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doi:10.1017/eea.2019.68

Maikel H.G. Kuijpers. *An Archaeology of Skill: Metalworking Skill and Material Specialization in Early Bronze Age Central Europe* (London & New York: Routledge, 2018, xvi + 318pp., 64 figs, 10 tables, hbk, ISBN 978-1-138-71809-8)

In recent years, archaeometallurgical research has shown a notable ability to increase or refine its analytical techniques, as well as to take advantage of the huge amount of data generated in previous decades. The reuse of this legacy is increasingly frequent in elemental composition data, which can be counted in the tens of thousands of analyses in the case of European prehistory. In the past few years, the lead isotope analysis corpus has also grown considerably, while metallography (particularly of archaeological artefacts) or microhardness studies continue to be less frequent. Nevertheless, the possibilities of reusing legacy data are conditioned by what Bray (2019) terms their *density*, which varies considerably depending on the different geographical areas or periods.

This book is an approach to metalworking skill in the Late Copper Age (LCA) and Early Bronze Age (EBA) of Central Europe (the northern Alpine region in particular). It is based on the author's doctoral thesis written within the Marie Curie Initial Training Network Forging Identities: The Mobility of Culture in Bronze Age Europe (FP7-PEOPLE-

2007-1-1-ITN). However, Kuijpers offers much more than a mere case study, as he presents a solid theoretical and methodological framework that is relevant to all those interested in archaeological analyses of skill. The study is based on an examination of 317 axes, 193 of which were subjected to a meticulous macroscopic examination by the author (p. 84), while 217 were part of a metallographic study by Tobias L. Kienlin (2008; 2010), offering a set of data that is examined here from a new perspective.

The book is divided into twelve chapters. The first six define the objectives of the research and the theoretical-methodological approaches. In the following three (Ch. 7–9), those proposals are applied to the selected sample following a chronological criterion: LCA (late fourth–early third millennium BC) (41 axes), EBA I (2200–1900 BC) (162 axes) and EBA II (1900–1500 BC) (114 axes). The final three chapters contain wide-ranging reflections based on the results obtained. At the end of the book, there are three appendices that present the data used in tabular format (general information on the axes;

morphology, metallography, and chemical composition; *chaînes opératoires*) and an index.

It is impossible in this review to convey the conceptual and methodological wealth of the work; so I will, therefore, focus on the aspects that I consider most important. The author argues that there are two key aspects relevant to the concept of skill: the properties and performance of the material and an understanding of them through *sensory engagement*. This emphasis on the sensorial aspect is one of the main commitments of the book. Kuijpers recognises the influence of Sennett's work (2008) and what he learned through interviews with various artisans. His approach is aimed at overcoming the distinction between what are known as the *hard* and *soft* approaches to ancient metallurgy (Ch. 2), understanding the former as being orientated towards the scientific characterisation of the material and the latter as mainly of an interpretative nature, 'taking people, rather than material, as the epistemic starting point' (p. 24). In fact, another of the connecting threads of his approach is the questioning of one of the common proposals in this second focus, i.e. the consideration of metallurgy as a demanding, skilful, and prestigious activity linked to socio-economic specialisation and the elites.

The book's main contribution consists of proposing a methodology that allows skill to be analysed empirically. This approach, which has also been partially published elsewhere (Kuijpers, 2018), is developed above all in Chapters 4 and 6, the latter being considered by the author himself as 'the key-chapter of this book where theory is operationalised' (p. 12). One of the crucial concepts in this approach is that of *perceptive category*, defined as 'a conceptual method that works with the data provided by the material sciences but the thresholds with regards to the categorisation and analysis

of this data are based on the human senses, and thus on metalworking as a human practice' (p. 65, see also pp. 72–73, 258). Once a *perceptive category* (e.g. colour) is identified as being important to the communities under study, it is necessary to translate it into causal properties that can be quantitatively measured in the data. Thus, for example, the differences in the colour of the metal are the result of variations in its chemical composition that could be quantified with diverse analytical techniques. These *perceptive categories* can be added as a horizontal expansion in the *chaîne opératoire* (Fig. 4.2), a classical concept in material culture studies that is revived here while maintaining its original French designation. For instance, for the step of 'copper composition', the author defines six types of metal, for 'casting quality' three grades (low, average, and high), another three of 'hardness' (inferior, standard, and superior), and so on up to a total of nine steps in the chain. These range from the selection of the metal (copper composition) to the surface treatment; the chain includes an element (dimensions) that is not a manufacturing technique in itself, but rather an attribute of the object (in this case with four options: below, normative, above, and undetermined). The graphic representation of this chain accompanied by its *perceptive categories* (pp. 73–76, 133–34) allows us easily to see the most recurrent options of the technique, the relations between them, and, therefore, what Kuijpers calls the *standard of the time*. Chapter 6 explains the classification criteria in each of these *perceptive categories*.

The three chapters devoted to analyses of the data (Chs 7–9) follow the aforementioned chronological scheme and have a similar structure. First, the standard of each period is defined and then each of the most representative axes is discussed in terms of their degree of technical skill. An

interesting observation is that the LCA artisans, taking advantage of their knowledge of the qualities of the metal, avoided unnecessary risks by not subjecting the pieces to strong hammering that would have provided little or no benefit in terms of hardness. The EBA I is defined as a period of experimentation and change in which five types of metal coexisted, without any of them becoming clearly dominant. Nevertheless, in that period the axe concept is less diverse at a morphological level and hardness was a notable concern for the artisans, with an overall increase in that quality with respect to the LCA, although the use of hammer-hardening is not seen in all the pieces of the repertory. Now the Type I metal (less than three per cent arsenic, antimony, nickel and/or silver in total; or less than five per cent tin), clearly predominant in the preceding period, had to be more intensively hammered to reach the standards of hardness required at the time. Finally, the EBA II is characterised by the clear predominance of tin-bronze, which offers a better casting behaviour and some of the best mechanical qualities, particularly in terms of hardness. This increase in quality makes it more difficult to differentiate between the axes in terms of the technical skill required, as most of them correspond to the standard of the time. As happened in the LCA, the material was not pushed to its limits, thus avoiding unnecessary risks in the manufacturing process.

In the final chapters (Ch. 10–12), among other aspects, the author tackles the questions of specialisation and what he calls axe-recipes. In terms of the former, he proposes distinguishing at least four ‘specialist’ groups: amateurs, crafts(wo)men, master crafters, and the virtuoso, as well as the criteria that allow them to be identified. In his opinion, the interpretations of metallurgy in the Bronze Age

have tended to overestimate the figure of the skilled metalworker. Kuijpers also defines five axe-making recipes: axe-tool, axe-weapon, axe-ingot, axe-simulacrum, and axe-exceptional. He uses these distinctions to highlight the importance of intentionality in metallurgical production, questioning the approaches that focus too much on the find-context, which tend to offer information on the most recent period of use, but not necessarily on previous uses. Although the artisan would have produced and shaped the artefact taking into account its purpose or function, the author recognises a certain flexibility in these categories, in particular after it had been produced: an axe-tool could also have been used as a weapon, in the same way as it could become part of an accumulation of metal to be recycled. He provides specific examples of these axe-recipes, but it would also have been pertinent to include a general discussion on the greater or lesser relevance of each of them in each of the periods studied.

Although I am aware that the complexity of the subject would merit another book, I believe that the contextual perspective could have been explored in greater depth. There are some specific references to the contexts of certain axes in the volume (pp. 84–85, 150, 157, 176, 197, 247), some of which even serve to frame some of their technical particularities, but the question would have benefited from a more profound treatment. Even assuming that the uses of an axe may have been very different to those for which it was conceived, it would be interesting to know how often such cases occurred.

Added to that, I doubt whether the debate on social complexity and its relation to metallurgy can be approached exclusively from the archaeological study of skill. For example, Kuijpers proposes that ‘the model in which metalworking is

positioned as an important prerequisite to increasing social hierarchies, via the argument of a powerful group of specialist and elites, should be nuanced' (p. 264). I agree that the correspondence between metallurgy and the elites should not be assumed as something natural, but neither should we elevate the opposite argument to the category of a general rule. I believe that a fundamental characteristic of the Bronze Age, in all its geographical and chronological breadth, is precisely its diversity. In fact, the models the author questions tend to be supported by arguments other than that of technical skill. These arguments could include an excess production reflected by the large accumulations of metal in the form of hoards or the unequal distribution of resources such as tin, that would have involved long-distance relations (Vandkilde, 2016).

The book is well written, and its conceptual density is compensated for by multiple headings, summaries, and recapitulations that make it easier to read. For a single-authored book, the decision to include bibliographical references at the end of each chapter is surprising, especially taking into account that many of the references come up repeatedly. I would have opted for a single bibliography at the end of the volume. It is also worth pointing out that some of the figures could be improved and that others require excessive visual effort due to the small font size of the text they contain.

These minor objections are in no way designed to tarnish my very positive evaluation of this book, which I would not hesitate to recommend to anyone interested in archaeometallurgy or the archaeological study of skill. The theoretical and methodological proposal has a high degree of applicability to other case studies and,

at the same time, constitutes an invitation to re-think the extensive volume of data that archaeometallurgical research has generated over the decades.

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doi:10.1017/eea.2019.67