



Cluster of Excellence
ASIA AND EUROPE
IN A GLOBAL CONTEXT



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ZUKUNFT
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IWH Symposium

APPROPRIATING INNOVATIONS

ENTANGLED KNOWLEDGE IN EURASIA, 5000-1500 BCE

January 15-17, 2015



Internationales
Wissenschaftsforum
Heidelberg

Hauptstraße 242, 69117 Heidelberg

WEB

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The question of how to conceptualize the role of technological innovations is of crucial importance for understanding the mechanisms and rhythms of long-term cultural change in prehistoric and early historic societies. For a long time, the changes that have come about have often been modelled as gradual and linear, innovations have been considered positively as a progress in the development of humankind and the focus was on the localization of the origin of innovations and the routes of their spread.

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Our conference wants to go beyond the current discussion by shedding light on the conditions facilitating the quick spreading of technological innovation and on the process of the integration of new technologies into the life world of the appropriating societies. In particular, we want to concentrate on two key innovations, namely the transmission of the various components of the so-called "Secondary Products Revolution" in parts of the Near East and Europe during the 4th millennium BCE and the appropriation of early bronze casting technology, which spread from the Near East to Europe and China in the late 3rd and early 2nd millennium BCE.

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We are especially interested in non-technological knowledge that is transmitted together with the technological knowledge, as technological knowledge is always deeply interconnected with the communication of social practices, ideas and myths. The acceptance of new technologies, therefore, requires the willingness to change existing world views and modify them due to the potentials and problems which are connected with the new technology.

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Contributions should, therefore, concentrate on the conditions facilitating or hindering the spread of innovations and the transformative power of these innovations in the appropriating society. They should analyse how the introduction of novel technologies and the associated non-technological knowledge led to a transformation of existing economic systems and the underlying social orders in Late Neolithic, Chalcolithic and Early Bronze Age Eurasia by integrating innovative methodological approaches and contextual studies.

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Augusta McMahon: Mesopotamia's Textile Industry. First Steps in the 4th Millennium BC

10.30–11.00

Coffee

11.00–11.30

Kristina Sauer: In the Light of Innovations. Tracing the Transfer of Commodities and Knowledge in the "Uruk World"

11.30–12.15

Giulio Palumbi and Maria Bianca D'Anna: Uruk, Pastoralism and Secondary Products. Was it a Revolution? A View from the Anatolian Highlands

12.15–12.45

Mariya Ivanova: The „Green Revolution“ in Prehistory. Late Neolithic Agricultural Innovations as a Technological System

12.45–14.00

Lunch (Speaker Only)

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Stefan Burmeister: Early Wagons in Eurasia. De-Entangling an Enigmatic Innovation

14.30–15.00

Elke Kaiser: The Innovative Potential in Communities of the Eastern European Steppe in the 3rd Millennium BC

15.00–15.30

Sabine Reinhold and Corina Knipper: Contextualising Innovation. On Waggon Drivers and Burial-Mound Possessors in the North Caucasus and Beyond

15.30–16.00

Coffee

16.00–16.30

Maleen Leppik: Innovation, Interaction and Society in the 4th Millennium BCE in Europe

16.30–17.00

Joseph Maran: Wheels of Change. The Polysemous Nature of Early Wheeled Vehicles in Central and Northwest European Societies, ca. 3200-2500 BCE

17.00–17.30

Niels N. Johannsen: Appropriating Draught Cattle Technology in Southern Scandinavia. Roles, Context and Consequences

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Helle Vandkilde: Innovation and Change at the Onset of the Nordic Bronze Age

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Unruly Innovations.

Evolutionary Perspectives on the Relations of Technology and Society

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Current innovation studies, by and large, have been developed out of a critique of simplified linear innovation models. Such models, which understand technological innovation as a unidirectional development from basic to applied research, to development and finally to market (at least in highly differentiated societies) or as simple cases of technology push or market pull, operate with highly abstract assumptions about the diffusion of technology – usually from centre to periphery, from expert to laymen, e.g. from company laboratories to private households. In contrast, evolutionary models of innovation have highlighted the inherently unforeseeable, complex, heterogeneous, and distributed character of innovations.

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Novel technologies do not simply diffuse, but have to overcome manifold hurdles, among them habits and customs. Well aligned social structures may be disrupted by innovative artefacts and so innovation always poses a threat to the status quo. Inventive activities, on the other hand, emerge from locally situated problem constellations, evolutionary niches so to say, that allow for novel solutions to be tried and tested. And as novel solutions travel from their place of origin, they are adapted, reconfigured, and sometimes remade into something new yet again. In this sense, evolutionary models of innovation have stressed the role of laymen and users in the shaping of technologies, the complex interrelations of technological and social structures beyond simple ideas of technical or social determinism as well as the open ended nature of ongoing innovation processes.

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My talk will sketch out the evolutionary perspective in innovation studies by revisiting early concepts and cases such as Pinch and Bijker's interpretative flexibility in the development of the bicycle, Hughes' seamless web of electricity networks, the idea of evolutionary niches in technological innovations by Kemp, Rip, and Shot and that of actor-networks by Latour, Callon, and Law or the role of users stressed by Oudshoorn and Pinch. I will draw these findings together in order to highlight the multilinear, complex, distributed, and messy character of innovations and their unintended consequences. Unruly innovations challenge established socio-technical practices and infrastructures while at the same time they hold the possibility for new stabilisation and durability. Therefore, they lie at the centre of both social and technical continuity and change that make up the fabric of society.

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WEB

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Mesopotamia's Textile Industry: First steps in the 4th millennium BC

The 4th millennium BC in Mesopotamia saw the origins of urbanism and socio-economic complexity. Recent excavations at sites in northern Mesopotamia have revealed a distinct northern trajectory to urbanism contemporary with that of better-known southern Mesopotamian sites such as Uruk. Tell Brak, in northeast Syria, was one of the largest and earliest of northern Mesopotamia's cities, with evidence for religious and secular power from c 4200 BC. Urban growth and increased levels of hierarchy were accompanied by the clustered and standardised mass production of basic goods, particularly ceramics, which intensified during the Late Chalcolithic 2-3 Periods (4200-3600 BC).

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Groups of spindle whorls of converging weights and dimensions from LC 2-3 Tell Brak suggest that changes in the textile industry also took place during this early 4th millennium BC urbanisation. These changes overlap with the possible flax-to-wool shift in the economy and new uses of the surrounding rural territory. The evidence does not yet imply workshops – as are documented in 3rd millennium BC Mesopotamian texts but may reflect the first steps towards these in the direct commissioning of products and possible management of labour.

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In the Light of Innovations: Tracing the Transfer of Commodities and Knowledge in the “Uruk World”

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The late chalcolithic in the Near East, also known as Uruk-Period, sees the formation of previously unknown urban complexity indicating extensive settlement and communication networks. The dispersion of material culture, technical and economic improvements, but also the transmission of knowledge and cultural practices created an extensively cross-linked, trans-regional cultural landscape. Moreover, in a broader context Mesopotamia at that time was part of an innovative horizon extending from central Asia to Europe, characterized by several novel technologies and production processes. In the case of Uruk-Period Mesopotamia the introduction of new technologies, involving intensified economic activities, finally lead to an increased need for administrative mechanisms and, in a further step, to the invention of writing.

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Hence, the society was changed in a way that needed increased control and differentiation. Innovations in other words stand in a mutual relationship to the transformation of societies. They involve changes in the economic and social order, but more significantly, they need a viable social system and a certain readiness to adopt new technologies and ideas.

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This paper tries to trace the transmission and impact of key innovations on the involved societies. Can the directions of innovation exchange be reconstructed? Is it possible to trace the mediation of knowledge? If so, why do innovations face rejection? The highly interlinked “Uruk World” offers a viable basis to examine these questions, contributing to the understanding of the interaction in the early urban societies of the Ancient Near East.

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Uruk, Pastoralism and Secondary Products. Was it a Revolution? A View from the Anatolian Highlands

During the second half of the fourth millennium, the intensification of caprine-focused husbandry strategies was among the most profound changes involving the primary economy in the Near East. These changes took place in regions that were involved in the development and expansion of the so-called Uruk culture, to be originally identified as the expression of the earliest states and cities of Southern Mesopotamia.

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As A. Sherratt pointed out, “innovations” in animal-exploitation strategies were the result of both a leap in terms of “social complexity” and a radical reorganisation of the economic relationships “entangled” with the emergence of new world-views and ideologies. But was the development of specialised pastoralism in the Uruk period straightforwardly linked to milk, dairy products and textiles?

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From the perspective of the Anatolian site of Arslantepe, the relations between Uruk pastoralism and the “secondary products revolution” will be analysed and eventually questioned.

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The role of specialised caprine husbandry will be also investigated in terms of long-term cultural changes as concerns the “expansion” of the Kura-Araxes culture in Anatolia in the early-third millennium BCE.

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The „Green Revolution“ in Prehistory. Late Neolithic Agricultural Innovations as a Technological System

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In the 1960s, famine in Southeast Asia and Mesoamerica triggered a series of research and technology transfer initiatives that involved improved high-yielding cereal breeds as well as new practices of irrigation and sowing, the extensive use of synthetic fertilizers, pesticides, and herbicides, modern management techniques, and mechanisation. The introduction of the new agricultural “package” and related food security had dramatic political and socioeconomic impacts for all involved countries (the so-called “Green Revolution” of the late 1960s). Increase in agricultural production and food security must have had similarly dramatic effects on societies in prehistory.

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Research on this topic in archaeology tends to centre on products, the most prominent model being Sherratt’s „Secondary Products Revolution“. In this paper I change the focus from production to technology. The example of the „Green Revolution“ teaches us that only the adoption of the entire cluster of innovations at once warranted a satisfactory production increase. I explore the possibility that the integration of the initial farming techniques with post-Neolithic, “secondary” farming practices brought about a similarly coherent technical system in Late Neolithic Europe.

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Early Wagons in Eurasia. De-Entangling an Enigmatic Innovation

Innovation discourse is usually following a narrative of progress. In this perspective, prehistoric innovations are charged with meaning. From past, as well as own experience, we suppose to know what something is good for. We assess the cultural significance of e. g. early wagons, because we recognize its function and its usefulness in the retrospective. The functionalistic perspective as well as the narrative of progress provide explanations that seem to bring us close to cause and course of innovation processes. The axiomatic assumption that a successful innovation resulted from its technical and economic benefits, and the focus on the instrumental rationality of new technologies obscures our view on the reality that hides in a specific innovation process.

This I want to discuss in my case study of the innovation of wagons in the 5th and 4th millennium BC. Looking at the obstinacy and affordance of this new technology we see an irrational moment contrasting our idea of the use of wheeled vehicles. Not those advantages for transport and mobility obvious for us have been decisive for the resounding success of this innovation, but new ways of social practice and self-staging

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The Innovative Potential in Communities of the Eastern European Steppe in the 3rd Millennium BC

At the transition from the 4th to the 3rd mill BC, two fundamental innovations in completely different spheres took place in the eastern European steppe. One is connected with the ritual sphere: the construction of pit graves beneath or in previously erected burial mounds, in conjunction with other distinct burial rite characteristics, developed and established itself in the steppe zone between the rivers Ural and Danube. The other innovation involved the subsistence economy of these populations, which archaeologists have dubbed the Yamnaya culture, which takes its name from the eponymous grave construction. From its beginning, the Yamnaya culture is associated with a specialized breeding and herding of bovids. This was practiced so efficiently that it, unlike the burial rites and grave construction initially associated with it, remained unchanged for about 2000 years. It is likely that specific interferences connected the two innovations closely to each other, but it is hard to describe them more in detail due to the limited archaeological dataset.

However, the changes introduced in the ritual and the economic circumstances can contribute to our understanding of the Yamnaya culture's potential for innovation. Scholars have often pointed to this innovative potential to explain the dissemination of the Yamnaya culture. However, only a very limited number of technological innovations can be connected with the population of the Yamnaya culture as disseminators other than the transfer of the specific rites and construction of its burials, probably in conjunction with the specialized breeding and herding of bovids.

In my discussion of possible networks between the steppe north of the Black Sea and the Balkan-Carpathian-region to explain the transfer of innovation, I will refer to the model of Michael Frachetti (2012). Frachetti argues for non-uniform institutional alignments which connected prehistoric communities which were separated by great distances and had not developed common supraregional social value systems. Essentially, it is only the transfer of specific knowledge in particular spheres of life, in the form of economic, technological or ideological novelties, which allowed initial networks among individual agents to form. In my discussion, it is in the context of this very early development of networks, which had effects on very different levels, that I would like to discuss the transfer of innovations between the Eastern European steppe and the Balkan-Carpathian region.

Bibliography

M.D. Frachetti, Multiregional Emergence of Mobile Pastoralism and Nonuniform Institutional Complexity across Eurasia. *Current Anthropology* 53 (1), 2012, 2–38.

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Contextualising Innovation. On Waggon Drivers, Waggon Drivers and Burial-Mound Possessors in the North Caucasus and Beyond

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During the mid-4th and early 3rd millennium BC crucial technological innovations spread across wide parts of Eurasia. The Caucasus and the Eurasian steppe are important regions in this transfer, since they link Western Asia to the then still Neolithic societies of Europe. Besides, Caucasia is a focal point of new technical developments by itself. Along with them or as a foundation for the transfer of technical innovations such as waggons, charts or highly functional bronze weapons, a new ritual and a new attitude towards the individual spread even faster.

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Single individuals in burial monuments – mounds – became a pan-Eurasian phenomenon during this period. The emergence of the individual social person as an ancestor required a specific set of refurbishments among which exotic and technologically advanced products perhaps played a major role. The conference wants to explore non-technological knowledge that is transmitted and appropriated together with technological knowledge.

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In this contribution we want to take a closer look at the formation and transfer of such non-technological aspects in the 4th and early 3rd millennium BC. The idea of the mound itself represents a crucial transcendent and social innovation. Was it likewise important for the transfer of new techniques? For instance, when and why did wheeled transport become a topic in the set of representations of elite social persons? And were individuals buried with wagons indeed elite? Recent bioarchaeological research deciphers new information concerning such questions and helps to contextualise technologically innovative objects as media to display personhood and social order.

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Innovation, Interaction and Society in the 4th Millennium BCE in Europe

At the transition from the 4th to the 3rd millennium several important innovations that were outlined as aspects of the Secondary Products Revolution, as it was termed by Andrew Sherratt (1981), became widespread and were integrated into local contexts, exerting a specific influence on existing societies. This included a high potential for changes in all aspects of economy and society in certain regions.

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The project focuses on the preconditions for the quick spreading of these innovations and the divergent modes of appropriation, as well as on the different effects they had on existing local contexts. This will be done by comparing different geographical zones, namely the wetland settlements in the circum-alpine region and the area northwest to the Pontic Sea, where several of these innovations left significant traces in the archaeological record. It is expected that the interaction of particular innovations and their specific appropriation led to different results that could be connected to other remarkable phenomena arising in the 4th millennium, such as the existence of the Tripol'e culture's giant settlements between the Bug and Dnepr rivers or the changes in economic aspects and settlement patterns in the area of Lake Constance. These phenomena were accompanied by evidence that points to the presence of people of "foreign" origin. By investigating these particular cases, aspects of communication and human mobility will be incorporated as ways of transferring knowledge and innovation.

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CONTACT

Wheels of Change. The Polysemous Nature of Early Wheeled Vehicles in Central and Northwest European Societies, ca. 3200-2500 BCE

The paper will focus on the impact of early wheeled vehicles on the ideology of Central and Northwest European societies in the centuries around 3000 BCE. The example of these vehicles emphasizes that a technological or economic innovation is always much more than that, since its polysemous nature has the power of linking aspects of economy, religion and the social.

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In investigating the appearance of parts of such vehicles in the wetlands of Northwestern Europe J.D. van der Waals was the first to define certain cultural patterns of deposition which suggested to him a ritual character of these finds. Strikingly, similar patterns can be identified among many of the occurrences of parts of wheeled vehicles in circum-alpine wetland settlements. This points to the likelihood that the finds from uninhabited parts of wetlands are much closer related to those from wetland settlements than was hitherto accepted. Both groups of finds are likely to provide evidence for the execution of ritual practices, in which specific parts of wheeled vehicles were dedicated as pars pro toto depositions in and outside of settlements.

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Appropriating Draught Cattle Technology in Southern Scandinavia. Roles, Context and Consequences

This paper discusses the introduction of draught cattle technology in southern Scandinavia during the 4th millennium BCE. I start by providing an empirical overview of the relevant lines of evidence and what they tell us about the use of draught cattle technologies, primarily the ard/scratch plough and wheeled vehicular transport.

This identifies patterns of variation in both time and space, including general chronological developments and more delimited differences between various parts of the region. It is notable that even within a region of this, relatively speaking, limited size, there appears to be significant variation in the trajectories taken by the use of draught cattle technologies in different areas.

This variation may be causally related to differences between the landscapes inhabited by the regional groups in question, and to differences between both their internal traditions and their external connections. Throughout the discussion of the material from southern Scandinavia, I keep an eye on how the impression we currently have may to some extent be the product of taphonomic factors affecting the composition and representativity of the empirical record. Finally, I discuss how the evidence from southern Scandinavia plays into our broader understanding of the spread of draught cattle technologies during the 4th and early 3rd millennium BCE, and of how these developments in technology correlate with and are related to broader socioeconomic and ideological developments.

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Innovation and Change at the Onset of the Nordic Bronze Age

This paper addresses the potential role of metallurgical innovation in shaping socio-cultural change in the Nordic Bronze Age 2300-1500 BCE. To shed light on this seminal question, similarities as well as differences in the reception of innovations in Scandinavia will be tracked. Furthermore, the hoard from Pile will be considered as a potent source of information about the earliest local metallurgy. Data can together suggest that societal change first unfolded c. 2000 BCE and especially c. 1600 BCE. A likely scenario is a complex one: metallurgy co-acted with a number of dependent, and likewise exogenous, social-material innovations, which together capitalized on the growth of metal supply and hence the efficiency of macro-scale connectivity.

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An entanglement of innovations and the increasing amount of metals in circulation in nexus with a thriving economy seem to have collectively pushed society and culture towards and across the brink of transformation. Thresholds of change can be identified at approximately the same time across large parts of Bronze Age Afro-Eurasia, which implies an underlying connectivity while a combination of anthropogenic and nature-given pressures could very well have contributed as well.

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Haskel J. Greenfield: The Spread of Productive and Technological Innovations in the Old World. An Integrated Zooarchaeological Perspective on Secondary Animal Products and Bronze Utilitarian Metallurgy

9.30–10.00

Marcella Frangipane: The Role of Metallurgy in Different Types of Early Hierarchical Societies. The Case of Eastern Anatolia between 4th and Early 3rd Millennium BC

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Lorenz Rahmstorf: And Childe was Right after all? Vere Gordon Childe's Thoughts on Immigrant Craftsmen, Prospectors and the Dissemination of Key Economic Innovations During the 3rd Millennium BC in the Light of Recent Scholarship

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11.00–11.30

Federica Lume Pereira: Beads on a String. Gonur Depe (Turkmenistan) and its Role in the Middle Asian Interaction Sphere

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Peter Miglus: The Vault in 3rd and 2nd Millennium BC Mesopotamia

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Johannes Müller: Late Neolithic and Early Bronze Age Central Europe. Innovation and the Speed of Change

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14.00–14.30

Ulrike Wischniewski: Transfer of Innovation in the Near East in the Early Bronze Age

14.30–15.00

Ernst Pernicka: The Production of Tin Bronze in Eurasia – When, Where and Why?

15.00–15.30

Aslıhan Yener: The Discovery of New Tin Mines and Production Sites near Kültepe, Ancient Kanesh in Turkey. A 3rd Millennium BC Highland Production Model

15.30–16.00

Coffee

16.00–16.30

Xingcan Chen: Contact between the East and the West. Archaeological Evidence from the 3rd and 2nd Millennium BC

16.30–17.00

Jianjun Mei: The Appropriation of Early Bronze Technology in China

17.00–17.30

Sabine Linder: Early Bronze Casting in China. Transformative Capacity of a New Technology

19.00

Conference Dinner (Speaker only)

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The Spread of Productive and Technological Innovations in the Old World. An Integrated Zooarchaeological Perspective on Secondary Animal Products and Bronze Utilitarian Metallurgy

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This paper examines the nature of the spread of two major technological and productive innovations and how they transformed the nature of lifestyles in Eurasia from the Late Neolithic through the Early Bronze Age.

These changes set the tone for the development of modern lifestyles by transforming the more egalitarian Late Neolithic economic systems and underlying social orders into the hierarchical stratified systems of the Bronze Age. While it is often pointed out that the transition to the new „world-order“ occurred with the advent of the Chalcolithic and the changes in technology and food production, these changes did not occur all at once. This paper will show how the timing of the changes in technology and productive intensification did not directly coincide with or cause the major changes in society and economy, but may have been simply by-products of larger processes.

THURSDAY

The first of the innovations to be examined involves the spread of every-day or utilitarian bronze metallurgy. While it is commonly assumed that metallurgy appeared with the Chalcolithic and was widespread in the Bronze Age, this is not true, in fact.

Early metallurgy (Neolithic and Chalcolithic) is primarily for display purposes. In the Bronze Age, metal objects become more functional and utilitarian. As will be shown here, the use of bronze tools for mundane activities, such as butchering animals, did not become common until the Middle Bronze Age in the Near East and Europe.

FRIDAY

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The second innovation, the adoption of animal secondary products, does not coincide with the spread of utilitarian bronze metallurgy. Milking of several species clearly began during the Neolithic based on ceramic lipid studies. However, zooarchaeological research has suggested that intensive milking of goats probably began early in the Neolithic, while that of sheep and cattle occurred much later (i.e. during the Chalcolithic), coincident with the beginning of the intensive exploitation of sheep for their other secondary product (wool). In this paper, zooarchaeological data from across a broad swath of western Eurasia, from the southern Levant, Turkey, the Balkans and central Europe will be used to demonstrate the nature, rate of change, and rate of spread that occurred in productive relationship of these innovations from the Neolithic into the Bronze Age.

MAP

DIRECTIONS

WEB

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CONTACT

The Role of Metallurgy in Different Types of Early Hierarchical Societies. The Case of Eastern Anatolia between 4th and Early 3rd Millennium BC

The paper will take into consideration the great development of metallurgy and alloy technologies linked to an improved knowledge of polymetallic ores, in relation with the emergence of hierarchical societies in the peri-Mesopotamian world, with particular focus on the Anatolian Upper Euphrates and Upper Tigris regions.

Notwithstanding a clear continuity from 4th to early 3rd millennium in the appropriated technology and in the formal models adopted for the manufacture of objects as well, crucial differences can be observed in the destination and social use of metals in the 4th millennium proto-state societies and in the Early Bronze Age clan-based communities, which had developed from the “collapse” of the early state attempts in the regions considered.

CONTENTS

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These differences will be analysed in relation to the different conditions and social needs expressed by the fourth and early third millennium societies in the Upper Euphrates and, recently, Upper Tigris valleys, having as a reference point the analysis of the detailed sequence of events at Arslantepe-Malatya.

The different role of metallurgy, and wealth/prestige products in general in these two types of societies is particularly significant in that they may be considered two emblematic models of early hierarchical societies before the establishment of mature states.

FRIDAY

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MAP

DIRECTIONS

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CONTACT

And Childe was Right after all? Vere Gordon Childe's Thoughts on Immigrant Craftsmen, Prospectors and the Dissemination of Key Economic Innovations During the 3rd Millennium BC in the Light of Recent Scholarship

CONTENTS

The Prehistory of European Society, V.G. Childe's last synthesis, was published shortly after his sudden death in 1957.

In this work he presents for the last time his conviction that the major socio-political developments took place initially in the Near East but later affected also Europe. The disseminators of novel technologies like bronze casting were itinerant (immigrant) craftsmen and prospectors who diffused innovations far beyond their point of origin. Proponents of the New/Processual Archaeology in 1960ies and 1970ies rejected such views and emphasized instead the study of local developments and ecology.

THURSDAY

Research in recent decades has become again more open to some of Childe's ideas, yet the general dichotomy between "isolationists" and "diffusionists" explanation schemes for cultural change is still prevailing today.

FRIDAY

In this contribution I would like to discuss the novel technology of bronze casting together with other key economic innovations which are traceable for the first time (weights and measures) or were disseminated far beyond their original geographical area of use (seals) during the third millennium BC. The potential correlation between the spread of bronze technology to these two and other novel technologies will be analysed. Based on this new evidence, some of Childe's ideas on the existence of a small class of highly mobile people seem to offer indeed an important explanatory frame to understand the swift dissemination and local reinterpretation of major economic innovations during this period.

SATURDAY

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DIRECTIONS

WEB

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CONTACT

Beads on a String. Gonur Depe (Turkmenistan) and its Role in the Middle Asian Interaction Sphere

As one of the few extensively excavated sites of the BMAC (Bactria and Margiana Archaeological Complex), Gonur Depe has long occupied a central role in the study of the Central Asian Bronze Age. This vast settlement covers an area of more than 40 hectares and was once located on the deltaic fan of the Murghab River in Southern Turkmenistan.

Excavations by the “Margiana Archaeological Expedition”, spanning four decades, have uncovered complex fortifications and water storing systems. Monumental administrative and funerary architecture coupled with an outstanding craft and ceramic production further attest to the distinctively urban character of Gonur Depe and its marked role within the “Middle Asian Interaction Sphere”.

This paper will add to previous evidence by presenting newly identified beads of Indus origin found in Gonur Depe. It will explore the notion of “intrusive objects” found within the context of BMAC sites and juxtapose it with the concept of “entangled knowledge” championed at this conference. A detailed study of production techniques and material distribution concerning ceramics and ornaments based on recently gathered evidence will shed light on the nature of craftsmanship at Gonur Depe and its entanglements with other urban centres of the time.

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DIRECTIONS

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CONTACT

The Vault in 3rd and 2nd Millennium BC Mesopotamia

The vault was one of the key architectural innovations of the 3rd millennium BC in the Ancient Near East. An intensive use of vaulted roofs and doors can be especially observed in Mesopotamia during the Middle Bronze Age respectively Old Babylonian Period, when several types of vault constructions were developed and built.

CONTENTS

The paper discusses the spread of the vaulting technique and its integration in different Mesopotamian sites in relation to functions of buildings and the individual social status of their occupiers. The main questions are under which circumstances this innovation was accepted and accommodated or rejected, and in the latter case what reasons can be made responsible for the hindrance of its appropriation.

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MAP

Late Neolithic and Early Bronze Age Central Europe. Innovation and the Speed of Change

The acceptance or non-acceptance of innovative processes in the spheres of production, distribution and consumption influenced the constitution of Late Neolithic and early Bronze Age societies in Central Europe.

DIRECTIONS

The structural comparison of two different social groups (LN Northern Germany, EBA Central Germany) will highlight different social triggers that are responsible for appropriating innovations.

WEB

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Transfer of Innovation in the Near East in the Early Bronze Age

In the middle of the 3rd millennium BC, bronze casting became common in Southern Mesopotamia. The adoption and integration of this innovation in society is displayed by an increasing number of bronzes in burials as well as other depositions. Besides the archaeological sources contemporary administrative, cultic and literary texts help to underline the social impact of the new technology.

CONTENTS

On the one hand, these written sources inform us about metal resources and the very sophisticated technology of metal production, developed by highly specialized craftsmen. On the other hand, information about cultic and social practices, like burial rites, connected to bronzes are transferred.

THURSDAY

This paper presents the results of an ongoing research project with the objective to gain a closer insight into the entanglement of society and technology by collecting and analysing archaeological and textual evidence dealing with bronze casting. Additionally, recent metallurgical analyses will be included in the research. Another focus lies on the transfer of knowledge. Knowledge could be transferred via social and commercial contacts, i.e. with traders, intermediaries and other craftsmen exchanging experiences and knowledge, or via the object itself by drumming up interest for the new technology and material. Bronze casting is not only regarded as a technological but also a possible social innovation.

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WEB

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The Production of Tin Bronze in Eurasia – When, Where and Why?

Despite this long history of metal working and metal extraction the archaeological Metal Ages are traditionally considered to begin with the Bronze Age roughly at the beginning of the third millennium BCE in the Mediterranean and the Near East and at the end of it in central Europe.

CONTENTS

However, if we go beyond the descriptive use of the term then we are bound to encounter several questions that have been discussed for more than a century but never satisfactorily answered:

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i) Why was bronze, the alloy of copper and tin, so attractive?

ii) Where was this alloy invented and how was the technology distributed? Since it is distributed all over the world the question arises, if it was invented several times.

iii) What was the relationship between the introduction of bronze and early societies? Was it the cause for or the result of social changes that are associated with the Bronze Age?

FRIDAY

iv) And above all: Where did the tin come from?

This paper will provide a short overview of the earliest appearance of tin bronze and its use. In addition, a new methodological approach to the last question will be outlined.

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DIRECTIONS

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The Discovery of New Tin Mines and Production Sites near Kültepe, Ancient Kanesh in Turkey. A 3rd Millennium BC Highland Production Model

This paper introduces an unexpected new source of tin (cassiterite) combined with arsenic (yazganite), located in the foothills of the volcano, Erciyes [Argaeus] in the Kayseri Plain 26 km. south of the site of Kültepe Kanesh.

Volcanoes in Turkey have always been associated with obsidian sources, but were not known to be a major source of heavy metals, much less, tin. XRF analyses confirmed earlier semiquantitative pXRF analysis of the Hisarcık ores which yielded high levels of tin and arsenic, as well as significant traces of manganese and antimony, which are suitable to produce complex copper alloys and with enough tin and arsenic content to produce tin bronze. Crucible smelting experiments conducted in 2014 at Kültepe successfully smelted the Hisarcık ores into tin metal prills while a second co-smelting experiment with copper produced bronze.

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FRIDAY

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SATURDAY

Contact between the East and the West. Archaeological Evidence from the 3rd and 2nd Millennium BC

Recent archaeological evidence proves that several important inventions may have been transplanted from the West to the present-day China during the third and second millennium BC when China on the way from the late Neolithic to the Early Bronze Age.

MAP

This paper, based on the updated archaeological materials mainly from China, argues that Bronze and Iron metallurgy, wheat, barley, sheep, cattle and horse may all come from the West though the routes are not clear yet. The whole process may last for more than 1500 years, but the transplantation might be seen as a package because the inventions were somehow interconnected.

DIRECTIONS

This paper also discusses the inventions from the West may have played an important role in the formation of Chinese civilization.

WEB

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The Appropriation of Early Bronze Technology in China

Over the past two decades, there has been increasing archaeological evidence from Northwest China suggesting a strong link between the beginning of bronze metallurgy in East Asia and the eastward spread of bronzes across the Eurasian steppe. It has been observed that bronze finds of the late third and early second millennia BCE from Northwest and North China present a sharp contrast to those found in the Central Plains of China in terms of object types and manufacturing technologies, indicating significant distinctions in the appropriation of early bronze technology in different regions.

The appearance of ritual bronzes and the rise of piece-mould casting technology at the Erlitou site in Henan province marked a breakthrough in the early development of bronze metallurgy in the Central Plains. Regional interaction as well as local innovations provided further impetus to the development and spread of bronze metallurgy, which has been widely considered as a highly significant technological and economic factor in the rise of Chinese civilization in the Central Plains.

This paper aims to explore how the appropriation of early bronze technology happened in the Central Plains and why innovations in casting technology, especially piece-mould casting, became possible. It will highlight the role of local cultural and ritual traditions in shaping the trajectories of early bronze technology there in order to understand the driving forces behind these innovations in bronze technology. Finally, it will focus on the development of bronze technology in regions peripheral to the Central Plain, and explore the crucial influence of social-cultural factors on the formation of some local bronze traditions.

CONTACT

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DIRECTIONS

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Sabine Linder

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CONTACT

Early Bronze Casting in China. Transformative Capacity of a New Technology

Today younger Chinese archaeologists are extremely interested in "keji kaogu", scientific, lab-based archaeology in place of the macro-narrative. They are conducting research on formerly neglected regions to gain new insights into the Anthropocene, the artefacts, and the people who created them.

CONTENTS

Small bronze tools and ornaments as well as furnaces and slag appear at burial and settlement sites in Northwestern China for the first time in the late third and early second millennium BCE. Communities which lived in this arid environment acquired the complex system of metallurgical knowledge and developed a taste for similar items as their Central Asian neighbors. When metallurgy arrived in the central Yellow River Basin it became totally transformed. Craftsmen appropriated the technology in a new way: Elaborate serving vessels made by the piece-mold casting technique appear.

THURSDAY

How did this happen? Ceramic specialists experienced in pyrotechnology and in creating sophisticated ceramics and casters interacted, i.e. mutual interchange of ideas and materials and cross-crafting happened. It seems that from the very beginning this new and highly specialized ceramic piece-mold technique was relevant for a local "élite". In Southwestern China oversized bronze masks and sculptures seem to emerge all of a sudden with the beginning of bronze casting in this region. Yet the network between the different regions and societies and the bronze objects themselves are far from being well understood.

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By looking as closely as the data allow, the paper will discuss the important role that metallurgy played in shaping such a network and how it transformed some of these early societies.

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DIRECTIONS

Saturday, January 17, 2015

WEB

9.00–9.30

Florian Klimscha: Spheres of Knowledge and Recombination of Techniques. The Transfer of Innovations between SW Asia and Central Europe in the Chalcolithic and Early Bronze Age

9.30–10.00

Barbara Helwing: A Comparative View on Metallurgical Innovations in Southwestern Asia

CONTACT

10.00–10.30

Svend Hansen: Technical Innovations. The Role of Early Metallurgy

10.30–11.00

Coffee

CONTENTS

11.00–11.30

Philipp W. Stockhammer: The Transformative Power of Knowledge Transfer. Appropriating Bronze Technology

11.30–12.00

Ken Massy: Old space, Old Customs? Early Bronze Age Burials in the Lech Valley in the Light of Material and Cultural Innovations

THURSDAY

12.00–12.30

Corina Knipper: Personal Mobility and Dietary Differentiation at the Onset of the Central European Metal Ages. A Case from the Lech Valley in Southern Bavaria

12.30–14.00

Lunch (Speaker only)

FRIDAY

14.00–14.30

Alissa Mittnik: Genetic Studies on Late Neolithic and Early Bronze Age Burials of the Lech Region (Southern Germany)

14.30–15.00

Johannes Krause: Ancient Human Genomes Suggest three Ancestral Populations for Present-Day Europeans

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15.00–15.30

Christian Horn: The Last War. A Theoretical Outlook on Innovations in Weapon Technology in the Late Neolithic-Early Bronze Age Transition of Southern Scandinavia

15.30–16.00

Coffee

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16.00–17.30

General Debate and Conclusion

DIRECTIONS

WEB

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CONTACT

Spheres of Knowledge and Recombination of Techniques. The Transfer of Innovations between SW Asia and Central Europe in the Chalcolithic and Early Bronze Age

Since Colin Renfrew's well known works on the Copper Age of the Balkans there is an ongoing discussion of cultural autochthony vs. diffusion in the late prehistory of Western Asia and Southeastern Europe.

CONTENTS

In my paper I will discuss recent data on key innovations in the Chalcolithic and Early Bronze ages: even though it is difficult to show a gradient diffusion of techniques, there is a striking parallelism in the appearance of technical stages in both regions. When scrutinising these and analysing the different stages of the respective chaîne opératoires, it becomes clear that in many ways our models are still superficial and need modification. Chalcolithic and Early Bronze age innovations like copper smelting or wheeled vehicles appear in a variety of shapes and different states.

THURSDAY

Often there are similarities but from the typological and technological point of view differences can be observed. I will argue that it is necessary to understand spheres of interaction in which the knowledge of techniques was available and correlate them with our data on other long-distance networks to identify the pace and mode of diffusion as well as the successive changes.

FRIDAY

SATURDAY

MAP

DIRECTIONS

WEB

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CONTACT

A Comparative View on Metallurgical Innovations in Southwestern Asia

During the second half of the fourth millennium BCE, communities in southwestern Asia underwent fundamental changes in their social organization, taking towards models with institutions directed at central control of resources and manpower as is exemplified from the city of Uruk. This scenario correlates with the appearance of new technologies in metal production, namely the introduction of updraft furnaces and large-scale smelting operations in various areas distant from each other. These innovative practices allow for large-scale production of copper and copper alloys .

CONTENTS

The paper will first begin with a comparative analysis of these metallurgical innovations manifest in areas as distant as the southern Levant and highland Iran, and will secondly trace the impact that the new material had on the reproduction of social order, especially through its usage in the production of tools and weapons. The appearance of metal weapons in elite burials follows upon the establishing of these innovations only with several centuries of delay and is linked not with the emergence but with the breaking-apart of the centralized institutions. As will be argued, the spreading of the knowledge on copper smelting furnaces took place in an atmosphere of contact and exchange during a period of early state organization, but the material manifestation of copper usage in elite burials relates to a later period of competing powers at a moment when the social innovation of early state organization fell apart.

THURSDAY

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SATURDAY

Svend Hansen
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MAP

Technical Innovations. The Role of Early Metallurgy

Technical innovations played an important role in V. Gordon Childe's concepts of developments in prehistory and metal played a major role in these concepts. In Childe's view mining, melting ores and casting were fulltime occupations. The division of labour was connected with social control. It was the crucial point for the rise of social inequality. In my contribution I want to ask if this view can be sustained or should be replaced by other conceptions.

DIRECTIONS

WEB

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CONTACT

The Transformative Power of Knowledge Transfer. Appropriating Bronze Technology

In the current academic debate the spread of bronze casting technology is still discussed only from an evolutionistic point of view, thus focussing on the advantages of the production of highly efficient tools and weapons.

The transition from the Neolithic to the Early Bronze Age is considered to be an overregional uniform process which led to the growing management of the new technology. The general assumption that prehistoric humans were willing to accept this advanced technology as soon as they had acquired the respective knowledge is in stark contrast to present-day critical discourses about innovations.

CONTENTS

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In my presentation I will go beyond the dominating narrative by analyzing local differences in the appropriation of the new technology with a special focus on the social practices and ideas that were communicated together with the technological knowledge. These elements had to be translated into local world views and, thereby, developed their transformative potential. This approach helps us to better understand societal developments in the early 2nd millennium BCE as well as new material phenomena like Early Bronze Age gold vessels. Moreover, I will analyse the relevance of the adoption environment as well as shifting perceptions of the material world which resulted from the fact that for the first time actors were able to produce large numbers of identical objects.

FRIDAY

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DIRECTIONS

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CONTACT

Old space, Old Customs? Early Bronze Age Burials in the Lech Valley in the Light of Material and Cultural Innovations

Since the earliest Neolithic, the Lech-Valley with its two rivers and loess sediments had been the perfect spot for prehistoric settlements and burial sites. Until the Late Neolithic, the density of archaeological features remained unaltered on a level that was common for Southern Bavaria.

CONTENTS

Right at the beginning of the Early Bronze Age, an enormous increase of archaeological sources can be observed, especially settlements and large cemeteries with up to 63 burials were found. The burial rites seem to follow Bell Beaker traditions or at least to continue their development. By taking a closer look it becomes evident that not only burial customs but also settlement patterns seem to have changed since the beginning of the Early Bronze Age. For the first time in that area, the small villages with their huge timber buildings of up to 65 metres in length can be analysed and compared with their corresponding cemeteries and the people buried there. Well documented find complexes provide the foundation for an examination that is not solely based on pure archaeological facts.

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The presentation will deal with the most important Early Bronze Age sites south of the city of Augsburg. The sites will be put in a topographical context and inner structures as well as special characteristics will be explained. For a better understanding of the scientific analyses, all features that are going to be discussed in the following presentations will also be shown in detail here.

SATURDAY

MAP

DIRECTIONS

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CONTACT

Personal Mobility and Dietary Differentiation at the Onset of the Central European Metal Ages. A Case from the Lech Valley in Southern Bavaria

CONTENTS

At the end of the third and beginning of the second millennium BC, the introduction of bronze for the manufacture of tools, weapons and personal ornaments marked a major step in European prehistory. Facilitating the exchange of the metal raw materials and manufactured goods required regular and organized contacts among communities. On the other hand, local population continuity was a prerequisite for the accumulation of wealth, the establishment of enduring social differentiation, and the formation of regional elites.

THURSDAY

Radiogenic and stable isotope analyses of human teeth and bones provide effective means for the identification of non-local individuals and indicate dietary and – by extension – social differentiation. The Lech Valley in southern Bavaria offers excellent conditions for the exploration of the bioarchaeological record spanning from the Bell Beaker to the Early Bronze Age period.

FRIDAY

This presentation will introduce first isotope data from six cemeteries in this study area and explore dietary habits as well as age and sex-specific indication for personal mobility. The results will be linked to overarching research questions regarding the spread of the major technological and societal changes at the beginning of the central European metal ages.

SATURDAY

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DIRECTIONS

WEB

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CONTACT

Genetic Studies on Late Neolithic and Early Bronze Age Burials of the Lech Region (Southern Germany)

CONTENTS

European pre-history is marked by human population expansions and migrations as well as by the introduction and development of new technologies. For example, the Neolithic revolution was accompanied by an almost complete replacement of the maternally inherited mitochondrial DNA types (mtDNA haplogroups) typical of European hunter-gatherers by a more diverse set of haplogroups found in early farmers, indicating that farming in Europe was introduced by an incoming population expanding from the Near East. Later, during the Middle Neolithic the earlier hunter-gatherer haplogroups became more prevalent again, while the Late Neolithic and Early Bronze Age saw the emergence of even more haplogroups previously not found in the region.

THURSDAY

To gain insights into a possible changing genetic landscape during the transition of the Late Neolithic to the Early Bronze Age, we studied the remains of 83 individuals from burials associated with these two periods in the Lech region around Augsburg, Southern Germany. We assess the general preservation of ancient DNA in these remains and reconstruct complete and partial mitochondrial genomes to calculate the effective population size during that time, identify maternal relationships among the individuals and determine the level of genetic continuity from the Late Neolithic to the Early Bronze Age. We also discuss the planned approach of using nuclear DNA (inherited from both mother and father) to paint a more detailed and comprehensive genetic picture of these populations.

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DIRECTIONS

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CONTACT

Ancient Human Genomes Suggest three Ancestral Populations for Present-Day Europeans

Ancient DNA can reveal historical events that are difficult to discern through the study of present-day individuals. To investigate European population history around the time of the agricultural transition, we sequenced complete genomes from a ~7,000 year old early farmer from the Linearbandkeramik (LBK) culture from Stuttgart in Southern Germany and an ~8,000 year old hunter-gatherer from the Loschbour rock shelter in Luxembourg. We also generated genome wide data from seven ~8,000 year old hunter-gatherers from Motala in Sweden.

We compared these genomes and published ancient DNA to genome wide data from present-day individuals from 185 diverse populations to show that at least three ancestral groups contributed genetic material to present-day Europeans. The first are Ancient North Eurasians (ANE), who are more closely related to Upper Paleolithic Siberians than to any present-day population.

The second are West European Hunter-Gatherers (WHG), related to the Loschbour individual, who contributed to all Europeans but not to Near Easterners.

The third are Early European Farmers (EEF), related to the Stuttgart individual, who were mainly of Near Eastern origin but also harbored WHG-related ancestry. We model the deep relationships of these populations and show that about ~44% of the ancestry of EEF derived from a basal Eurasian lineage that split prior to the separation of all other non-African lineages.

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DIRECTIONS

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CONTACT

The Last War. A Theoretical Outlook on Innovations in Weapon Technology in the Late Neolithic-Early Bronze Age Transition of Southern Scandinavia

CONTENTS

A popular proverb states that generals always fight, or prepare to fight, the last war. In modern military science, this is considered an undesirable state, because it leaves armies unprepared for new challenges and future wars. The counter measures taken prove the real impact of the issue, which can be circumscribed as prior knowledge in the face of the imminent threat to a society.

THURSDAY

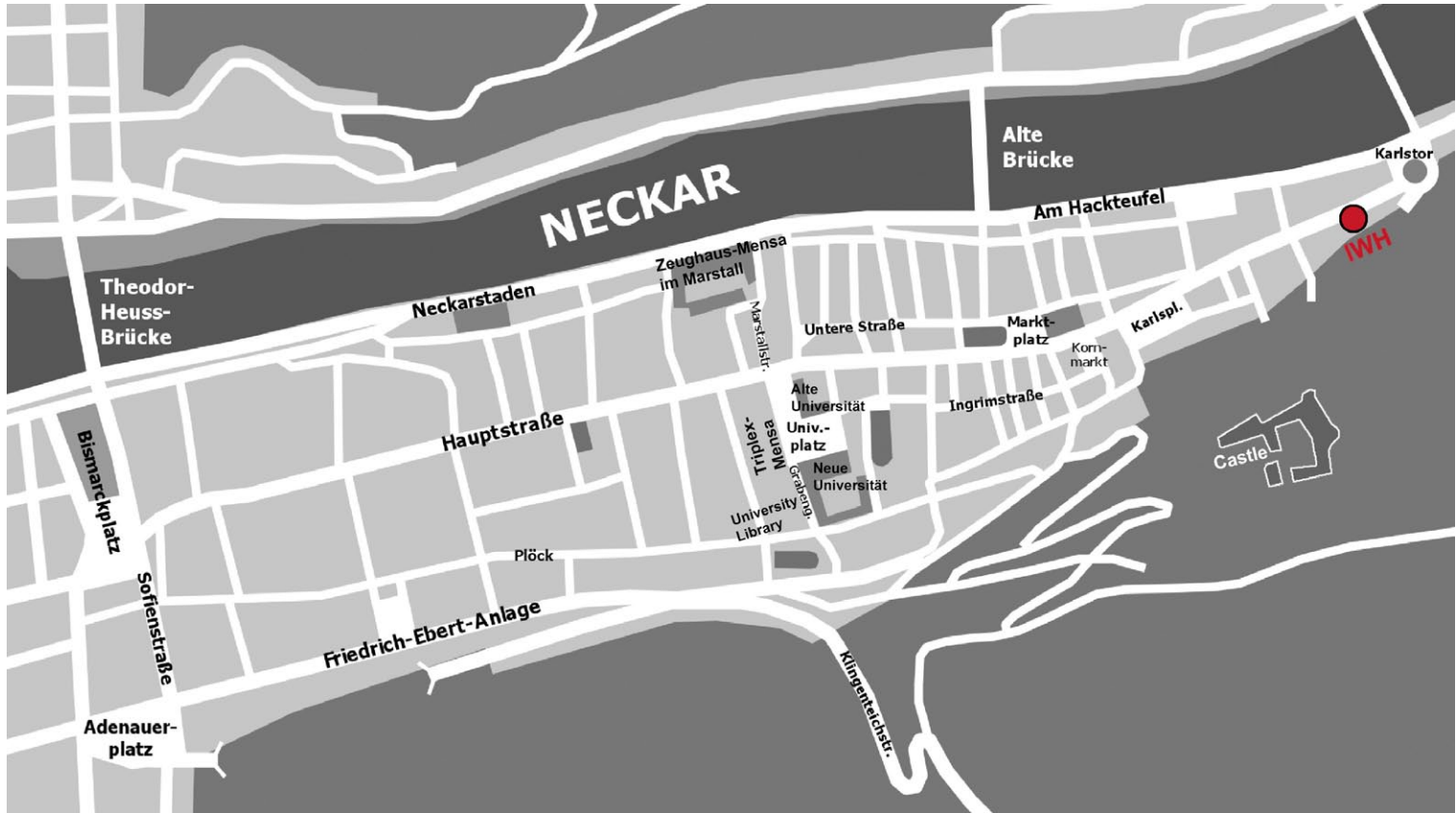
This paper explores the role of combat, tradition and weapon design in the introduction of new weapon designs into Southern Scandinavia, namely the sword and the spear. The choice to adopt these innovations was enabled and constrained by the use of Late Neolithic halberds as specialized weapons. Prior material, design, tradition and learned bodily techniques may have been factors in the adoption of swords and spears as specialized weapons of the subsequent Bronze Age. Furthermore, the possibility of non-verbal communication with the opponent will be discussed as a possible driving factor for adopting innovations.

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Arrival per public transport from Heidelberg main station

WEB

By S-Bahn

Take the suburban line S1 (direction Osterburken) or S2 (direction Mosbach) to “S-Bahnhof Altstadt” (ca. 4 minutes). From there, it is only a three minute walk to the IWH.

CONTACT

The S-Bahn operates approximately every 30 minutes.

By bus

From the station forecourt (Willy-Brandt-PLatz) take bus line 33 (direction “Köpfel”) to “Neckarmünzplatz” or “S-Bahnhof Altstadt“. From there, it is only a three minute walk to the IWH.

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