presence of Neolithic sites in suitable locations. In the latter case, associations have always been more easily assumed than proven, and such is the situation here. The presence of sites near Ocna Sibiului or Ocna Mureş, for instance, is suggestive but not definitive, although finds of 'mining tools' (waisted hammers) in the Govora area are certainly indicative (as also found at Figa, near Beclean). An alternative approach is that adopted by Brigand and Weller, whose spatial studies using a variety of statistical techniques are already well known in the literature.

A chapter by a team from Poznań, with Spanish involvement, covers salt exploitation in the Polish lowlands. Zbygniew Bukowski tried many years ago to create a picture of ancient salt-working across Poland, but realistically the only decent evidence comes from Little Poland, which is not covered here. The site at Inowrocław, excavated in the 1980s and 1990s, remains almost the only one in Great Poland with any real evidence for ancient exploitation; it is useful to have the results presented here as they were previously only published in local journals and on display boards in the park where the site is situated. It is also especially useful to have a plan and section of brine wells and reservoirs at this site, along with a full description of the production method adopted. There is mention too of a site at Chabsko near Mogilno, belonging to the Przeworsk culture, but no details are provided.

The chapter on the ethnography of salt in Moldavia, by Marius Alexianu and colleagues, provides fascinating information on the modern, 'traditional', uses and practices of salt in peasant communities. This Iaşi team, also including Weller and Brigand, has worked on the topic in various parts of Moldavia for many years; its results provide a window into the many possibilities that could also apply to the ancient exploitation of salt in such social and natural environments.

To supplement this fairly heavy European diet, we have two contributions on other parts of the world: an account of the search for 'pre-Columbian' salt production in Columbia, by Marianne Cardale Schrimpff, and a presentation of prehistoric salt production in Japan by Takamune Kawashima. Columbia is rich in salt, both coastal and from inland salt massifs, but its salt archaeology has been explored somewhat fitfully. Exploitation on a local scale on the coasts has happened up to the present day with enormous quantities of briquetage at some sites (e.g. Nemocón), but, as Cardale Schrimpff explains, archaeologically, the evidence for ancient production is hard to locate. In Japan, most salt production is coastal, and pottery for producing it began as early as Jōmon, with hearths and pits for brine boiling excavated from several sites on Kyushu. Kawashima is able to build up a dynamic picture of how the relative importance of salt changed over time, with the scale of production increasing rapidly after the Kofun period (sixth century AD onwards).

The book is well produced, as we have come to expect from this publisher, and most of the texts are in good English (only the French contributions would have benefited from the eye of a native speaker). The editors are long-term experts on salt archaeology, and the choice of contributors is appropriate. While one could wish for some of the articles to have been expanded, perhaps at the expense of the few that go over well-trodden ground, the volume, taken as a whole, is a valuable and welcome addition to the literature on salt archaeology.

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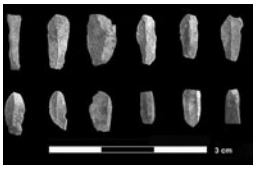
Nathan Goodale & William Andrefsky, Jr (ed.). *Lithic technological systems and evolutionary theory*. 2015. xix+297 pages, 112 b&w illustrations, and 15 tables. New York: Cambridge University Press; 978-1-107-02646-9 hardback £65.



Over recent years, the research interests of prehistoric archaeologists have diversified, but lithics (stone tools) remain central to understanding hominin behavioural variation. Approaches to lithic analysis vary from the philosophical to the highly empirical, and there is little consensus on the 'right' way to do lithic analysis—or, indeed, whether a universal approach is possible. These different methods and theories operate at multiple levels, from the character of data collection through to higher-level interpretative frameworks. One prominent strand of lithic analysis takes an 'evolutionary' perspective. Whether one advocates this evolutionary approach or not, this edited collection will be critical reading for those wanting to understand where the approach

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comes from, what it means, how it is done and what it tells us about human behaviour in the past.

In outline, *Lithic technological systems and evolutionary theory* focuses on how lithic technology can be seen as a by-product of human behaviour in an evolutionary framework. The 15 chapters cover a diversity of topics, including cultural transmission, risk management, human behavioural ecology and costly signalling. Slickly produced and well edited, the collection stems from a symposium organised at the 74th Annual Society for American Archaeology meeting in Atlanta, Georgia, in 2009, entitled 'Evolutionary Approaches to Understanding Stone Technologies as a By-product of Human Behavior'.

After a useful introductory chapter by the editors, the book is divided into three parts: culture, history and phylogenetic evolution (three chapters); applications of behavioural ecology to lithic studies (seven chapters); and cultural transmission and morphology (four chapters). As the editors acknowledge in their introduction, many of the papers are not wholly contained within any single one of these three categories. In this regard, the book is best read as a whole rather than by extracting individual chapters. The key contribution of the book is not that it is groundbreaking in any single aspect, but that it synthesises disparate yet complementary approaches and analyses in an accessible format.

It is useful to consider what is meant by 'evolutionary' in the context of lithic analysis. The editors are clear that they use the term in a broad, but 'Darwinian', sense. The diversity of approaches shows that the boundaries of the 'evolutionary' approach to lithics are hazy—this is not a 'good clade', but a pool of broadly similar approaches. The focus on evolution as 'descent with modification' is not without problem in the context of lithics, where similarities and differences reflect numerous and variable factors. This is acknowledged by the editors, but throughout the book, there is an assumption that once the 'noise' (differential reduction intensity, raw material factors and so on) is removed, what will be left is fairly unambiguous evidence of vertical cultural transmission that can be understood in terms of cladistics. It is arguable, however, that descent relationships need to be demonstrated in a more convincing manner than is commonly the case. In part, this gets to the heart of the somewhat ambiguous way in which the term 'evolutionary' is used by the authors; are we talking about the 'evolution' of lithic technological systems themselves, or rather investigating lithics that were made by hominin populations upon which evolutionary processes were acting? Hints towards the former, frequently building on the claim of scholars such as Robert Dunnell of a rigid dichotomy between 'function' and 'style' (selected and not selected, respectively), remain to be more convincingly demonstrated in my opinion. In Palaeolithic contexts, the argument for a distinction between 'style' and 'function' is by no means self-evident or epistemologically resolved.

Although the contributions to the volume are extremely diverse, a number of themes emerge. The editors and many of the papers use the notion of 'lithic technological systems' as a bridge between evolutionary or selective aspects and the archaeological record. Some of the key topics addressed in the book include the use of experimental replication (chapters by Clarkson *et al.*; Goodale *et al.*), raw material procurement (Beck & Jones; Garvey; Ferris; Bettinger *et al.*), retouch intensity (Kuhn & Miller; Shott; VanPool *et al.*; Bettinger *et al.*), and variation in North American projectile technologies (Beck & Jones; Kuhn & Miller; Shott; VanPool *et al.*). Such themes are addressed in different, if not necessarily contradictory, ways. The difference between human behavioural ecology and dual inheritance theory, for instance, is a topic that emerges several times.

Some chapters offer useful summaries of particular approaches, while others offer innovative contributions in their own right. I found chapters such as that of Clarkson and colleagues particularly interesting, combining a robust theoretical basis and experimental design with important findings (e.g. unretouched, unhafted flakes make the most effective wood-scraping tools). Others demonstrate the ability of lithic data to address 'big picture' questions, such as the chapter by Bettinger *et al.* on the origin of agriculture in North China. Kuhn and Miller highlight ways in which different analytical traditions—in this case, technological organisation and human behavioural ecology—can be brought together, rather than promoting one particular approach as superior to any alternative. Quinn's chapter focusing on costly signalling theory shows, in my opinion, the difficulty in dichotomising 'style' and 'function'. At the same time, however, this chapter also provides a good example of an approach rooted in the biological sciences, but one that is specifically adapted to an anthropological setting.

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The editors are right to stress in their introduction that there are two poles in lithic analysis: one involves detailed description and the other emphasises rather speculative notions. A middle ground is best achieved by building solid theoretical bases and using appropriate scientific methods. Crucial to the latter is not just hypothesis-testing but the formulation of clear expectations. An evolutionary approach to lithic analysis will show its maturity when it draws largely from its own body of theory, rather than unsystematically borrowing elements developed in the biological sciences. Likewise, research questions need clear experimental designs and model expectations, rather than back fitting ill-defined 'variability' to plausible possibilities. This book highlights the growing strength of the still young field of evolutionary approaches to lithic analysis, while also showing how much more remains to be done.

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PETER JORDAN. *Technology as human social tradition: cultural transmission among hunter-gatherers* (Origins of Human Behavior and Culture 7). 2015. xi+412 pages, numerous b&w illustrations, and tables. Oakland: University of California Press; 978-0-520-27693-2 paperback $34.95.

Peter Jordan has written what I believe will come to be recognised as one of the most influential books in evolutionary anthropology and archaeology of this decade. It is important as it nimbly engages with what is arguably the fundamental concern of a significant number of social anthropologists and archaeologists, that of how the complex interactions between social structure and human agency contribute to the development of cultural traditions. Despite a now vast literature and a substantial degree of polemic, very few scholars have sought to formalise and test hypotheses about these relationships. Drawing from research spanning the past two decades, Jordan succeeds in developing the first book-length treatment of the topic that not only includes a nuanced quantitative analysis but also provides a road map for future scholars to continue with further studies. Beyond general theory and method, Jordan's book is also about hunter-gatherers in the northern hemisphere and how their craft histories are affected by their social and ecological matrices.

In Chapter 1, Jordan makes the case that technologies can be investigated as social traditions, which are thus characterised historically by descent with modification and studied using trait lists based upon "design grammars" (p. 4). He identifies three themes central to the research described in later chapters that permit him to address cultural evolutionary process from social learning and cultural transmission between individuals (propagation of cultural traditions), to the formation of cultural lineages as affected by vertical, oblique and horizontal inheritance (coherence in cultural traditions), and finally, the degree to which lineages develop independently or become "bundled together" (p. 5) (congruence among cultural traditions). It is this multi-scalar approach that is essential to a comprehensive examination of social structures and individual decision-making underlying the historical development of cultural lineages. In essence, it permits Jordan to view craft history simultaneously bottom-up (impacts of micro-evolutionary process) and top-down (impacts of macro-evolutionary process). A major contribution embedded within this work under the cultural congruence theme is the first comprehensive testing of the Boyd *et al.* (1997) hypotheses regarding macro-scale cultural evolution (culture as species, hierarchically integrated system, assemblages of many units and collections of ephemeral entities).

Chapter 2 provides a primer for evolutionary analysis and shows clearly how this approach can be useful for formalising and testing hypotheses about human agency and cultural traditions. There are several contributions in this chapter worth highlighting. First, Jordan draws creatively upon the concept of *chaîne operatoire* to understand the internal logic behind craft traditions, which can in turn define key traits for evolutionary analysis. Second, he explains the basics of phylogenetic networks, trees and co-phylogenetic analyses in such a way that any interested student or

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