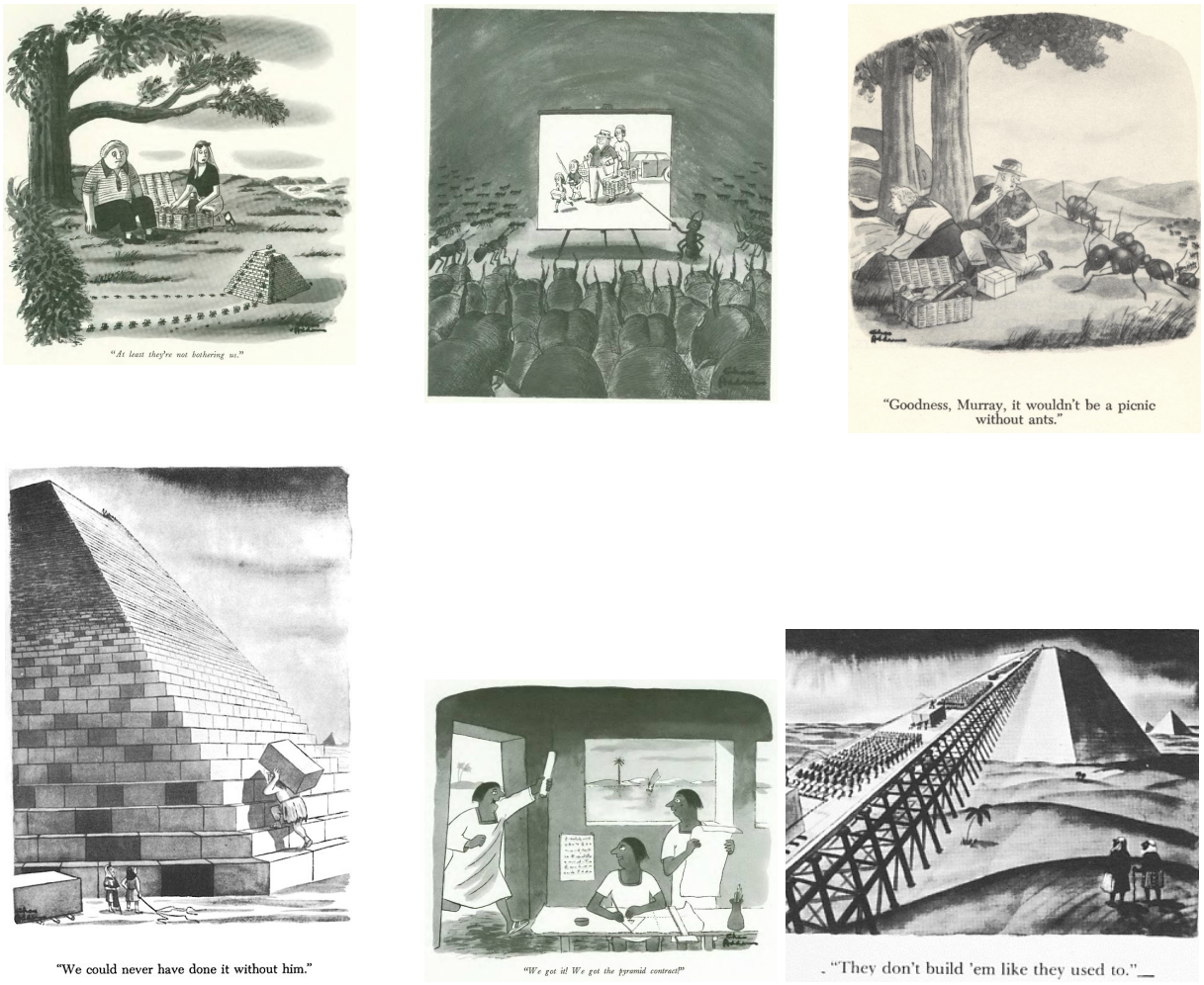


Fig. 5.26. Cartoons by Addams printed in issues of the The New Yorker magazine. From top to right, of in the issues of May 31 1982 (p. 41); Sept 17 1966 (p. 64). From bottom to right: May 25 1957 (p. 36); Aug 13 1984 (p. 31); and 1954.

In other group of cartoons by Adams, a giant man is accomplishing with its superhuman force what would require thousand hours of human labor harnessed by an office head (**Fig. 5.26**, bottom left and middle). “They don’t build ’em like they used to,” says an Egyptian looking at an industrial assembly line (**Fig. 5.26**, bottom right). In what ways intelligent behavior has been associated with interpretations of what a civilization must be made of? Could the tale of civilization be reinterpreted in other terms than under the heading of progress and technological revolutions increasingly engendering social asymmetry and sometimes a gloomy prospect of our own demisal (**Fig. 5.27**)?

Fig. 5.27. Carton by Charles Addams printed in The New Yorker magazine Aug 17 1957 (p. 21).

The Davids Graeber and Wengrow in *The Dawn of Everything* (2021) challenge the history of civilizations as an ineluctable tale of inequality brought about by the institutional complex forms which humans found themselves in. By so doing, they have opened alternative and creative pathways to think about the ‘emergence of civilization’ beyond evolutionary storytelling from the state of innocence to current inequality of political economy affairs to “[…] reshape our conceptions of who we are and what we might yet become […]” (Graeber; Wengrow, 2020: 525). To propose new world historical answers to ‘big questions’ of the development of social and cultural complexity is an innovative intellectual exercise given intellectual legacy of notions of civilization of the Enlightenment and colonialism.

Traditionally, within evolutionary and neo-evolutionary synoptic perspectives in archaeology, civilization has been defined hierarchically as human deterministic adaptation through culture. Childe (1936: 27) saw in man’s ingenuity a “[…] compensation for his relatively poor bodily endowment […]” in making himself at home in new environments. In the vein of Whitean anthropology, processualists framed culture as “[…] an extrasomatic adaptive system […]” (Binford, 1965: 205) and sociocultural formations as a ‘buffering’ zone between human’s body and the physical environment (Clarke, 1968: 126). In his study on the “first civilisations of Europe,” Renfrew ([1972] 2011: li; 13), equals it as “[…] space rocket […] within it [men] are […] insulated from direct contact with nature […]”. In general terms, therefore, civilization and state speak the same language of a ranked hierarchy of social types (Flannery, 1972: 400), or as Crumley (1995: 2), regarded as quintessential of order.

In a long announced book, *Por Que Não Há Pirâmides no Brasil?* (Azenha, 2016), Neves tuns upside down the idea of a sociopolitical pyramid of resource concentration in making Amazonian environement as 'boundless as the sea.' Along many years of accumulated archaeological experience in Amazonia, Neves and collaborators have done an excellent work in dispelling "atavistic views of tropical condition" (Pesquisa FAPESP, 2018) and national *doxa* about the inability of lowland native peoples and the own country to give birth to something worth of value.

The argument os little selective pressure is thought-provoking. Yet, to turn the formula 'necessity equals production equals centralization equals complexity' in its head implies the acquiescence to the imperialist bias of great (evolutionary) expectations from the start. The held potential of comparative approaches is precisely in challenging inherent views of the Eurasian agriculturalization (Neves, 2007; 2011; 2016; Moraes, 2015; Iriarte, 2024), socio-evolutionary models of complexity and urbanism. Alternative pathways of ecological variables of complexity, meta narratives of social evolution and civilization lay ahead to be explored.

For long time and still in some areas of research it is still present, agricultural and sedentary revolutions were understood as generalizable and transferable models for socio political evolution, in the same way as outlined long ago by Childe (1936; 1950b). The experiences of extensive and low-density network of settlements revealed by lidar survey, terraforming projects of platforms, mounds, ditches, causeways, enclosures, and pyramids in the southern margin of Amazonia in places as SE Llanos de Mojos, Ecuadorian montane forests and the Xingu in the Late Holocene laid down another area of contention of conventional paradigms (Heckenberger, 2005; Heckenberger et al. 2008; Prümers *et al*. 2022; Rostain, 2012; 2016; see review in Iriarte, 2024: ch. 8).

> So while it's tempting to hold Amazonia up as a 'New World' alternative to the 'Old World Neolithic', the truth is that Holocene developments in both hemispheres are starting to look increasingly similar, at least in terms of the overall pace of change. And in both cases, they look increasingly un-revolutionary. (Graeber; Wengrow, 2021: 271).

Take the "sapient paradox" (Renfrew, 2001; 2003: 11-15; 2009; 2013: 73-93) viewing agriculture and sedentism as cognitive leap devices for the development of complex human behavior through history.[243] The basic idea behind it is of a posited a gap of thousands of years since the emergence of intelligent behavior in *sapiens sapiens* and the emergence of the first complex societies around 10,000 years ago. Renfrew (2001: 94) argues that "[…] the differences are not such as would greatly interest either untutored laymen […] or the perceptive extra-terrestrial observer casually visiting our planet." That British archaeologist asks if the genetic structure of the human body and

[243] Aka civilization and the check-list of redistributive centers, commodity exchange, specialized production, record and written systems, hierarchies and many others.

brain has been ready for more than 60,000 years, the hardware is already assembled, why everything seems uniform for so long in the archaeological record? The solution proposed by the own Renfrew is to establish sedentarization as a true breakthrough of human way of life on earth (cf. Peixoto; Florenzano, 2020: 460 ff.; Graeber; Wengrow, 2021: 83-85).

In an interview for W. Rathje and M. Shanks, Renfrew (2013: 87) expresses his wishes of archaeologists broadening their scope of comparison and phrasing "Childeish questions" (Sherratt, 1996; cf. Ceserani, 1997), "[…] sit back and say, right, let's look at the Chinese Neolithic and the Formative period in Mesoamerica: 'it is very different and why it is very different?' Those are the big questions." As recognized by Renfrew (1993b: 76; 1994c: 122; see also Peixoto; Florenzano, 2020: 467), the Australian archaeologist set many years before New Archaeology these 'processual' interests, although he was concerned back then only with Western Asia and North India and, by means of the "light of the most ancient East," Europe. Eventhough Renfrew (2000b; 2002c) has attempted to generalize the farming/language model to East and Southeast Asia, Africa, Polynesia and Mesoamerica, it is revealing that considerations of lowland South American are restricted to brief linguistic evaluations in continent-spanning coverages (cf. Heggarty; Renfrew, 2014). It is obvious even to stalwart supporters of the FHLD that the wholesale application of it in contexts of "extreme Balkanization of Amazon basin cultures" (Lathrap, 1970: 20) would lead to gross distortions (Renfrew; Heggarty, 2014d: 1351; Heggarty, 2014: 621). However, it is fair to say that still the area is largely marginalized in the cognitive categories and concept of the Old-World archaeology.

A nod to this direction of how things could have unfolded differently in the New and Old worlds has been given in the concept of "mosaic zone" as opposed to "spread zone" in explaining language replacement of many of the macro family languages around the world (Renfrew, 1992b: 56-60; 2000b: 24-26; 2002c: 4-5). The model basically implies a center of initial colonization, an adaptive 'package' of technological innovations, military force, state collapse, or *lingua franca* triggering off centrigual population movement of major and minor (as in the case of élite dominance and pidgin trading language) magnitudes (see Renfrew, 1992b: 59, fig. 1). As a consequence of this expansion and as far as interacting systems would tend to adopt new functionally advantageous variability, autochthonous populations in the areas affected underwent language replacement.

A combination of the two models have been suggested in a multi strata episodes underlying linguistic distribution as in the case of Arawak, Tupi and Tupi-Guarani (for example, see Iriarte *et al*. 2017). Are we talking about FLHD blended with warrior technologies in the case of Tupi and Tupi-Guarani dispersions (**Fig. 5.28**)? Intriguingly, and beyond the connection between speech with culture which we have been stressing repeatedly, Amazonianists have been ignoring Renfrew's (1992b: 17) remarks that in egalitarian societies such episodes of warrior elite expansion should be rare. By missing it, they leave unsaid the premise of process of language diffusion and levels of sociocultural complexity. In the case of the expansion of the distributional area of polychrome ceramics, it is mainly compared to the Tupinambá expansion in the Atlantic coast of Brazil in a warrior/language scenario bringing a "*tabula rasa*" (Neves, 2012: 263) to the archaeological record. How to make sense of a rationale of push/pull factors of this migration into settled areas of Amazonia, an environment lacking 'evolutionary stress' of resource competition? The parameters of correlation between centralization of power and evolutionary stages of development are left unchanged. Further, without the 'standard conditions for temperature and pressure' for the emergence of complexity (unless other conditions intervene), scholars are obliged to recur to normative conceptions in broad temporal and spatial scales of movements in order to move cultures as agents of change.

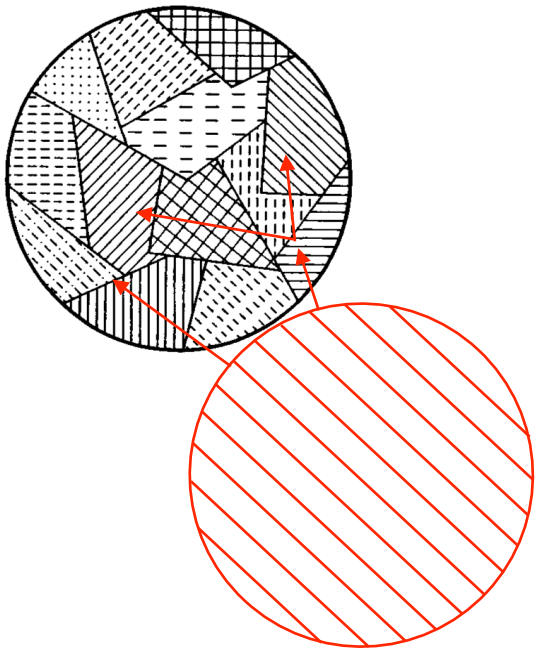


Fig. 5.28. Spread zone over a mosaic zone: a distinctiveness of South American family language expansions? Drawing author after Renfrew, 1992b: 59, fig. 1.

It could be said that despite the differences both sides of the field draw a caricature of one another through the looking-glass of their respective position. By accepting to stay put on the game of swapping over signs for absence/presence of the attribute 'State,' both parties constrain themselves to continue to move up the scales of societies a step closer or farther away from higher states of organization. On the one hand, by reducing thousands of years past of "people without state" in a monochromatic stretch of time. On the other hand, by comparing world ecologies in terms of laboratories of state formation in a pyramid of inferences of 'what are the origins of the state?' In this way, the debate becomes a rhetorical opposition with a caricature, making of all this a straw man argument without operating, at elementary levels, the analytic scales.

CONCLUSION

Comparing seemingly like with unlike phenomena of different research fields is at the core of network science. The World Wide Web, social links in cocktails parties, dinning-table partners, epidemics, and molecular reaction are few among many classical examples of the field. As network researchers have been emphasizing, the set of metaphors and the own versality of abstraction through mathematical graphs is the very reason of its uptake across physical, biological and humanities. Moreover, network thinking resonates with a broader specter of relational theories, postcolonial perspectives and globalization of today's word that also contributes to its upsurge in colloquial and formal usage.

No one would deny the Mediterranean Sea and Amazon River may look at first sight an odd couple, but how about if we eye, with Lévi-Strauss on mythological thought, not for the ressemblances or differences, but the 'differences which resemble each other'? At its best, 'imcoparable' realities might motivate new ways of seeing, theories and methods to be explored.

The present thesis model argued that the Mediterranean Sea and Amazon basin have fractally similar properties, in that both regions of the premodern and precolonial periods constitute:

(I) Highly managed landscapes transformed by millennia of accumulated human-induced activities and reciprocal influence/interactions between human and nonhuman agents, in a relatively stable symbioses and equilibrium of metabolic exchange;

(II) Diversified environments embedded in diversification and risk-buffering strategies of productive economies and power-diffusing mechanisms linked to varied patterns of socioecological adaptation;

(III) Hyper connected topographies in which a medium for connectivity is favored by sea-borne or riverine systems.

Writing the history of the ancient Mediterranean and Amazonia in a long-term perspective means to seriously engage with a Braudelian and post-Braudelian historiography. If we are to rewrite models of mobility and interaction informed by such perspectives, the terms of an ancient history must be conceived beyond the purview of shoestring conceptions of classical antiquity in order to resygnify concepts of "civilization," "complexity" and "social evolution" well into periods of 'barbarian histories' of the Mediterranean, as it were, and in the history of the often deemed 'people without history' of Amazonian environment.

Despite the broad brushstrokes of the assesments and geographical characterization they entail, the intention was far from glossing over variability or downplaying the multiple micro-region trajectories, which aggregate different speeds, tempos and rhythms in the micro-ecologies of the Mediterranean and Amazonia. The numberless Mediterraneans and Amazonians of the greater whole

give shape to (the) multiple 'history(ies) of' places. My concern here was thus the running thread created by self-similarity in the jargon of fractal geometry, which, as we have seen, is a characteristic of objects whose magnified parts replicate the structure of the greater whole *ad infinitum*. The long-term reconstruction of regional ecological history before global capitalist production places the center of the scene in the theatres of the basin themselves instead of an approach tied to deterministic views of physical topographies or ethnocentrically engulfed in the culture-history of some peoples in time-bounded periods.

Naturally enough there are great differences in terms of higher volumes in trade chains and spatial scale of intersocietal political economy integration in the periods analyzed of the Bronze Age Mediteranean and Late Holocene Amazonia. However, I tried to present the case that these differences are of degree and not of kind. A world of metals and stones and a world of perishable materials, by the higly visible aspects of preservation that have attracted archaeologist's attention, are commonly ported to imcompatible ontologies. The shine of the metal implements, and persistent material aspects of built stone constructions have been confounded with what marks of truly civilization and complexity may look like, with the prejudice against less enduring but nevetherless complex constructed relatiosnhips. To be engaged in such relational entanglements involve equal profound plasticity of the brain in view of the body engagement with the material world. I could not disagree more with the judge of McCarthy' *Blood Meridian* for whom 'who builds in stone seeks to alter the structure of the universe.'

The defining principles of the comparison of the Mediterranean and Amazonia is ecological fragmentation, diversification of productive practices and the relatively low-friction spheres for mobility ('many-to-many' kind of network), and interaction afforded by 'thassologies,' that is the liquid mobilities of the respective basins. The magnitude of abundance of history and culture and sociobiological diversity in such places must be read according to these key-concepts that helped to shape a greater picture. It follows from this that the perceived nature of landscapes is an outcome over the *longue durée* of an active and cumulative process of geology, climate history, and the daily choices by native populations and nonhuman agents.

In regions of overall abundance, natural resources must not be viewed through the lens of blanket definitions and stable essences placing conceptual units as homogeneity. Notions such as of evenly or unevenly allocated resource distribution, indigenous people galvanized by mobility imperatives of physical survival, or areas inherently possessing defyining conditions for the establishment of 'headquarters' of political authority and hierarchy do not allow to discuss emergent properties of geographies in historical breath. Power is part of the structure itself of the tangled web of links, flows and relationships opportunities afforded by vectors of communication in a heterogenous mosaic across space and time. And that is precisely the reason why in such networked

places it becomes an unstable phenomenon, operating fractally in a manner of the specific conjunctions of sub-ecossystems, climatic, relief, sazonality, etc. 'Connectivity' thus may have had proportioned disrupting effects of decentralization and diversity of production systems of exploration, shortening the efficacity of strategies of political power, monopoly over resources and production and complexification rooted on highly centralized social formations.

Modernity marks in these apartaded precolonial histories the point of major encounter and rupture, one in that the Old and New worlds become enlaced through the political-economical forces of exploration and domination, autotchtonous displacement, epistemicide of indigenous and non-Western ontologies. These sources of actual and potential contraditions shaped the current times of the Plantationocene we are living in. The cogs of this transformation of modern and industrial society operate in the assymetrical material transfers and moral placement system of social hierarchies and values, roles and places of peoples.

The thousands of drowned at the Mediterranean Sea and material wrecks on the shores, the pressure of extractivism on Amazonian indigenous and traditional peoples in the periphery of capitalist modernity constitute a strong political ecological remainder of global inequality and unevenly distributed benefits and costs of connectivity between Global North and South. The diametrical inversion of modalities of mobility and way of life sign the differential encoding of human beings, portrayal of threat and anxieties about prospects that draws along racial lines. The biopolitical enactment of barriers and the 'last' frontiers of civilization deep into the jungle externalized in the high-pitched vocalization in media platform about the 'other outside the gate' ideologically recloth threadbare anthropological categories according to which people are slotted into inferior places.

More than an illustration of 21st-century hyperconenected world or implicitly moral significance of global integration, the analogy with Mediterranaean Sea pretended to recast the theological anticipation of the process a great deal of narratives of social evolution purport to reconstruct. The refugee and the 'stone age' people under the onslaught of progress have been the losers and will continue to be of this global history of integration, stories of 'crises' and 'collapses' translated and mediated at trowel's edge. But they also can be a lynchpin for and self-reflexive critical enterprise of capitalist modernity through the looking-glass of archaeology knowledge site.

The fractal imagery and network graph theories coumpoudded with the reflection on the discourse of knowledge in archaeology mediated by material culture to challenge long-held notions of environmental limitation, biological/genetic models of transmission, normative conceptions of population movement and all that. Despite the critical historical analysis of a range of issues from the origins of people with the basic problems of comparative linguistics and narratives of population genetics, the main core of the analysis concentrated in part of archaeological evidence linked

historiographically to particular sort of people, with a bias toward the production aspects of specific class of material culture.

It follows from the issues discussed previously definitions of interdisciplinary concepts and methods, in that:

(I) Migration of entire peoples is the least means of diffusion/mobility mechanisms of material assemblages. The entirety of migratory mobilities is a subset within a spectrum of spheres, ranges and scales of a cultural process that encompasses varied natures, group size, social positon, and balance of power relations, etc. The extent of forms of human mobility is great and it should not be isolated or thought as necessarily an extraneous factor causative of change in the archaeological record;

(II) Materiality and mobility are as much outcomes of historically bounded experience of places and temporalities as they are intrinsic parts of life. It is up to the researcher to get into the multi-stratigraphy of the phenomenon in the assemblage of relationships of entities of archaeological units;

(III) It is only through the transformation of type-trait distribution into the learning mechanisms underlying apprenticeship and the embodiment of skill that one can aprehend long-range associations of material culture assemblages and forms of migratory mobility, as well as mobilities without migration. Visible signatures of craft-making are a window onto material-discursive and non-discursive knowledge and procedural gestures and instruments in the framework of operational sequences;

(IV) The enactmenet of vertical transmission of know-hows viewed at the population level shape many discourses on continuity and rupture in the archaeological record and migrationist paradigms. Static concepts of identity are at the core of how archaeologists operationalize units of classification, ethnolinguistic relatedness, or the meaning and implication of material stylistic similarities in cultural processes;

(V) A stylistic theory grounded on skill allows researchers to interpret the social significance of intra- and inter-site variability in a broader scope of forms and hypotheses of intercultural interactions and degrees of explanatory power. Despite environmental constraints, style is much as a choice of people made of flesh in culturally and socially saturated frameworks.

The analysis of material demonstrated how the relational analogy and critical engagement with how scholars intepret evidence might work with real-world archaeological material. Archaeological knowledge is not neutral and branch out to ramifications in current political and ethical issues. The reinterpretation of the phenomena of long-distance associations in the light of

specific archaeological evidence took also into account the role of society in shaping the field of possibilities of archaeological interpretations. It also discussed, at the same time, the moral responsibility in dealing with presentist concerns, hidden Western-centric assumptions of single migration events or 'closed' social totalities and colonial legacy of the discipline.

If we are to disentangle the process underlying the distribution of traits, it is a precondition to bring down the logic framework of interpretation to the archaeological remains themselves. Network archaeological research provided the necessary theoretical-methodological framework to gauge the sociopolitical significance of mobility, how and in which social contexts it occurred. The case studies showed that even with just specific classes of artifacts and ranges of type a much of a plural history of social interaction and learning process is condensated.

In data collection, management, and analysis, I opted here for an area of research focused on the technological and technical ramifications of production process, communities of practice and similarity networks. The aim was to start a reverse engineering of the many options followed by ancient crafters in the manufacturing process as to provide likely and unlikely scenarios of social interaction and mobility. The network analysis of the regional distributions of two group of artifacts in the Mediterranean Sea and Amazon basin were addressed in two case studies.

The Naue II type is a bronze weapon type widely disseminated in Central Europe, Balkans, Italy and the Aegean, Cyprus, the Nile Delta, and the North Syrian coast over the 2nd millennium BC. A great variety of views concerns the patterns of production, distribution and circulation of these swords in terms of group composition, size and forms of mobility in the eastern Mediterranean, particularly the Aegean. The data of corresponding subtypes and groups of the main type in the Italian Peninsula and the Aegean were networked in mixed shared attributes in different stages of production, findspot and chronology. While in the first stages in the distribution of the type migratory mobilities might be hypothesized for the appearance of new types of weapons, the diffusion of high visible elements of blade surface, especially across North-East Italy and West Greece, on the other hand, might better suggest scenarios of travel and interactions between groups that fall outside migration.

The case of group of Naue II swords demonstrated that their diffusion in the Aegean might be explained by different processes as varied as itinerant artisan mobility, as well non migrigatory mobilities in the form of trade of intermediate or finished bronze swords and transmission of technical knowledge with or without direct interaction of producers. The so-called cross-Adriatic *koiné* of the end of the Bronze Age was thus constituted by many networks of cross-community transmission of goods, techniques, and spatial mobility of different social actors, smithers, traders and, possible, warriors. The architecture of complexity displayed in the pattern of network structure brings us close than ever to understanding patterns of movement and temporalities of knowledge transmission within the rich texture of past relations.

There are many paths that lie ahead, only scratched on the surface, to be explored with a range of techniques of material analysis and other further approaches to bring into completion the genealogy of these objects in the past through use-alteration traces, in the trend surveyed of combat studies. Moreover, this endeavor should go on, I hope, with the broadening of the geographical scope of the corpus with exemplars of regions of the whole of the eastern Mediterranean, completion of the life-cycle of things and systematic investigation of use-alteration aspects in order to better contextualize production and consumption practices as well as mobility agents in the trajectories of use.

The distribution of polychrome ceramics type totalizes 6,000 km of length in river channels of the Amazon basin in almost 1,000 years of archaeological and historical record. Explanations for the mechanisms behind the typological distribution have been accumulated for half a century according to different models of ethno-linguistic filiation, population movement and relatively homogenous lineages of pottery tradition. The analysis of the material was conducted for the earliest contexts of the type in the upper Madeira and Central Amazon. A qualitative approach to variability between ceramic assemblages was adopted. Intra- and inter-site comparability in synchronous contexts was examined through similarity network measures of shared attributes of stages of pottery production. The graph's general pattern of material relations poorly corroborates interpretation of direct migration from point A to point B.

The major conclusion to be derived is that the distribution of traits enlisted in the type, ease to learn from finished pottery surfaces, or standing for widely shared techniques among past Amazonian pottery-producing indigenous communities favors many forms of mobilities than people carrying pots. The many-to-many relational structure compeled us to conjecture complex and myriad forms of transfer of elements of the production sequence and fluidity in residence patterns, rather than straightforward ethnic correlation. As far as the material associations of ceramic assemblages analysed are concerned, we might be on safer ground when speaking about non-specialized objects made from hybrid aggregates and forms of migratory (or non-migratory) mobility, such as the circulation of individuals paved by social alliances through marriage, rituals events, etc.

The case of the polychrome ceramics demonstrated that the evidence available poorly supports single events of typical migrationist or invasionists hypotheses on Tupian origins and expansion in Amazonia od pre-colonial times. The study is the first application of network archaeological analytical techniques in Amazonian archaeology. It may suggest directions for further advancements and improvements with regard to padronization of description of pottery production and classification criteria of attributes in a happy marriage between visible effects of invisible gestures of the technical system made of artifacts, persons and social relationships in the course of time.

Not for nothing these issues dealed in both case studies are of interest for historians and archaeologists alike. 'Sea people' and 'tupís' are etically entangled ethnomyns of protohistory in the

perspective of the history of written cultures (Egyptian and Hittite sources and sixteenth- and seventh-century European missionaries, travelers, explorers and so on). In the regional archaeologies of end of the Bronze Age in the Mediterranean and precolonial lowland South America they become encoded either with essences, totalities or mobilities with particular forms of social interaction, part of refugee movements, warriors (and cannibals) on the move, colonizers, etc. Without any necessary implication in terms of biological or genetic descent, I proceeded to pointed out these cultural phenomena might be beter framed as for the areas analyzed as a recurrent theme of an everchanging kaleidoscopic of environmental opportunities and flexible human responses in a broader latitude of range of interactions in *polytropos* (Greek *polý*, 'many' plus *trópos*, 'ways') ways. They are in sum an elusive byproduct of co-ocurring and scaled connectivity and mobility that peaked by regional systems over the late 2nd millennium BC Mediterranean and 1st millennium BC Amazonia.

I conclude saying that in an intercultural sphere of interaction and encounters, society is cross-cut by translocation of individuals and groups whose continuous mobility form over time pattern of social groups and material culture. If through co-residence or exchange mechanisms or mobility and migration, a constellation of cultural traits, symbolism and institutional practices, gender roles, and lifestyles of production and consumption of material culture might be disseminated. In the waterways or sea routes of areas acting as frontier of movement and communication, distance is shrieked, and the threshold of physical, cognitive or ethnolinguistic barriers and identities are continuously altered. Without major population replacement, groups from different cultural backgrounds and distances may be incorporated in the same 'international' language in the sense that overall typological and stylistic resemblances is a measure of heterogeneous extra local ties, long-distance mobility and cross-cultural interactions. This is not likely, however, to be mistaken by whole 'packages' carried over by migrating nations (people or cultures), although in assessing coupled networks of intersocietal encounters we cannot do without mobility and, eventually, migration.

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APPENDIX A – CATALOGUE OF TYPE II BRONZE SWORDS IN ITALY

Sword ID	Text label	Site of find	Context	Attribution	PBF	Eder; Jung (2005)	Regional unit/State	Condition	Actual location	Chronology
IT-1	v1.AdNsMCeto	Antro della Noce sul Monte Cetona	Cave	Type Cetona	No. 135	N/A	Siena, Tuscany	Preserved	MANU (Mus. Inv. No. 01080), on display	MBA/early RBA(?)
IT-2	v2.AdNsMCeto	Antro della Noce sul Monte Cetona	Cave	Type Cetona	No. 136	N/A	Siena, Tuscany	Preserved	MANU, on display	MBA/early RBA(?)
IT-3	v3.AdNsMCeto	Antro della Noce sul Monte Cetona	Cave	Type Cetona	No. 137	N/A	Siena, Tuscany	Fragmented	MANU, on display	MBA/early RBA(?)
IT-4	v4.Sulm	Sulmona	?	Type Cetona	No. 138	N/A	L'Aquila, Abruzzo	Preserved	Romano-Germanic Central Mus.	?
IT-5	v5.AdSGiul	Alpe di S. Giulia	Settlement or place of cult on summit of mountain	Type Cetona	No. 139	N/A	Modena, Emilia-Romagna	Preserved	Civic Mus. of Modena	RBA(?)
IT-6	v6.Musc	Muscoli	Bronze hoard (outside settlement)	Type Cetona	No. 140	N/A	Udine, Friuli Venezia Giulia	Fragmented	National Arch. Mus. of Aquileia (Mus. Inv. No. 23232)	RBA/FBA1
IT-7	v7.Redu	Redù	Terramare settlement	Type Cetona	No. 141	N/A	Modena, Emilia-Romagna	Fragmented	Mus. Civ. Modena	RBA

IT-8	v8.Ital	“Italia”	?	Type Cetona	No. 142	N/A	?	Preserved	Hermitage Mus.	?
IT-9	v9.Fuci	Fucino	Lake bed (Fucino)	Type Cetona	No. 143	N/A	L’Aquila, Abruzzo	Preserved	Romano-Germanic Central Mus.(?)	?
IT-10	v10.Fuci	Fucino	?	Type Cetona	No. 144	N/A	L’Aquila, Abruzzo	Preserved	Pigorini Mus. (Mus. Inv. No. 23 211)	?
IT-11	v11.LTras	“Lago Trasimeno”	?	Type Cetona	No. 145	N/A	Perugia, Umbria	Fragmented	?	?
IT-12	v12.Ital	“Italia”	?	Type Cetona	No. 146	N/A	?	Fragmented	State Collections of Antiquities (no. inv. 307)	?
IT-13	v13.Casi	Casier	Lake bed(?)	Type Cetona	No. 147	N/A	Treviso, Veneto	Fragmented	Santa Caterina Mus. (Mus. Inv. No. 18)	?
IT-14	v14.Bacc	Bacchiglione	River bed (Bacchiglione)	Type Cetona	N/A	N/A	Padua, Veneto	Preserved	Mus. of the River Bacchiglione at Cervarese Santa Croce (I.G. 14023)	RBA(?)
IT-15	v15.Biga	Bigarello	?	Type Cetona	N/A	N/A	Mantova, Lombardy	Preserved	Ducal Palace Mus. (Mus. Inv. No. 9357)	?

IT-16	v16.VVale	Vibo Valentia	INAM cemetery (T. 156)	Type Cetona	No. 145A	No. 7	Catanzaro, Calabria	Preserved	Nat. Arch. Mus. “Vito Capialbi”	RBA
IT-17	v17.OdNoga	Olmo di Nogara	T. 41 (inhumation)	Type Cetona	N/A	No. 1	Verona, Veneto	Preserved	Venice Nat. Arch. Mus.	MBA 3 B/RBA 1
IT-18	v18.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Preserved	Private collection	RBA 2/FBA 1
IT-19	v19.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Fragmented	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 26523)	RBA 2/FBA 1
IT-20	v20.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Fragmented	Venice Nat. Arch. Mus. (Mus. No. IG.VR 40293)	RBA 2/FBA 1
IT-21	v21.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Fragmented	Venice National Arch. Mus. (Mus. Inv. No. IG.VR 40292)	RBA 2/FBA 1
IT-22	v22.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Fragmented	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 40289)	RBA 2/FBA 1

IT-23	v23.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Fragmented	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 40291)	RBA 2/FBA 1
IT-24	v24.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Cetona	N/A	N/A	Verona, Veneto	Preserved	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 40288)	RBA 2/FBA 1
IT-25	v25.Caor	Caorso	?	Type Cetona	N/A	N/A	Piacenza, Emilia-Romagna	Preserved	Mus. of Piacenza (Mus. Inv. No. 17464)	?
IT-26	v26.Cado	Cadore	?	Type Cetona	N/A	N/A	Belluno, Veneto	Preserved	Private collection?	?
IT-27	v27.Alle	Allerona	?	Type Allerona	No. 153	N/A	Terni, Umbria	Preserved	Pigorini Mus. (Mus. Inv. No. 61 529)	?
IT-28	v28.CsSile	Casale sul Sile	Lake bed	Type Allerona	No. 154	N/A	Treviso, Veneto	Preserved	Venice Nat. Arch. Mus. (Ligabue Collection, Room VII)	?
IT-29	v29.LTras	“Lago Trasimeno”	?	Type Allerona	No. 155	N/A	Perugia, Umbria	Preserved	?	?
IT-30	v30.SBinPeri	San Benedetto in Perillis	T. (cremation)	Type Allerona	No. 156	No. 5	L’Aquila, Abruzzo	Preserved	Pigorini Mus. (Mus. Inv. No. 48 137)	FBA (*terminus post quem*)
IT-31	v31.Apul	“Apulia”	?	Type Allerona	No. 157	N/A	Apulia(?)	Preserved	State Collections of Antiquities(?)	?

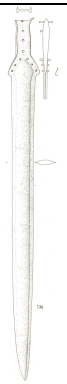
IT-32	v32.Fuci	Fucino	Funerary(?)	Type Allerona(?)	No. 158	No. 6	L'Aquila, Abruzzo	Preserved	Pigorini Mus. (Mus. Inv. No. 32 927)	RBA 2-FBA 2(?)
IT-33	v33.Fuci	Fucino	Funerary(?)	Type Allerona	No. 159	N/A	L'Aquila, Abruzzo	Preserved	Pigorini Mus. (Mus. Inv. No. 23 210)	?
IT-34	v34.Rove	Rovereto	River bed (Leno)	Type Allerona	No. 160	N/A	Trento, Trentino-Alto Adige	Fragmented	Civic Mus. of Rovereto (Mus. Inv. No. 376)	?
IT-35	v35.Camp	Campodenno	?	Type Allerona	No. 161	N/A	Trento, Trentino-Alto Adige	Fragmented	MArTa (Mus. Inv. No. 3493)	?
IT-36	v36.Unk	Unknown	?	Type Allerona	No. 162	N/A	?	Preserved	Arch. Mus. of Turin (Mus. Inv. No. 3191)	?
IT-37	v37.Mont	Montegiorgio	?	Type Allerona	No. 163	No. 4	Ascoli Piceno, Marche	Preserved	Nat. Arch. Mus. of the Marche Region (Mus. Inv. No. 16637)	RBA(?)
IT-38	v38.Bacc	Bacchiglione	River bed (Bacchiglione)	Type Allerona	N/A	N/A	Padua, Veneto	Preserved	Mus. of the River Bacchiglione at Cervarese Santa Croce (Mus. Inv. No. I.G. 14024)	FBA(?)
IT-39	v39.CEuga	Colli Euganei	?	Type Allerona	n. 157, A	N/A	Padua, Veneto	Preserved	Private collection	?

IT-40	v40.Fros	Frosinone	?	Type Allerona	N/A	N/A	Frosine, Latium	Preserved	BM (Mus. Inv. No. G71/dc1 PRB WG 1262)	RBA-FBA
IT-41	v41.GVero	Gazzo Veronese	?	Type Allerona	N/A	N/A	Verona, Veneto	Preserved	Archeological Museum of Gazzo Veronese	RBA 2-FBA
IT-42	v42.Nard	Narde	T. 168 (cremation)	Type Allerona	N/A	No. 2	Rovigo, Veneto	Fragmented	Nat. Arch. Mus. of Fratta Polesine	FBA 1-2
IT-43	v43.Nard	Narde	T. 227 (cremation)	Type Allerona	N/A	No. 3	Rovigo, Veneto	Fragmented	Nat. Arch. Mus. of Fratta Polesine	FBA 1-2
IT-44	v44.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Allerona(?)	N/A	N/A	Verona, Veneto	Preserved	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 26487)	RBA 2/FBA 1
IT-45	v45.PdBran	Pila del Brancón	Bronze hoard from bank of the Tartaro River	Type Allerona	N/A	N/A	Verona, Veneto	Fragmented	Venice Nat. Arch. Mus. (Mus. Inv. No. IG.VR 26489)	RBA 2/FBA 1
IT-46	v46.Bisi	Bisignano	?	Type Allerona	N/A	N/A	Cosenza, Calabria	Preserved	BM (Mus. Inv. No. G71/dc1/no6 PRB WG 1143)	FBA/EIA(?)

IT-47	v47.Fuci	Fucino	Lake bed (Fucino)	Type Allerona	N/A	N/A	L'Aquila, Abruzzo	Preserved	Nat. Arch. Mus. of Abruzzo (Mus. Inv. No. 67516)	?
IT-48	v48.Fuci	Fucino	Lake bed (Fucino)	Type Allerona	N/A	N/A	L'Aquila, Abruzzo	Preserved	Nat. Arch. Mus. of Abruzzo (Mus. Inv. No. 67517)	?
IT-49	v49.MdPian	Madonna del Piano	T. 194 (*enchytrismós* within *pithos*)	Type Allerona	N/A	N/A	Catania, Sicily	Preserved	Mus. of Arch. of the University of Catania (Mus. Inv. No. 71146)	FBA 2
IT-50	v50.MValc	Montereale Valcellina	River bed	Type Allerona	N/A	N/A	Pordenone, Friuli-Venezia Giulia	Preserved	BMV, AQ 343.003	?
IT-51	v51.Caor	Caorso	?	Type Allerona	N/A	N/A	Piacenza, Emilia-Romagna	Fragmented	Mus. of Piacenza (Mus. Inv. No. 17463)	?
IT-52	v52.Grem	Gremanu	Sanctuary	Type Allerona	N/A	N/A	Nuoro, Sardinia	Fragmented	?	RBA-FBA
IT-53	v53.Pesc	Pescara	River bed	Type Allerona	N/A	N/A	Pescara, Abruzzo	N/A	Nat. Arch. Mus. of Abruzzo	N/A
IT-54	v54.?	?	?	?	N/A	N/A	?	?	Arch. Mus. in Syracuse	?

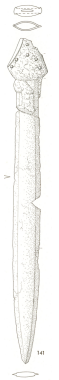
Distribution of Naue Type II sword findings in Italy.

TEXT TABEL	MATERIAL ASSOCIATION	INTRINSICAL PROPERTIES	CHEMICAL COMPOSITION	PROVENANCE ANALYSIS	USE WEAR	PHOTO	DRAWING	REFERENCE
v1.AdNsMCeto	Deposited in a cave room, right side of the entrance and next to the cavity, between the wall and a stone. Contextual association with other swords, bronze fibula, dagger, pottery sherds, animal and human bones	L 64 cm (Calzoni) [64,2 cm (Bianco Peroni); 64,5 cm (55 cm blade + 9,5 cm handgrip) (Volante)] W 5,5 cm max handgrip W 3,5 cm (bellow max W handgrip) W 3,1 (med blade) [W 3,5 cm (Calzoni)] W 2,6 cm max (handgrip) H of flanges: 1,1 cm Th of grip: < 1 cm Th: 0,9 cm (max) and 0,2 cm (min) Mid-rib flanked by steps Striation by sharpening parallel to edges' orientation Rivet set before casting(?) and mechanically widened Diameter rivets: 0,5 cm (shoulders) and 0,3 cm (shoulders) 10 rivets (6 × 4) Burnished blade's surface	(pXRF) 8-10% Sn	N/A	"*In particolare, lungo il tagliente nella porzione definita forte e media sono state osservate tracce del tipo* rippling notches o U-shaped curved notches" (Volante, 2020: 161)			Calzoni, 1933: 59; 98, no. 3; 99, fig. 81; 1954: 48; 48, fig. 14; Bianco Peroni, 1970: 62, no. 135; pl. 19, 135; pl. 77, 1; Carancini; Peroni, 1999: pl. 27, 24; pl. 29; 56, 24; Volante, 2020: 159-165; 169, fig. 68; 170, fig. 69; 171, fig. 70; Volpi; Dallai, 2020

		Lenticular cross section Wt 533 g						
v2.AdNsMCeto	Deposited in a cave room, right side, in a deep cavity (6 m), associated with a fibula, dagger, fragmented cranium, beneath a slab and tips crossed with another Cetona type sword	L 64 cm (Calzoni) [61,9 cm (Bianco Peroni)] W. 4 cm 10 rivets (6 × 4) Mid-rib flanked by steps Lenticular cross-section	N/A	N/A	N/A			Calzoni, 1933: 59; 98, no. 4; 1954: 48; 48, fig. 14; Bianco Peroni, 1970: 62, no. 136; pl. 19, 136; pl. 77, 2; Carancini; Peroni, 1999: pl. 29; 56, 24
v3.AdNsMCeto	Deposited in a cave room, right side, in a deep cavity (6 m), associated with a fibula, dagger, fragmented cranium, beneath a slab and tips crossed with another Cetona type sword	Pres L 57 cm (Calzoni) [57,4 cm (Bianco Peroni)] W. 3 cm ? rivets (6? × ?) Mid-rib flanked by steps Lenticular cross-section	N/A	N/A	N/A			Calzoni, 1933: 59; 98, no. 5; 1954: 48; 48, fig. 14; Bianco Peroni, 1970: 62, no. 137; pl. 19, 137; pl. 77, 3; Carancini; Peroni, 1999: pl. 29; 56, 24

v4.Sulm		L 60 (Bianco Peroni) ([60,5 (Peroni)] cm 8 rivets (4 × 4) Grip with almost straight outline and distinct from the base of the blade (semicircular) Parallel sides blade Narrow and pronounced midrib 2 narrow couple of steps along the blade Biconvex (lenticular) cross-section	N/A	N/A	N/A	N/A		Ancona, 1889: 6, pl. 1, 21; Naue, 1903: pl. 7, 1; Peroni, 1961: 127; 183-184, no. 111; Bianco Peroni, 1970: 62, no. 138; pl. 19, 138
v5.AdSGiul	N/A	L 57,8 cm 8 rivets (4 × 4) Steps Elliptical cross-section	N/A	N/A	N/A			Malavolti, 1948-1950; Foltiny, 1964: 253; pl. 76, n. 30; Bianco Peroni, 1970: 62, no. 139; pl. 19, 139; Bettelli, 1997: 726; 726, fig. 428, no. 1; Iaia, 2015: 88, fig. 8, A

v6.Musc	Bronze hoard of 14 kg total with sickles, axes and fragment of another sword	L 15 cm W 2,8 cm (blade) 8 rivets (4 × 4) Full annealing on the cross section on the internal part of the blade (possibly the outer part was cold hammered to improve hardening) Elliptical cross-section Wt 117 g	SEM-EDS and EPMA chemical analysis (wt%) SD Cu 84.6 0.7 Sn 12.1 0.2 S 0.8 0.2 Pb 0.7 0.6 Ni 1.6 0.2 S 0.11 0.20 Cl 0.01 0.01 Mn 0.01 0.01 Fe 0.01 0.01 Co 0.04 0.01 Ni 0.65 0.07 Cu 86.69 0.32 Zn 0.02 0.03 As 0.35 0.07 Ag 0.05 0.03 Sn 11.97 0.26	South-eastern Italian Alps (Veneto and Trentino-Alto-Adige)	N/A	b 		Marchesetti, 1903: 135, n. 1; Pigorini, 1904; Anelli, 1949: 14, fig. 42; Bianco Peroni, 1970: 63, no. 140; pl. 20, 140; Carancini; Peroni, 1999: pl. 29; 56, 24; Borgna, 2000-2001: 311-316; 316, fig. 11, no. 3; Canovaro, 2016: 20; 21, fig. 2.5, b; 45, fig. 4.8; 46, fig. 4.9, b; 92, fig. 5.12; 94; 107, fig. 6.2; 123, fig. 6.9; 130; 141, app. 1, Mus-S2; 141, app. 2, tab. 1; 146, app. 2, tab. 2, Mus-S2; 154, app. 3, Mus-S2; 167, app. 4, Mus-S2; *et al.* 2019: 4832, tab. 1, Mus-S2; 4834; 4835, fig. 3, b; 4837, tab. 2, Mus-S2; 4840, fig. 7; tab. 3. Mus-S2; 4841, fig. 8, c; 4843, fig. 9; 4843, fig. 9

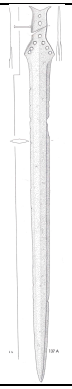
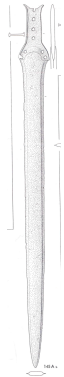
			Sb 0.00 0.00 Pb 0.06 0.10 Bi 0.00 0.00 Pb isotope values ± 2SE $^{206}Pb/^{204}Pb$ 18.197 0.001 $^{207}Pb/^{204}Pb$ 15.663 0.002 $^{208}Pb/^{204}Pb$ 38.417 0.005					
v7.Redu	N/A	L 50,5 cm [45,5 cm] W 3,7 cm (blade) W. 3,8 (middle) W 2,2 cm (midrib) W. 0,7 cm (edges) [6] rivets (4 × [1]) W 3,4 cm (below handgrip) 5,5 cm (handguard) Observations: "*Bronzo oro chiaro*" (Säflund, 1939: 46); "[…] lama era molto più dura nella parte tagliente che non	Cu 87.000% Sn 11.800%	N/A	N/A	N/A		Pigorini, 1883: 82; pl. 3, 13; Mosso, 1906: 563-565; 564, fig. 5; Säflund, 1939: 46; pl. 49, 3; Bianco Peroni, 1970: 63, no. 141; pl. 19, 141

		nella costola centrale[…]" (Mosso, 1906: 565); "[…] *nucleo originario delle spada (che doveva essere di un tipo a codolo), inglobato nella base e nella lingua da presa attuali, fuse in un secondo momento*" (Bianco Peroni, 1970: 63)						
v8.Ital	N/A	L 58 cm 7 rivets (6 × 1) Rhombic cross-section	N/A	N/A	N/A	N/A		Bianco Peroni, 1970: 62, no. 142; pl. 20, 142

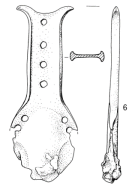
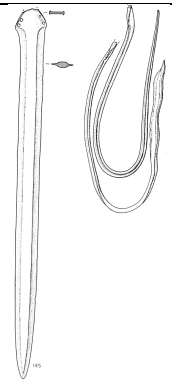
v9.Fuci	N/A	L 63 cm Curved shoulders 6 rivets (6 × 0) Broad medial line Elliptical cross-section	N/A	N/A	N/A	N/A		Ancona, 1886: 9; pl. 3, 30; Peroni, 1961: 127; 183, no. 110; Bianco Peroni, 1970: 62, no. 143; pl. 20, 143; Bouzek, 1985: 123, fig. 58, no. 2
v10.Fuci	N/A	L. 61,4 cm (Peroni; Bianco Peroni) [61,5 cm (Pigorini); 61,6 (Hermann *et al.*)] Broad and sinuous grip (half of grip's length), discontinuous with the base of the blade (semicircular) Slightly curved (almost straight) shoulders 6 rivets (6 × 0) Parallel sides Steps Beveled medial line Flattened rhomboid (elliptical) cross-section	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.)	N/A		Pigorini, 1895: 256; 256, fig. 1; Montelius, 1910: pl. 142, 6; Peroni, 1961: 127-129; 128, no. 1; pl. 1, 2; Bianco Peroni, 1970: 62, no. 144; pl. 20, 144; Hermann *et al.* 2020b: app.

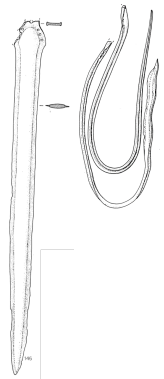
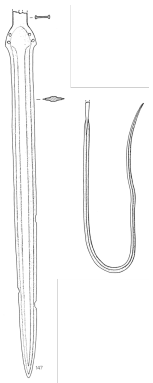
v11.LTras	N/A	Pres L 43 cm 6 rivets (6 × 0) Steps? Lenticular cross-section	N/A	N/A	N/A	N/A		Ancona, 1886: 10; pl. 3, 38; Bianco Peroni, 1970: 63, no. 145; pl. 20, 145
v12.Ital	N/A	Pres L 58 cm 6 rivets (6 × ?) Incised lines Narrow midrib Elliptical cross-section	N/A	N/A	N/A	N/A		Bianco Peroni, 1970: 63, no. 146; pl. 20, 146
v13.Casi	N/A	Pres. L. 29 cm ? rivets (4 × ?) Pronounced midrib Lenticular cross-section	N/A	N/A	N/A			Foltiny, 1964: 252; pl. 75, no. 24; Bianco Peroni, 1970: 63, no. 147; pl. 20, 147

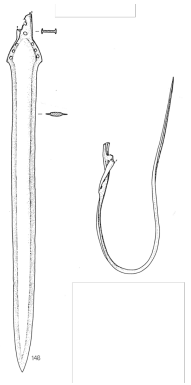
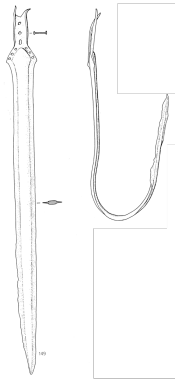
v14.Bacc	N/A	L. 63,5 (Bianco Peroni) [65,4 (Zampieti)] cm (9,5 cm handgrip) W 3,6 cm (ears) and 3.5 cm (blade) 8 rivets (4 × 4) Almost straighten shoulders (slightly arched) without bottleneck at the junction with the handgrip, which slightly exceeds the blade Parallel sided edges Mid-rib flanked by 2 steps along the cutting edge Ogival thickness of the blade in the junction of the grip with the shoulders Pres. rivet in quadrangular cross section, rounded ends (H 24 mm; Th 3.2 mm) and signs of mechanical flattening by hammering Lenticular cross-section	Cu 87.10% Sn 8.005% Pb 1.96% Zn 2.02% Sb 0.22% P 0.09%	N/A	N/A		N/A	Zampieri, 1973: 10; 10, fig. 1; 11, fig. 2, 12; A; Fogolari; Bianchi, 1976: 89; pl. 27, no. 123; Pabst, 2013: 137

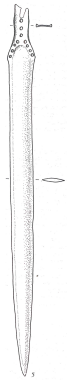
v15.Biga	N/A	L 66,5 cm 9 rivets (6 × 3) Steps Lenticular cross-section	N/A	N/A	Use wear traces on the blade	N/A		Bianco Peroni, 1974: 15, no. 137; pl. 2, 137, A
v16.VVale	Peschiera dagger	L 61,5 cm W 3,14 cm (pommel ears) Pres W 4,65 cm (shoulders) H max 0,65 cm (flanges) Th max 0,95 cm (hilt) Th max 0,7 cm (blade) Diam 0.4-0.5 cm) (rivets on grip-tongue) Diam 0.4 cm (rivets on hilt shoulders) 8 rivets (4 × 4) Balance point at 28,2 cm Grip-tongue with slightly convex lines Conical and slightly convex shoulders	Pb isotope values $^{208}Pb/^{206}Pb$ 2.1053 $^{207}Pb/^{206}Pb$ 0.85809 $^{208}Pb/^{204}Pb$ 38.401 $^{207}Pb/^{204}Pb$ 15.652 $^{206}Pb/^{204}Pb$ 18.240 XRF Fe 0.40 Co 0.04 Ni 0.03 Cu 88 Zn <0.2 As 0.18 Se <0.01 Ag 0.09 Sn 10.7 Sb 0.08 Te <0.01 Pb 0.44 Bi 0.05	Copper ore deposits in Sardinia	None	N/A		Bianco Peroni, 1974: 15, no. 145; pl. 2, 145, A; Carancini; Peroni, 1999: pl. 29; 56, 24; Pacciarelli, 2001: 189-190, fig. 110, rigth; Jung, 2006: pl. 11, 4; 2018: 277, fig. 19.2, 7; Jung *et al.* 2021: 356, fig. 10, 3; 360; 364, fig. 12, cat. no. 49; 365, tab. 2, cat. no. 49; 366-368; 367, fig. 13, cat no. 49; 369, tab. 3, cat. no. 49; 370, fig. 14, cat. no. 49; 383-384, cat. no. 49

		Broad midrib (65% of the blade) and steps Lenticular cross-section Wt 504,0 g						
v17.OdNoga	Deceased's right arm (anthropologically determined man) along bronze dagger	L. 71 cm 10 rivets (6 × 4) Handgrip with slightly sinuous outline Broad medial line Handgrip's limit with semicircular *incavo* Shoulders slightly curved Lenticular cross-section	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	N/A			Salzani, 1991: 141; 143, fig. 3, no. 4; Carancini; Peroni, 1999: 15; pl. 19, 25; 20; Salzani, 2005: 130-131; 131, figs. 272-274; 336, pl. 6, Tb 41, a; Fantini *et al.* 2005: 532, tab. 1; Jung, 2006: pl. 10, 1; Jung; Mehofer; Pernicka, 2011: 233, tab. 23.1; 238-240
v18.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	L. 41,6 cm 8 rivets (4 × 4) Slightly curved edges of handgrip Slightly broad and round shoulders Steps	N/A	N/A	Signs of ritual "killing" or destructive treatment before final deposition: originally bent	N/A		Salzani, 1994: 83, no. 2; 84, 2; Carancini; Peroni, 1999: pl. 29; 56, 24; Jung, 2006: pl. 11, 2; Bietti Sestieri *et al.* 2013: 160-161

	Elliptical cross-section							
v19.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres. L. 12,8 cm 8 rivets (4 × 4) Slightly curved edges of handgrip	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	N/A	N/A		Salzani, 1994: 83, no. 6; 84, fig. 1, 6; Jung; Mehofer; Pernicka, 2011: 233, tab. 23.1; 238-240
v20.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres. L 59 cm Slightly curved shoulders ? rivets (4 × ?) Steps flanking broad medial line Lenticular cross-section Wt 540-665 g	N/A	N/A	Signs of ritual "killing" or destructive treatment before final deposition: hilt broken, blade bent together with no. 146	N/A		Salzani, 1998: 67, fig. 1, 145; 69, no. 145; Bietti Sestieri *et al.* 2013: 159-161

v21.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres L 58 cm Slightly curved shoulders ? rivets (6 × (1)?) Steps Lenticular cross-section Wt 540-665 g	N/A	N/A	Signs of ritual "killing" or destructive treatment before final deposition: hilt broken, cutting edges heavily hammered, deformation by fire, blade bent together with no. 145	N/A		Salzani, 1998: 67, fig. 1, 146; 69, no. 146; Bietti Sestieri *et al.* 2013: 160-161; 160, fig. 4
v22.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres L 58,5 cm (Salzani) [58,7 cm(Hermann *et al.*)] Slightly curved shoulders ? rivets (4 × (1)?) 2 steps flanking midrib Lenticular cross-section Wt 540-665 g	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.) and of ritual "killing" or destructive treatment before final deposition: hilt broken, notches in the cutting edges, blade bent	N/A		Salzani, 1998: 68, fig. 2, 147; 69, no. 147; Bietti Sestieri *et al.* 2013: 159-161; Hermann *et al.* 2020b: app.

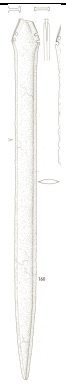
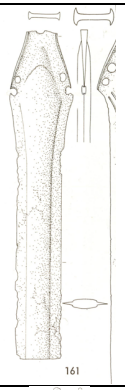
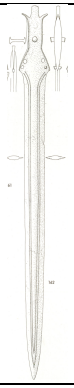
v23.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres L 46,4 (Salzani) [46,3 cm (Hermann *et al.*)] Slightly curved shoulders ? rivets (6 × (2)?) Steps Lenticular cross-section W. 237.88 g	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.) and of ritual "killing" or destructive treatment before final deposition: hilt broken and blade bent			Salzani, 1998: 68, fig. 2, 148; 69, no. 148; Bietti Sestieri *et al.* 2013: 160-161; 160, fig. 3; Hermann *et al.* 2020b: app.
v24.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres L 64,5 cm (Salzani) [64,3 cm (Hermann et al)] Slightly swelling of the edges of handgrip Pommel ears pointing up Not very curved shoulders 9 rivets (6 × 3) Steps Lenticular cross-section W. 540-665 g	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	Marks of combat (see Hermann *et al.* 2020b: app.) and of ritual "killing" or destructive treatment before final deposition: hilt broken, cutting edges heavily hammered, deformation by fire, blade bent	N/A		Salzani, 1998: 69, no. 149; 70, fig. 3, 149; Jung, 2006: pl. 11, 1; Bietti Sestieri *et al.* 2013: 160; 160, fig. 4; Jung; Mehofer; Pernicka, 2011: 233, tab. 23.1; 238-240; Hermann *et al.* 2020b: 1071, tab. 6; app.

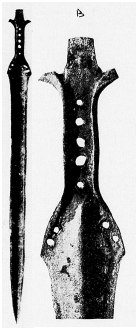
v25.Caor	N/A	L 58 cm W max 3,12 cm Th max 0,7 cm Slightly sinuous outline of handgrip [11] rivets (8 × [3]) Almost straight and narrow sloping shoulders Barely noticeably steps Lenticular cross-section	N/A	N/A	N/A	N/A		Bettelli, 1997: 727, fig. 429, n. 5; 729-730
v26.Cado	N/A	N/A	N/A	N/A	N/A	N/A	N/A	De Marinis, 2013
v27.Alle	N/A	L. 66 cm (Bianco Peroni) [64 cm (Colini)] 9 rivets (4 × 5) Swelling at handgrip Lenticular cross-section	N/A	N/A	N/A			Colini, 1900: 145; pl. 8, 4; Montelius, 1910: pl. 126, 11; Bianco Peroni, 1970: 66, no. 153; pl. A, 153; pl. 21, no. 153; Bietti Sestieri, 1973: 405, fig. 22, no. 8; 406

v28.CsSile	N/A	L. 46,8 cm Fine ridges on the blade Flat rhomboid (lenticular) cross-section	N/A	N/A	N/A			Battaglia, 1957: pl. 1; 1958-1959: 284, fig. 98, b; Bianco Peroni, 1970: 66, no 154; pl. 22, 154; Bietti Sestieri, 1973: 405, fig. 6; 406
v29.LTras	N/A	L. 74,5 cm Fine ridges Elliptical cross-section	N/A	N/A	N/A	N/A		Ancona, 1886: 10; pl. 3, 44; Naue, 1903: pl. 7, 2; Bianco Peroni, 1970: 66, no. 155; pl. 22, 155; Cultraro, 2005: 31, fig. b
v30.SBinPeri	Sword above urn	L. 64,4 cm 10 rivets (6 × 4) Grip with straight outline, discontinuous with the base of the blade Trapezoidal spur Base of the blade ogival Broad medial line 2 steps along the blade edges Parallel sides	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.)	N/A		De Nino, 1892: 485; Peroni, 1961: 127; 147, no. 34; pl. 1, 4; Bianco Peroni, 1970: 66, no. 156; pl. 22, 156; Cultraro, 2005: 31, fig. 3b; Hermann *et al.* 2020b: 1071, tab. 6; app.

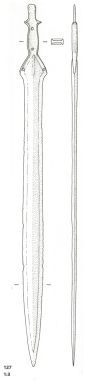
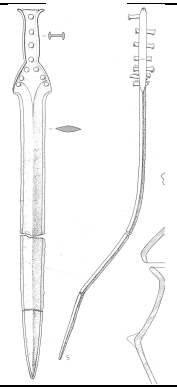
		Biconvex cross section (Lenticular cross-section)						
v31.Apul	N/A	L. 60,6 cm (12, 2 cm of handgrip) W max 5,3 cm (handgrip) W 5,1 cm (blade, superior part) W. 3,5 cm (blade, medium) 9 rivets (6 × 3) Parallel sides Ear with flanges Flat spur tapered in the superior part Broad medial line Narrow cutting edges Lenticular cross-section	N/A	N/A		N/A		Undset, 1890: 21, fig. 38; Naue, 1896: 96; pl. 3, 3; 1903: pl. 7, 6; Bianco Peroni, 1970: 66, no. 157; pl. 22, 157; Cultraro, 2005: 31, fig. 3b;

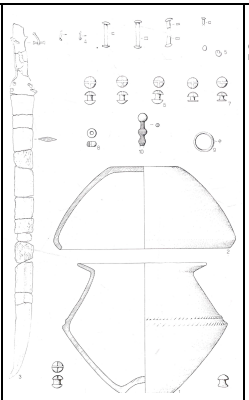
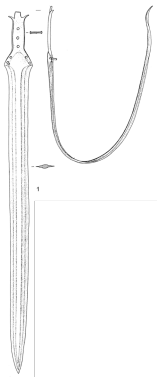
v32.Fuci	Lot of bronze purchased, find associated with 1 axe and 2 knifes and, probably, 2 violin fibulae and spearhead	L. 64,7 cm 7 rivets (4 × 3) Grip with strongly sinuous outline Bottleneck at the junction of the base and swelling towards the low part of the grip's length Spur(?) Base of the blade ogival Parallel sided edges Broad medial line 2 steps along the blade edge Biconvex (lenticular) cross-section	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.)	N/A		Colini, 1909: pl. 14, 1; Montelius, 1910: pl. 142, 5; Peroni, 1961: 137-139, no. 17; pl. 1, 3; Bianco Peroni, 1970: 68, no. 158; pl. 22, 158; pl. 77B, 1; Carancini; Peroni, 1999: 58, 44; Cultraro, 2005: 31, fig. 3b; Hermann *et al.* 2020b: app.
v33.Fuci	N/A	L. 61,4 cm (Bianco Peroni; Peroni) [62,6 cm (Hermann *et al.*)] 6 rivets (4 × 2) Grip's outline continuous with the base of the blade Parallel sides Biconvex cross section (Lenticular cross-section) Broad medial line 2 incised steps	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.)	N/A		Montelius, 1910: pl. 142, 10; Peroni, 1961: 128-129, no. 2; pl. 1, 1; Bianco Peroni, 1970: 68, no. 159; pl. 23, 159; Hermann *et al.* 2020b: 1071, tab. 6; app.

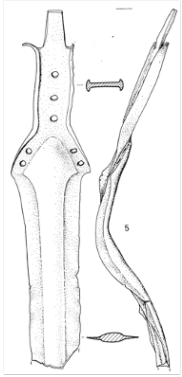
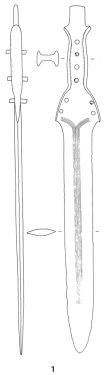
v34.Rove	N/A	L. 55,8 cm (Bianco Peroni) [56 cm (Pigorini)] W. 3 Steps Flat rhomboid (lenticular) cross-section	N/A	N/A	N/A	N/A		Pigorini, 1898: 260; Bianco Peroni, 1970: 69, no. 160; pl. 23, 160
v35.Camp	Single find	Pres. L. 23 cm (probably originally 40 cm [?] rivets (4 × [?]) Blood channels Lenticular cross-section	N/A	N/A	Observation: "*I due tagli presentano non poche intaccature forse prodotte da mano vandalica.*" (Roberti, 1932: 300)	N/A		Roberti, 1932: 299-300; Bianco Peroni, 1970: 69, no. 161; pl. 23, 161
v36.Unk	N/A	L. 64,3 cm 5 rivets (4 × 1) Double incised lines in each side of the blade edges Elliptical cross-section	N/A	N/A	N/A	N/A		Bianco Peroni, 1970: 69, no. 162; pl. 23, 162

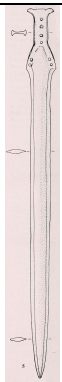
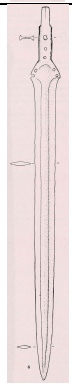
v37.Mont	Part of a collection, probably associated with a knife of Matrei type	L. 61,3 cm 5 rivets (4 ×1) Elliptical cross-section	N/A	N/A	N/A	N/A		Peroni, 1961: 139; Bianco Peroni, 1970: 69, no. 163; pl. 23, 163; Carancini; Peroni, 1999: 58, 44
v38.Bacc	N/A	L 61 cm (12,30 cm of handgrip) W. 3.30 cm (blade); 4.90 cm (maximum) 9 rivets (4 × 5) Narrow and slender handgrip Slightly wavy and strongly raised margins; ears turned outwards and flattened to the appendages Spur flat in section, rectangular in shape, tapered at the top (trapezoidal) Sloping and elongated shoulders with slight bottleneck at the junction with the handgrip	Cu 87.27% Sn 9.73% Pb 1.24% Zn 1.30% Sb 0.23% P 0.07%	N/A	Small indentations, specially and in right cutting edge, and missing fragments		N/A	Zampieri, 1973: 10-12; 11, fig. 2, B; 12, fig. 3; Fogolari; Bianchi, 1976: 91; pl. 27, no. 140; Pabst, 2013: 139

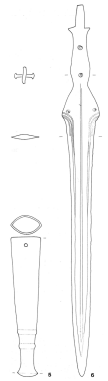
		Mid-rib flanked by 2 slight steps (specially near the point) Slight beveled edge in the medial line Swelling in the blade (ogival) below the junction of handgrip and handguard Lenticular cross-section						
v39.CEuga	N/A	L. 66,2 cm 8 rivets (4 × 4) Elliptical cross-section	N/A	N/A	N/A	N/A		Bianco Peroni, 1974: 15, no. 157A; pl. 3, 157A

v40.Fros	N/A	L. 69,5 cm 4 rivets (2 × 2) Rectangular tang Curved hilt Triangular sloped shoulders Almost straight edges Diamond shaped cross-section Sharp step Wt 714 g	ICP-AES Cu 88.9% Sn 9.57% As 0.26% Pb 0.58% Zn <0.01% Fe 0.009% Ni 0.128% Co 0.024% Sb 0.12% Bi 0.019% Ag 0.042% S 0.09% Total 99.8%	N/A	N/A	N/A		Schauer, 1974: 31; pl. 9, 2 [scale 1:3 incorrect]; Bietti Sestieri; Macnamara, 2007: 63, cat. 127; pl. 27, no. 127; Hook, 2007: 314, tab. 1
v41.GVero	N/A	L. ? 7 rivets (4 × 3) Narrow midrib Lenticular cross-section	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	N/A	N/A		Salzani, 1987: 63, figs. 43- 44; 2002: 159, fig. 1; Jung; Mehofer; Pernicka, 2011: 238-240
v42.Nard	At the bottom of the pit alongside bronze tweezer and pin	L. 46 cm 10 rivets (4 × 4) Broken spur Steps at lower distal Flat rhomboid (lenticular) cross-section	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	Bent and possibly broken intentionally in three pieces before ritual deposition	N/A		Salzani, 1989: 14; 34, fig. 12, no. 5; 20-21; Carancini; Peroni, 1999: pl. 28, 44; pl. 58, 44; Jung; Μόσχος; Mehofer, 2008: 105, fig. 7 (left); Jung; Mehofer; Pernicka, 2011: 238-240

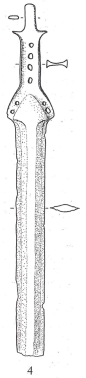
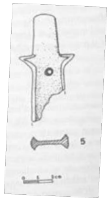
v43.Nard	Rich burial deposition with objects of gold, bronze, bone such as buttons, rings, pearls, pins, bracelets, razor, bracelet, tweezer, knife deposited inside the urn and showing evidence of breakage and deformation by fire	L. 66,8 cm 10 rivets (4 × ?) Gold rivets L. 2,6 cm (rivets) Lenticular cross-section	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	Fragmented in 17 pieces and deformation by fire alongside all the funerary furniture	N/A		Salzani, 1989: 16; 38, fig. 16, no. 3; 20-21; Carancini; Peroni, 1999: 58, 44; Jung; Mehofer; Pernicka, 2011: 233, tab. 23.1; 238-240; Pabst, 2013: 128, fig. 7, a, no. 3
v44.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	L. 70 cm (Salzani) [69,2 cm (Hermann *et al.*] 7 rivets (4 × 3) Flat and rectangular spur, rectangular flat cross-section Ears Slightly swelling of the edges of handgrip Sloping and long shoulders Blade: Straight-sided edges Lenticulat cross-section Midrib and 2 steps in each side Wt 726.73 g	N/A	N/A	Marks of combat (see Hermann *et al.* 2020b: app.) and of ritual "killing" or destructive treatment before final deposition: hilt broken and distorted, terminal part of the blade bent, sword's point bent			Salzani, 1994: 83, no. 1; 84, fig. 1, 1; Jung, 2006: pl. 11, 3; Bietti Sestieri, 2010: 58, fig. 26, a; Bietti Sestieri *et al.* 2013: 158, fig. 2; 160-161; 160, fig. 4; 162; 163, fig. 7-8; Hermann *et al.* 2020b: 1071, tab. 6; app.

v45.PdBran	Bronze hoard with 152 complete or fragmented pieces of swords, daggers, spear- and javelin heads and other bronze fragments deposited in water probably in a single ritual votive deposition	Pres L 25,3 cm Flat, rectangular spur Straight ears 7 rivets (4 × 3) Slightly curved edges of handgrip Sloping and long shoulders Straight-sided edges Midrib flanked by steps Lenticular cross-section	N/A	Copper ore deposits in Trentino Alto Adige/Südtirol regions	Signs of ritual "killing" or destructive treatment before final deposition: central fragmented by bending(?)	N/A		Salzani, 1994: 83; 84, fig. 1, no. 5; Carancini; Peroni, 1999: 58, 44; Bietti Sestieri *et al.* 2013: 160-161; 163, fig. 7 and 8; Jung; Mehofer; Pernicka, 2011: 233, tab. 23.1; 238-240
v46.Bisi	N/A	L. 40 cm Rectangular tang Slightly curved edges of handgrip Rounded shoulders Almost paralleled edges 8 rivets (4 × 4) Multiple incised lines on the central part Lenticular cross-section Wt 359g	ICP-AES (Blade) Cu 89.8% Sn 7.04% As 0.28% Pb 2.40% Zn 0.078% Fe 0,091% Ni 0.040% Co 0.026% Sb 0.15% Bi 0.021% Ag 0.175% S 0.27% Total 100.4 (rivet) Cu 88.5% Sn 10.0% As 0.45% Pb 1.59% Zn <0.01% Fe 0.017% Ni 0.031%	N/A	N/A			Giardino, 1994: 779; 780, pl.167, n. 1; 781, pl. 168, n. 1; Bietti Sestieri; Macnamara, 2007: 81-82, cat. 219; pl. 45, n. 219; Hook, 2007: 314, tab. 1

			Co 0.033% Sb 0.02% Bi 0.014% Ag 0.067% S 0.14% Total 100.9%					
v47.Fuci	*Ex voto*	L 64 cm 8 rivets (4 × 4) Pommel ears facing outwards and quite developed Slight swelling on handgrip Sloping and long shoulders Lenticular (thick) cross-section	N/A	N/A	N/A			Peroni, 1961: 184-185; D'Ercole 1997: 72; 75, fig. 2; 76, pl. 1, no. 5; 77; Bietti Sestieri, 2003: 99, fig. 91
v48.Fuci	*Ex voto*	L 64 cm 8 rivets (4 × 3) Long and thick handgrip Sloping shoulders and *apici*, slight convex Steps on cutting edges flanking raised medial line Lenticular cross-section	N/A	N/A	N/A			Peroni, 1961: 184-185; D'Ercole 1997: 72; 75, fig. 2; 76, pl. 1, no. 6; 77; Bietti Sestieri, 2003: 99; 100-101, fig. 92

v49.MdPian	Fragments of bone and wood of sword's scabbard, bronze razor, single-handled jug, drinking cup	L 40 cm Hilt: W 22 mm (base) W 8,8 cm Spur: Trapezoidal spur, rectangular cross-section Straight ears (asymmetrical) 4 rivets (2 × 2) Sinuous handgrip outline Convex grip Concave base Curvilinear shoulders, expanded on the blade juncture Lenticular) cross-section Incisedl ines (a straight pair, parallel, flanking the medial line of the blade, from handgrip to the mid-blade (?); two incisions and a third one near the shoulders in both sides)	XRF, AAS and SEM/EDS (blade) Cu 85.8% Sn 11.2% Pb 1.80% As tr. Sb Fe 0,7% Ni tr. Co Ag tr. Zn Mn tr (point) Cu 86.2% Sn 9.4% Pb 2.70% As 0.50% Sb tr. Fe 0,2% Ni Co Ag tr. Zn Mn (rivet 1) Cu 88.9% Sn 8.7% Pb 0.70% As Sb Fe 1,1% Ni tr. Co Ag tr. Zn	N/A	N/A			Albanese Procelli, 1994: 156, fig. 2, no. 6; 160; 168; Giumlia-Mair; Carancini; Peroni, 1999: 22; Albanese Procelli; Lo Schiavo, 2010: 473-474; 486, tab. 1, nos. 48-55

			Mn (rivet 2) Cu 90.4% Sn 8.5% Pb 0.40% As Sb Fe 0,5% Ni tr. Co Ag Zn Mn					
v50.MValc	N/A	L. 61,4 cm 7(9?) rivets (2(4?) × 5) Rectangular flat cross section (spur) *Spalle allungate* Lenticular cross-section	N/A	N/A	N/A	N/A		Pettarin, 1996: 455, no. 117; 456, fig. 24, no. 117

v51.Caor	N/A	Pres L. 39,6 cm (2/3) [≈ 59 cm total] W 3 cm (blade) Th max 0,9 cm 8 rivets (4 × 4) Slight swelling on handgrip Horizontal ears Rectangular spur Sloping shoulders, slightly convex Ogival limit of hilt plates Rhomboid (lenticular) cross-section Double steps	Observation: "[…] *tracce di colpi* […]" (Bettelli, 1997: 729)	N/A	N/A	N/A		Bettelli, 1997: 727, fig. 429, n. 4, 729; 730
v52.Grem	N/A	N/A	N/A	N/A	N/A	N/A		Lo Schiavo *et al.* 2004: 377, fig. 4, no. 5; 378
v53.Pesc	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Pabst, 2013: 140
v54.?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cultraro, pers. comm.

Details of context, morpho-stylistic aspects and technological choices of Naue Type II sword findings in Italy.

APPENDIX B – CATALOGUE OF TYPE II BRONZE SWORDS IN GREECE

Sword ID	Text label	Site of find	Context	Attribution	Catling, 1961	PBF IV, 12	Bouzek (1985)	Eder; Jung (2005)	Regional unit/state	Condition	Actual location	Chronology
GR-1	v55.Myce	Mycenaea	House of the Warrior's Vase	Group I/*Gruppe* A	No. 1	N/A	A.I.1	N/A	Argolis, Peloponnese	Preserved	AM (Mus. Inv. No. 1017)	?
GR-2	v56.Myce	Mycenaea	Acropolis hoard (Tsountas' hoard)	Group I/ *Gruppe* A, *Variante* 2	No. 2	N/A	?.1	N/A	Argolis, Peloponnese	Fragmented	AM (Mus. Inv. No. 2539)	LH IIIB-C
GR-3	v57.Myce	Mycenae	Acropolis	?	No. 3	N/A	?.2	N/A	Argolis, Peloponnese	Fragmented	AM (Mus. Inv. No. 2740)	?
GR-4	v58.Tiry	Tiryns	Tiryns Tresure (SE of the Lower Town)	?	No. 4	N/A	B.IIa1.2	N/A	Argolis, Peloponnese	Fragmented	AM (Mus. Inv. No. 6228a)	LH IIIC
GR-5	v59.Tiry	Tiryns	Tiryns Tresure (SE of the Lower Town)	Group II(?)/ *Gruppe* C	No. 5	N/A	?.3	N/A	Argolis, Peloponnese	Fragmented	AM (Mus. Inv. No. 6228b)	LH IIIC
GR-6	v60.AKlau	Achaea Klauss	T.	Group II/ *Gruppe* C, *Variante* 3	No. 6	N/A	B.IIa2.1	N/A	Achaea, Western Greece	Preserved	AM (Mus. Inv. No. 10186)	?
GR-7	v61.K-Spen	Kallithea-Spenzes	ChT A, burial II (shaft grave)	Group II/*Gruppe* C, *Variante* 3	No. 7	N/A	B.IIa1.1	No. 11	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 318), on display	LH IIIC Middle

GR-8	v62.K-Spen	Kallithea-Spenzes	ChT B	Group II Early/*Gruppe* C, *Variante* 3	No. 8	N/A	B.IIa2.2	No. 12	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 319), on display	LH IIIC Advanced-Late
GR-9	v63.Palai	Palaiokastro	ChT 6	Group III/*Gruppe* C, *Variante* 2	No. 9 (10)	N/A	B.IIa1.1	No. 18	Arcadia, Peloponnese	Preserved	Sparta Mus.	LH IIIC Middle-Late
GR-10	v64.Sten(SOdos)	Steni(Schiste Odos)	?	Group II Developed/ *Gruppe* C, *Variante* 3	No. 10 (9)	No. 248	C.IIb.3	N/A	Phocis, Central Greece	Preserved	AM (Mus. Inv. No. 8017)	?
GR-11	v65.Vran	Vranezi	Grave(?)	Group II Developed(?)/*Gruppe* C, *Variante* 3	No. 11 (10)	No. 249	N/A	N/A	Boeotia, Central Greece	Fragmented	Lost	?
GR-12	v66.Grad	Graditsa	?	Group II Developed/ *Gruppe* C, *Variante* 3	No. 12	No. 245	C.IIb.1	N/A	Thessaly(?)	Preserved	Ash. (Mus. Inv. No. AN. 1927: 1383)	?
GR-13	v67.Grad	Graditsa	?	Group II Developed/ *Gruppe* C, *Variante* 3	No. 13	No. 246	C.IIb.2	N/A	Thessaly(?)	Preserved	Ash. (Mus. Inv. No. AN.1927: 1384)	?
GR-14	v68.Moul	Mouliana	ThT B, burial 1 (larnax)	Group III/ *Gruppe* C, *Variante* 2	No. 14 (11)	No. 242	B.III.1	No. 23	Siteia, Lasithi (Crete)	Preserved	AMH (Mus. Inv. No. 1010)	LM IIIC Late
GR-15	v69.Moul	Mouliana	ThT B, burial 2 (floor)	Group I/*Gruppe*	No. 15 (12)	No. 230	N/A	No. 24	Siteia, Lasithi (Crete)	Preserved	AMH (Mus. Inv. No. 1011)	LM IIIC Late

				A, *Variante* 2								
GR-16	v70.Moul	Mouliana	ThT A (cremation)	Group II Developed(?)/ *Gruppe* C, *Variante* 3	No. 16 (13)	No. 247	B.III.2	No. 22	Siteia, Lasithi (Crete)	Fragmented	AMH (Mus. Inv. No. 999)	LM IIIC/LH IIIC
GR-17	v71.Moul	Mouliana	ThT A	Group III/*Gruppe* C, *Variante* 3(?)	No. 17 (14)	N/A	B.III.4	N/A	Siteia, Lasithi (Crete)	Fragmented	AMH(?)	LM IIIC/LH IIIC
GR-18	v72.Karp	Karphi	Settlement	?	No. 18	No. 261	?.5	N/A	Siteia, Lasithi (Crete)	Fragmented	AMH	LM III C (1100-900 BC)
GR-19	v73.Site	Siteia	?	?/*Gruppe* C	No. 19	No. 260	C.V.4	N/A	Siteia, Lasithi (Crete)	Preserved	The Fitzwilliam Mus. (Mus. Inv. No. GR.94a.1906)	?
GR-20	v74.Vrok	Vrokastro	?	Dagger (Group IV)	No. 20	N/A	C.IVb.1	N/A	Siteia, Lasithi (Crete)	Fragmented	?	?
GR-21	v75.Myrs	Myrsini	ChT A	Group I/*Gruppe* A, *Variante* 2	No. 21	no. 227	A.I.3	N/A	Siteia, Lasithi (Crete)	Preserved	AMH (Mus. Inv. No. 2745)	LM III A-C
GR-22	v76.Mplai	Messara plain	?	Group III/*Gruppe* C, *Variante* 1	No. 22	No. 241	B.III.3	N/A	Heraklion, Crete	Preserved	AMH, Giamalakis Collection (Mus. Inv. No. 641)	?

GR-23	v77.Stav	Stavros	Cave sanctuary(?)	Group I(?)/*Gruppe* C	No. 23 (29)	No. 262	?.4	N/A	Ithaka, Ioanian Islands	Fragmented	Stavros Mus. or AM	?
GR-24	v78.Samo	Samos	?	?	No. 24	N/A	C.V.3	N/A	Samos, North Aegean	Fragmented	?	G(?)
GR-25	v79.Aplo	Aplomata	ChT A	Group II Early/ *Gruppe* C, *Variante* 2	No. 25	No. 243	A.I.4	No. 19	Naxos, Cyclades (South Aegean)	Preserved	MN (Mus. Inv. No. 10207)	LH IIIC Middle-Late
GR-26	v80.Lang	Langada	T. 21	Group I/ *Gruppe* A, *Variante* 2	No. 26 (15)	No. 228	A.I.5	No. 21	Kos, Dodecanese (South Aegean)	Preserved	Arch. Mus. Rhodes	LH IIIB Late
GR-27	v81.Olym	Olympia	Sanctuary	Group IV	N/A	N/A	C.VI.1	N/A	Elis, Western Greece	Fragmented	(Mus. Inv. No. 6255)	?
GR-28	v82.Tser	Tseravina	T. or cist grave(?)	?	N/A	No. 264	C.V.2	N/A	Epirus	Fragmented	Lost	?
GR-29	v83.Site	Siteia	?	Group III/*Gruppe* C, *Variante* 1	N/A	No. 240		N/A	Siteia, Lasithi (Crete)	Preserved	Ash. (Mus. Inv. No. AN1966. 543)	?

GR-30	v84.Orch	Orchomenos	?	?	N/A	No. 263	C.IIb.4	N/A	Euboea, Central Greece	Fragmented	Arch.Mus. of Chaeronea	LH IIIC
GR-31	v85.Agal	Agalianon	?	Group IV(?)	N/A	No. 259	N/A	N/A	Aetolia-Acarnania, Western Greece	Preserved	Mus. Larissa	?
GR-32	v86.Kang	Kangadhi	ChT	?	N/A	N/A	?.6	N/A	Achaea, Western Greece	Fragmented	PM (Mus. Inv. No. 292), on display	LH IIIC(?)
GR-33	v87.Unk	Unknown	?	Group II Early-III /*Gruppe* B	N/A	No. 239	A.I.17	N/A	Western Macedonia	Preserved	Mus. Thessaloniki (Mus. Inv. No. 7190)	?
GR-34	v88.Unk	Unknown	?	?/*Gruppe* C, *Variante* 4	N/A	No. 256	C.IIb.9	N/A	Northern Greece(?)	Preserved	Canellopoulos Mus. (Mus. Inv. No. X749)	?
GR-35	v89.Kami	Kamini	ChT A, lower stratrum	Group III/ *Gruppe* C, *Variante* 2	N/A	No. 244	N/A	No. 20	Naxos, Cyclades (South Aegean)	Preserved	MN (Mus. Inv. No. 9440)	LH IIIC Middle-Late
GR-36	v90.Knos	Knossos	T. 201 (cremation)	Group II-III/*Gruppe* C, *Variante* 4	N/A	No. 255	N/A	No. 25	Heraklion, Crete	Fragmented	AMH	SM
GR-37	v91.HPant(Pate)	Hagios Panteleimon (Pateli)	?	?/*Gruppe* C	No. 33	No. 268A	N/A	N/A	Florina, Western Macedonia	Fragmented	Instanbul Mus.	?

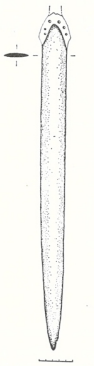
GR-38	v92.Verg	Vergina	Burial mound C, T. Δ	?/*Gruppe* A, *Variante* 4	N/A	No. 232	N/A	N/A	Imathia, Central Macedonia	Preserved	Mus. Veria	LH IIIC/IA(?)
GR-39	v93.Itha	Ithaka	Cave sanctuary(?)	Group I/*Gruppe* A, *Variante* 2	N/A	No. 228A	N/A	N/A	Ithaka, Ioanian Islands	Lost	Herzoglich es Mus.(?) Plaster copy in RGZM (Mus. Inv. No. 13355)	?
GR-40	v94.L-Spal	Lousika-Spaliareika	ChT 2, Pit 2 (NE)	Group III/*Gruppe* C, *Variante* 3	N/A	N/A	N/A	No. 13	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 4650), on display	LH IIIC Middle-Advanced/ Late
GR-41	v95.L-Spal	Lousika-Spaliareika	ChT 2, inhumation at the floor (W)	Group I - II/*Gruppen* A-B	N/A	N/A	N/A	No. 14	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 4645), on display	LH IIIC Late
GR-42	v96.AKlau	Achaean Klauss	ChT Θ, primary burial A	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	No. 16	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 4977), on display	LH IIIC Middle
GR-43	v97.K-Drim	Krini-Drimaleïka	ChT 3, burial D	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. 3327 α), on display	LH IIIC Middle-Advanced
GR-44	v98.Port	Portes	ChT T3	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Achaea, Western Greece	Preserved	PM, on display	LH IIIC Middle-Advanced

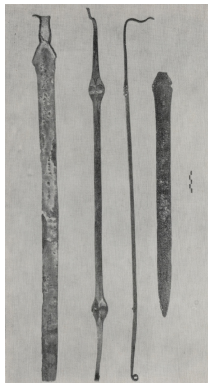
GR-45	v99.Liat	Liatovouni	T. 59 (cist grave in mound)	Group III/ *Gruppe* C, *Variante* 1	N/A	N/A	N/A	N/A	Epirus	Preserved	AMI (Mus. Inv. No. 8183)	LH IIIC
GR-46	v100.Alph	Alpheiousa	?	Group III/*Gruppe* C, *Variante* 2?	N/A	N/A	N/A	N/A	Elis, Western Greece	Preserved	Arch. Mus. of Pirgos	?
GR-47	v101.Unk	Unknown	?	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	?	Preserved	AM (Mus. Inv. No. 9885)	?
GR-48	v102.Unk	Unknown	?	?	N/A	N/A	N/A	N/A	?	Preserved	AM (Mus. Inv. No. 13905)	?
GR-49	v103.AGeor	Agios Georgios	T.	?	N/A	N/A	N/A	N/A	Euboea, Central Greece	Fragmented	AM (Mus. Inv. No. 15176/16591)	?
GR-50	v104.K-AKons	Krini-Agios Konstantinos	Spot A, ChT 2, layer β΄	Group I/*Gruppe* A, *Variante* 2	N/A	N/A	N/A	N/A	Achaea, Western Greece	Preserved	PM (Mus. Inv. No. MH654α/M5432)	LH IIIB/LH IIIC Early
GR-51	v105.Palai	Palaiokastro	ChT	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Arcadia, Peloponnese	Preserved	Arch. Mus. of Tripolis (Mus. Inv. No. 5529, on display, upper floor)	?
GR-52	v106.Niko	Nikoleika	ChT 4, Pit 7	?	N/A	N/A	N/A	N/A	Achaea, Western Greece	Preserved	AM (Mus. Inv. No. 842)	LH IIIC Middle

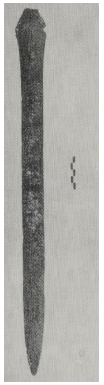
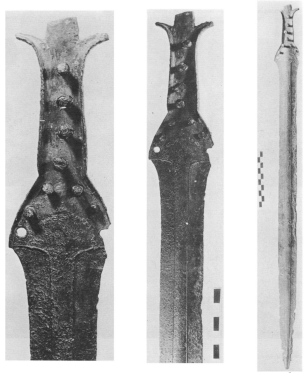
GR-53	v107.Goum	Goumero	?	Group I/*Gruppe* A, *Variante* 2	N/A		N/A	N/A	Elis, Western Greece	Preserved	Arch. Mus. of Pyrgos (M2271)	?
GR-54	v108.Kouv	Kouvaras	Cist tomb 1	Group III/*Gruppe* C, *Variante* 3	N/A	N/A	N/A	N/A	Aetolia-Acarnania, Western Greece	Preserved	Arch. Mus. of Agrinio (Mus. Inv. No. 1548)	SM
GR-55	v109.Mage	Mageiras	ChT 6, inhumation in angle NW	Group III/ *Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Elis, Western Greece	Preserved	Arch. Mus. of Pyrgos (Mus. Inv. No. 3461)	LH IIIC Late
GR-56	v110.Mage	Mageiras	ChT 7, third burial (W)	Group III/ *Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Elis, Western Greece	Preserved	Arch. Mus. of Pyrgos (Mus. Inv. No. 3491)	LH IIIC Late
GR-57	v111.Mage	Mageiras	ChT	?	N/A	N/A	N/A	N/A	Elis, Western Greece	?	?	?
GR-58	v112.Mage	Mageiras	ChT	?	N/A	N/A	N/A	N/A	Elis, Western Greece	?	?	?
GR-59	v113.Kast	Kastrokephala	Room 1, Building complex III	Group I/*Gruppe* A	N/A	N/A	N/A	N/A	Heraklion, Crete	Preserved	AMH (Mus. Inv. No. X5958)	Early LM IIIC
GR-60	v114.Mega	Meganissi	Tumulus 6	Group III/*Gruppe* B -C	N/A	N/A	N/A	N/A	Meganissi, Ioanian Islands	Preserved	Arch.Mus. of Lefkada (Mus. Inv. No. 4606)	LH IIIC Late

GR-61	v115.Voud	Voudeni	T. 67	Group I-II/*Gruppen* A-B	N/A	N/A	N/A	N/A	Achaea, Western Greece	?	PM, on display	LH IIIC
GR-62	v116.Voud	Voudeni	T. 69	Group III/*Gruppe* C, *Variante* 2	N/A	N/A	N/A	N/A	Achaea, Western Greece	?	PM, on display	LH IIIC
GR-63	v117.Voud	Voudeni	T. 67, 69 or 75(?)	Group II Developed/ *Gruppe* C, *Variante* 3	N/A	N/A	N/A	N/A	Achaea, Western Greece	?	PM, on display(?)	LH IIIC
GR-64	v118.Voud	Voudeni	T. 67, 69 or 75(?)	?	N/A	N/A	N/A	N/A	Achaea, Western Greece	?	PM, on display(?)	?
GR-65	v119.E-Lous	Elaiochorion-Lousika	T.(?)	?	N/A	N/A	N/A	N/A	Achaea, Western Greece	?	?	?
GR-66	v120.Palai	Palaiokastro	T.93(?)	Group III/ *Gruppe* C, *Variante* 1 or 2	N/A	N/A	N/A	N/A	Arcadia, Peloponnese	?	Arch. Mus. of Tripolis (Mus. Inv. No. 5531, on display, lower floor)	?
GR-67	v121.Unk	Unknown	?	Group II Developed/ *Gruppe* C, *Variante* 3	N/A	N/A	N/A	N/A	?		Canellopoulos Mus. (Mus. Inv. No. X788)	?

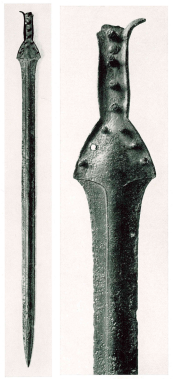
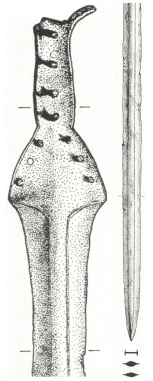
Distribution of Naue Type II sword findings in Greece.

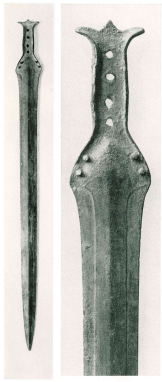
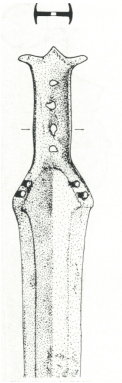
TEXT LABEL	MATERIAL ASSOCIATION	INTRINSICAL PROPERTIES	CHEMICAL COMPOSITION	PROVENANCE ANALYSIS	USE WEAR	PHOTO	DRAWING	REFERENCE
v55.Myce	N/A	L. 60,2 cm 8 rivets (4 × 4) Midrib flanked by steps Elliptical cross-section	(AAS) Cu 89,4% Sn 8,28% Zn 0,07% Pb 0,54 As 0,13% Sb 1,22% Fe 0,1% Ni 0,1% Co 0,06% Ag 0,1% Bi - Au - (ICP-AES) Bi 0,03% Au -	N/A	N/A			Schliemann, 1878: 144: no. 221; Naue, 1903: pl. 6, 3; Montelius, 1924: pl. 14, 1; Catling, 1956: 109; Cowen, 1961: 209, fig. 2, 6; Foltiny, 1964: pl. 76, 28; Bouzek, 1985: 122; pl. 8, 2; Koui *et al.* 2006: 54; 56, figs. 6-7; 58, tab. 1; 59, tab. 3
v56.Myce	NE of the Lion Gate, ruins of Mycenean houses, hoard with 4 double axes, swords (Sandars' type F and G), razor, wedge-shaped tools, knives, arrowheads, tweezers, horse's bridle and gold wire	Pres. L. 50,6 cm, (probably 60 cm originally, see Τσούντας, 1891: 25, n. 1) W max 4,3 cm W 4,8 (shoulders) W 0,4 cm (edges) No blood channels 6 rivets (6 × [?]) W. rivets (pres.) 1,6 cm W. 0,4 cm (rivet hole); 0,6 cm distant from each other Lenticular cross-section	(AAS) Cu 87,16% Sn 11,6% Zn 0,05% Pb 0,53% As 0,06% Sb 0,27% Fe 0,2% Ni 0,04% Co 0,04% Ag 0,1% Bi - Au – (ICP-AES) Bi 0,012% Au -	Copper ore deposits in Trentino Alto Adige/Südtirol regions	Damage and repairs at the blade's edges			Τσούντας, 1891: 25; Montelius, 1924: pl. 14, 5; Catling, 1956: 109-111; Σπυρόπουλος, 1972: 16-17; 17, fig. 17; 79-82; 194; 196; pl. 7, δ; Jung; Mehofer, 2013: 176, fig. 3, B-C; 177, fig. 4; 177-178; 179, fig. 5; 180, fig. 6; 2017: 391, fig. 2; 392-393; Koui *et al.* 2006: 58, tab. 1;

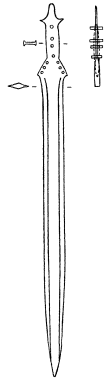
								59, tab. 3; Jung; Μόσχος; Mehofer, 2008: 94; 106, fig. 9; Jung, 2018: 282, fig. 19.4, 1
v57.Myce	N/A	Pres L 8,5 cm W 5 cm (handguard) Broad midrib ? rivets (6 × ?) No blood channels Elliptical cross-section	(AAS) Cu 92,68% Sn 5,94% Zn 0,01% Pb 0,29% As 0,56% Sb 0,16% Fe 0,2% Ni 0,08% Co 0,04% Ag 0,02% Bi - Au – (ICP-AES) Bi - Au -	N/A	N/A		N/A	Catling, 1956: 111; 1961: 117; Bouzek, 1985: 128; Koui *et al.* 2006: 52, fig. 2, no. 2740; 56, fig. 6-7; 58, tab. 1; 59, tab. 3
v58.Tiry	A hoard of metals in the NE from the acropolis, a collection of golden objects, bronze vessels, implements as well as scraps of metal and jewelry	L 81,3 cm W 6,7 cm (handguard) Unfinished (no rivets) but with flanges Spur(?) Pronounced midrib Elliptical cross-section	(AAS) Cu 86,76% Sn 12,88% Zn 0,02% Pb 0,02% As 0,06% Sb 0,05% Fe 0,1% Ni 0,04% Co 0,04% Ag 0,04% Bi - Au - (ICP-AES) Bi -	N/A	N/A		N/A	Karo, 1930: 135; pl. 37; Catling, 1956: 111; 1961: 117; Σπυρόπουλος, 1972: 187-188; 189-193; pl. 32, α; Bouzek, 1985: 125; Koui *et al.* 2006: 56, fig. 5; 58, tab. 1; 59, tab. 3

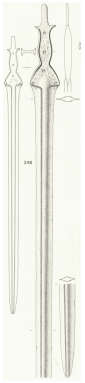
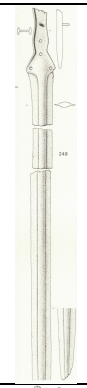
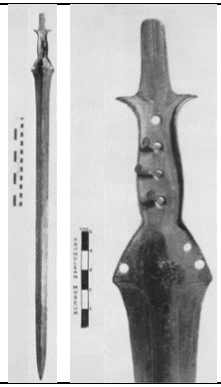
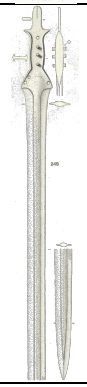
			Au -					
v59.Tiry	A hoard of metals in the NE from the acropolis, a collection of golden objects, bronze vessels, implements as well as scraps of metal and jewelry	Pres L 55 cm W 5,5 cm W 6,7 cm (handguard) 4 × [?] No blood channels Lenticular cross-section	(AAS) Cu 91,68% Sn 8,3% Zn 0,01% Pb 0,18% As 0,08% Sb 0,06% Fe 0,1% Ni 0,05% Co 0,03% Ag 0,01% Bi - Au - (ICP-AES) Bi - Au -	N/A	N/A		N/A	Karo, 1930: 135; pl. 37; Catling, 1956: 110; 1961: 117; Σπυρόπουλος, 1972: 187-188; 189-193; pl. 32, α; Bouzek, 1985: 128; Koui *et al.* 2006: 55; 58, tab. 1; 59, tab. 3
v60.AKlau	Spearhead, blade fragment	L 65,5 cm W 2,2 cm (handgrip) W max 4,5 cm (handguard) W 3 cm (blade) Th 0,8 cm (blade) L 1 cm (spur) Rivets 4 × 6 H rivets 2,1-2-3; 1.4 (one missing); 1,2 cm (pommel to handguard) Spur and blade tip broken Pommel ears Medial line flanked by fine ridges	(AAS) Cu 86,79% Sn 10,91% Zn 0,77% Pb 0,68% As 0,64% Sb 0,12% Fe 0,1% Ni 0,06% Co 0,04% Ag 0,02% Bi - Au - (ICP-AES) Bi - Au -	N/A	N/A			Κυπαρίσσης, 1938: 118-119; Catling, 1956: 111-112; 1961: 117; Papadopoulos, 1978-1979: 166; 228, no. 218; Papadopoulos; Kontorli-Papadopoulou, 1984: 221-224; 222, fig. 2; pl. 29, b-d; Bouzek, 1985: 125; Koui *et al.* 2006: 54; 58,

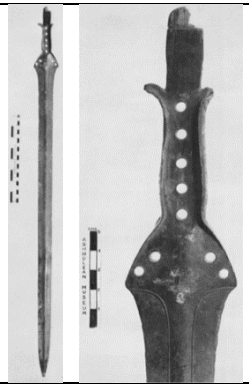
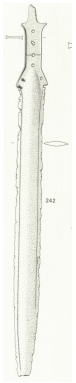
		Parallel-sided blades Faux-midrib						tab. 1; 59, tab. 3; Giannopoulos, 2008: 219-220; 220, fig. 33; Steinmann, 2012: cat. no. 194

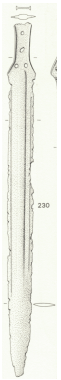
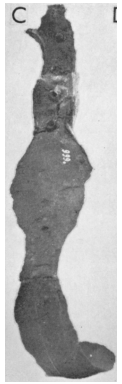
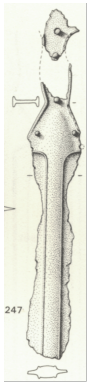
v61.K-Spen	Bronze greaves, bronze-sheet and studs, bronze spearhead, vases (stirrup jars and pyxdes, etc) and sherds	L. 81,4 cm Rivets 6 × 4 Spur(?) Fine ridges Faux-midrib	N/A	N/A	N/A			Yalouris, 1960: 42-43; pl. 27, 1-2; Snodgrass, 1967: pl. 4; 1971: 306, fig. 10.2; Papadopoulos, 1978-1979: 228, no. 222; 296, fig. 320, a-b; 331, fig. 355, c-d; Bouzek, 1985: 124-125; 127, fig. 61, no. 5; pl. 9, no. 3; Papadopoulos, 1999: 268; pl. 56d; Papadopoulos; Kontorli-Papadopoulou, 2001: 133, fig. 23; Deger-Jalkotzy, 2006: 160; 2008: pl. 15.1; Giannopoulos, 2008: 213-217; 217, fig. 31; Steinmann, 2012: cat. no. 197

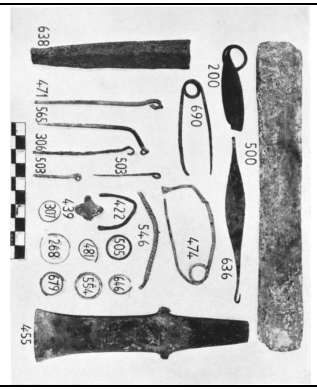
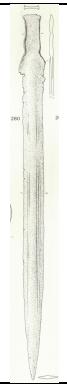
v62.K-Spen	Offensive bronze weapons (spearhead and butt-spike, knife) razor and tweezers, board's tusks plates, vases	L 67,4 cm Rivets 4 × 4 Medial line flanked by steps Elliptical cross-section	N/A	N/A	N/A			Yalouris, 1960: 42; 44-45; pl. 31, 1-2; Snodgrass, 1967: pl. 4; 1971 2000: 306, fig. 10.2; Papadopoulos, 1978-1979: 228, no. 223; 296, fig. 320, a-b; 332, fig. 356, a-b; Bouzek, 1985: 125; 127, fig. 61, n. 5; pl. 9, no. 1; Deger-Jalkotzy, 2006: 160-161; 2008: pl. 15.1; Jung; Μόσχος; Mehofer, 2008: 91-92; 105, fig. 7 (right); Giannopoulos, 2008: 218-219; 218, fig. 32; Steinmann, 2012: cat. no. 198

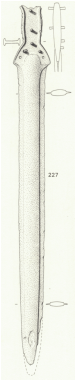
v63.Palai	Biggest ChT from the cemetery. Inside pit, to the right, on the floor, LH III C vases, potsherds, slabs. Underneath slabs and probably associated with burials, two bronze socket spearheads, two knives, chisel or wedge and bronze pin(?)	L. 63 cm 10 rivets (6 × 4) Diam 0,38 [0,375] cm (rivets in handgrip) Parallel-sided edges “Blood channels” tapering towards the point and flanking wide, low midrib Straight ears Spur tang (mended) (1:2) Nipped in handgrip at the junction with handguard Notches at the beginning of blade sharpened by whetstone Slight swelling outline (handgrip) Flatten lozenge (elliptical) cross-section (12 cm from the point smooth curve)	(AAS) Cu 83,91% Sn 14,67 Pb 0,50% As 0,92% Sb 0,04% Fe 0,04% Ni 0,04% Co 0,04% Zn 0,01% Bi – Ag 0,01% Au 0.01%	N/A	N/A			Daux, 1958: 717; Catling, 1961: 117; Demakopoulou, 1969: 226, figs. 1-2; 227: pl. 1; Bouzek, 1985: 125; Σπυρόπουλος, 1997: 29; Demakopoulou; Crouwel, 1998: 274; 275, fig. 6; pl. 52a; Mangou; Ioannou, 1999: 92, tab. 2; Papadopoulos; Kontorli-Papadopoulou, 2001: 132; 133, fig. 20; Cultraro, 2005: 18-20; 31, fig. 3a; Deger-Jalkotzy, 2006: 161; Καγιάφα, 2006: 145, n. 46; Σαλαβούρα, 2015: 493-495; 494, figs. 1-2; Steinmann, 2012: cat. no. 211

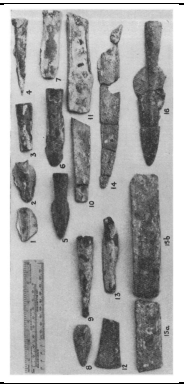
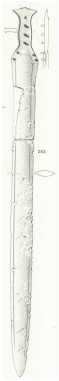
v64.Sten(SOdos)	?	L 77 cm W 5 cm 5 Rivets (2 × 3) Fine ridges Faux-midrib	N/A	N/A	N/A	N/A		Montelius, 1924: pl. 14, 4; Catling, 1956: 112-113; 1961: 117; Bouzek, 1985: 125; Kilian-Dirlmeier, 1993: 97, no. 248; pl. 38, 248; Papazoglou-Manioudaki, 1994: 179
v65.Vran	N/A	Pres. L.: 66,5 cm W. 4,2 cm (handguard) Rivets 2 × 3 Sinuous handgrip Fine ridges Faux-midrib	N/A	N/A	N/A	N/A		Catling, 1956: 113; Kilian-Dirlmeier, 1993: 97, no. 249; pl. 38, 249
v66.Grad	?	L. 84,6 cm Medial line flanked by fine and parallel ridges Rivets 3× 4 Faux-midrib	N/A	N/A	N/A			Catling, 1961: 117; pl. 26, c; pl. 27; Bouzek, 1985: 125; 127, fig. 63, n. 1-2; Kilian-Dirlmeier, 1993: 97, no. 245; pl. 37, 245

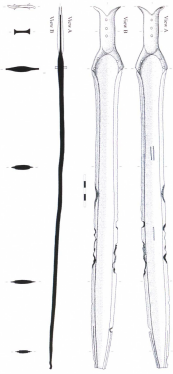
v67.Grad	?	L. 86,6 cm Rivets 4 × 5 Medial line flanked by fine and parallel ridges Faux-midrib	N/A	N/A	N/A			Catling, 1961: 117; pl. 26, c; pl. 27; Kilian-Dirlmeier, 1993: 97, no. 246; pl. 37, 246
v68.Moul	Tomb with 2 bronze spearheads and 2 ivory plates. 3(?) bronze discs (on the chest), goldring and stirup jar. Sword in the left side of the deceased	Pres, L. 51,4 (Kilian-Dirlmeier) [55 cm (Catling) L. 49 cm (blade) L 9 cm (hilt) W 4 cm (blade max) W 5 cm (handguard) Rivets 4 × 4 Spur Blood channels Elliptical cross-section Observation: "[…] *δι' ἀμβλειῶν γωνιῶν μεταβαίνει ἠρέμα πρός τὴν λεπίδα*[…]" (Ξανθουδίδης, 1904: 48)	N/A	N/A	N/A			Ξανθουδίδης, 1904: 45-46, fig. 11; Montelius, 1924: pl. 14, 3; Catling, 1956: 113; 1961: 117; Bouzek, 1985: 125; 127, fig. 61, no. 3; Kilian-Dirlmeier, 1993: 97; pl. 36, no. 242; Deger-Jalkotzy, 2006: 164; Steinmann, 2012: cat. no. 315; Basakos, 2016: 24-25

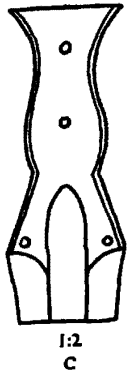
v69.Moul	Tomb with 2 bronze spearheads and 2 ivory plates. Gold band (mask?) and two stirrup jars in the close to the deceased head, sword found in the left side of the deceased	Pres. L.: 41,2 cm (?) [46 (Ξανθουδίδης); 45 cm (Catling)] W. 3,5 cm (handguard) L 9 cm (hilt) W max 4 cm (blade Rivets 2 × 2 Blood channels Elliptical cross-section	N/A	N/A	N/A			Ξανθουδίδης, 1904: 45-46, fig. 11; 48; Montelius, 1924: pl. 14, 2; Catling, 1956: 113; 1961: 117; Kilian-Dirlmeier, 1993: 95, no. 230; pl. 34, 230; Steinmann, 2012: cat. no. 315; Basakos, 2016: 24-25
v70.Moul	Clay vessels, 2 Mycenaean bronze swords, 2 spearheads, fibulae, pin, bronze vessels and other personal implements	Pres L 27,2 cm Rivets 4 × > 3 Fine ridges Faux-midrib	N/A	N/A	N/A			Ξανθουδίδης, 1904: 30-31; Catling, 1956: 113-114; pl. 9, c; 1961: 117; Bouzek, 1985: 125; Kilian-Dirlmeier, 1993: 97, no. 247; pl. 37, 247; Deger-Jalkotzy, 2006: 163-164; Steinmann, 2012: cat. no. 314; Basakos, 2016: 24-25
v71.Moul	Clay vessels, 2 Mycenaean bronze swords, 2 spearheads, fibulae, pin, bronze vessels	Pres. L. 13, 5 cm W. 0,3,5 cm Cross section as the previous	N/A	N/A	N/A	N/A	N/A	Catling, 1956: 114; 1961: 117; Bouzek, 1985: 125

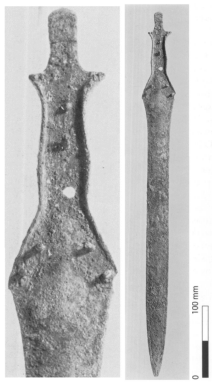
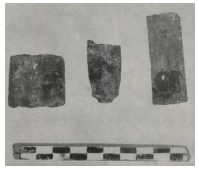
	and other personal implements							
v72.Karp	?	Pres. L. 22,3 cm	N/A	N/A	N/A		N/A	Pendlebury *et al.*, 1937-1938: 117; pl. 29, no. 500; Catling, 1961: 117; Bouzek, 1985: 128; Kilian-Dirlmeier, 1993: 99
v73.Site	?	Pres L 56 cm Hilt incomplete Ridges flanking medial line Elliptical cross-section	N/A	N/A	N/A	N/A		Catling, 1961: 117; Bouzek, 1985: 127; Kilian-Dirlmeier, 1993: 99, no. 260; pl. 39, 260
v74.Vrok	N/A	Pres. L. 21,5 cm Swelling handgrip Pommel lost 1 + 2x 1 rivets	N/A	N/A	N/A	N/A	N/A	Montelius, 1924: pl. 14, 8; Catling, 1961: 117; Bouzek, 1985: 126

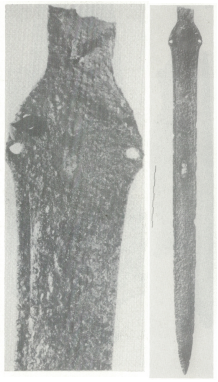
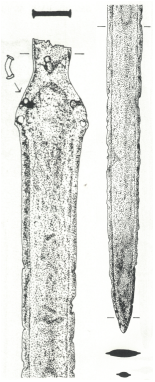
v75.Myrs	Thirty vases, triton shells and weaponry	Pres. L. 50,5 cm 7 rivets (4 × 3) “Blood channels” (steps) Elliptical cross-section	N/A	N/A	N/A	N/A		Platon, 1959: 372; Catling, 1961: 117; Bouzek, 1985: 122; Kilian-Dirlmeier, 1993: 95, no. 227; pl. 34, 227; Deger-Jalkotzy, 165; 167, tab. 9.2; Basakos, 2016: 24; Steinmann, 2012: cat. no. 316
v76.Mplai	?	Pres. L. 53,5 cm Rivets 4 × 3 Spur “Blood channels” (steps) “Leaf-shaped” blade Elliptical cross-section	N/A	N/A	N/A	N/A		Catling, 1961: 117; Bouzek, 1985: 125; Kilian-Dirlmeier, 1993: 97, no. 241, pl. 36, 241; Basakos, 2016: 25

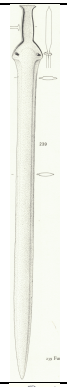
v77.Stav	N/A	L. 25 (17+8) cm Blood channels	N/A	N/A	N/A			Benton, 1934-1935: 71-72; 70, fig. 20, 15a-b; 72, fig. 21, a; Catling, 1956: 118; Catling, 1961: 117; Bouzek, 1985: 128; Kilian-Dirlmeier, 1993: 99, no. 262
v78.Samo	N/A	Pres L 38 cm Two ridges on each side	N/A	N/A	N/A	N/A	N/A	Bouzek, 1985: 127; Catling, 1961: 117
v79.Aplo	Not associated to a burial	Pres L 65,4 (Kilian-Dirmeier) [65,5 (Βλαχόπουλος); 72 cm (Καρδαρά)] cm W. 4,7 (blade) Rivets 4 × 4 Blood channels Elliptical cross-section	N/A	N/A	N/A			Catling, 1961: 117; Κοντολέω, 1965: 228, fig. 173; 229; Καρδαρά, 1977: 8; pl. 7, δ-ε; Bouzek, 1985: 122; Kilian-Dirlmeier, 1993: 97, no. 243, pl. 36, 243; Deger-Jalkotzy, 2006: 162; Βλαχόπουλος, 1999: 308; 309, fig. 16, α; 2006: 99; 259; 451; 477, MN 10207; dwg. 37, α; pl. 115 no.

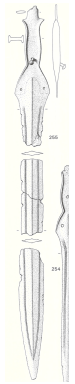
								10207; 2019: 166-167, cat. no 81; 2012: 60; 261; 263; Steinmann, 2012: cat. no. 369
v80.Lang	Spearhead, bowls, jar, stirrup jar, cup, kylix Single burial (W-E) with spearhead over the right shoulder and on the bench of the ChT's S facing the deceased, bent Naue II sword	L 59,5 cm L 10 cm of (handgrip) W. 5,2 cm (handguard) Ears opening 4,1 cm L 6 cm (handguard) W max 2,2 cm (handguard), at the half swell up to 2,4 cm L max 1 cm (flanges) 7 rivets (4 × 3) L 2,4 cm (rivets of the handgrip) L 1,9 and 1,3 cm (rivets of handguard, superior and inferior, respectively) Slightly curved shoulders W 4,6 cm (base of handguard) 3,5 cm (blade) 3,9 cm (around 1/3) Convergence to the point (last 1/3) Blood channels 0,6 cm in both blade's edges	N/A	N/A	Bent and blade's tip point curled up and edges hammered			Catling, 1961: 117; Morricone, 1967: 24; 26; 136-138; 137, fig. 122; 139, fig. 123; 140, fig. 124; Bouzek, 1985: 122; Kilian-Dirlmeier, 1993: 95, no. 228; pl. 34, 228; Vitale, 2009: 1236; 1237, fig. 2; Vitale, 2016: 272-273; 273, fig. 26, a; 275, tab. 21; Vitale; Blackwell; McNamee, 2017: 244; 245; pl. 79, c; pl. 80, tab. 3; Steinmann, 2012: cat. no. 358

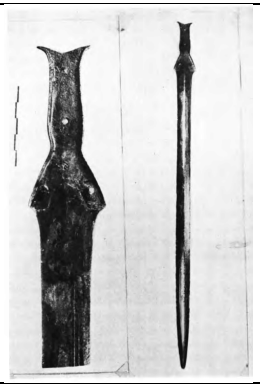
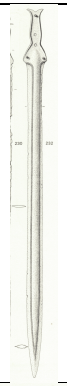
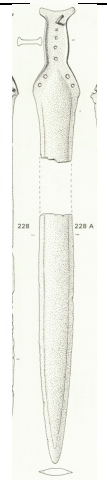
		Leaf-shaped midrib Almost lenticular cross section						
v81.Olym	N/A	Pres. L. 60 cm [0,5855 cm] W. 1-2 (blade) Mid-rib (H. 1 mm) 3 rivets	N/A	N/A	N/A	N/A		Furtwängler, 1890: 72, no. 529, pl. 26; Montelius, 1924: pl. 14, 9; Bouzek, 1985: 127; Sherratt, 2000: 97
v82.Tser	N/A	L 59 cm Haft is 7,2 cm in length (from the line of the shoulder-tips) Swelling in the handgrip The shoulders slope straight from the haft to the blade, which is 3-6 cm wide where it joins the shoulders. Parallel-sided edges Midrib wide and flat 4 rivets 2 × 2	N/A	N/A	N/A			Hammond, 1967: 319; 323-324; fig. 19, c; pl. 21, c; Catling, 1968: 99; Bouzek, 1985: 127; Kilian-Dirlmeier, 1993: 99

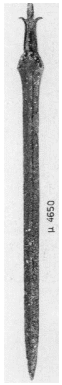
v83.Site	N/A	L 51,2 cm W 4,8 cm (handgrip) W blade ranges from 3 and 3,15 Th 0,6 cm L spur: 2,9 cm Rivets (pommel to handguard) 2,9; 2; - cm; 1,7 cm (two); 1,3 cm (two) Rivets 4 × 3 Spur (off axis) Top straight ears Steps “Leaf-shaped” blade Elliptical cross-section	N/A	N/A	N/A			Catling, 1968: 90; 93, fig. 2, n. 2; pl. 22, c-d; Bouzek, 1985: 125; Kilian-Dirlmeier, 1993: 97, no. 240; pl. 36, 240; Basakos, 2016: 25
v84.Orch	Bronze founder’s hoard with around 102 pieces and fragments of many tools (axes, chisels, sickles and knives) and weapons (daggers, spearheads and swords), objects of personal use (tweezers, fibulae and bronze vessels) and many other	L. 66,5 cm [Catling]? Medial line flanked by fine ridges and flutes	N/A	N/A	N/A		N/A	Σπυρόπουλος, 1970: 264; 1972: 221; pl. 36, β; Kilian-Dirlmeier, 1993: 99

v85.Agal	N/A	N/A	N/A	N/A	N/A		N/A	Γαλλής, 1977: 335; pl. 293, δ; Catling, 1979a: 24; Kilian-Dirlmeier, 1993: 99
v86.Kang	N/A	Pres. L. 52,8 cm W. 4,7 cm (handguard) [5]7(?) rivets (4 × [3]3(?)) “Blood channels” (Steps) Ears? Spurs? Elliptical cross-section	N/A	N/A	N/A			Papadopoulos, 1978-1979: 166; 228, no. 221; 296, fig. 320, c-d; 332, fig. 356, c-d; 1999: 272; Bouzek, 1985: 128; Sherratt, 2000: 96; Deger-Jalkotzy, 2006: 165, 166, tab. 9.1; Steinmann, 2012: cat. no. 200

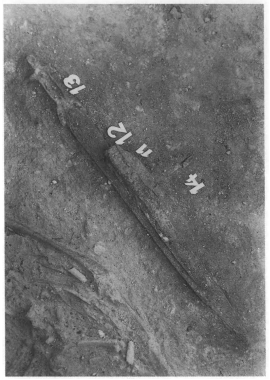
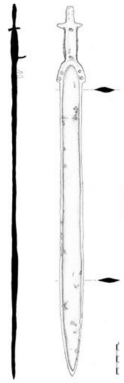
v87.Unk	N/A	L. 67,9 cm Rivets 2 × 0 Steps Elliptical cross-section	N/A	N/A	N/A	N/A		Bouzek, 1985: 123; Kilian-Dirlmeier, 1993: 96, no. 239; pl. 36, 239
v88.Unk	N/A	L 64,3 cm Rhombic cross-section	N/A	N/A	N/A	N/A		Bouzek, 1985: 126; Kilian-Dirlmeier, 1993: 99, no. 256; pl. 39, 256
v89.Kami	7 bronze plates and horsehair brush, lower stratum, W-E direction, 0,38 m bellow the stone circle's corner Observation: "[…] ἰδιότητα καὶ κοινωνικὴ τάξη τοῦ ιπποτροφοῦντος πολεμιστοῦ[…]"	L 81 cm (Ζαφειρόπουλος; Βλαχόπουλος) [80,6 cm (Kilian-Dirlmeier)] W 4,1 (blade) Th max 1,3 (blade) Th max 2,6 (handgrip) Rivets 4 × 4 Blood channels Elliptical cross-section	N/A	N/A	N/A			Ζαφειρόπουλος, 1966: 330; 331, fig. 1; Kilian-Dirlmeier, 1993: 97, no. 244; pl. 37, 244; Deger-Jalkotzy, 2006: 162; Βλαχόπουλος, 1999: 308; 309, fig. 16, β; 2006: 99; 259; 352, fig. 98; 357-

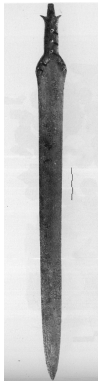
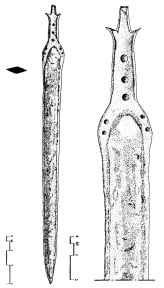
	Ζαφειρόπουλος, 1966: 330)							358; 357, fig. 103; 369, MN 9440; 485, MN 9440; dwg. 37, β; pl. 24, no. 9440; Steinmann, 2012: cat. no. 369
v90.Knos	E. chamber in a pit cave with the remains of two individuals. Cypriot four-sided bronze stand, shield boss, strip and rivet. Arrowheads, spearhead, iron pins(?), knife, gold ring, ivory handle, fragments of boar's tusk and ivory (comb?)	L *c*. 54,5 cm L 9,3 (handgrip) L 2.1 (rivet) Th midrib 0,7 cm (mid-blade) W 5,4 cm (handguard) A pair of relief ridges on both sides ("These ridges come to a point 3.0 from the existing tip") Sinuous profile of shoulders (Codlstream; Catling, 1996: 195) Parallel sides Ellipsoidal cross-section Wt 472 g	N/A	N/A	N/A			Catling, 1979b: 46; Kilian-Dirlmeier, 1993: 98, no. 255; pl. 39, 255; Coldstream; Catling, 1996: 196; 194-195, no. 7; fig. 163; pl. 35, d; f; 227, f7
v91.HPant(Pate)	N/A	L 68 cm W 4,7 (handguard) W max 3,6 (blade) Rivets 2 × 3 2 pair of parallel ridges in both sides of midrib	N/A	N/A	N/A	N/A	N/A	Catling, 1961: 118; Kilian-Dirlmeier, 1993: 99

v92.Verg	Bronze ring, kantharos	L 72 cm 5 rivets (2 × 3) Fish-tail hilt Fine ridges Faux-midrib	N/A	N/A	N/A			Πέτσας, 1961-1962: 242; pl. 115, δ; 146, α; Catling, 1968: 101; Bouzek, 1985: 123; Kilian-Dirlmeier, 1993: 96, no. 232; pl. 34, 232
v93.Itha	Probably cave find	L. 18,2 + 29,3 cm [≈ 53 cm] Blood channels Elliptical cross-section	N/A	N/A	N/A	N/A		Kilian-Dirlmeier, 1993: 173-174, no. 228A; pl. 34, 228A

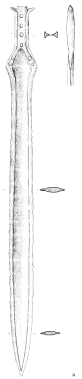
v94.L-Spal	Shield boss, bronze spearhead, double-edged knife, spear-butt spike and probably organic material of the sword's plates	L. 75 cm (Papazoglou-Manioudaki) [74 cm (Πετρόπουλος) [73,7 cm (Giannopoulos)] cm W. 5 cm Rivets 4 × 6 Fine ridges Faux-midrib	N/A	N/A	N/A			Πετρόπουλος, 1990: 506, fig. 3; 507; 1995: 134; 134, fig. 4; 2000: 68; 69, fig. 2; 76; 90, fig. 41, no. 4650; Papazoglou-Manioudaki, 1994: 180; Papadopoulos, 1999: 271; Moschos, 2002: pl. 1, 4; Deger-Jalkotzy, 2006: 157-158; Giannopoulos, 2008: 171; pl. 6; pl. 34, no 54; 50, no. 54; 78, Sp.G2-54; 2022: 152-160; 153, fig. 3; Κολώνας, 2008: 28; 28, fig. 36 (top); Steinmann, 2012: cat. no. 206

v95.L-Spal	Two bronze spearheads and double-edged knives, shield boss, and vases	L 61,5 cm W 5 cm Spur(?) 8 rivets (4 × 4) D. 1 cm (nails) 2 steps close to the tip Elliptical cross-section	N/A	Italian provenance	N/A			Πετρόπουλος, 1990: 506, fig. 3; 507; 531, fig. 12; 1995: 134; 134, fig. 4; 2000: 69, fig. 2; 71; 83, fig. 7; 9; 76; 90, fig. 41, no. 4645; Papazoglou-Manioudaki, 1994: 180; Papadopoulos, 1999: 271; Moschos, 2002: pl. 1, 4; Deger-Jalkotzy, 2006: 157-158; Giannopoulos, 2008: 169-170; pl. 6; pl. 32, no. 48; 48, no. 48; 78, Sp.G2-48; 2022: 152-160; 153, fig. 3; Κολώνας, 2008: 28; 28, fig. 36 (bottom); Steinmann, 2012: cat. no. 206

v96.AKlau	Primary burial, tall (1,77 cm) male, quite muscular, supine and crouched position, orientation N-S, facing and knees toward female burial B, alongside the E wall of ChT. On the chest miniature stirrup jars, 5 bone pins. Sword with knife, leaf-shaped spearhead, tweezer and deposited on the right side of the deceased's body with black earth layer, suggesting all these objects were wrapped up in textile or inside a leather-covered box. Behind the head, many vases. Associated bench along the E wall with sacrificed calf and pig and two four-handled	L 62,3 cm (Paschalidis) [61,5 (Papazoglou-Manioudaki)] (9 cm handrip) W 4,4 cm [5 cm (Papazoglou-Manioudaki)] (hilt) W 4,8 cm (shoulder) W 3,9 cm (blade) Th 0,4 cm (blade) Spur Horizontal ears Slightly oval handgrip and curved shoulders 6 rivets 4 × 2 L. 2 cm (rivet) Diam 0,4 cm (rivet) Blood channels Slightly swelling before the point Broad and low medial rib Elliptical cross-section	N/A	N/A	N/A			Παπαδόπουλος, 1994: 81 pl. 48, β; 1999: 270; pl. 58, a-b; Papazoglou-Manioudaki, 1994: 180; Papadopoulos; Kontorli-Papadopoulou, 2001: 133, fig. 22; Deger-Jalkotzy, 2006: 165; Paschalidis; McGeorge, 2009: 89-92; 90, fig. 9, a-b: 106-108; Paschalidis, 2018: 80; 79, fig. 145; 147; 80, fig. 148; 86; 84, fig. 158; 86; 251-252, Θ13. M 4977; 252, figs. 500a-b; 416-418; Steinmann, 2012: cat. no. 201

	vases later in date							
v97.K-Drim	Along dead's right hand, bronze oval spearhead, bonze spiral ornament, silver ring still on finger and ivory comb	L. 60 cm (Papazoglou-Manioudaki) [59,8 cm (Giannopoulos)] L 8,1 cm (hilt) W 2,2 cm (hilt) W 4,8 cm (handguard) W 4 cm (blade) Th. 1,9 cm (blade) L rivets 2 cm (handgrip) 1,5 cm (handguard D. rivets 0,5 cm Slight swelling of handgrip Long spur Curved pommel ears Rounded sloping shoulders 7 rivets (4 × 3) Broad, low midrib Blood channels 7 rivets (4 × 3) Elliptical cross-section	N/A	N/A	N/A			Papazoglou-Manioudaki, 1994: 173-174; 174, fig. 2; 175, fig. 3; 177-181; 178, fig. 4-5; 177; pl. 24, b-c; pl. 26, a-d; pl. 27, a; Papadopoulos, 1999: 271; pl. 58, c-d; Papadopoulos; Kontorli-Papadopoulou, 2001: 134, fig. 28; Moschos, 2002: 31, fig. 10, 3-4; pl. 1, 4; Deger-Jalkotzy, 2006: 157; Jung, 2006: 18, 9; Giannopoulos, 2008: 175; 210-213; 2011, fig. 28; pl. 59, 1; 60, 1; 78, Kr.G2-1; 2022: 143; Steinmann, 2012: cat. no. 203; Pabst, 2013: 112, n. 32

v98.Port	Bronze armour: pair of greaves, spearhead, knife, tiara-like helmet, hemispheric bowl and LH. Sword in the IIIC pottery. Sword deposited with sheath. Deceased "… φαίνεται πως είχε χάσει τη ζωή του στη πολεμική σύγρουση" (Μόσχος, 2002: 307)	L ? 7 rivets (4 × 3) Blood channels Elliptical cross-section	N/A	Copper ore from Cyprus Observation: "Η μεταλλογραφική μελέτη του ξίφους φανέρωσε την εξαιρετική καθαρότητα της πρώτης ύλης, που προήλθε από ειδική τεχνική επεξεργασία του μετάλλου πριν από τη χύτευση." Μόσχος, 2002: 307	Observation: "[…] έφερε σαφέστατα έχνη αυτής της μάχης." Μόσχος, 2002: 307		N/A	Tomlinson, 1996: 15; Touchais, 1996: 1170-1171; Κολώνας, 1996-1997: 474; 2000: 96; 2001: 260-261; 2008: 42; 43, fig. 58; Moschos, 2000: 12; 2009a: 356; 2017: 27-28; 28, fig. 2.6; Μόσχος, 2012: 307; 307, fig. 602; Κολώνας; Μόσχος, 2000: 218; pl. 83, β; Deger-Jalkotzy, 2006: 159; Giannopoulos, 2008: 205-207; 206, fig. 25; Steinmann, 2012: cat. no. 207

v99.Liat	Mycenean sword (Sandars Type F), spearheads, small bosses, studs and rock crystal beads	L 58 cm L (hilt): 9,5 cm W max 3,7 cm (blade) W (hilt) max: 1,1 cm W at juncture hilt/blade: 4,7 cm Th 0,07 cm (blade) Spur? 8 rivets (4 × 4) Blood channels D. rivet holes along: 0,4-0,5 cm (hilt); 0,3-0,4 cm (handguard) Blade widens near lower third (Lead-Shaped) Elliptical cross-section Wt 609,5 g Rivets graded and roughly square in section 4 L: 0,25 cm; D max: 0,3 cm; Wt: 1 g 2 L 0,15 cm 2 L max: 0,11 cm Total Wt 5,1 g (rivets)	N/A	N/A	N/A			Ντούζουγλη, 1999: 368-369; pl. 121, δ; pl. 122, β; Douzougli; Papadopoulos, 2010: 23-27; 24, fig. 5, a-b; 26, fig. 6; 68; Steinmann, 2012: cat. no. 221

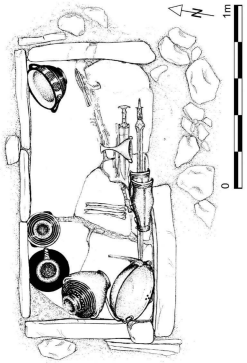
v100.Alph	N/A	L. 69 cm W 8,0 Th 3,0 cm 6 rivets (4 × 2)	N/A	N/A	N/A		N/A	Βικάτου, 2001: 194; pl. 62, ε; Paschalidis, 2018: 418
v101.Unk	N/A	L. 57,7 (Koui *et al.*) [56,8 cm (Papazoglou-Manioudaki)] W 4 cm Elliptical cross-section	(AAS) Cu 90% Sn 9,01% Zn 0,01% Pb 0,05% As 0,37% Sb 0,07% Fe 0,2% Ni 0,05% Co 0,1% Ag 0,1% Bi - Au - (ICP-AES) Bi - Au -	N/A	N/A		N/A	Papazoglou-Manioudaki, 1994: 179; Koui *et al.* 2006: 52, fig. 2, no. 9885; 58, tab. 1; 59, tab. 3

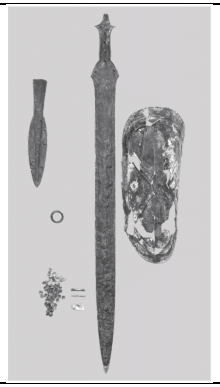
v102.Unk	N/A	L 66,8 cm W 4,5 cm	(AAS) Cu 88,81% Sn 10,08% Zn 0,01% Pb 0,31% As 0,25% Sb 0,17% Fe 0,2% Ni 0,07% Co 0,04% Ag 0,1% Bi - Au - (ICP-AES) Bi - Au -	N/A	N/A		N/A	Papazoglou-Manioudaki, 1994: 177-179; Koui *et al.* 2006: 52, fig. 2, no. 13905; 58, tab. 1; 59, tab. 3
v103.AGeor	Bronze model of a wagon	Pres L 40 cm W 4 cm	(AAS) Cu 87,25% Sn 12,07% Zn 0,01% Pb 0,25% As 0,11% Sb 0,18% Fe 0,1% Ni 0,04% Co - Ag 0,01% Bi - Au - (ICP-AES) Bi - Au -	N/A	N/A	N/A	N/A	Papazoglou-Manioudaki, 1994: 179; Koui *et al.* 2006: 58, tab. 1; 59, tab. 3

v104.K-AKons	On the floor (close to the E side), 1,75 m dept, alongside it, 3 rivets (from a sword's component?), ivory object, small plate-like object, close to a cranium	L 53,4 cm [40 cm (Papazoglou-Maniodaki)] 9,5 cm (handgrip-guard) W max 2,35 cm (handgrip) W 2 cm, superior part (handguard) W max 4,9 cm [5 cm (Papazoglou-Maniodaki) (handguard) W 2,5-2,8 cm (blade) Th 0,255 cm maximum (handgrip) Th 0,17 cm (at junction handgrip/handguard) 7 rivets (4 × 3) Leaf-shaped outline Th. 0,6 cm maximum (handguard) "Leaf-shaped" blade Fish-tail hilt (W max 3,44 cm) Bottleneck at the junction with the guard Slightly curved shoulders Broad low midrib (55% of the W of the blade), W 1,55-1,61 cm (middle) Steps?		Observation: "Όπως με πληροφόρησε ο R. Jung, η ανάλυση του χαλκού του ξίφους του Αγ. Κωνσταντίνου κατέδειξε ότι πιθανώς δεν είναι προϊόν μυκηναϊκού εργαστηρίου." (Κασκαντίρη, 2016: 354, n. 974)	Signs of intense sharpening of the blade's edges below the guard		N/A	Petropoulos, 1995: 133; Papazoglou-Manioudaki, 1994: 180; Deger-Jalkotzy, 2006: 165; 166, tab. 9.1; Κασκαντίρη, 2016: 181, fig. 15A; 184-185; 187-188; 190; 257-258; 263; 265-266; 354-355; pl. 131; pl. 133, T2/X1; Giannopoulos, 2008: 125-126; 127; 2022: 138, n. 46; Steinmann, 2012: cat. no. 205

		7 rivets (4 × 3) Elliptical cross-section W rivets 0,4-0,44 cm (handgrip); W rivets' heads 0,6-0,7 cm (handgrip) Point of balance 25,4 cm from the junction of handrip/guard Wt 417,61 g [384 g handguard + blade; 33,61 g handgrip + pres. rivets; 2,56 g fallen rivet] Observation: "Το περιχείλωμα της λαβής είναι έντονο και διαμορφώθηκε πιθανώς στο ίδιο το καλούπι." (Κασκαντίρη, 2016: 187)						
v105.Palai		L. 63 Slopping shoulders Sharp mid-rib 6 (6 × 4) Faux-midrib cross-section Wt 522,45 g Observation: "*Το ξίφος έχει μήκος περίπου 63 εκ., φέρει ενισχυτική ράβδωση και στις δύο πλευρές της λεπίδας του και*	N/A	N/A	N/A	See Fig. 4.28	N/A	Blackman, 1997: 33-34; Σπυρόπουλος, 1997: 29; Papadopoulos; Kontorli-Papadopoulou, 2001: 132-134; Deger-Jalkotzy, 2006: 161; Καγιάφα, 2006: 145, n. 46; Σαλαβούρα, 2015: 493, n. 1;

		βραχεία συμφυή λαβή με ώμους που νεύουν προς τα κάτω και στερεώνονται με έξι τουλάχιστον ήλους στην κοπή του ξίφους. Η λεπίδα φέρει επιμήκεις εγχαράξεις (Blutrillen)" (Σπυρόπουλος, 1997: 29)						495; Steinmann, 2012: cat. no. 212
v106.Niko	N/A	Spur(?) Double steps	N/A	N/A	N/A		N/A	Πετρόπουλος, 2006: 40-41; 2007: 257; 260; 262; 285, fig. 87; Deger-Jalkotzy, 2006: 160; Steinmann, 2012: cat. no. 196
v107.Goum	N/A	L 59 cm	N/A	N/A	N/A		N/A	Βικάτου, 2000: 283; 2012c: 366, fig. 740; 2019: 253

v108.Kouv	4 vases, Mycenaean-type sword with ivory hilt plates, 2 bronze greaves, spearhead and arrowhead, bimetallic knife with hilt plates, golden kylix and bronze tripod cauldron	L 93,7 cm (Σταυροπούλου-Γάτση; Jung; Mehofer) [84,4 cm (Morgan)] Gold wire decoration Fine ridges Faux-midrib cross-section	N/A	(MC-ICP-MS) Import	N/A			Morgan, 2008: 47; Stavropoulou-Gatsi, 2009: 417, fig. 731-732; Σταυροπούλου-Γάτση; Jung; Mehofer, 2012: 250; 251, fig. 2; 254; 255, fig. 6, a; 259-261; 259, fig. 9; 260, fig, 10; 12; Steinmann, 2012: cat. no. 209
v109.Mage	Alongside bronze spearhead and lekythos	L 61 cm W 3,6 cm (blade) 10 rivets (6 × 4) Blood channels Observation: "[…] λεπίδα[…], *διακοσμημένη με μονό λεπτό χάραγμα*" (Βικάτου, 2019: 245)	N/A	N/A	N/A		N/A	Vikatou, 2009: 380-381; 380, fig. 23; 2012a: 70; 2012b: 293, cat. no. 1/3; Βικάτου, 2019: 244-245; 245, fig. 18; 245, fig. 20; 2021: 562; 564, fig. 19

v110.Mage	Bronze vessel, spearhead, stirrup jar, pair of greaves, bronze phiale and remains of helmet lining	L. 67,8 cm 10 rivets (6 × 4) Observation: "*Η λεπίδα φέρει χάραγμα περιμετρικά και διπλό προς την ακή*" (Βικάτου, 2019: 248)	N/A	N/A	N/A		N/A	Vikatou, 2012a: 70; 73, fig. 9; 2012b: 304-305, cat. no. 1/43; Βικάτου, 2019: 247-249; 248, fig. 22; 249, fig. 23; 253-254; 2021: 562; 564, fig. 20
v111.Mage	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Βικάτου, 2019: 248, n. 75; 253, n. 104
v112.Mage	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Βικάτου, 2019: 248, n. 75; 253, n. 104
v113.Kast	Together with more than 10 cooking pots	L 53 cm	N/A	N/A	N/A		N/A	Kanta; Kontopouli, 2011: 130; 140, fig. 6, a; Κάντα, 2014: 185; 190, fig. 6

v114.Mega	Bronze pin, fibulae and 2 sperheads	L 52,6 cm Mid-rib flanked by steps and double steps at distal part Observation: "Οι βαθμίδες ξεκινούν από την αιχμή και σβήνουν προς τα πάνω στη λεπίδα στα 12 εκ. η πρώτη και στα 17 εκ. η δεύτερη" Βικάτου, 2017: 175, n. 18; 2018: 408, n. 63)	N/A	N/A	N/A		N/A	Βικάτου, 2017: 370; pl. 130, b; 2017b: 174, 174-175, fig. 6, β; 2018: 402; 407-408; 425, fig. 8-9
v115.Voud	?	8 rivets (4 × 4) Spur(?) Straight pommel ears Swelling at handgrip and bottleneck at the junction with the guard Stepped midrib Elliptical cross-section	N/A	N/A	N/A	N/A	N/A	Paschalidis, 2018: 7; 417; Giannopoulos, 2022: 138
v116.Voud	?	7 rivets (4 × 3) Blood channels Long spur with rectangular outline and slightly off-axis Curved pommel ears Slight swelling of handgrip Sloping shoulders Broad and low midrib	N/A	N/A	N/A	N/A	N/A	Paschalidis, 2018: 7; 417; Giannopoulos, 2022: 138

		Elliptical cross-section						
v117.Voud	?	?	?	N/A	N/A	N/A	N/A	Paschalidis, 2018: 7; 417; Giannopoulos, 2022: 138
v118.Voud	N/A	8 rivets (4 × 4) Fine ridges	N/A	N/A	N/A	N/A	N/A	Paschalidis, 2018: 7; 417; Giannopoulos, 2022: 138
v119.E-Lous	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Paschalidis, 2018: 7; 417
v120.Palai	?	L. 41,5 cm 8 rivets (4 × 4) Leaf-shaped blade Blood channels Elliptical cross-section Wt 339,32 g	N/A	N/A	N/A	See Fig. 4.28	N/A	Σπυρόπουλος, 1997: 31; Καγιάφα, 2006: 145, n. 46; Σαλαβούρα, 2015: 493, n. 1; 495-496; Paschalidis, 2018: 417-418; 417, n. 870; Giannopoulos, 2022: 418
v121.Unk	N/A	Spur 8 rivets (4 × 4) Curving pommel ears Swelling at handgrip Faux-midrib cross-section	N/A	N/A	N/A	N/A	N/A	N/A

Details of context, morpho-stylistic aspects and technological choices of Naue Type II sword findings in Greece.

APPENDIX C – CATALOGUE OF TYPE BRONZE SWORDS IN OTHER REGIONS

Sword ID	Site of find	Context	Attribution	Catling, 1961	Hammond (1967)	PBF IV, 12	Bouzek (1985)	Regional unit/State	Condition	Actual location	Chronology	Reference
AL-1	Scutari	?	?	No. 32	D	No. 265	N/A	Shköder, Albania	Fragmented	BM (Mus. Inv. No. 2754)	?	Catling, 1956: 117; pl. 9, d; 1961: 118; 1968: 99-100; Hammond, 1967: 324; fig. 19, D; Kilian-Dirlmeir, 1993: 99, no. 265
AL-2	Vodhinë	Tumulus A, Grave 14	?	N/A	I	No. 271	A.I.20	Gijirokastër, Albania	Preserved	Nat. Arch. Mus. of Albania	LH III B-C	Hammond, 1967: 320; fig. 20, I; 1971: 234-235; 234, fig. 3, I; 235-236; pl. 34, 2; Catling, 1968: 100; Kilian-Dirlmeir, 1993: 100, no. 271; pl. 40, 271
AL-3	Mati valley	Tumulus	?	N/A	D	N/A	B.IIa1.3	Lezhë, Albania	?	Nat. Arch. Mus. of Albania?	?	Hammond, 1967: 324, n. 7; Catling, 1968: 100;

												Bouzek, 1985: 125
AL-4	Vajzë	Tumulus A, grave 8	Group I/*Gruppe* A, *Variante* 3	N/A	N/A	No. 231	N/A	Vlöre, Albania	Fragmented	Nat. Arch. Mus. of Albania	LH III C-EIA	Kilian-Dirlmeir, 1993: 95, no. 231; pl. 34, 231
AL-5	Rhethe-Bazje	?	Group I/*Gruppe* A, *Variante* 4	N/A	N/A	No. 233	N/A	Dibër, Albania	Preserved	Nat. Arch. Mus. of Albania	?	Kilian-Dirlmeir, 1993: 96, no. 233; pl. 35, 233
AL-6	Kakavi	Tumulus	?/*Gruppe* A, *Variante* 4	N/A	K	No. 234	A.I.16	Gijirokastër, Albania	Preserved	Nat. Arch. Mus. of Albania	LBA-EIA	Hammond, 1967: 320-321; fig. 20, K; 1971: 234-235; 234, fig. 3, K; 236-238; pl. 34, 1; Catling, 1968: 100; Bouzek, 1985: 123; Kilian-Dirlmeir, 1993: 96, no. 234; pl. 35, 234
AL-7	Vajzë	Tumulus B	?/*Gruppe* C, *Variante* 3	N/A	J	No. 251	C.IIb.6	Vlöre, Albania	Fragmented	Nat. Arch. Mus. of Albania	LBA-EIA	Hammond, 1967: 320; fig. 20, J; 1971: 234-235; 234, fig. 3, J; 237, n. 29; Catling, 1968: 100; Bouzek,

												1985: 125; Kilian-Dirlmeir, 1993: 98, no. 251; pl. 38, 251
AL-8	Vajzë	Tumulus A, grave 7	?/*Gruppe* C, *Variante* 3	N/A	H	No. 252	N/A	Vlöre, Albania	Fragmented	Nat. Arch. Mus. of Albania	LBA-EIA	Hammond, 1967: 320; fig. 20, H; 1971: 234-235; 234, fig. 3, H; 237, n. 29; Kilian-Dirlmeir, 1993: 98, no. 252; pl. 38, 252
AL-9	Barç	Tumulus B, grave 146	?/*Gruppe* C, *Variante* 3	N/A	N/A	No. 253	N/A	Korçe, Albania	Preserved	Nat. Arch. Mus. of Albania	EIA	Hammond, 1967:320; fig. 20, H; 1971: 234, fig. 3, H; 237, n. 29; Catling, 1968: 100; Kilian-Dirlmeir, 1993: 98, no. 253; pl. 38, 253
AL-10	Dukat	Tumulus, grave 7	?/*Gruppe* C, *Variante* 3	N/A	N/A	No. 254	N/A	Vlöre, Albania	Fragmented	Nat. Arch. Mus. of Albania	EIA	Kilian-Dirlmeir, 1993: 98, no. 254; pl. 38, 254
AL-11	Prennjas	Unknown	?/*Gruppe* C, *Variante* 4	N/A	N/A	No. 257	N/A	Elbasan, Albania	Fragmented	Nat. Arch. Mus. of Albania	?	Kilian-Dirlmeir, 1993: 98,

												no. 257; pl. 39, 257
AL-12	Barç	Tmulus B, grave 18	?	N/A	N/A	No. 269	N/A	Korçe, Albania	Preserved	Nat. Arch. Mus. of Albania	LH III C-EIA	Kilian-Dirlmeir, 1993: 100, no. 269; pl. 40, 269; Eder; Jung, 2005: pl. 52; no. 10
AL-13	Patos	Tumulus, grave 72	?	N/A	N/A	No. 270	V.5	Fier, Albania	Fragmented	Nat. Arch. Mus. of Albania	?	Bouzek, 1985: 127; Kilian-Dirlmeir, 1993: 100, no. 270; pl. 40, 270
AL-14	Pazhok	Unknown	?	N/A	N/A	No. 272	V.6	Elbasan, Albania	Fragmented	Nat. Arch. Mus. of Albania	?	Bouzek, 1985: 127; Kilian-Dirlmeir, 1993: 100, no. 272; pl. 40, 272

Distribution of Naue Type II sword findings in Albania.

Sword ID	**Site of Find**	**Context**	**Attribution**	**Catling, (1961)**	**PBF II, 8**	**Bouzek (1985)**	**Regional Unit/State**	**Condition**	**Actual Location**	**Chronology**	**Reference**
CY-1	Enkomi	T. 18	Group I/*Gruppe* A, *Variante* 2	No. 27 (16)	No. 3	A.I.6	Famagusta, Cyprus	Preserved	CM	LH IIIC Early	Catling, 1956: 115; 1961: 118; 1964: 113; pl. 12, h; Bouzek, 1985: 122; Matthäus, 1985: 364, no. 3; pl.

											140, 3; Kilian-Dirlmeir, 1993: 95, n. 8; Eder; Jung, 2005: 495; pl. 63
CY-2	Enkomi	T. 47	Group IV/*Gruppe* C, *Variante* 1	No. 28 (17)	No. 2	?.8	Famagusta, Cyprus	Preserved	BM (Mus. Inv. No. 1897/4-1/963)	LH IIIC Early(?)	Catling, 1956: 115; 1961: 118; 1964: 113; pl. 12, k; Matthäus, 1985: 364, no. 2; pl. 140, 2; Kilian-Dirlmeir, 1993: 97, n. 12
CY-3	Unknown	?	Group I/*Gruppe* A, *Variante* 2	No. 29 (18)	No. 8	A.I.12	Cyprus	Preserved	CM	?	Catling, 1956: 115; 1961: 102-104; 105, fig. 2; 118; pl. 9, a-b; 1964: 113; pl. 12, i; Bouzek, 1985: 123; Matthäus, 1985: 364, no. 8; pl. 141, 8; Kilian-Dirlmeir, 1993: 95, n. 8

CY-4	Enkomi	?	Group I/*Gruppe* A, *Variante* 1	No. 30	No. 9	A.I.13	Famagusta, Cyprus	Preserved	Private collection	?	Catling, 1961: 115-116; 118; pl. 16, a-b; 1964: 113; pl. 12, j; Matthäus, 1985: 364, no. 9; pl. 141, 9; Kilian-Dirlmeir, 1993: 95, n. 7
CY-5	Enkomi(?)	?	Group I(?)	No. 31	No. 10	?.7	Famagusta(?), Cyprus	Fragmented	CM (Mus. Inv. No. Met. 3001)	?	Catling, 1956: 115; pl. 9, f; 1964: 113; Matthäus, 1985: 364, no. 10; pl. 141, 10;
CY-6	Enkomi	Well 212, Quartier 5 E	Group I/*Gruppe* A, *Variante* 2	N/A	No. 4	A.I.7	Famagusta, Cyprus	Preserved	CM	LH IIIB-C Early	Bouzek, 1985: 120, fig. 56, 1; 122-123; Matthäus, 1985. 364, no. 4; pl. 140, 4; Jung, 2006: 177-178; Mehofer; Jung, 2017: 393-394; 394, fig. 4, 1
CY-7	Enkomi	Well 212, Quartier 5 E	Group I/*Gruppe* A, *Variante* 2	N/A	No. 5	A.I.8	Famagusta, Cyprus	Preserved	CM	LH IIIB-C Early	Bouzek, 1985: 120, fig. 56, 2;

											122-123; Matthäus, 1985. 364, no. 5; pl. 140, 5; Jung, 2006: 177-178; Mehofer; Jung, 2017: 393-394; 394, fig. 4, 2
CY-8	Enkomi	Well 212, Quartier 5 E	Group I/*Gruppe* A, *Variante* 2	N/A	No. 6	A.I.9	Famagusta, Cyprus	Preserved	CM	LH IIIB-C Early	Bouzek, 1985: 120, fig. 56, 3; 122-123; Matthäus, 1985: 364, no. 6; pl. 141, 6; Jung, 2006: 177-178; Jung, 2006: 177-178; Mehofer; Jung, 2017: 393-394; 394, fig. 4, 3
CY-9	Enkomi	Well 212, Quartier 5 E	Group I/*Gruppe* A, *Variante* 2	N/A	No. 7	A.I.10	Famagusta, Cyprus	Preserved	CM	LH IIIB-C Early	Bouzek, 1985: 120, fig. 56, 4; 122-123; Matthäus, 1985: 364, no. 7; pl. 141, 7; Jung; Mehofer, 2005-2006: 115, fig. 5, 2; Jung, 2006:

											177-178; pl. 15, 5; Mehofer; Jung, 2017: 393-394; 394, fig. 4, 4; 395, fig. 5
CY-10	Enkomi	Quartier 4 E	Gorup I/*Gruppe* A	N/A	N/A	A.I.11	Famagusta, Cyprus	Fragmented	CM(?)	LH IIIB-C Early(?)	Courtois, 1972: 25 Bouzek, 1985: 123

Distribution of Naue Type II sword findings in Cyprus.

Sword ID	**Site of Find**	**Context**	**Attribution**	**Catling, (1961)**	**Bouzek (1985)**	**PBF IV 13**	**Regional Unit/State**	**Condition**	**Actual Location**	**Chronology**	**Reference**
SYR-1	Hama	Cremation G.VIII-299	Group IV(?)	No. 39 (24)	D.IVa.1	N/A	Hama Governorate, Syria	?	?	1075-1025 BC	Riis, 1948: 121; 232, no. 299; Catling, 1956: 117; 1961: 118; Bouzek, 1985: 126
SYR-2	Hama	Cremation G.VIII-322	Group IV	No. 40 (25)	D.IVa.2	N/A	Hama Governorate, Syria	?	?	1075-1025 BC	Riis, 1948: 120, fig. 136, b; 121; 232, no. 322; Catling, 1956: 117; 1961: 118; Bouzek, 1985: 126
SYR-3	Hama	Cremation G.VIII-522	Group IV(?)	No. 41 (26)	D.IVa.3	N/A	Hama Governorate, Syria	?	?	1075-1025 BC	Riis, 1948: 121; 238, no. 522; Catling, 1956: 117; 1961: 118;

											Bouzek, 1985: 126
SYR-4	Rams Shamra-Ugarit	Great Priest House	N/A	N/A	D.1	N/A	Lakatia Governorate, Syria	Preserved	?	14th-13th c. BC	Catling, 1956: 121-122; Schaeffer, 1956: 251; 253, fig. 217; 255, fig. 219; 259; 260, fig. 224, 12; Bouzek, 1985: 128; Jung, 2009b: 142, fig. 7, 2
SYR-5	Rams Shamra-Ugarit	Great Priest House	N/A	N/A	D.2	N/A	Lakatia Governorate, Syria	Preserved	?	14th-13th c. BC	Catling, 1956: 121-122; Schaeffer, 1956: 251; 253, fig. 217; 255, fig. 219; 259; 260, fig. 224, 13; Bouzek, 1985: 128; Jung, 2009b: 142, fig. 7, 3
SYR-6	Rams Shamra-Ugarit	Great Priest House	N/A	N/A	D.3	N/A	Lakatia Governorate, Syria	Preserved	?	14th-13th c. BC	Catling, 1956: 121-122; Schaeffer, 1956: 251; 253, fig. 217; 255, fig. 219; 259; 260,

											fig. 224, 14; Bouzek, 1985: 128; Jung, 2009b: 142, fig. 7, 4
SYR-7	Rams Shamra-Ugarit	Great Priest House	N/A	N/A	D.4	N/A	Lakatia Governorate, Syria	Preserved	?	14th-13th c. BC	Catling, 1956: 121-122; Schaeffer, 1956: 251; 253, fig. 217; 255, fig. 219; 259; 260, fig. 224, 15; Bouzek, 1985: 128; Jung, 2009b: 142, fig. 7, 5
SYR-8	Ugarit	Pit (hoard?)	Group I or III/*Gruppen* A or C	N/A	N/A	N/A	Lakatia Governorate, Syria	Fragmented	Mus. of Lattakia (Mus. Inv. No. M /231)	LH IIIC Ealy or Middle	Jung, 2009b: 140, fig. 5, 2; 143; Jung; Mehofer, 2013: 112-114; 112, fig. 1,1; 113, figs. 2-4; 116-117
IL-1	Megiddo	Settlement	Group IV	No. 38	D.IVc.2	No. 180	Northern District, Israel	Preserved	?	IA (end of 12-11th c. BC)	Catling, 1961: 118; Bouzek, 1985: 126; Shalev, 2004: 63, no. 180; pl. 23, 180
EGY-1	Tell el-Farah'un	?	?	No. 34 (20)	D.5	N/A	Egypt, Nile delta	Fragmented	Egyptian Mus. of	?	Catling, 1956: 116;

									Berlin (Mus. Inv. No. 20305)		1961: 118; Bietak; Jung. 2007-2008: 212-213; 212, fig. 1; Jung, 2009b: 139; 140, fig. 5, 1
EGY-2	Zagazig/Bubastis(?)	?	Group II-III/Gruppe C	No. 35 (21)	A.I.15	N/A	Al-Sharqia Governorate, Egypt	Preserved	Egyptian Mus. of Berlin (Mus. Inv. No. 20447)	?	Catling, 1956: 116; 1961: 118; Bouzek, 1985: 123; Mehofer; Jung, 2017: 389-390; 393, fig. 3, B; 396
EGY-3	Delta	Pépinville	?	No. 36 (22)	?.9	N/A	Ismailia Governorate, Egypt	Fragmented	?	Unknown	Budge, 1892: pl. 1, 1; Catling, 1956: 116; 1961: 118; Bouzek, 1985: 128
EGY-4	Unknown	?	Group I(?)	No. 37 (23)	?.10	N/A	Egypt(?)	Fragmented	Ash. (Mus. Inv. No. 1927: 1993 a/b)	?	Catling, 1956: 116; 1961: 118; Bouzek, 1985: 128; Jung, 2009b: 143, n. 47

Distribution of Naue Type II sword findings in the Levant and Egypt.

Sword ID	Site of find	Context	Attribution	Catling, (1961)	Bouzek (1985)	Regional Unit/State	Condition	Actual location	Chronology	Reference
TUR-1	Cape Gelidonya	Shipwreck	Group I/*Gruppe* A	N/A	N/A	Cape Gelidonyia, Turkey	N/A	N/A	End of the 13th/early 12th c. BC	Bass, 1991: 69

Distribution of Naue Type II sword findings in Turkey.

APPENDIX D – CATALOGUE OF SITES IN THE CENTRAL AMAZON

Site	Text label	Coordinates (UTM)	Municipality/state	River channel	Context	Occupation	Stratigraphy	Cultural affiliation	Date	Reference
Coari I/ Coari II	v1.CoarI/ v2.CoarII	20M 483765 E 9548228 N (Coarí I) 20M 483765 9548228 N (Coarí II)	Coari, Amazonas	Middle Solimões	Right margin of Solimões River near Coarí Lake, 80 m apart in the southwest (Coarí I) and southern end (Coari II) of the city of Coarí; spots of ADE 30 cm deep (Coarí I) 0,5 ha (Coarí II)	Multi	Superficial collection and excavation; shallow deposits of ADE (30 cm deep) in spots smaller than 1 ha (Cut 1, Coarí I) and biggest concentration 0-45 cm; excavation80 cm deep (Cut 2, Coari II)	Paredão and Guarita	800/1150 ± 47 BP/AD (Cut 1, 0-15 cm) (Coari I) (Guarita) 763/1187 ± 48 BP/AD (Cut 2, 15-30 cm) (Coarí II) (Paredão) 780/1170 ± 65 AD (Cut 2, 80 cm) (Coarí II) (Paredão)	Hanke, 1959; Meggers; Evans, 1961; Hilbert, 1968; Pronapa, 1970; Simões; Araújo-Costa, 1978; Brochado; Lathrap, 1982
Conjunto Vilas (Vila I/Barroso/ Fazenda do Francês, Vila II/Bastos, Vila III/Vila Vale/Tambaquí Paratú and Vila IV/Vila Valente):	v3.CjVilaCaia/ v4.CjVilaTefe/ v5.CjVilaFlux	20M 314339 9628152 (Conjunto Vilas) 20M 0313990 E 9628446 N (Vila I) 20M 0314322 E 9628192 N (Vila II) 20M 0314322 E 9628192 N (Vila III) 20M 0314694 E	Tefé, Amazonas	Middle Solimões	Right margin of Solimões River and Lake Tefé (38ha), 1,5 km of length in a continuous sequence of ADE spots; West of the city of Tefé, ADE 30ha and 70 cm medium deep deposits	Multi	Superficial collection along a continuous stretch of AED and ceramic material linking Vilas I-IV (20-40 cm deep). Excavation by Hilbert in the locality Tambaquí (1,5 m × 1,5 m, 1 m deep) and all results mixed up with Caiambé site stratigraphy; Tefé	Pocó-Açutuba, Caiambé and Tefé	440 ± 50 AD (S1068E1450, F14, 80-90 cm) 450 ± 50 AD (S1068E1450, 20-30 cm) (Tefé) 970 AD (S450E1651, 92 cm) 1070 AD (S1410E16512, 50-60 cm)	Hilbert, 1968; Belletti, 2015

		9627918 N (Vila IV)					quantitatively less significant, 5 units and 98 test pits			
Boa Esperança	v6.BEspeCaia/ v7.BEspeTefe	20M 304060 9725616	Amanã Sustainable Development Reserve (Barcelos, Coari, Codajás and Maraã), Amazonas	Middle Solimões	150,000 m² (15 ha), right margin of the Lake Amanã, extension ADE layer and ceramic deposits associated with domestic activities	Multi	Superficial and upper levels (Caiambé and Tefé), Pocó at the basis and an ancient ceramic style associated to archaeological features	Pocó-Açutuba, Amanã, Caiambé and Tefé	1080±30 BP (S1575W1248, 50-60 cm) (Caiambé) 1220±30 BP (S1575W1248, 30-40 cm) (Tefé) 1520±30 BP (S1623W1175, 60 cm) 2.410±40 BP (S1600W1247, F3 top, 100 cm) 2.500±40 (S1600W1247, F2 base, 170 cm) 2690±30 BP (S1526W1248, F1, 70-80 cm) (Pocó) 2800±30 (S1600W1247F3 top, 120-130 cm) 3.320±30 (S1600W1247, F2, 100-110 cm)	Gomes, 2011; Costa, 2012; Gomes; Neves, 2016
Santa Fé	v8.StFe	20M 419307 E 9529884 N	Coari, Amazonas	Middle Solimões	Left margin of the Urucu, River, upper lowland, 350 × 150 m, low density, small concentration areas and	Uni	Test pits (spaced 25 m) and 5 units of 1m², 40 cm deep max. of archaeological deposit	Guarita	770-850 AD	Neves, 2010a; Tamanaha, 2012; 2016; Tamanaha; Neves, 2014

					absence of ADE					
São Paulo II	v9.SPII	20M 485248 E 9562229 N	Coari, Amazonas	Middle Solimões	Left margin of Solimões in area delimited by the river and seasonally inundated *igarapés*; variation in soil coloration and small concentration of ceramic material on ADE	Uni	Test pits (spaced 25 m) and 8 units (1m²): 3 of 2 × 1 and 2 of 1 × 1, 40 cm deep med. of archaeological deposit (ceramic and lithic)	Guarita	895 AD	Neves, 2010a; Tamanaha, 2012; Ribeiro, 2013; 2016
Santa Rosa (AM-MA-9)	v10.StRosa	20M 745961 9721625	Manaus, Amazonas	Lower Negro	Near the mouth of the river, left margin on bluff over riverbank (Apuá) (100 × 150, main axis parallel to the river) (10ha), ADE deposits	Uni	Two seasons (1969 and 1982), 3 cuts, 60 cm maximum	Apuaú Pajurá	825 AD	Simões, 1974; 1983; Simões; Araújo-Costa, 1978; Simões; Kalkmann, 1987; Meggers, 1991; 2001; DeBoer; Kintigh; Rostoker, 1996; Heckenberger; Petersen; Neves, 2001
Engenho Velho (AM-BL-7)	v11.EngVelh	20M 614848 9845329	Barcelos, Amazonas	Middle Negro	Right margin of the Negro River on bluff, circular plan 150 m. of diameter, *terra preta*	Uni	1 cut with 60 cm of cultural deposit (season of 1978)	Manuacá	880 AD	Simões, 1983; Simões; Kalkmann, 1987
Açutuba (AM-IR-02)	v12.AcuAcut/ v13.AcuMana/ v14.AcuPare/	20M 792812 9657514	Iranduba, Amazonas	Lower Negro	Settlement on top of riverbluff	Multi	250 cm of cultural deposits identified in	Açutuba, Manacapuru,	25 cal. radiocarbon dates	Heckenberger; Neves; Petersen, 1998;

	v15.AcuGuar				terrace next to Negro River, 3000 × 400 m (main axis parallel to the site) (90ha), spots of ADE (30ha) and divided in sectors I, II and III		1994, seasons in 1995, 1997, 1999, 2002 and 2004 Açutuba deep (under 1 m ½ of sediments) (Sector I and II), Manacaputu (Sector I and II), Paredão, cemetery (Section I) Guarita ceramics over almost all surface	Paredão and Guarita	(1100 BC-1380 AC) Cal. dates (1-error σ): 120/340-890/1160 AC (Açutuba I, Unit 2) (Modelled-Incised or IR) 750/150 BC-1290/1410 AC (Açutuba II, Unit 1) (Modelled-Incised or IR) 1210/1270-1220-1390 AC (Açutuba I, surface) (Guarita) Median range (1-error σ): 230 AC (Açutuba I) (Açutuba) 1025 AC (Açutuba I) (Manacapuru) III BC-IV DC (Açutuba) VI-IX cents. AD (Manacapuru) 950-1375 AC (Paredão) (Sector I) XII-XIV cents. AD (Guarita)	Heckenberger; Petersen; Neves, 1999; Lima *et al.* 2006; Lima, 2008; 2010; Lima; Neves, 2011; Lima; Neves; Petersen;2016

Distribution of polychrome ceramics (TPA) and other assemblages in the Central Amazon.

APPENDIX E – CATALOGUE OF SITES IN THE UPPER MADEIRA

Site	Text label	Coordinates (UTM)	Municipality/state	River channel	Context	Occupation	Stratigraphy	Cultural affiliation	Date	Reference
Teotônio (RO-JP-01)	v16.TeoBarr/ v17.TeoJama/ v18.TeoJatu	20L 383376 9019700	Porto Velho, Rondônia	Upper Madeira	Right margin next to eponymous waterfall (now flooded) and village, and Madeira River (≈ 4,3 ha); 14 km upstream of Porto Velho	Multi	Prospected by Miller in the late 1970 (test unit 2 × 2 m); 161 test pits and 21 excavation units by PALMA (2011-2016); 3,000 year of ocupation, 4 m deep of cultural deposit; upper layer (Jatuarana), 40 cm on ADE	Pocó-Açutuba, Barrancóide/Incised Rim, Jamari, Dionisio, Jatuarana	3250 BP (N10049E9956, 330-350 cm) (Pocó-Açutuba) 1550 ± 30 BP (N10045E9986) 1245 ± 60 BP (N10041E9956, 90-100 cm) 1111 ± 60 BP (N10041E9956, 90-100 cm) (Barrancóide) 1170 ± 85 BP (N10041E0056, 90-100 cm) 1036 ± 105 BP (Jamari) 700 AD-1600 (Jatuarana)	Miller, 1978; 1987; 1992; 1999; Simões, 1983; Almeida, 2013; Vassoler, 2016; Kater, 2018; 2020; Watling *et al.* 2018; 2020
Ilha de Santo Antônio (RO-PV-1)	v19.ISAnto	20L 395600 9026400	Porto Velho, Rondônia	Upper Madeira	Right margin of Madeira Riveira and the Santo Antônio waterfall, destroyed by the construction of UHE	Multi	Prospected by Miller in the late 1970s; 134 test pits and 25 excavation units (1m²) Barrancóide in ADE Jatuarana in more superficial levels (up to 30 cm), mechanical mixture with superposed	Barrancóide and Jatuarana	Preceramic level: 7760 BP (163 cm) 990 BP (42 cm, charred wood)	Miller, 1978; 1987; 1992; 1999; Zuse, 2014; 2016; Zuse *et al.* 2020; Pessoa, 2015; Vassoler, 2016

							components (Barrancóide)			
Associação Calderita	v20.AssCald	20L 442601 9044784	Porto Velho, Rondônia	Lower Jamari	2,4ha, ADE (20-30 cm medium, 50 cm in the mound), low density of ceramic material. 4 km from the Madeira River	Uni	18 test pits, one excavation unit (2 × 1) in the mound (N1030/N1031 E1002). Excavated in August 2008	Jatuarana	620 ± 40 AP (20-30 cm) 980 ± 40 AP 940 ± 40 AP (30-50 cm)	Almeida, 2013

Distribution of polychrome ceramics (TPA) and other assemblages in the Upper Madeira.