



Katarina Botwid, PhD in Archaeology and Master of Fine Arts, works with interdisciplinary research combining ceramic art and archaeology to better understand ancient society through in depth analysis of ceramic craft, techniques and skill. Botwid is affiliated researcher at the Department of Archaeology and Ancient History, Lund University.

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Craft Knowledge in the Service of Archaeology: Tracing Skill, Knowledge and Invisible Tools through the Artisanal Perspective

By Katarina Botwid

INTRODUCTION

Interdisciplinary research involving both artisans and archaeologists has the potential to contribute to forming and posing new questions within archaeology. Almost all artefacts exist because of the coming together of hands and material. Clay is clay, soft and malleable until dried and fired; wood is wood, to be cut and carved by persistently wielded tools; and fibre is fibre, twined together by nimble fingers and made into rope or woven into fabric. The embedded quality of different materials dictates certain human actions in order to be formed or transformed. As a consequence, a wide range of craft practices still live on from ancient days. In some ways, an artefact can be read as a message from one artisan to another. The artefact belongs to a context, a connection—a society, a time, and a practical reality. My work is about how we can implement the knowledge of practi-

cal expertise in archaeology as we implement the chemists' analyses of C14. Archaeology is not only a theoretical but also a practice-based field. When archaeology was initially formed into a research subject, practical experiments were tried out by contemporary researchers (Trigger 2006). This is still the case today but in contemporary archaeology there is a distinction between experimental and *experiential* archaeology (Cunningham, Heeb and Paardekooper 2008; Nilsen 2011). The archaeological experiments are staged around technological questions and the experiential archaeology is the gathering of experiences of interpreted ancient working and living conditions.

Being an archaeologist with a master's degree in ceramics, I have worked from an artisanal perspective in contemporary archaeology. Through this approach I have been able to contribute with new knowledge, even in already thoroughly research-

ched find assemblages. The combination of academic archaeological studies and artisanal skills and knowledge provides me with code competence in ceramics but also, to a degree, in general craft processes. In this chapter I hope to show that possessing skills in craft is a relevant source of information to archaeology. Drawing on my own tacit knowledge, the present investigation centred on in-depth validations of the craft and skill performed in vessels that were made by Roman Iron Age ceramists. This interdisciplinary approach has been practiced for archaeological interpretations of craft in my research since 2009 (Botwid 2009a; 2009b; 2013; 2014a; 2014b; 2016a; 2016b; 2017; 2020).

After thirty-one years in the ceramic craft, my own background involves an extensive knowledge of the theory of ceramics and a professional proficiency in ceramic craft, combined with extensive knowledge of archaeology.

To have the opportunity to demonstrate how another artisan—specifically, a prehistoric colleague—may have reasoned and worked is an extremely enticing prospect. My technical specialisation within ceramics/arts and crafts is prehistoric and historic firing techniques (wood-firing). Through this specialisation, my connection to prehistoric techniques became evident and led me to studies in archaeology. During my studies in archaeology I realised that my practical knowledge would be able to interact with this—to me—new academic way of explaining the world in words. Early on, I realised that I had something to say about the prehistoric artisans who had practised ceramic crafts before me. Ceramic craft has not died out like some other materials-based techniques; it does not have to be reinvented (Vincentelli 2004). As a combined ceramist/crafts teacher/archaeologist and researcher, I was posing artisanal research questions in a different way. The interaction between my two sub-

jects became visible, there was only one way open: I wanted to conduct research on the possibility of grounding archaeological explanations upon practical knowledge—an ‘in practice’ perspective. The visual and tactile experiencing of the vessel gives information that can be written down and compared but also questioned by peer-artisans.

In this chapter I want to show the potential in inviting a group of practitioner’s to join me in this pursuit. The purpose is to demonstrate what professional artisanal skill knowledge can contribute to archaeological interpretations. I choose the terms *artisan*, *artisanal*, and *artisanship* over *craft*, *craftsman*, and *craftsmanship*. An artisan is a worker in a skilled trade, especially one that involves making things by hand (Oxford Dictionary 21-12-21). The term *artisan* has a neutral gender-free connotation and is commonly used in pre-historic archaeology, where the term includes *all* people involved in the making of material culture. In pre-historic archaeology, words that have connotations to contemporary concepts such as art, art and crafts, etc., are avoided. It is a choice to be inclusive and not label ancient makers of things.

THE ARTISANAL PERSPECTIVE

Combining knowledge from two arenas—archaeology and craft—I have, in earlier work, shown how the artisanal perspective can contribute to the understanding of prehistoric societies (Botwid 2016). I will here briefly present contemporary research in detecting artisanal knowledge and levels of skill including the essence of my research concerning artisanship and thereafter the methods that I use to trace and build up an artisanal understanding of the past.

Decoding knowledge in an extensive archaeological material, the process of assessing skill-levels,

makes it possible to compare artisanal knowledge over time or geographical distances. There are a few archaeologists dealing with this issue, using skill-assessment in their research (see, e.g., Budden 2008; Budden and Soafer 2009; Botwid 2009a; 2009b; 2013; Kuijpers 2013; Botwid 2014a; 2014b; 2016; Botwid and Eklöf 2016; Sperling 2016; Botwid 2017; 2018; Kuijpers 2018; Sperling 2019; Botwid 2020). Uwe Sperling (2019) addresses skill in five levels, studying the complexity of the skill demanded in metal craft. Sperling's way of differentiating skill levels in *crafting* is not connected to the specific artefact or its features. His levels are very useful when discussing what can be referred to as common work vis-à-vis skilled artisans' work in a crafting community and in division of labour (Sperling 2019).

In contemporary research, the division of levels of skill concerning practice is often rather crude. There are often only two levels defined: "the excellent practitioner" and a single level incorporating all the others (see, e.g., Pye 1978, 4–8; Molander 1996, 33–56; Gustavsson 2002, 88–90). These scholars also discuss practical work and the practitioners' development, their relations to master apprentice learning and learning-processes, and making great contributions in their fields (philosophy, pedagogics, and design). Studies of *acquisition* of skill, as demonstrated in Dreyfuss, Dreyfuss, and Athanasiou's work *Mind over Machine* (1986) provides five stages of skill-acquisition in the area of artificial intelligence (AI). *Acquisition* of skill can of course be discussed in archaeological contexts with connotations to the context and the social status of artisans (Budden and Soafer 2009) but cannot be used to evaluate *technical* artisanal skill visible in an artefact.

Sandy Budden (2008), a ceramist and archaeo-

logist in the United Kingdom, uses three divisions to evaluate every step in the process of the manufacturing of pots. She uses the categories good, moderate, and poor (2008, 2–3, 10–11). Her work is an evaluation of every pot (not too fragmented) connected to the artisanal skill invested in every form (e.g., cup, vessel, and plate) and how skilled you have to be to produce them. This division of forming is deeply connected to a *specific place and timespan* in which the pots were made and the result is used to discuss social relations, as well as skill investment in artisanal learning processes and communities (Budden 2008; Budden and Soafer 2009). The evaluation of skills concerning ceramics is similar in Botwid's and Budden's artisanal interpretations, and the most obvious differences lie in the way the acquired information is used.

Researcher Maikel Kuijpers undertakes research on skill and craftsmanship. The fact that my own approach to skill in archaeology and that of Kuijpers have reached closely related conclusions is highly interesting as we have reached them from different points of departure; Kuijpers from the theoretical side of archaeology with a great interest of skill in metal craft and I from the ceramic practitioner's perspective. Kuijpers gathers information primarily by working together with skilled contemporary artisans, such as his collaboration with the skilled bronze smith J. Zuiderwijk (Kuijpers 2013).

Kuijpers has conducted interpretations of early bronze age axes using categories of level of skill in a very similar way that I have. His levels are as follows: amateur (lowest level of skill), common craftspeople (skilled but do not stand out), master crafters (produce a high level of perfection, admired by peers), and virtuoso (explores the very limits of the material, unique, highly skilled). In Kuijpers's division of four levels of skill, the first

three bear many of the same signatures as those I have put forward (see below), but the additional fourth level that provides the level of exceptional skill (included in my third level) also includes *social status* and context which, in my mind, makes that level more uncertain or dependent upon timespan or context (Kuijpers 2018, 562–63). To explain my standpoint in this matter, I cite Kuijpers, who adds that as well as the exceptional *technological knowledge* on the part of the virtuoso-level practitioner,

These are highly skilled artisans who create objects that are likely to be laden with ideological and political meaning, individuals who are admired (or feared) for their exceptional skills by the community, which lead to a special social status (Helms, 1993). (Kuijpers 2018, 563)

I prefer to have Kuijpers's ideological and political or social circumstances (in the description of the fourth level) as a factor in the interpretation process grounded in the specific archaeological material and contexts at hand, not in the division in skill levels (see also Olausson 2008).

The skill levels I define concern only the *technological skill of the artisan*; the context is not taken into account and is left to the *archaeological interpretation*. I argue that craft knowledge, which is present in technological traces and built into an artefact, can be sensorily assessed and analysed by a skilled artisan in the craft at hand. These assessments make a grounded judgement of the level of skill held by the maker of the artefact (Botwid 2009a; 2009b; 2013; 2016). The levels of skill in *artisanal interpretation* can be used across a range of crafts and do not exclude any practical way of working, though every craft needs to find the adequate parameters, traces, and signatures (Botwid 2016) and is therefore usable in a broader meaning.

METHODS

Artisanal interpretation relies on tacit or silent knowledge. These forms of knowledge are mostly explored within the fields of theoretical philosophy of knowledge, evolutionary biology, pedagogic research, and in craft research (e.g., Polanyi 1966, 39–43; Pye 1978, 4–8; Molander 1996, 170–71; Gustavsson 2002, 88–89; Niedderer and Townsend 2014; Gärdenfors and Högberg 2015). Some research refers to this concept as embodied knowledge or “knowing in action,” implying that it is not possible to learn without practicing until the knowledge gets into the individual's own physical motions, and becomes a part of him/her as second nature (see Polanyi 1966; Marchand 2010).

My intention when proposing (and developing) a practical sensory assessment method based on tacit knowledge and declarative objective criteria (artisanal interpretation) was that it should have a wide application to different crafts and topics, and that it should allow for the possibility of dividing or evaluating skill using the interpreter's own artisanal knowledge and experience or by consulting artisans.

The assessment of the artefacts in this chapter derives from one particular site. The first case study consists of my own artisanal interpretations of the ceramic artefacts and the three following case studies consist of artisanal interviews with a fine woodworker, a textile artisan, and a farmer. Each of them was approached to take part for their skill, expertise, and experience in their respective field of practical knowledge in a specific occupation. They were invited to separate one-hour semi-structured interviews (Bryman 2012, 419) and were prepared with information about the site and the context, as well as given the possibility to influence the setting of their participation. The artisanal interpretations would have

benefitted greatly from the opportunity to conduct hands-on examinations but there was no possibility to do so at the time (the museum could not give access to them as the items were being exhibited). This circumstance makes the evaluations of skill more declarative and reflective. Still, I find the participating artisans' assessments highly interesting and a valuable contribution to archaeology.

The qualitative semi-structured interview guide I use starts by asking both the artisan (or the consultant expert) and the archaeologist (in this case, me in my role as archaeologist) to position their own skill in the craft at hand. This is done to reveal the level of understanding and to pose the starting point. It creates a mutual understanding which is beneficial for both parties. The interviews are concerned with *how* the artefacts were made as well as how the contemporary artisan interprets the ancient methods, the choice of materials, and working processes. After the assessment and interpretation, the contemporary artisan, with his or her own experience and skill as a guideline, evaluate the ancient technological knowledge invested in an artefact to one of the defined levels of skill (see below). The interviews were recorded and transcribed and all specialist terms and concepts were explained. The informants were then given the opportunity to correct any misunderstandings. The artisanal interpretation in my earlier work (Botwid 2009a) together with the presented case studies (cases 2, 3, and 4) completes the picture of skill present at the site of Käringsjön.

EVALUATION OF SKILL

The artefact with its various characteristics can be ranked according to different skill levels by judging the technical details of how it was created (Botwid 2013; 2016). In the development of the artisanal interpretation method (adapted for use and applica-

tion in archaeological analyses of crafts), I divided this practical knowledge into three parts. The third part—beginners and less skilled artisans—was placed on a level where the practitioner had the least amount of skill and the lowest level of knowledge of techniques.

The three levels that make up the observable evaluation criteria (Botwid 2013, 31–34; 2016, 32–34) are presented and used as follows:

Professional artisanal skill: The artisan has experience over a long period of time and a very high level of knowledge. This individual is particularly skilful in her/his craft and can, in addition, move unhindered within the relevant field of expertise. An artisan who has attained a professional skill level takes risks and is able to completely resolve new problems by using the assembled knowledge s/he possesses.

Good artisanal knowledge: The knowledge that most artisans possess is traditional knowledge. The bearer of tradition is not particularly inclined to take risks, even if very skilled at the craft in question. Though not willing to deepen or proceed in knowledge development, such an individual is secure at a lower level of practical knowledge—a knowledge that s/he possesses and refines.

Artisanal knowledge: The lowest level of artisanal-technical knowledge displays craft that is performed by a beginner or by someone who cannot perform on an independent level. This individual can only work step-by-step on the basis of instructions, or proceed by trial and error without guidance. The execution shows clear technological deficiencies.

EXAMPLES OF ARTISANAL STUDIES OF ARCHAEOLOGICAL ARTEFACTS

I will present examples of how the artisanal perspective may reveal new information, thus expanding the archaeological interpretations of artefacts from an archaeological site. In the forthcoming



Figures 1–2: Käringsjön’s location in the Swedish west coast area. Illustration by Henning Cedmar Brandstedt.

examples the aim was to re-investigate a Swedish Roman Iron Age site at the Käringsjön tarn and its artefacts using a strict artisanal perspective. Four practitioners make artisanal evaluations of four different (practice) areas: ceramics, wood, textiles, and farming.

The research was mainly designed to explore questions related to skill levels:

- How skilled were the artisans that came to be represented in Käringsjön tarn?
- For how long would the artisans have to practice before mastering the knowledge visible in the artefacts?
- Are there any signs of tools marks visible in the artefacts?

The four case studies used in this example could have been from any well-preserved excavation or historical context; however, the choice of the Käringsjön site is pragmatic as the artefacts here derive from different types of crafts and they are unusually well preserved.

PRESENTATION OF KÄRINGSJÖN SITE

Käringsjön has been interpreted as a Roman Iron Age offering site. It has been the subject of archaeological research since the Swedish archaeologist Källmark’s excavation in 1917, followed by T. J. Arne and L. von Post’s excavation a year later (cf. Arbman 1945, 174).

The site is situated in Övraby parish near the city of Halmstad on the west coast of Sweden (Figures 1–2). It became a well-known archaeological site in 1941, when archaeologist Holger Arbman excavated it extensively and published his results (Arbman 1945). Since then, several researchers have published papers and articles concerning the site (see Carlie 1998; 2001; 2003; 2009a; 2009b; Botwid 2009b). Arbman’s interpretation of the tarn as an *offering site* has been accepted in archaeology since 1945.

In the Roman Iron Age, Käringsjön was a small tarn, secluded in the surrounding broadleaved forest. Hemp, flax, and rye were cultivated in the area



Figure 3: Reconstruction of Käringsjön and the vegetation present at the site. The reconstruction is based on pollen analysis and the interpreted water level, 200–400 AD. Illustration by Henning Cedmar Brandstedt.

(Figure 3). Spacious grass- and croplands characterised the landscape and environment (Björkman 2009, 204). When excavated and analysed, the majority of the artefacts at the site were determined to have originated from 200–400 AD (Arbman 1945, 116; Carlie 2001, 125).

The finds are briefly presented in the table (Figure 4). Surrounding the small tarn was a platform made from a large quantity of wood and stone. Notably, there were no traces of sacrificed war-booty or sacrifices of animals or human beings. Consequently, the tarn has been interpreted as a peaceful offering site where the local peasant population came to ask for a good year or to celebrate harvests (Arbman 1945, 100; Carlie 1998, 35; 2009a; Botwid 2009b).

REVEALING SKILL THROUGH ARTISANAL EXPERTISE: FOUR CASE STUDIES

The following case studies formed the basis for well-informed artisanal interpretations of the artefacts from Käringsjön. Ceramic evaluation (case 1) together with woodwork evaluation (case 2), textile craft evaluation (case 3), and farming (case 4) are undertaken in order to expand the knowledge of the skill embedded in the artefacts from the site.

CASE 1: Artisanal Interpretations of the Käringsjön Ceramic Artefacts

Starting with the artisanal interpretation of ceramic artefacts, the expert uses his/her senses—primarily vision, touch, and hearing, along with personal experience of the craft—to study how the vessel was

created. Within the field of archaeology, as far as I am aware, only two experts have conducted skill evaluations out of their own expertise in ceramics: Sandy Budden (presented above) and myself. The parameters included in pottery investigations are performed by both experts and are as follows: weight, balance, structural integrity, size, thickness of vessel walls, amount of temper, manufacturing process and artisanal quality, selection of material, firing method and temperature, surface treatment, and decoration (Budden 2008, 4; Botwid 2009a; 2009b; 2013, 31–44; Botwid 2014, 60; cf. Budden and Soafer 2009, 10). Marks and traces are visible on the artefacts as imprints of the makers’ hands or tools, and each artefact consequently carries evidence of a level of skill in a “frozen moment.” In what follows, I present the artisanal interpretation of Käringsjön’s ceramic artefacts (Botwid 2009b).

Käringsjön’s ceramic material included 114 vessels and was interpreted through qualitative artisanal interpretation (Botwid 2009b). I had the opportunity to access 24 of these vessels for visual and tactile analysis. These vessels are presented as photographs in Figure 5. A further 23 vessels were interpreted only visually, as they were in exhibitions. These are presented as silhouettes. The 67 small sherds depicted each represent one vessel in very small pieces or fragments. The dots (white, grey, and black) represent the level of skill according to my artisanal interpretation.

The interpretation of the vessels in the study shows that 25% of the vessels reached the level of professional artisanal skill, 67% reached the level of good artisanal knowledge, and 8% reached the level of artisanal knowledge (Botwid 2009b).

Overall, Käringsjön’s ceramic material shows very good performance of ceramic craft. The analysis

Categories	Type	Number
Ceramic artefacts	vessels, small cups, storage vessels, cooking pots	114
Wood artefacts	box-lid (1), bowl (1), knife-shaft (1), tray (2),	5
Wood/ agricultural implements	rake heads (2), spade (1), digging stick (1), pulley (1),chopping block (1)	6
Wood/objects	worked wooden objects unknown function	16
Wood/prepared	curly birch blocks	2
Wood/textile tools	linen-mallet?/flax attachment	2
Textile	processed flax	2
Bast	ropes	3
Stone artefacts	grinding stone (1)/flint (firemaking) (1)	2
Stone/prepared	worked flint (4)/quartz (1)	5
Iron/traces	Knife-shaft and stick with iron-oxidation	2
Leather	left-shoe, mended (medieval)	1

Figure 4: Finds in Käringsjön (Arbman 1945, 89–97).

revealed that so-called coarse household ware was sometimes made with professional artisanal skill. Vessel H21, for example, was light, even, and made with an excellent finish while a similar form, vessel H27, was thin, had uneven walls, and was asymmetric and clearly performed by an unskilled artisan or a recent beginner. Some of the fine-ware vessels, on the other hand, revealed the lowest level of skill, as finds nr A6 and L3 (Figure 5) show. These examples nuance the understanding of ceramic vessels because while such vessels have been commonly referred to as coarse household-ware, some vessels are simple and carefully crafted and some fine-ware vessels are crafted with the lowest level of skill.

INTERVIEWING ARTISANAL SPECIALISTS

The following cases presented in this chapter are the interviews with the fine woodworker Per Brandstedt (case 2), the textile consultant Linda Olofsson (case 3), and the farmer Kjell Davidson (case 4). Together with my own former artisanal interpretations of ceramics, the artisanal analyses are applied in the section below entitled “Artisanal Knowledge at the Käringsjön Site.”

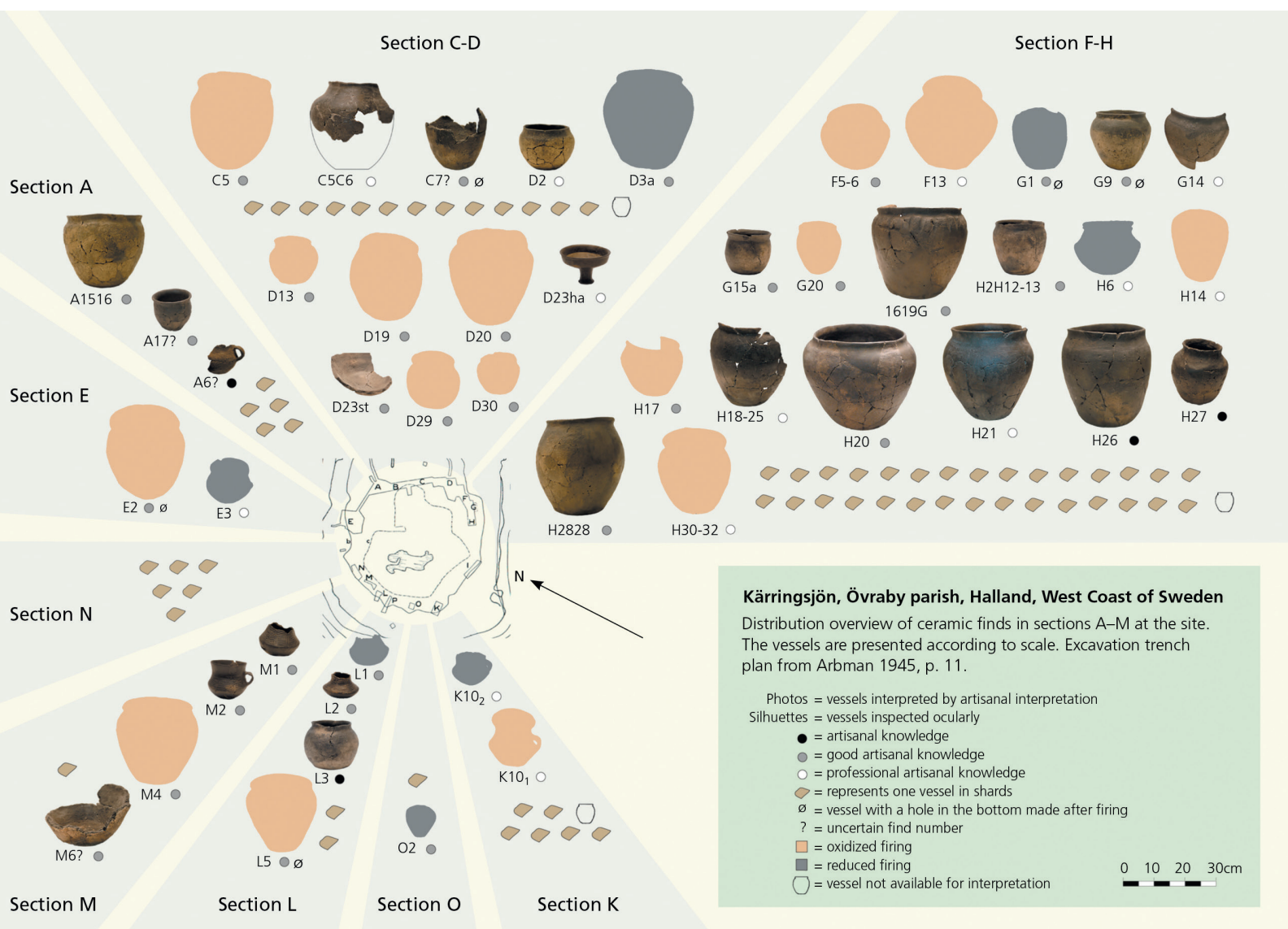
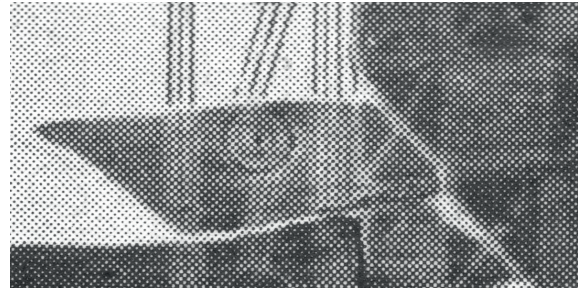
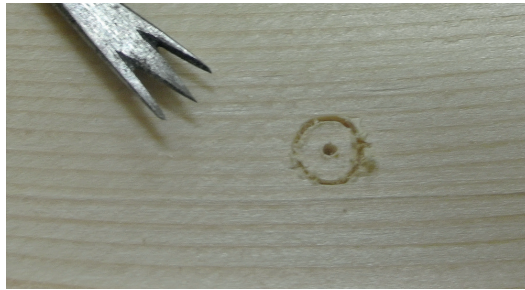
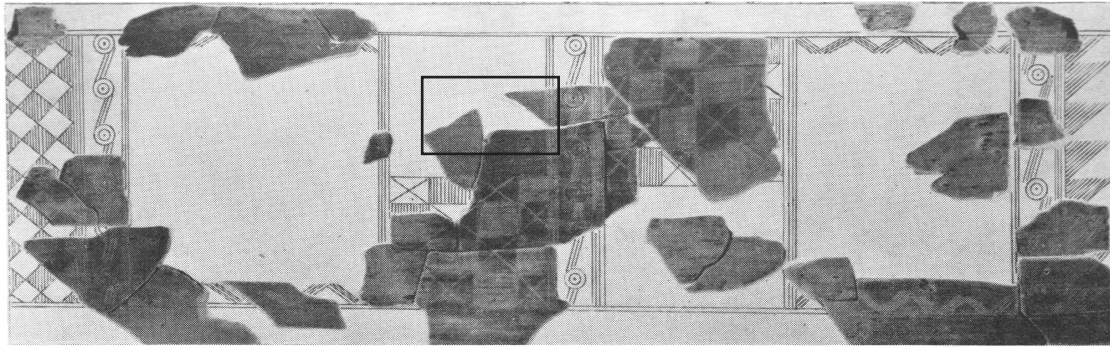


Figure 5: The ceramic finds (114 vessels) and their position in the excavated shafts at the tarn. Silhouettes represent the artefacts that could only be visually assessed. The small dots (white, grey, and black) represent the level of skill interpreted. Illustration by Katarina Borwid and Henning Cedmar Brandstedt.



Figures 6–9: (Above, Figure 6) Find D10 (Käringsjön), painted wooden lid, reconstruction by Dagmar Selling (1945), courtesy of Kungliga Vitterhetsakademien, Sweden. (Middle, Figure 7–8) The box lid D10. Comparing Brandstedt's suggestions and the actual photograph of the artefact D10. Photograph by Katarina Botwid and Holger Arbman, courtesy of Kungliga Vitterhetsakademien, Sweden. (Below, Figure 9) Brandstedt shows the tool and technique he proposes was used for decorations on the find.

CASE 2: Woodworker

Per Brandstedt is an internationally renowned Swedish woodworker in the area of arts and crafts. His experience of the craft is extensive and he has worked full-time for over 35 years, achieving master level in the guild of master craftsmen. As a master, he has taught woodwork to apprentices, both nationally and internationally. Brandstedt evaluates his own skill to be at the level of professional artisanal skill. Brandstedt was interviewed and gave his interpretation of the wooden artefacts in Käringsjön based on his own artisanal expertise. This interpretation reveals the skill and the artisanal choices that the ancient artisan was able to perform. Brandstedt's general interpretation concerning all wooden finds from Käringsjön (farming implements and other artefacts) is that a high level of skill was present in the group of woodworkers. When discussing the decorations and ornaments (see Figure 6), Brandstedt was able to show the tool and technique that would have been used for the decoration on find D10 (see Figure 9).



Figure10: Artefact A3. Turned birch bowl. 11.5–14 cm diameter, 8.2 cm, with a lost lid. Photograph by Gabriel Hildebrand/The Swedish History Museum.

Brandstedt suggested an old type of drill, similar to the one in his own workshop, as the tool used on the actual artefact from Käringsjön. As shown in Figure 7, the tool fits perfectly and makes the same type of decoration mark when used without pressure. The original decorative mark appears to show that two drills were used, one smaller and one bigger, using the same centre.

Brandstedt evaluates the skill visible in some specific wooden artefacts. He puts the decorated box lid made from ash tree (find D10) at the level of good artisanal knowledge. The decorated wooden lid (D10) was made from an ash plank using the splitting technique. This gives the woodworker

a very thin plate without the use of a plane tool, and the technique requires about five years to master. Using drills is a sign of a developed technical knowledge and supports the interpretation that the woodworkers near Käringsjön were able to reach a high level of skill.

Brandstedt interpreted that the artisan who created the turned bowl made from birch (find A3, see Figure 8) also performed his/her craft with good artisanal knowledge. Brandstedt estimated that this level of skill in turning wood would take at least four years to acquire.

When interpreting the chopping block from oak (F19) Brandstedt is sure that the block was as

important as the axe for the ancient wood artisan. He interpreted that the block was deliberately put in the tarn as a valuable object for the woodworker. This information is new to archaeology and provides interesting information about specific artisanal understanding of the importance of tools and related objects (the axe and the chopping block, the hammer and the anvil and so on) but does not evaluate levels of skill (see Figure 11, number 6).

Brandstedt interprets and concludes that his ancient colleagues have been aware of different types of wood and how to use them in the most appropriate way. The rake is a good example, as oak, birch, and goat willow were chosen for their individual properties as part of its construction. Curly birch is an unusual kind of wood and was used for tool handles because of its hard property; the different directions in the wood would prevent the handle from breaking as well as providing a unique pattern (Figure 11. Finds D32 and A17).

CASE 3: Textile Artisan

Eva-Linda Olofsson is a textile-archaeologist, educated in both subjects. She has artisanal knowledge and experience of ancient textile crafting techniques and a degree in archaeology (BA). Her learning process in textile craft started at the age of five. Her artisanal knowledge was a starting point for her archaeology studies with an aim to studying textile-related topics. Olofsson is involved with craft-related work at Trelleborgs Museum and scientific archaeological experiments concerning textile crafts in international workshops and conferences at the Centre of Textile Research (CTR) in Copenhagen. Olofsson evaluates her own skill to be at the level of *good artisanal knowledge*.

In addition to Arbman's publication, more recent photograph printouts from the National

Museum of History in Stockholm were used in Olofsson's interpretation. The flax material is limited to two bunches of flax. Ropes of lime tree bast were found. There are also wooden artefacts that are possible to discuss as potential textile tools (see Figure 11, numbers 3, 4, 5 and 7).

Olofsson interprets that the person (textile artisan) who produced the flax-bunch (find F1) showed good artisanal knowledge. This level of skill was discerned from the *particular choices* that the artisan had undertaken during the flax-making process. These choices concerned aspects of growing, harvesting, retting, and trimming. According to Olofsson, at this point in the process the artisan can choose to stop and gather bunches to sell. If working further, the next steps in the process of preparing flax are braking, swingling, and spinning linen thread, before weaving linen textiles. Olofsson suggests that the ropes of lime tree bast (finds A18, H19, E2) were made in different stages of the bast's drying process; fresh bast loses its twist when drying, while dried bast will keep its twist. It may appear that making ropes from dry bast requires greater skill, but if the purpose is to make a rope for one-time use, it can be sufficient to make rope from fresh bast. A good rope for repeated use should be made of dry bast or other fibres. The knowledge evaluated shows good artisanal knowledge in rope making.

The mallet of alder wood (find K12) seems to be a tool that could be used in the process of textile manufacturing. Olofsson interprets the mallet to be useful when breaking flax. This information is new according to former interpretations. Olofsson has a clear view of how she would use this tool in her own work, turning it for different edges for different purposes in the textile process. Olofsson also interprets the mallet to be useful when washing textiles.



Figure 11: Plate showing finds discussed in the article: Agricultural implements F3, H16, K1, K2, K12; 2. Rakes F4, F; 3. Distaff A5; 4. Flax-bunch F1; 5. Ropes, lime tree bast A18, H19, E2; 6. Chopping block F19, (top) (80 cm), curly birch D32 (raw material); 7. Mallet K12 (alder wood); 8. Knife-shaft A17 (curly birch); 9. K11 Wooden lock (swe: lekane) (oak). Photographs 1, 2, 6, and 9: Holger Arbman, courtesy of Kungliga Vitterhetsakademien, Sweden. Photograph 3: Annica Ewing/ The Swedish History Museum. Photographs 4 and 7: Peter Sillén/The Swedish History Museum. Photograph 5: Sara Kusmin/ The Swedish History Museum. Photograph 8: Gabriel Hildebrand/The Swedish History Museum.

Olofsson interprets find A5 as a possible distaff. Flax is sticky when dampened and will attach to the stick even if it is not designed in the same way as find A5. The *square form* of one end might imply that the stick could have been used as a distaff that was formed to fit a square hole in a plank that the textile artisan could sit on while spinning the flax. This way of working allows the use of both hands while using the spindle. This construction is easy to use in different surroundings—outdoors and indoors—according to Olofsson. Olofsson shows different ways of using a distaff without connecting it to a table or a plank, holding a stick in one hand and the spindle in the other. She also puts the distaff under her upper arm, pressing it to her body, which allows the freedom to use both hands during the spinning process. Another alternative is to attach the distaff to a belt, also enabling the use of both hands. If the distaff is used in this complex way, the artisan can be interpreted as having good artisanal knowledge.

CASE 4: Farmer

To understand the more complex world of farming and tool making, and to validate my own interpretations, I interviewed an experienced farmer. As a practitioner in a living tradition of (small scale) farming for generations, Kjell Davidsson represents and holds the knowledge that I hoped to take advantage of, in order to undertake artisanal interpretations of agricultural implements. When discussing the woodwork from Käringsjön, I mainly wanted to discuss Arbman's interpretation of the farm implements, tools, and skill. I was also interested in the daily running of farms. By interviewing a farmer, I hoped to gain insights into farming practices that were beyond common artisanal knowledge. Kjell Davidsson has been a farmer for forty-five years. Be-

fore working full-time from the age of fifteen, Davidsson was helping his parents in the holidays and during his free time. He considers himself as holding good artisanal knowledge—following a tradition without creating new ways of working. He notes that his father was more of an innovator since he had one of the first tractors in the area. Davidsson describes himself as a farmer who waits for evidence that new technology is working before he takes it up himself, and he does not like to take risks.

The agricultural implements analysed by Davidsson were made of wood (Figure 11, number 1). He says that these are implements that he is able to make himself, if he had to, and that he would be able to make them with artisanal knowledge or, for some of the implements, good artisanal knowledge. The rakes (Figure 11, number 2) are harder to make and would require more than the knowledge of a common farmer, according to Davidsson. He assesses that his father, who was good at handicrafts, would have been able to whittle rakes during the winter and maybe sell or trade some if he had had the interest for such work. Finds D10 (lid) and A3 (turned bowl) were not made using the knowledge of a common farmer, Davidsson argues. He suggests that they were made by a fine woodworker as they are much too specialised. Davidsson describes farming as a very complex kind of knowledge, where one is supposed to know a great deal about a great many things. For Davidsson, that is what makes a farmer a farmer.

Davidsson suggests that building houses and making fences are also a farmer's responsibility, and that special woodwork for buildings can be interpreted as being a joint effort between professional woodworkers and farmers. Davidsson says that both carpentry and smiting require knowledge that surpasses that of the common farmer and that

such people would have had artisanal training. Artisans could allocate time to help others out (relatives, neighbours, villagers) during harvesting and other work-intense periods of the farming year, and consequently they had insight into the realities of farming.

When discussing the itinerant artisans, Davidsson mentions that knife and scythe (coulter) grinding were performed 'properly' by a knife-grinder once a year; during the rest of the year, a farmer would sharpen their own tools. Tanners (who tinned copper casseroles or pans) walked around the villages doing their craft in exchange for food and a little money, or something they could trade further. Itinerant artisans (for example, butchers from a nearby area) carried out slaughtering and dismemberment (primal cutting). "Everyone is not doing everything" is Davidsson's very short conclusion of this interview.

ARTISANAL KNOWLEDGE AT KÄRINGSJÖN

I am striving to give examples of how artisanal knowledge can provide knowledge that cannot be obtained in any way other than from consulting artisans. When I go through older archaeological investigations concerning, for example, ceramic artefacts, there are both factual errors and misunderstandings of technology and sometimes even strange reconstructions. Evaluation of skill from peer artisans (contemporary) is lacking in these former interpretations of craft. I have found that artisanal interpretations allow for the detection of irregularities and anomalies that otherwise seem to hide. New categories of artefacts can be identified using qualitative approaches from new craft perspectives (see also Westerlund and Thane in this anthology) and I am convinced that these perspectives can help to find additional traces of people, workshops, tools, and

equipment. In the section below, the compiled interpretations give complimentary information about the artisans and artefacts at the Käringsjön site.

During the interview with Per Brandstedt (case 2), he demonstrated how the perfect circles on the lid (D10) were made. Using an old type of drill and a light hand, the circular marks were easily engraved onto the wood. Given this information I, as an archaeologist, can propose that the old type of drill was *also* used as a design tool and would thus have had a broad usability in various crafts, which is an obvious example of transferring knowledge between disciplines. The drill was actually used for decorative imprints. For an archaeologist, the perfect concentric circles are not uncommon, and marks like these can be seen on bone (Müller-Karpe 1957, 35), wood, ceramics, and metal (Müller 1933, 72, 85–86, and Fig. 108; Ekengren 2009, 132). Brandstedt's interpretation of the technique behind the concentric circles opens up the potential for new discussions in archaeology about collaborations between artisans in many different ancient crafts.

Woodworkers from the Käringsjön environment were competent and had good knowledge about different types of wood and their usability (case 2). Curly birch, for example, was used because of its firmness, its specific surface, and its rarity. Complex techniques such as turning and splitting were used at the level of *good artisanal knowledge* and Brandstedt interpret that splitting was the more complex technique. Time-consuming training in a craft-moment (splitting) has, according to Brandstedt's information, thereby been established. According to Brandstedt, turning with an ancient lathe is not as complex as the splitting technique and takes approximately four years to accomplish (case 2).

Artisanal material was grown or taken from the nearby surroundings close to the settlements. Har-

vesting and preparing bast of lime trees was known, although lime trees were probably uncommon in the area (Björkman 2009, 201). Finds of rope showed that making or twining was known. Indeed, in the tarn there are preserved ropes of different sizes and qualities (see the evaluation of lime tree bast ropes given by Olofsson, case 3, concerning finds A18, H19, E2). The stages in preparing flax became visible as well as the possibility to work independently from a specially arranged working-space.

According to Arbman, sunken and decomposed artefacts tied with ropes (finds A18 and H19) could indicate the use of boats on the small lake (Arbman 1945, 108). The use of canoes or other kinds of small boats would require knowledge of boat building. As the wooden artefacts testify, the artisans had *good artisanal knowledge*, and, in turn, this might support Arbman's interpretation that boat building may have been known in the area.

Textile artisans in the Käringsjön area knew the stages of manufacturing linen (case 3). They were familiar with growing, harvesting, and preparing flax, and were using tools such as linen-mallets and flax attachments. Different ways of fastening the flax attachment may have been in use (Olofsson case 3). These interpretations were not noticed or discussed in former research. Olofsson's interpretation makes clear that it is possible to expect that knowledge of spinning thread and making yarn was known. The evidence shows that textile artisans had a *good artisanal knowledge* of the process, with a good grasp of textile technologies. Mobile constructions allowed the textile artisan to work flexibly and to take the craft elsewhere. Consequently, textile artisans had the possibility of working as itinerants.

I suggest that those who went to Käringsjön from surrounding settlements were linked to a wider understanding of *artisanal knowledge*. Some

had a general understanding of craft while others had a deeper and very particular understanding of specific crafts. Artisanal knowledge may have been adopted in various ways, for example by learning from relatives in situations resembling so-called "situated learning" or "peripheral participation" (Lave and Wenger [1991] 2005). Artisans visiting the settlements could easily work together with artisans living in the existing artisanal environment (Botwid 2020, 241). Artefacts made in connection with foreign artisans (or foreign objects) can give a sense of hybridisation by cultural choices, showing an urge to connect to other artisans or to other artisanal traditions (Ekengren 2009, 24–30). In Käringsjön's material, the ceramic artefacts in particular visualise these kinds of cross-cultural expressions (see finds: L1, M1, K101, K102, G21, E3, and D23). Further, the everyday or domestic artefacts became of greater interest when the study showed that they were performed with such different levels of skill—the excellently manufactured storage pot (H21) contrasted by the poorly made pot (H27).

CONCLUSIONS

Revisiting a well-interpreted site years after the last publication might seem superfluous. As my own research developed from an individual project into an artisanal perspective that allowed me to reflect upon archaeological approaches that would broaden awareness of particular questions about artisanship (both in prehistory and in the present), it became clear that some questions about the site were unanswered. Being a ceramic practitioner and an archaeologist, I have the exceptional position of being able to analyse artefacts with my competence in ceramics *and* to put them into an archaeological context. My position gives me a special competence that gets better for every new examination.

After about ten thousand finds passing through my hands and eye, the amount of experience is higher than that of most archaeologists. Archaeologists often have to interpret all kinds of artefacts and also lead projects in excavation archaeology. It is rarer that the field archaeologist has the time and the economy to really concentrate on one artefact group. When I am included as an expert, I have time and also knowledge that I otherwise had to gather from literature or specialists. I asked myself if I could be more inclusive and involve other contemporary artisans when discussing or interpreting techniques used by prehistoric artisans. Therefore I wanted to find artisans from the field of artisanal expertise in woodwork, textile, and farming to collaborate with.

In the field of pre-historic archaeology, typological analyses have previously tended to focus on *when* a ceramic artefact was made and its shape (typology). But *how it was made*, the time taken to produce it, and the skills involved, to my knowledge have—with few exceptions—not been evaluated by contemporary artisans defined as specialists with contributory expertise (see Collins and Evans 2007).

A brief summary of Arbman's own interpretations of craft knowledge at Käringsjön, without consulting artisans, is useful to make the comparison clear. Fine-ware has been interpreted and referred to as more carefully crafted (Arbman 1945, 42), and this is an interpretation that has been reproduced over time (Carlie 2009a, 248). Alongside the ceramics, the excavation included different wooden finds (see Figure 2), which Arbman interpreted to be artefacts reflecting a *good knowledge of woodwork* (Arbman 1945, 84). Flax and bast were *placed in the tarn in a deliberate way*, according to Arbman, and sorted into small stacks and placed in different directions. This is obvious to the archaeologist but does not include artisanal knowledge. Arbman in-

terpreted a stick as a distaff, used for spinning flax (Arbman 1945, 109). The deeper interpretation of an artisan's bodily movement and mobility together with the practical dimension (see case 3) of the textile craft is missing.

In conducting artisanal interpretations of Käringsjön ceramics, I have found that the simplest of household vessels could involve both tremendous skill and poorly made goods and that so-called fine-ware can be the work of a new beginner (Case 1). This research shed new light on the offering tarn, not seen in any of the earlier publications. We (archaeologists) know very little of the practices of so-called offering tarns of the Roman Iron Age but through this new way of focusing on *skill* in artefacts we can get a glimpse into the ancient practices at Käringsjön. How well made a pot was was not a hindrance when placing them in the offering tarn; while someone parted with an extremely useful and well-made vessel that could have served for much longer, someone else brought a vessel made by someone with only the most rudimentary grasp of ceramic craft. Both these artefacts were still placed in the tarn, a fact that could be interpreted in many ways, perhaps as a sign of a non-hierarchical community, but what I wish to stress is that this, in itself, is a new fact, reached by a new method of analysing artefacts.

Semi-structured interviews with artisans in crafts other than my own proved to be useful when doing in-depth validations of skill. The transparency in naming and writing down the different specialists' evaluation of the ancient artisans' skill is making what is often referred to as 'oral information' or 'personal communication' valid and possible to discuss with other artisans. I propose this as a basis for future peer reviewing of the craft specialists' assessments, enabling a more scientific approach to the collaboration between archaeologists

and practitioners. I regard the lack of naming and thus the inability to compare their results as a scientific problem. Naming the artisans and presenting their expert knowledge and experience will further help this effort. Artisanal specialist informants were able to describe and evaluate the time and effort it would take to produce artefacts. Reflections about the artisans' close relations to, and emotions concerning, their own artisanal equipment and tools were illuminated—for example, the importance of a contemporary woodworker's chopping block (see, e.g., Niedderer and Townsend 2014). This is a telling example of how archaeology can gain the opportunity to assess the importance of an artefact which might otherwise be overlooked.

The interview conducted with a professional and experienced small-scale farmer supports the idea that specially trained members of the population could have been performing some work or crafts. Davidsson puts forward that a farmer has a broad knowledge and leads a life of hard and time-consuming work. The reasoning and reflection about a contemporary farmer's knowledge and the ancient farmer's knowledge bears evidence that the specific knowledge of turning wood, making linen, or producing a fine-ware pot may not have been in a full-time farmer's list of chores. One might envisage that a Roman Iron Age farmer who was in need of something that requires specific craft knowledge would be turning to an artisan with the skill, tools, and workspace for such a task. Based on the results, one can propose that the artisan at Käringsjön lived within the small-scale society as an experienced member in his or her artisanal arena, providing the items needed in everyday life and as a resource in farming. An artisan seems to have had access to some form of education from a skilled person or may have gone to other regions

to learn a specific craft. The ideas of new or different design may have arrived with foreign artefacts, or from visiting artisans. Local artisans may have been travelling for some time and picked up ideas about form and techniques that were later applied and visualised in the Käringsjön tarn. To live in the settlements nearby to Käringsjön was actually to live in an artisanal environment and to take part in actions deeply connected to embodied knowledge.

In addition, the present reflections and interpretations of the artefacts were not included in previous studies of the tarn and thus there are reasons to believe the information was overlooked or inaccessible to the previous research team. I have not come across literature where I can read oral information which has been written down and approved by artisans themselves. On the contrary, I continuously come across publications where even the names of participating craft practitioners are left out—an omission of the very basics to make research comparable. My present study shows how archaeology would benefit from interviews with practitioners.

It is most gratifying to see that the contributed artisanal interpretations raised new questions that in the future may be answered in reflective, collaborative discussions between archaeologists and artisanal consultants. Through the studies it was also possible to expand the understanding—and interpretations—of how skilled the ancient artisans in the Käringsjön area were, and how long they had trained to acquire the knowledge visible in the artefacts.

In this matter, I want to contribute to those endeavours with a more balanced exploration of ancient artisanship, presenting additional information deriving from the deep knowledge of the actual craft. The visual or visual/tactile investigation

cannot be carried out by a non-tactile expert. We have to acknowledge that some information can be found in the actual artefact hidden in the present archaeological material and that some information can be found in literature.

In the future, I hope to gather groups of archaeologists, craft researchers (practitioner-researchers with multiple educational backgrounds), and artisans together to explore a number of artefacts. Such a combinations of skills can help interpret and bridge the knowledge gaps between artisans and archaeologists. Hopefully, this would provide an unexpected impetus for further discussion and interpretation, yielding results and new questions that neither of the disciplines could bring out alone, thus further developing craft theory.

REFERENCES

- Arbman, Holger. 1945. *Käringsjön: studier i halländsk järnålder* [*Käringsjön (Women Lake): Studies in Halländsk Iron Age*]. Stockholm: Wahlström & Widstrand
- Björklund, Lars-Erik. 2008. "Från novis till expert: förtrogenhetskunskap i kognitiv och didaktisk belysning" ["From Novice to Expert: Intuition in a Cognitive and Educational Perspective"]. Dissertation. Norrköping: Nationella forskarskolan i naturvetenskapernas och teknikens didaktik (FontD).
- Björkman, Leif. 2009. "Vegetationsutveckling och markanvändning vid Käringsjön i Halland Från neolitikum till tidig medeltid" ["Development of Vegetation and the Use of Land at Käringsjön in Halland (parish) from Neolithic to Early Medieval Times"]. Paper (Halmstad) Halmstad: Uppdragsverksamheten, Stiftelsen Hallands läns museer.
- Botwid, Katarina. 2009a. "Från Skärva till helhet—keramisk hantverkarskunskap som redskap för djupare förståelse av artefakter och arkeologisk kontext" ["From Sherd to Whole (pot)—ceramic Artisanal Knowledge as Tool for In-depth Understanding Concerning Artefacts and Archaeological Context"]. Bachelor Thesis. Visby, Sweden: Högskolan på Gotland.
- Botwid, Katarina. 2009b. "Offrad keramik—mossfynd från romersk järnålder i Käringsjön i Halland" ["Offered Ceramics: Tarn Findings from Roman Iron Age (Sweden 200–400AD) in Käringsjön (Women's Lake) in Halland Parish"]. Master Thesis. Visby: Högskolan på Gotland.
- Botwid, Katarina. 2013. "Evaluation of Ceramics: Professional Artisanry as a Tool for Archaeological Interpretation." *Journal of Nordic Archaeological Science (JONAS)* 18: 31–44.
- Botwid, Katarina. 2014a. "Från hand till hand—arkeologisk forskning ur ett hantverksperspektiv" ["From Hand to Hand: Archaeological Research from an Artisanal Perspective"]. In *Att befolka det förflutna: fem artiklar om hur vi kan synliggöra människan och hennes handlingar i arkeologiskt material* [*To Populate the Past. Five articles on How We Can Visualise Humans and their Actions in Archaeological Materials*], edited by Anne Carlie, 55–71. Kalmar: Riksantikvarieämbetet.
- Botwid, Katarina. 2014b. "Hantverkstolkning av keramik—en undersökning av forntida keramikens hantverksskicklighet" ["Artisanal Interpretation on Ceramics: A Survey of Ancient Ceramists Artisanal Knowledge"]. In Aspeborg m.fl., Gustavslund, 223–46. RAÄ.
- Botwid, Katarina. 2016. "The Artisanal Perspective in Action: Archaeology in Practice." Dissertation. Lund: Lund University. <http://lup.lub.lu.se/record/859>.
- Botwid, Katarina. 2017. *Understanding Bronze Age Life: Prysgården (LBA) in Sweden from an Artisanal Perspective*. Lund: Institute of Archaeology and Ancient History.
- Botwid, Katarina. 2018. "Report on Ceramics." In Grehn, F. Eskilstorp 2:26, etapp 1B, samt delar av Åkarp 1:4: arkeologisk förundersökning och utredning 2017 : Eskilstorp socken, Vellinge kommun, Skåne län. Kristianstad: Sydsvensk arkeologi.
- Botwid, Katarina. 2020. "Skill in High-Temperature Crafts: An Artisanal Perspective on Fire." In *Detecting*

- and *Explaining Technological Innovation in Prehistory*, edited by Michela Spataro and Martin Furholt, 231–46. Leiden: Sidestone Press.
- Botwid, Katarina. In press. “The Colour of Life: An Artisanal Perspective on Ceramic Anomalies during the Scandinavian Roman Iron Age.” In *Technology and Change in History*. Leiden: Brill.
- Botwid, Katarina, and Paul Eklöf. 2016. “Use Traces on Crucibles and Tuyères? An Archaeological Experiment in Ancient Metallurgy.” BAR S2785. In *Prehistoric Pottery Across the Baltic*, edited by Paul Eklöv Pettersson, 21–28. Place: British Archaeological Reports Ltd.
- Bryman, Alan. 2012. *Social Research Methods*. Oxford: Oxford University Press.
- Budden, Sandy. 2008. *Skill Amongst the Sherds: Understanding the Role of Skill in the Early to Late Middle Bronze Age in Hungary*. Oxford: Archaeopress.
- Budden, Sandy, and Joanne Sofaer. 2009. “Non-discursive Knowledge and the Construction of Identity Potters, Potting and Performance at the Bronze Age Tell of Szlhalombatta, Hungary.” *Cambridge Archaeological Journal* 19: 203–20.
- Carlie, Anne. 1998. *Käringsjön: A Fertility Sacrificial Site from the Late Roman Iron Age in South-west Sweden*. Current Swedish Archaeology. Stockholm: Svenska arkeologiska samfundet [Swedish Archaeological Society].
- Carlie, Anne. 2001. Fosfatkartering och provundersökning vid Käringsjön, södra Halland: Halland, Övraby socken, Älvasjö [Phosphate Mapping and Sample Survey at Käringsjön Lake, South Halland]. 1:1, 1:2 m. fl., RAÄ 18. Halmstad: Hallands länsmuseum [The Museum of Halland Region].
- Carlie, Anne. 2003. Från maglemose till senmedeltid: nya perspektiv på Käringsjön i södra Halland [From Maglemosse Culture to Late Medieval Times: New Perspectives on Käringsjön Lake in the South of Halland]. Halland, Övraby socken, Älvasjö. 1:1, 1:2 m fl, RAÄ 18. Halmstad: Hallands länsmuseum [The Museum of Halland Region].
- Carlie, Anne. 2009a. “Käringsjön – en av järnålderns rituella platser: inledande kommentarer kring boken och projektet” [“Käringsjön Lake—One of the Iron Age Ritual Places”]. Paper (Halmstad) Halmstad: Uppdragsverksamheten, Stiftelsen Hallands länsmuseum [The Museum of Halland Region].
- Carlie, Anne. 2009b. “Käringsjön: en gammal fyndplats i ny belysning” [Käringsjön Lake: An Old Excavation Site in New Light]. Paper, (Halmstad) Halmstad: Uppdragsverksamheten, Stiftelsen Hallands länsmuseum, 1991- [The Museum of Halland Region].
- Collins, Harry, and Robert Evans. 2007. *Rethinking Expertise*. Chicago: University of Chicago Press.
- Cunningham, Penny, Julia Heeb, and Roeland Paardekooper. 2008. Experimental Archaeology Conference. Experiencing Archaeology by Experiment: Proceedings of the Experimental Archaeology Conference, Exeter 2007. Oxford: Oxbow Books.
- Dreyfus, Hubert L., Stuart E. Dreyfus, and Tom Athanasiou. 1986. *Mind Over Machine: The Power of Human Intuition and Expertise in the Era of the Computer*. New York: Free Press.
- Ekengren, Fredrik. 2009. *Ritualization - Hybridization - Fragmentation: The Mutability of Roman Vessels in Germania Magna AD 1–400*. Lund: Institutionen för arkeologi och antikens historia, Lunds universitet.
- Gustavsson, Bernt. 2002. *Vad är kunskap? : en diskussion om praktisk och teoretisk kunskap* [What is Knowledge? A Discussion about Practical and Theoretical Knowledge]. Stockholm: Statens skolverk.
- Gärdenfors, Peter, and Anders Högberg. 2015. “Evolutionary Mechanisms of Teaching.” In *Behavioral and Brain Sciences* 38 (e41): 25–26.
- Kuijpers, Maikel. 2013. “The Sounds of Fire, Taste of Copper, Feel of Bronze, and Colours of the Cast: Sensory Aspects of Metalworking Technology.” In *Embodied Knowledge: Perspectives on Belief and Technology*, edited by M. L. Stig Sørensen and K. Rebay-Salisbury. Oxford: Oxbow.

- Kuijpers, Maikel. 2018. "The Bronze Age, A World of Specialists? Metalwork from the Perspective of Skill and Material Specialisation." *European Journal of Archaeology* 21 (4): 550–71.
- Lave, Jean, and Etienne Wenger. [1991] 2005. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.
- Marchand, Trevor. H. J. 2010 "Embodied Cognition and Communication: Studies with British Fine Woodworkers." In *Making Knowledge: Explorations of the Indissoluble Relation between Mind, Body and Environment*, edited by Trevor H. J. Marchand, 96–114. Malden, MA: Wiley-Blackwell.
- Molander, Bengt. 1996. *Kunskap i handling [Knowledge in Action]*. Gothenburgh: Daidalos.
- Müller, Sophus. 1933. Oldtidens kunst i Danmark. 3, Jernalderens kunst i Danmark : førromersk og romersk tid, [The Old Times Art in Denmark. 3, The Art of Iron Age in Denmark: Early Roman Iron Age and Roman Iron Age = L'art de l'âge du fer au Danemark : époque préromaine et romaine], K.benhavn. Müller-Karpe, H. (1957). Münchener Urnenfelder: ein Katalog. Kallmünz, Opf.
- Müller-Karpe, Hermann. 1957. *Münchener Urnfelder: ein Katalog*. Kallmünz, Opf.: M. Lassleben.
- Niedderer, Kristina, and Katherine Townsend. 2014. "Designing Craft Research: Joining Emotion and Knowledge." *The Design Journal* 17 (4): 624–47. <https://doi.org/10.2752/175630614X14056185480221>.
- Nilsen, Gørill. 2011. "Doing Archaeological Experiments in an Ethnic Context-Experimental Archaeology or Experiential Activities?" In *Experimental Archaeology: Between Enlightenment and Experience*, edited by Bodil Petersson and Lars Erik Narmo, 257–277. Lund: Lund University.
- Polanyi, Michael. 1966/1983. The tacit dimension. Repr. Gloucester, Mass.: Peter Smith
- Pye, David. 1978, The Nature and Aesthetics of Design. London: Herbert Press.
- Sperling, Uwe. 2016. "Bronze Age Connections Across the Baltic Sea: Discussing Metalwork as Source of Maritime Contacts in Prehistory." In *Marine Ventures - Archaeological Perspectives on Human-Sea Relations*, edited by Hein Bjerck, Chapter 25. Sheffield: Equinox Publishing.
- Sperling, Uwe. 2019. "Bronze Casting Debris in Settlements and Within Dwellings. Revisiting a Frequent Phenomenon with the Case of Asva (Estonia)." Paper presented at the Fifteenth Nordic Bronze Age Symposium (NBAS). Lund University.
- Trigger, Bruce G. 2006. *A History of Archaeological Thought*. 2nd ed. Cambridge: Cambridge University Press.
- Vincentelli, Moira. 2004. *Women Potters: Transforming Traditions*. New Brunswick, NJ: Rutgers University Press.

ELECTRONICAL SOURCES

- Photograph from Swedish History Museum (decorated bone comb) derived from <http://mis.historiska.se/mis/sok/fid.asp?fid=117237&g=1>. Accessed 8 May 2019.
- <https://www.oxfordlearnersdictionaries.com>. Accessed 28 August 2020.