

Introduction

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This volume is the result of the conference session “Lithic raw materials in prehistory: methods, practice and theory” at the 27th Annual Meeting of the European Association of Archaeologists (EAA) in Kiel 2021.³ The scope of this session was to bring together researchers from different cultural backgrounds, research traditions and methodological approaches to address and discuss various aspects related to archaeometric research of one overarching topic: lithic raw material procurement and distribution, lithic economy and related human behaviour.

Arguably, lithic materials are the oldest verifiable culture-bearing resources in human history, demonstrated by the wide array of their uses in the profane and sacred spheres of life. Owing to their abundance, versatility and longevity, lithic artefacts are ideally suited for exploring and interpreting past human behaviour through the reconstruction of resource management, i.e. the procurement either directly or through distribution networks, and the processing, use and eventual discard, which represents the complete *chaîne opératoire* of lithic production and artefact biographies (Fig. 1). From a diachronic perspective, such studies can reveal dynamic processes relating to the development of economic behaviour, production strategies and traditions, landscape use, contact spheres, routes of migration and distribution networks.

Reconstructing these processes, however, depends on being able to trace the raw materials used back to their sources. Despite the obvious importance of provenance studies in

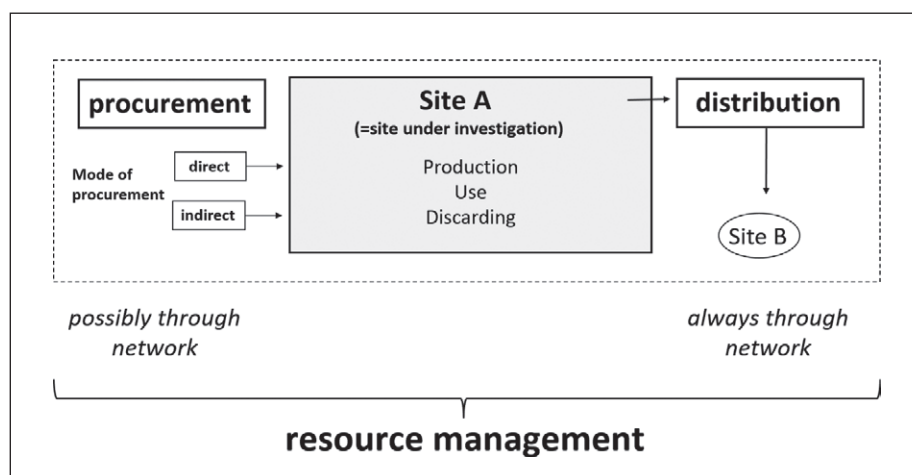


Fig. 1 Basic elements of resource management entailing the processes of procurement, production, use and discarding at the site (here called Site A), and potential distribution to other sites (here indicated as Site B) (graphics: M. Brandl)

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archaeology, attempts to generate characteristic “fingerprints” of particular raw materials are still not widely available and remain challenging endeavours. Therefore, this session focused on analytical techniques applied to various lithic raw materials from all geographical regions and their potential for tracing lithic resource management. This topical issue can be tackled from a multitude of perspectives, which hold the promise of significantly enhancing our insights into past economic behaviours on a large international and multidisciplinary scale.

Consequently, this volume comprises two sections: Section I is concerned with methodological approaches to chert and flint characterization and provenance analysis (Gurova et al.; Kochman), while Section II presents five case studies spanning from the Middle Palaeolithic in France (Wilson), through the Upper Palaeolithic in Portugal (Gameiro et al.), moving on to the Neolithic in the eastern Alps (Posch & Brandl; Schmitsberger et al.) and concluding with an examination of battle-axes assigned to the Corded Ware cultures (3rd millennium BCE) in Finland (Nordqvist & Holmqvist).

The methodologically oriented Section I contains two contributions that deal with provenance analyses of lithic raw materials for chipped stone tools from different viewpoints and propose different pathways to solving the most pressing topic in provenancing archaeological materials in general: how to achieve a sound and systematic database for such attempts covering as much geological information as needed to be able to securely differentiate between macroscopically similar materials and identify a potential source region.

Within this framework, Gurova et al. focus on a type of raw material that has gained a lot of attention during the past decade due to its prominent role as one of the markers for Early Neolithic networks within the Balkan region and is commonly referred to as “Balkan flint” (BF). Their contribution is based on more than a decade of intensive field surveys and laboratory analyses, combining micropetrographic and trace element (LA-ICP-MS) techniques, offering a substantial corpus of analytical data from geological outcrops and archaeological sites and resulting in the identification of several clusters of BF outcrops in a particular Upper Cretaceous geological unit. The paper adds a conceptual vision to the substantial corpus of empirical and analytical work previously undertaken. This also touches on the important issue of Balkan Neolithization, while crucial scientific questions highlight important future directions and challenges regarding this particular lithic resource.

Kochman’s study is concerned with the characterization of another lithic material of high significance for the production of chipped stone tools since the Middle Palaeolithic. The material under discussion comprises various chert varieties found in Upper Jurassic sequences of the Kraków-Częstochowa Upland in southern Poland, previously subsumed under the name “Kraków flint”, which is terminologically incorrect. The main claim of this contribution is that most analytical approaches are insufficient to securely characterize the highly variable chert types of this region and consequently do not allow for reliable provenance assessments, suggesting systematic in-depth microfacies analyses as a possible solution.

Section II, the case study part of this volume, offers various perspectives on lithic procurement strategies through a diverse spectrum of topics involving chert and flint, as well as other types of materials.

In the first chapter of Section II, Wilson presents a detailed case study of the Middle Palaeolithic sequence from the Bau de l’Aubesier rock shelter in Vaucluse, France, which provides the opportunity to examine diachronically the potential relationships between the season of use, climate and lithic territories. Based on faunal, climatic and lithic raw material data from three archaeological horizons, Wilson demonstrates that in the earlier layers, source access appears to have been the factor guiding the choice of lithic raw materials over knapping quality, while during the younger periods in the sequence, raw material choice was influenced more by the quality and size of the raw nodules than terrain difficulty. The youngest assemblage displays a more diverse picture of raw material use of both local and exogenous resources by highly mobile hunter-gatherer groups.

Gameiro et al. discuss new evidence for the Upper Palaeolithic in central Portugal. Their contribution adds valuable new data on the still patchy knowledge of this period through an

investigation of hunter-gatherer raw material procurement strategies at three sites, Rôdo, Vau and Bispeira. These sites are located in the Vouga River valley, which was previously considered devoid of Upper Palaeolithic occupation. The study area is situated between two hotspots of Upper Pleistocene research in Portugal, the Estremadura and the Côa Valley. The results of the current study suggest the use of mainly local raw materials accompanied by exogenous siliceous materials for blade and bladelet production. Based on petrographic analyses of the exogenous lithic raw materials, the authors postulate that highly mobile groups interacted throughout all three areas, the Estremadura, the Vouga River valley and the Côa Valley, indicated by extensive raw material distribution networks.

Posch and Brandl focus on lithic procurement modes and potential proxies for decision-making processes in western Austria, investigating the most ubiquitous locally available materials for chipped stone production in this region, chert and radiolarite. The study area, the Kleinwalsertal, can be regarded as a microregion rich in archaeological sites producing rich chipped stone assemblages from various periods and is therefore ideally suited to examining varying modes of local raw material acquisition. For this study, the results of both technological and raw material analyses for lithic assemblages from different chronological and topographic contexts were combined, which revealed particular choices made regarding the source type, the colour of the raw materials and the extent of core preparation.

Situated on the eastern fringe of Austria, the case study of Schmitsberger et al. highlights radiolarite mining, processing and distribution in eastern Austria. They present the preliminary results of an ongoing project aimed at a fuller understanding of a recently discovered radiolarite mining landscape within the St. Veit Klippen Belt southwest of Vienna. Mining there was aimed at the extraction of a particular type of raw material, for which the term “Vienna radiolarite” is proposed due to its petrographic and geochemical characteristics. The mining area is large and displays a long history of use, which lasted from the Upper Palaeolithic until the Bronze Age. The peak of the mining activities, however, can be attributed to the Neolithic period, for which there exists ample evidence for the use and distribution of Vienna radiolarite. Altogether, it becomes evident that the dimensions of Neolithic radiolarite mining in Vienna were dramatically underestimated, and research on this prehistoric mining landscape of an international scale has only just begun.

The final case study is from Finland and revisits an old hypothesis regarding the provenance of battle-axes made from diabase assigned to the Corded Ware cultures (CWC) dating to the early 3rd millennium BCE. Around 1500 battle-axes are known from Finland, which is an astonishingly high number given Finland’s position at the northern fringe of the CWC phenomenon. Using pXRF as a non-destructive technique, Nordquist and Holmquist re-evaluate the prevailing Satakunta provenance paradigm, hypothesizing an origin for most of the battle-axes from this source and their circulation as ready-made products. Although Satakunta could be established as the likely source of many of the objects analysed, the single-source hypothesis has to be rejected since the results point to the use of multiple outcrops for battle-axe production. Additionally, the authors explore the potential of pXRF for the analysis of archaeological non-siliceous rock raw materials by defining a systematic sourcing protocol, which closes the arc to Section I.

This brief overview demonstrates that the overarching topic of this volume, lithic resource management, is tackled from diverse perspectives, applying various analytical strategies in the attempt to explore the most suitable approach to this undertaking. As such, previous work is critically reviewed, as demonstrated in Kochman’s discussion of how best to deal with a complex geological setting producing abundant chert deposits within a spatially restricted area which are still hardly differentiable. Continuous and innovative efforts in explorative provenance studies often result in the development of systematic well-defined protocols, as demonstrated, for instance, by Gurova et al. and Nordquist & Holmquist. Additionally, new discoveries have been made, showing the potential of integrated analytical approaches to produce a comprehensive picture of prehistoric regions and microregions from the viewpoints of lithic

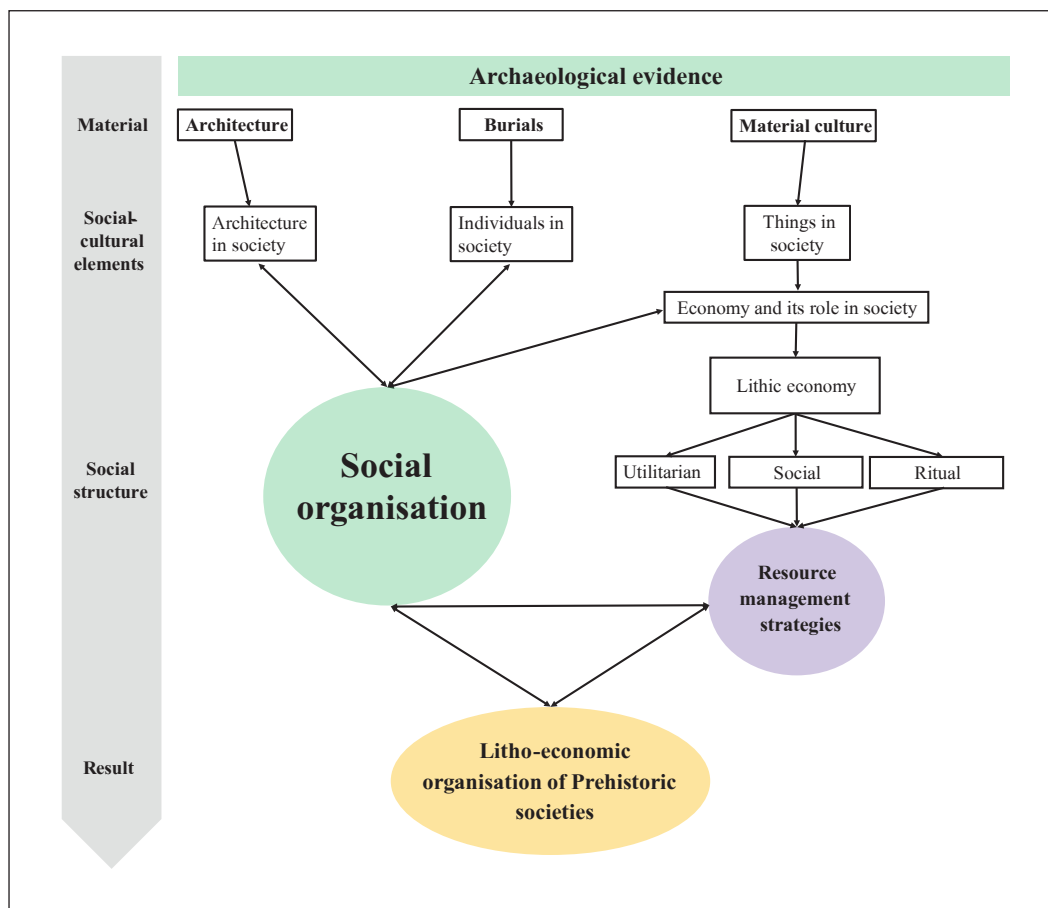


Fig. 2 The position of resource management within the overall organization of prehistoric societies from the perspective of the archaeological evidence and the interplay between material culture remains, social organization and economy (graphics: M. Brandl)

raw material procurement and human interaction, whilst placing the results in the known or newly discovered settlement infrastructure. In this volume, Gurova et al., Gameiro et al., Posch & Brandl and Schmitsberger et al. are at the forefront of such undertakings. Finally, Wilson addresses a topic that could not be of more relevance to our modern world when she explores potential influences of changing climatic conditions on human economic behaviour. Resource management explored from these perspectives raises questions far beyond those relating to the provenance of certain materials.

Through these ambitious endeavours, which all stem from original fundamental research, readers also have the opportunity to observe how the field of lithic raw material studies and its integration into the larger archaeological framework has developed over recent years and the enormous progress that has been made. Indeed, it should be clear by now that the days of “just macroscopic” raw material analysis are over, an obvious fact of such importance that we decided nevertheless to state it clearly here. Ultimately, this volume demonstrates a real change of this long-lasting paradigm in archaeological research by putting an end to the macroscopic study of lithic raw materials in favour of petrographic and geochemical approaches.

The recurrent theme throughout all contributions to this book is that we have just begun to comprehend the complexity of prehistoric economies and economic systems and how the multifaceted processes involved in lithic economy and prehistoric economic behaviour in general emerged, developed and functioned on various scales. It is not sufficient just to identify the potential source of a particular kind of raw material; it is always necessary to place provenance

results in the broader techno-cultural-economic background and – even more important perhaps – the social organization of the societies or communities under investigation. This is best illustrated by visualizing the position of resource management within this continuum, as shown in Figure 2.

As stated initially, this will allow us to examine and reveal spheres of contact, distribution and exchange between prehistoric communities through the reconstruction of raw material networks, and the development of production strategies and traditions within different prehistoric societies. To reach these goals, systematic fundamental research on a broad international interdisciplinary scale in a collaborative effort is urgently required. In this regard, the current volume can definitely be regarded as a successful international collaboration and an incentive to young and established scholars alike to continue work in this direction.