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Notations on Craft: Movement, Gesture and Bodily Expression

By Harald Bentz Høgseth and Magnús Rannver Rafnsson

INTRODUCTION

There is a need to detect and to transfer craft knowledge in the field of archaeology (Stout 2002a; 2002b; Ingold 2013; Kuijpers 2018). A craftsperson carries experiential knowledge of craft processes similar to those that have left marks on archaeological sites. In cases where the craft practice has not changed dramatically over the years, there is a tradition of knowledge still living through the craftsperson's experiential and embodied knowledge. Knowledge of craft is therefore of great importance for such studies. In this chapter, the use of notations in the study of experiential knowledge in craft is discussed from the perspective of archaeology, craft sciences, and the craftsperson's practice.

Craft research in heritage studies often revolves around the reconstruction of processes and knowledge behind the creation of objects and constructions (Outram 2008; Almevik 2017; Peterson 2017).

This represents a closing in, through interpretation, on the processes that are likely to have been used in the past and on the craftsperson's choice of materials, tools, and method. These must be reconstructed and studied thoroughly if a deeper understanding of the subject is to be gained. The method presented in this chapter largely follows this procedure, with the reconstruction of tools and working processes being based on the combination of observations, examinations, analysis, and interpretations.

Archaeological tool marks are the starting point of the topic under discussion—an analysis method which studies the craft and likely bodily actions behind excavated tool marks (Sands 1997; Høgseth 2007; 2012). Tool marks in timber have very distinct characteristics; they represent a craftsperson's signatures and they provide information about the tool and the way it was used. Tool marks, once identified, are analysed, and the tool, procedures, and actions behind them are reconstructed. Here,

special attention is devoted to the documentation (preservation) of the information that is generated in the reconstruction process.

Attempts to develop notation systems for applications in craft research have been previously conducted by, amongst others, Willeke Wendrich, who developed an ethno-archaeological interpretation of traditional basketry manufacturing in Egypt (Wendrich 1999), defining terms and concepts for work processes through applying written studies, animated videos, and a dance notation system. Patrik Jarefjäll, in his work, adapted practice-led research and time-geography in his study on blacksmithing processes by using video recordings to analyse his own actions in a step-by-step process (Jarefjäll 2013; 2016; Eriksson et al. 2019; see also the analysis on language use in relation to bodily actions developed by Gustav Thane in this anthology). In his articles “The Semiotic Body in its Environment” (2003a) and “Pointing as Situated Practice” (2003b), the American sociologist Charles Goodwin presents approaches which he developed from theoretical and methodical grounds and which describe specific (knowledge) processes that take place and unfold through an intentional action. He analysed archaeologists’ practice and their application of the body and perceptions in field situations. In addition, Goodwin studied embodied interaction, language, gestures, and body language through archaeological practice and communication in the material world (2003a; 2003b; 2011).

Many craft practices make use of notation systems that allow the practitioner to make notes about the practice for personal use as well as for sharing with colleagues or disciples. Examples can be found in the notations for sail-making, recipes for glazes in a pottery, or even mathematical calculations as notations (see also the vocabulary developed by Arja Källbom in this anthology).

Our research interest—and the focus of this chapter—revolves around developing a notation system that describes movements and gestures of a practitioner’s body today, in order to interpret the anticipated movements behind tool marks from the past. The objective is to pave the way for further development of notation systems for craft research and to introduce the wide-ranging advantages that the method provides, as a complement to traditional written documentation in archaeology and to the methods available in heritage craft research presently. At the same time, the chapter contributes to the discussion in the craft research community through the reflective dialogue in traditional craft practice.

COMMUNICATION OF CRAFT SKILLS IN THE ACADEMY: KNOWLEDGE AND BODILY EXPRESSIONS

Tacit knowledge is a term that is used to describe knowledge that is difficult to transfer to others using language alone (Polanyi 1998; 2000; Ingold 2013; Dreyfus 2014; Christensen, Sutton and McIlwain 2016; Ingold 2018). Examples of tacit knowledge include the ability to play an instrument, to speak a language, or to ski. Tacit knowledge is not easily explicitly verbalised and is usually transmitted through demonstration (actions). This also applies to many situations in craft. A master demonstrates his skills and experiential knowledge mainly through bodily action—through showing how things are done—often without verbalising anything at all (Mol 1999; 2002).

Intentional actions and the practical knowledge of craftsmanship are to a large extent captured in unspoken implicit knowledge. The same is true for art forms such as music and dance. Bodily knowledge and expressions like rhythm and feelings are communicated through motions and gestures, of-

ten in a *tacit way*. The transfer of such knowledge, its communication and interpretation, take place in the interaction between people (Birgerstam 2000, 91–93; Polanyi 2000, 20–26; Goodwin 2003a, 15–24, 217–41; 2003b, 19–42; Merleau-Ponty 2003, 82–83, 121–22, 138–39; Høgseth 2007, 222–27; Clark 2008; Malafouris 2008, 401–14). This communication is, furthermore, affected by the physical surroundings we are a part of and which we shape (Heidegger 1971, 148; 1982, 163; Mol 1999, 47–89; Andersson 2001, 37–44, 136–37, 142–64; Harman 2002, 21, 34–35; Mol 2002, 1–29; Heidegger 2007, 68–72, 110–11; Høgseth 2007, 141–62; Olsen 2010, 63–88).

Craft-based practices have, to some extent, suffered from views that prioritise written sources as a means of communication of knowledge (Olsen 2010; 2015; see also Almevik and Westin in this anthology). Theorisation has gradually increased in modern education systems, affecting also vocational education (Gustafsson 2002, 28–57, 171–220; Udir 2016; Almevik 2019, 1–14). A certain lack of general holistic understanding of the many facets of knowledge has resulted in a gap between theoretical and practical training, making vocational education more and more theoretical (Gustafsson 2002, 28–57).

Craftsmanship is often defined as a skill developed in the field between practice in, and reflection upon, its practice (Adamson 2007; Knappett and Malafouris 2008; Marchand 2012; Ingold 2013; 2018). Development of craft skills takes place in the practitioner's encounters with their material environment and through experiential learning processes (Adamson 2007; Knappett and Malafouris 2008, 1–78; Marchand 2012, 260–66; Ingold 2018, 159–63). The tradition and practice-based knowledge of craftsmanship is therefore communicated both tacitly and verbally, through practice. From this arises

the following questions: How can we analyse knowledge related to bodily activity more systematically? How can we better document—learn, understand, and convey—this form of knowledge?

WHY DOCUMENT CRAFT GESTURES?

Traditional craftsmanship is rapidly changing as a result of the many advances in the field, such as automation, digitalisation, and even artificial intelligence. In the context of heritage craft research, there is a reason to ask: What is the best way to document experiential and practice-based knowledge? And how can it be preserved and communicated to future generations?

Understanding the past is often important for the generation of improvements in the future. Information concerning how previous generations treated nature (i.e., raw materials and available resources through making and cultivating) can be of great value, not only to understand the past, but to learn from it. This is relevant for preservation purposes in the context of growing requirements for sustainability and even for developments of new environmentally responsive technologies. This is especially true when it comes to timber-technologies, as signs indicate that construction technologies in the past may have been more environmentally sustainable than the construction methods commonly used today.

Craftspeople, like musicians or archaeologists, have their own unique professional language—one containing various expressions, terms, and definitions to characterise the techniques, tools, and actions used (see also Thane in this anthology). As practice-based and experiential knowledge is, to a large extent, *tacit*, the most efficient way to learn is through active participation and working with the masters of the traditional craft. Apprenticeship is thus essential if the actions of craft are to be un-

derstood in full depth, including language-based dialects and specific expressions exchanged at the building site (Tempte 1982; Godal 1996; Molander 1996; Høgseth 2007).

A craft notation system based on Sutton Movement Writing (www.movementwriting.org) was applied in Harald B. Høgseth's doctoral thesis (2007) to archaeological wooden tool marks found in remnants of ancient timber structures. The method, as presented in this chapter, makes it possible to preserve and communicate knowledge that is based on bodily actions in craftsmanship. It enables a more profound and structured approach in craft research because it visualises systematically the communication of key information. The method can be used as a supplementary tool, together with other well-known methods, such as video documentation, pictures, and written documentation, or independently, such as f.ex. with hand-notation during a live performance.¹

We thus put forward the idea that notation systems visualise depths in the craft language which written language alone is not able to offer.

In the following sections, notation systems in music and dance practice will be discussed with regard to the development of a practical notation system for craft. Thereafter, a craft-related notation system inspired by the former will be presented. Finally, the challenges and advantages of the notations in the field of craft and craft sciences will be discussed.

NOTATION SYSTEMS AS A METHOD IN CRAFT SCIENCE

Astonishingly, there are many similarities between material-based craft practice, dance, and music performance. Generally speaking, dance and music are usually categorised as art forms. This is true in education or research contexts as well. However, dan-

cers and musicians do not perform at the highest level of their art every day; their daily practice is, to a large extent, similar to craft practice. Interestingly, the practice of both music and dancing rely significantly on communication through notation systems, which describe and communicate movements (actions) and sound respectively, through applications of standardised signs and symbols. Dance and music notations are *sign languages* that enable the communication of movements in a way other than text and spoken language are able to. Thereby, it is possible to create, preserve, analyse, and communicate—and even improvise on—specific art and knowledge by using the defined rules and framework of the system.

NOTATION SYSTEMS IN THE CONTEXT OF PERFORMING PRACTICES

Most people would agree that describing music just through words or even musical notation would be a poor illustration of the art. The tacit knowledge in music unfolds through the dynamics, rhythms, and sounds of the music itself. The way music comes alive cannot be explained by words or even musical notation alone. We gain certain insights through words, and much better and structured understandings through musical notations, but not the in-depth understanding of the procedures and nuances behind the sounds we hear and the emotions we feel. However, we do gain some insight into Mozart's musical career by analysing his compositions represented in the musical notations from the eighteenth century. However, these can never replace Mozart's tangible actions in the form of his performance, how he played, and his personal expressions such as feelings or rhythm. Nevertheless, the musical notation system preserves important aspects of Mozart's work in a structured form and

enables us to come much closer to understanding the craft and the art of Mozart and his compositions than would otherwise be possible.

This can also be applied to the art of dancing. Documented choreography in the form of dance notation adds a new dimension to the practice of dancing, enabling the deeper systematic understanding and expression of so much more. Neither musical notation nor choreography can, however, reach the full depths and insights of the art form they represent and the feelings that are generated within us during a performance. It still requires hard work to become a master, but the tools to become one through systematic work and training are far more wide ranging with the notation system. At its best, the performer (the master) and the art are one; everything comes easily, without force and without thinking.

Similar arguments may be used for the art of crafts, to craft as an art form and to craft as a traditional industry, especially when it comes to the documentation, preservation, and communication of craft-related tacit knowledge. One could argue that this is of vital importance to the past and the future of craft science. How would Mozart's music sound today if it hadn't been documented and preserved systematically using a musical notation system? If such a system had not existed, we would have been dependent on a continuous and unbroken tradition, the music being transferred from one generation to another in an unbroken continuous flow. The music of Mozart would most likely have sounded very different from the original composition.

What happens to craft-related knowledge that is only transmitted verbally from one generation to the next? What is today's 'sound' of past craft? Has it changed? How will it 'sound' in the future?

Knowledge of crafts is materialised through the performer's body language, gestures, choice

of procedures, force, rhythm, and other expressions of action—and the physical product that becomes the result of the actions (Olsen 2010; 2015). Although it is *tacit*, it can be reconstructed and therefore investigated through examining the practitioner's tangible actions in the present, through the physical material and traces in physical material left by them (in the past or present). This has great meaning in archaeology in the analysis of traces of tools (tool marks) in ancient wooden materials from building remains (Sands 1997; Stout 2002a; 2002b; Wendrich 2012; Ingold 2013; Olsen 2015; Kuijpers 2018).

It thus could be of great value to develop a practical craft notation system for the purpose of research and general communication of craft knowledge. Standardised notation systems could represent a common platform from which researchers and practitioners can communicate and discuss a wide range of different craft-related matters, constructively and systematically.

In the following pages, two examples of notation systems will be presented: one for performing dance practice and one for performing carpentry. The latter was inspired by the former.

THE SUTTON MOVEMENT WRITING SYSTEM

Sutton Movement Writing (SMW) is a dance notation system that was developed by the American movement notation developer, pedagogue, and former dancer Valerie Sutton (1973; 2007; 2014). Dance notation is based on a system that combines a set of five horizontal lines and a variety of standardised symbols to represent known patterns and characteristics in dance movements (see Figure 1). Sutton developed this detailed sign language to describe patterns of actions and postures in dance.



Figure 1. Sutton Movement Writing. Image reproduced from Høgseth 2007, 103.

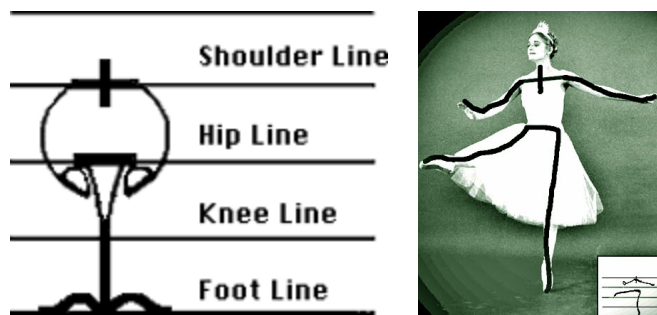
SMW can therefore be used to preserve historical dance forms through reconstruction (transcription) of choreography and exercises.

SMW allows us to transcribe most forms of motion into characteristic symbols. This comprehensive character system was categorised by Sutton in the International Movement Writing Alphabet, IMWA (Sutton 2014). SMW not only enables us to characterise human activities, for example of a craft, but also movement patterns of animals, insects, and objects. SMW is based on a notation system developed in the sign writing community at the University of Copenhagen in 1974. Standardised symbols are designed to describe one specific characteristic motion. The system consists of five disciplines: dance writing, sign writing, mime writing, sports writing, and movement writing (Sutton 2007). The SMW system is practical, easy to learn and use, and has the ability to note even the most complex movement patterns, including levels of finger movements.

Movement writing has frequently been used to document bodily movements within physical therapy and the movement patterns of autistic children (Valerie Sutton, www.movementwriting.org). The idea emerged from the urgent need to visualise bodily spatial knowledge through a set of simple characteristic signs. The method was eventually developed further by other researchers (Høgseth 2007; Hoffmann-Dilloway 2011; 2013; 2018). In

the context of craft research, the method is interesting because it enables detailed documentation of the entire body in motion and is suitable for describing gestures, rhythms, mimics, and movements.

The approach is adaptable to the performer or an observer. When being recorded from the perspective of an observer, it uses the *spectator principle*. A survey, accomplished by an observer, holds a more objective documentation and description of the performer and the context. The observer should have a basic understanding of the practice and be trained in the application of the notation system. In order to achieve qualitative results in the process, an empathetic approach is necessary to get close to the craftsperson and properly interpret and document the actions. One reason for this is that it is easier for an observer to make the notations, as the performer cannot do this while performing. At the same time, it is important to have knowledge of the relevant practice to better understand the process. However, the survey can also be conducted from the *performer's perspective*, one that is more intentional, behavioural, and subjective. The characteristic of the notation system can also be compared to the alphabet—standardised symbols that are lined up in a certain order. For that reason, the notations should not differ significantly from one observer/notator to another. However, different performers will vary in their techniques and performance-related parameters, such as rhythm, speed, and force. Still, the system as such should be just as reliable



Figures 2A–B: Dance notation, Sutton Movement Writing (SMW). Image reproduced from Høgseth 2007, 104.

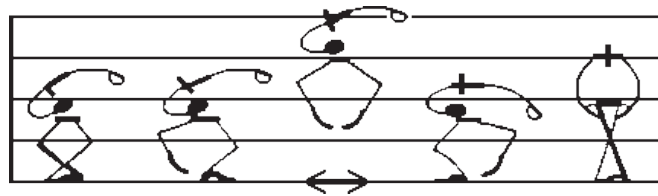


Figure 3: Dance notation, Sutton Movement Writing (SMW): punctuation, visualisation of motion. Image reproduced from Høgseth 2007, 105.

for the purpose of documentation of craft as notation systems of dance and music. A continuity and correlation between processes of actions, documentation, and analyses is required by qualitative interpretation processes.

Figures 2 and 3 show examples of SMW and demonstrate the placement of sign symbols on a five-lined staff. Each line of the staff represents a specific level of the body. The bottom line is called the *Foot Line*. It represents the ground. The next line up is the *Knee Line*, which is at knee level when the stick figure is standing straight. The next line up is the *Hip Line*, and after that, the *Shoulder Line* (Figure 2).

The figure depicted on the lines is, for example, lowered on the staff where it bends its knees or raised where it jumps into the air (Figure 3). The five-lined staff acts as a guide of level. Figures and symbols are written from left to right (or vice versa), notating movement position by position, as if frame by frame of a film. Repetitive movements can be written in a single symbol.

Additional 3D symbols, black-filled and half-filled circles, representing the third dimension, are written under the stick figures where more detail is required (Figure 4). The round circles depict the head as seen from above, providing an overhead view. The spokes projecting from the circles show the direction of the limbs in relation to the centre of the body. There are two rows of 3D symbols: one that represents the overhead view of the arms and upper body (small circles) and one representing the overhead view of the legs and lower body (larger circles).

SMW dance notation can also be presented in time and in the context of music and musical notation, combining time (music) and three-dimensional spatial movement (dance). Two sets of five-string layouts are then required: one for the musical notation and one for the dance notation. This is well known from classical dance notation (Figure 5).

Dance writing shorthand (Figure 6) enables a trained writer to write movement at the speed it occurs. This, like secretarial shorthand, is a shortened

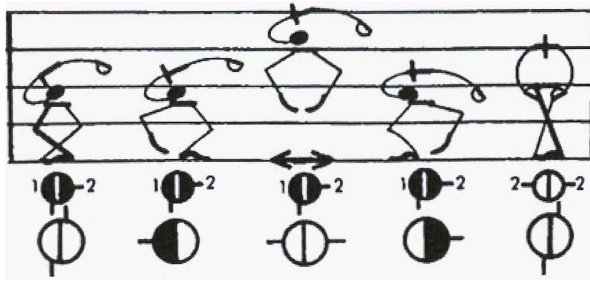


Figure 4: Dance notation, Sutton Movement Writing (SMW): two rows of 3D symbols below the staff. Image reproduced from Høgseth 2007, 105.

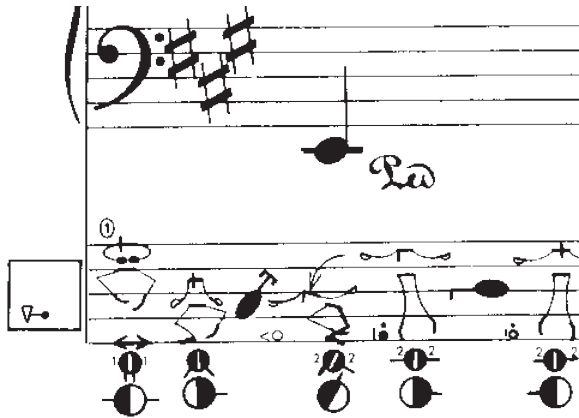


Figure 5: Dance notation, Sutton Movement Writing (SMW): classical dance notation combined with musical notation. Image reproduced from Høgseth 2007, 105.

version of the stick figure. An entire dance performance can be captured in ‘first-draft’ form using the shorthand, later being transcribed into detailed Dance Writing. Hundreds of dance students at the Dance Department of Boston Conservatory of Music in the late 1970s learned the shorthand with success (Valerie Sutton, <https://www.dancewriting.org/>). This carries great potential for applications in the field of craft sciences.

This system of dance notation enables the characterisation of the speed, strength, interaction, and connection of the movement, containing hundreds of symbols that are logically built up. Movement writing is applied as a method in Høgseth’s study, in which he analyses the embodied and characteristic motion patterns of craftspeople that come alive during the processing of timber (Høgseth 2007).

The characteristic working techniques and procedures behind the output (the physical piece that becomes the result of the process) can be systematically examined in great detail, through signs and symbols, in a step-by-step transcription of a craftsperson’s movement during action. While the method may be applied in several different craft disciplines, we here focus on carpentry and processing of timber.

From the perspectives of archaeology and craft science, the above method can be applied in reconstructing processes from the past, in which traces of tools (tool marks) upon wooden artefacts are the starting point. SMW, because of its simplicity, flexibility, and convenience, seems to be very adaptable to practice-led research in the field of craft sciences and the analysis and characterisation of a craftsperson’s actions.

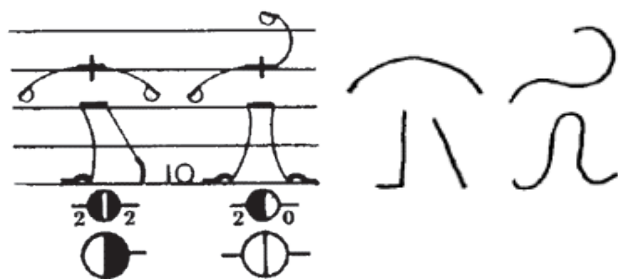


Figure 6: Dance notation, Sutton Movement Writing (SMW): detailed dance writing (left) and dance writing short-hand (right). Image reproduced from Høgseth 2007, 105.

APPEARANCE AND RECONSTRUCTION OF TOOL MARKS IN ARCHAEOLOGICAL MATERIAL

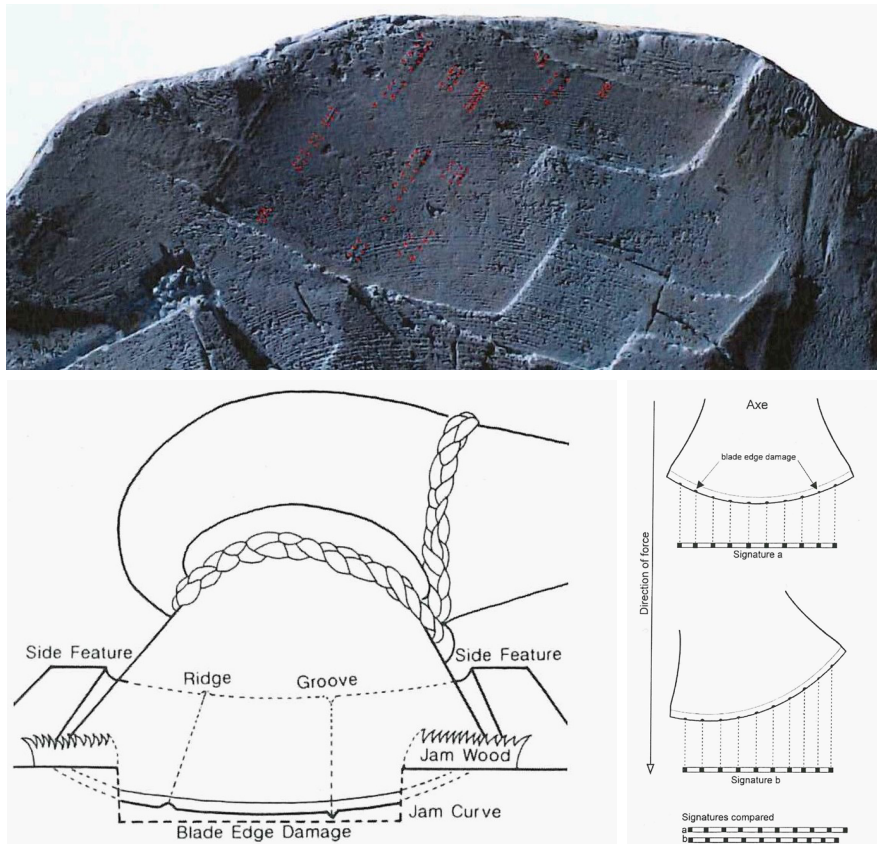
Tool marks, once found on the surface of ancient timber, may be analysed using different types of research methods. Examples include silicone casting and 3D photo scanning. Such methods allow the tools, techniques, and procedures behind distinctive characteristics of the deformed wood surface (tool mark) to be reconstructed (Figures 7 and 8). Through analysis of tool marks, it is possible to identify specific tools and even the individual characteristics of tool marks made by specific craftspersons, and thereby link processed timber to a single tool used by a specific person. Factors such as the centre-distance between stroke series, depth, geometry, and the angle of the marks all reveal valuable information about the rhythm, force, and dynamics that must have been applied in the process

The method reveals details of the characteristics of a specific tool, such as the shape and geometry of the tool's edge and other impressions rooted in damage and wear of the edge. From this, we can even establish whether the chopping was done by the same craftsperson or tool. This makes it possible

to systematically map the identified characteristics, for example the axe's gradation and the depth and order of the tool marks on the surface of the timber. Tool marks can also be used to identify separated timber constructions. It may also reveal the craftsperson's posture and standpoint towards the timber (Figure 8). This information supplemented with other methods, such as dendrochronology, can, piece by piece, yield a coherent picture of events in the past.

The picture in Figure 7 and the sketch in Figure 8 show the relationship between signatures and the 'stopping mark' of the axe (i.e., where the edge of the axe stops). The stopping mark uncovers the curvature of the edge. The angle between the signature and the stopping mark uncovers the circulating movement of the axe, and thereby the posture of the craftsperson during the working process. If the angle between the stopping point and the signature changes, this represents a change in the craftsperson's posture and standpoint towards the timber.

In other words, studies of archaeological tool marks reveal important information on the relationship between the craftsperson, the material, and the processes involved when the timber was processed.



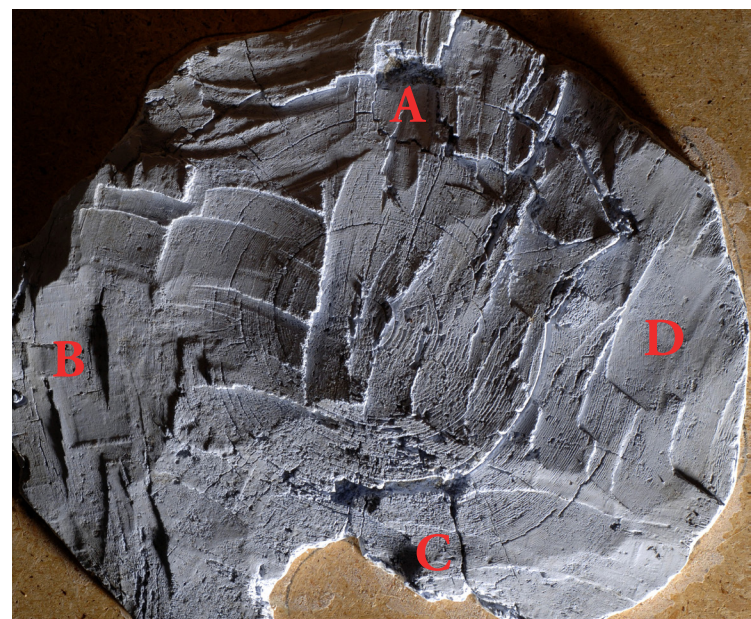
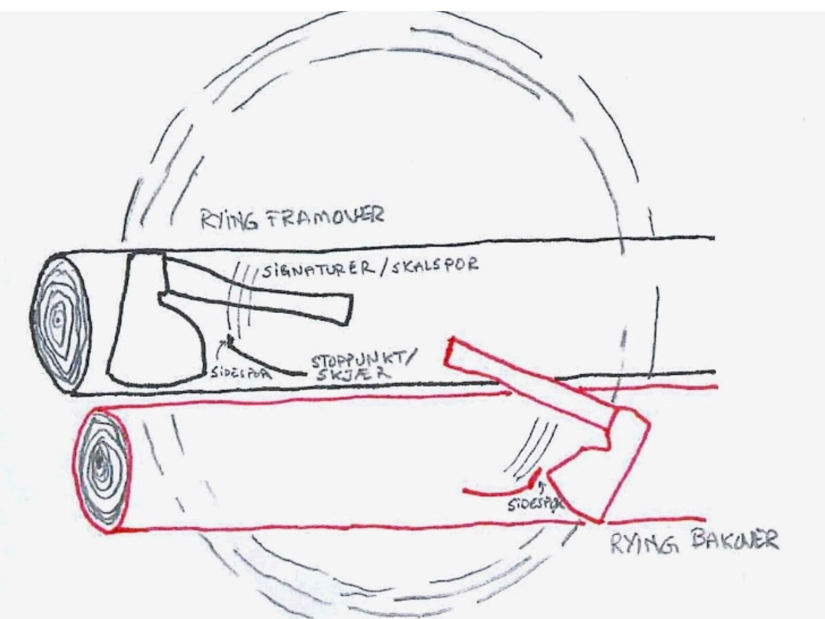
Figures 7A–C: To the left we can see the ridges and grooves from the same axe with its characteristic signatures (Høgseth 2007). To the right and in the middle, tool marks with distinctive individualities are evident (Sands 1997).

Further, Figure 9 illustrates the procedure of log-cutting, which can be recognised through the characteristic tool marks clearly visible on the photograph. The shape of the tool marks indicates that the procedure must have taken place in four cutting steps (A, B, C and D), where the log is turned and cut from four different sides.

The cutting process seen in Figure 9 can be characterised as follows: the craftsperson started the chopping process in area A, then turned the log and continued in area B, after that turning it again and moving to area C and finally D. Throughout the process the log was turned to the right, with the

carpenter chopping from the outer surface inwards towards the marrow. The log's D area faced upwards after the chopping process was completed. The carpenter completes the cutting process by brushing off the goat wood from the outer edge and moving gradually, with long strokes, inwards towards the marrow. He uses long, controlled, steady movements. The purpose of the brushing is to remove irregularities and the fracture from felling the timber in the woodland.

Area A shows that the craftsperson took up a position on the right side of the log. In area B, however, the carpenter seems to have continued chop-



Figures 8-9: (Left) The axe follows a curved path and rotates when used (Prytz 2005). (Right) Casting of tool marks (log 1077) from the Nidaros Cathedral excavation (Høgseth 2007).

ping on the opposite side. The stopping mark of the axe's blade supports this hypothesis, the angle being steeper towards the side features on the right side. In other words, he must have been standing on the left side during the cutting process, the log then being turned and hewing continuing in area C. Here also the carpenter must have cut the timber from the right side of the log. He then stopped in area D. These cutting series very clearly visualise the method and procedure applied in the process of cutting the log. The craftsman moves gradually from the outer surface of the log, inwards towards the centre. He works from the left side of the log, with cutting being conducted from four sides/edges, whereby he regularly shifts between the left to right side.

This detailed analysis enables us to reconstruct the production process behind a tool mark very accurately. When the correct movement patterns and

bodily actions have been identified, they can be registered (transcribed) in great detail in the craft notation system. In the context of heritage studies in craft, the analysis therefore serves as the generator of the input data for the documentation and future preservation of the relevant craft knowledge.

THE PROCESS OF WRITING CRAFT: RE-CONSTRUCTION OF WORKING PROCESSES WITH THE HELP OF NOTATIONS

In this section, the process of writing craft procedures into a craft notation system, developed on the basis of Sutton Movement Writing, will be presented. This is a process that comes into play mainly when analysis of tool marks and the reconstruction of tools and procedures have been completed. The tool marks are the starting point.

In the reconstruction process, snapshots are taken from video recordings and used as key patterns in the documentation of the relevant actions. This is a transcription process not unlike analysis of jazz music performances, especially when it comes to improvisations. Selected snapshots that represent visual key information of a bodily action are then transcribed piece by piece, using signs and symbols developed from the SMW notation system.

In Høgseth's study (2007), reconstructed working processes were documented by video recordings from two different angles. A fixed camera recorded the posture of the craftsperson and the process from the side. A mobile camera was used to visualise the posture and the process from the front and from behind. The cameras were used to analyse action details—i.e., techniques, gestures, rhythm, procedures, etc.—where the aim was to examine the artisan's actions in the reconstruction process. It is important to gain insights into what happens before, during, and after each action, and the context of embodied processes when the tool marks and the reconstructed procedures of cutting become alike. This approach in craft research is aligned with methods of practice-led research, where the researcher's position is that of the participating performer and the participating observer.

The video recordings were carefully studied and documented with help and inspiration from the SMW notation system. It enabled detailed description of postures, movements, and processes around the cutting procedures. Six main action patterns were identified:

- The movement of the upper body in relation to the axe's rotation
- Leg posture and movement in relationship to the axe's rotation

- Combination of leg posture and upper body in relation to the timber
- Combination of leg posture and upper body in relation to material and tool
- The dynamic of the movement, timing, and rhythm
- Direction of sight (eye contact)

The working process, represented by the craftsperson's position, posture, movements, and the relationship between position, posture, tool and the material, is of major importance. It is important to identify the start and end position of the axe during the cutting movement. This allows the context of body movements and the techniques that are applied in the creation of tool marks to be better understood. Thereby, one must consider where the centre of gravity of the axe and body lies during the rotation and fluctuation of the axe (see Figure 10).

The study and documentation of the upper body movement in relation to the axe's rotation raises many questions, such as: How should upper body movements be described? What signs could be used to describe the movements of the shoulders, their posture and position? Their geometrical relationship? Is the posture vertical, horizontal, or inclined? Which shoulder is higher, which is lower, how do they rotate and how does their location change through the movement? What is the position of the head? What is the direction and focus of the eyes? What about the direction of the face, as shown by the face and nose? And what of the level of concentration and focus during the work? These are questions one needs to ask in the process of documentation of key information (see Figures 11–14).

In order to approach useful answers to all these questions, the researcher (the spectator) needs to systematically study a variety of different parameters related to the bodily action that is being analy-

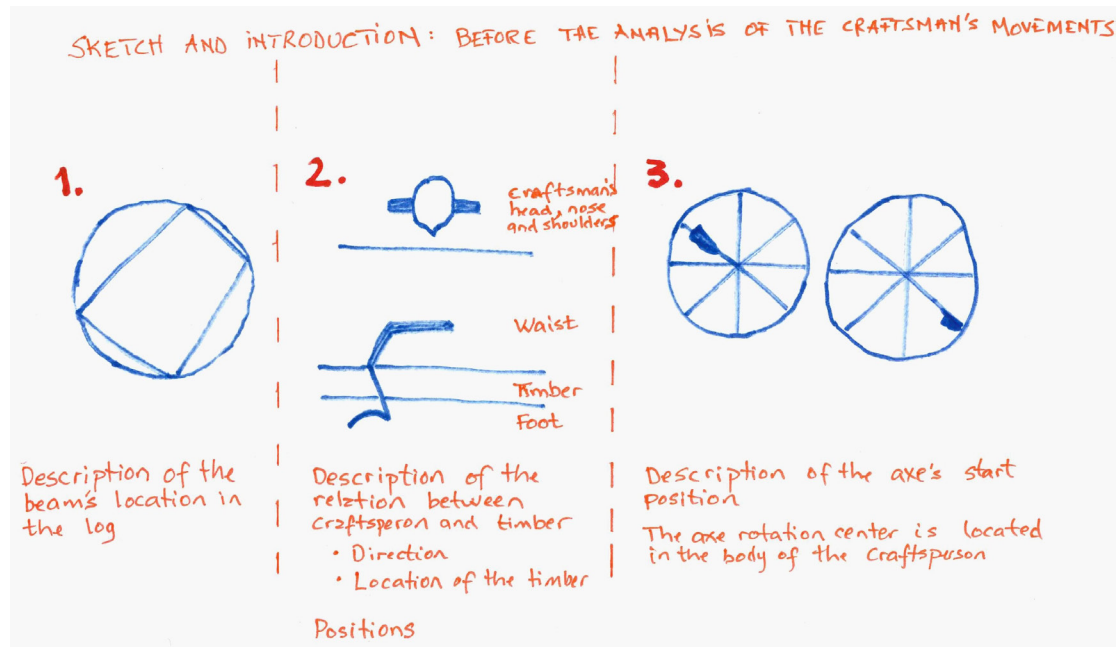


Figure 10: Sketches from the working process: 1. Cross-sectional form of log; 2. Description of craftsman position and posture in relation to the tool and the material; 3. Start and end position of the axe during rotation (centre of gravity in the craftsman's body).

sed by asking specific questions. The notation system serves here as an excellent analytical tool that is also capable of visually preserving key elements of the answers and putting them in context.

And it is not enough to limit questions to parameters of body posture, head, or shoulders. The craftsman's grip on the tool—the axe—is of great importance as well. Twisting and rotation of the body and tool need to be described independently, in relation to one another and with regard to changes during the time period the relevant bodily action takes place. This is not an easy task, especially with methods that are limited to written and oral documentation forms. Standardisation would ge-

nerate substantial benefits for any type of analysis with craft notation systems.

In Harald B. Høgseth's doctoral thesis (Høgseth 2007), video recordings of bodily action processes were analysed in parallel to text and pictures that were taken during the process. The video analysis and the sign writing method explains what happens in a way that the written language alone cannot. The sign writing, video analysis, and written descriptions together thus make it possible to generate a greater value than is otherwise possible with written documentation alone, with very profound understanding and a more thorough description of the know-how involved in the process.

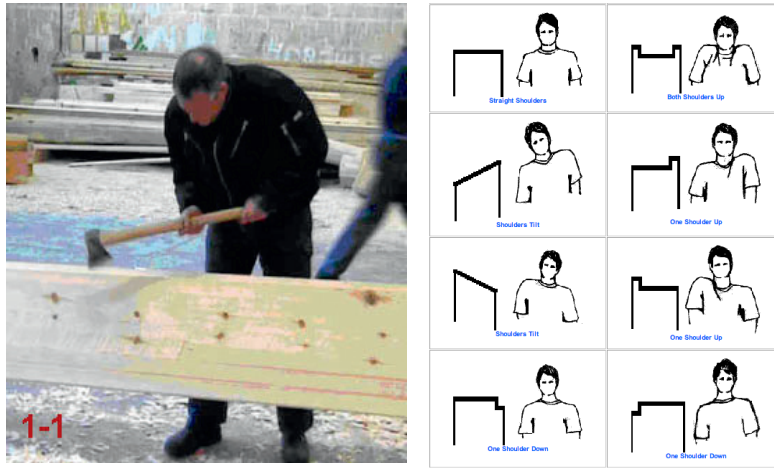


Figure 11A–B: Example showing shoulder line highlighted. Photograph by Atle Ove Martinussen, NHI; drawings to the right by Valerie Sutton, <http://www.movementwriting.org/science/craftsman/>.

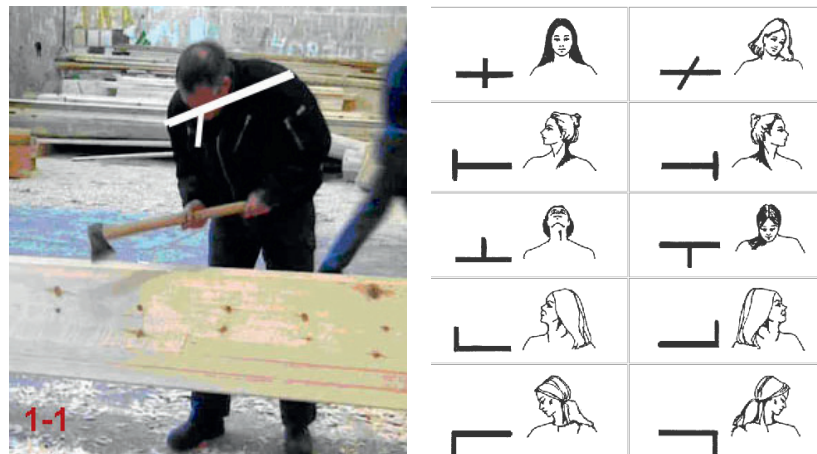


Figure 12-13: Symbol shows how shoulders are tilted forward. Photograph by Atle Ove Martinussen, NHI). Figure 13 to the right, symbols showing head positions. Drawing by Valerie Sutton, [http://www.movementwriting.org/science/craftsman/\).craftsman/](http://www.movementwriting.org/science/craftsman/).craftsman/).

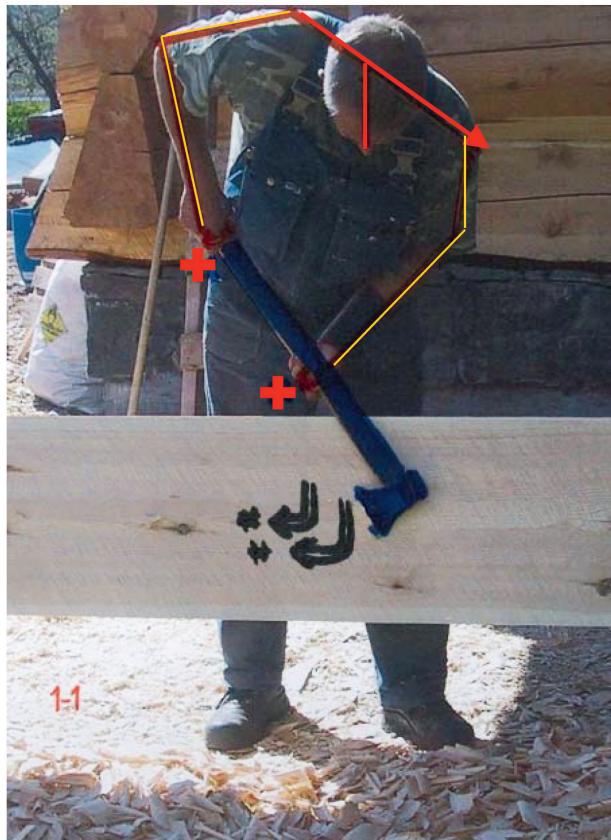


Figure 14: The thick red sloping line marks the position of the shoulders and the position of the hands is marked by plus signs. The position of the arms in relation to the shoulders and the position of the head in relation to the position of the hands can therefore be shown. Signs can be used to indicate the way in which the tool is gripped. Movement symbols mark how the tool stops, the movement precisely placing the tool on the timber. Photograph by Atle Ove Martinussen, NHI (1980).

DEVELOPING METHODS IN CRAFT RE-SEARCH THROUGH NOTATIONS

The concept of writing crafts and the junction between the documentation, demonstration, bodily action, practice, and analysis of craft presents many challenges. The starting point of the study of craft in archaeology is often hidden in the surface of timber remains, the remnants of the craftsman's working-techniques, procedures and methods being conserved in traces of tools (tool marks) found in physical constructions and objects.

Tool marks have very distinct characteristics and represent a craftsman's fingerprint. Such signatures provide us with information on the connection between the artisan, their materials, their

working rhythm and the processes behind various building parts (Sands 1997; Høgseth 2007).

The analysis of crafts from the past is rooted in several scientific problems: the tacit and physical context, the relation between past and present, and the relation between theory and practice being just a few examples. Sands (1997) and Høgseth (2007) have each given substance to the assumption that it is possible to transmit craft knowledge from an intangible context in the past, when craft knowledge was alive, to the present, through analysis of tool marks found in archaeological timber (Høgseth 2012).

However, complementary methods that capture craft knowledge in its entirety are needed for the analysis of the traditional craftsman's prac-

tice—methods that provide a more profound understanding of the subject than what can be written in documentation alone (Olsen 2010; 2015). Otherwise, the risk of losing important aspects of the knowledge is greater (Høgseth 2007, 220–64). Written documentation, supplemented by video recordings and craft notation systems, allows crafts scientists to analyse in greater depth the processes and complexity behind apparently simple actions. No writing, notation, choreography, or any other sign system can alone cover all aspects of the knowledge. However, together they can provide a more complete picture of the whole.

Craft, unlike dance and music, leaves something concrete and physical behind. This could be a small object, a building, a structural system or a beam—the traces of sequences, workflow procedures, techniques, or even material selection being the key to unlocking the knowledge behind it. All traces and tool marks are a form of the expression of the craftspeople's know-how. The performance of music or dance is the intangible result, which we experience and memorise through hearing and visualising the act in our mind. It is the abstractions and the actions which remain in our memory after the music or dance has stopped (Høgseth 2013). There is no physical result, such as a piece of wood, a building, or some other physical product. Not even a tool mark. The physical outcome of craft, such as an aesthetically appealing object or a cleverly designed piece of wooden furniture, well-known in design and architecture, can, however, also be experienced and memorised through visualisation in our minds, thereby potentially generating similar effects on us.

Notation systems and transcriptions play an important role in music and dance in achieving a deeper and broader understanding of the art and

the master behind it. The same could be argued in craftsmanship. One of the experiences which young jazz musicians need to undergo in their education is to transcribe jazz improvisations from older masters. It requires an ability to listen, repeat, imitate, and to notate while practicing. It certainly takes a lot of practicing if the master's skills are to be fully understood. This approach to the thorough reconstruction and preservation of music would not have been possible without musical notation systems. The overflow of digital tools has accelerated the process, but the musical notation system is still today in the centre of the process.

Tool marks are key elements when it comes to craft research in archaeology because they enable transcriptions of craft performances from the past. They are the link between the past and the present, the starting point that enables us to reconstruct craft knowledge. Application of craft notation systems as a method, combined with other well-known survey and documentation forms, yields the possibility to approach craft research, the arts, and industry in a new analytical and communicative way.

Craft plays an important role in our society, and through this has great diversity in art, industry, and our daily life. It seems logical to develop a craft notation system that could represent a similar practical functionality, like that of music and dance.

THE OPPORTUNITIES AND CHALLENGES OF DOCUMENTING CRAFT WITH A NOTATION SYSTEM

Languages and communication play a central role in understanding humans and their surroundings. In semantic and language research, there is occasionally discussion of languages and communication (Hansen 2005; Raanes 2012; Raanes and Slettebakk 2017). In traditional linguistics it is common

to emphasise language systems and the mathematical and grammatical elements related to languages. Others study humans as a whole, concentrating on the relationship between the bodily, physical, and linguistic work in human practice and what this, in its entirety, communicates (Goodwin 2003a; 2003b; 2011; Hoffmann-Dilloway 2011; 2018). The focus is then on the communication itself, and not the grammatical system, in order to better understand what is being communicated. This is of special importance when knowledge processes related to practice are to be analysed and understood in their entirety. Intentional action cannot be isolated to studies of the physical practice alone, but must include the perceptual human being as a performer in his or her surroundings.

Why should we bother to describe past practices? Why is it important in craft research to characterise bodily motions of craft practice using notation systems? One reason is the importance of understanding the different layers and dimensions of knowledge. Another is to preserve traditions and heritage by supporting transmission of knowledge and skills between generations. Yet another is the communication of that knowledge to specialists in crafts, to scientists and students. To learn from the past for improving the future becomes easier, if the knowledge can be easily accessed. Craft notation systems could serve as a platform for the communication of traditional crafts, as they are powerful tools for applications in analysis and reflective dialogues about craft and practice and seem to enable a greater sensibility than some other methods.

In American jazz music, musical notation often isn't needed at all, especially among professional musicians who have developed a large musical vocabulary and have learned many jazz standards (jazz songs). However, the musical notation platform serves in

the background, preserves the song (documentation), and can be looked up at any time. Thereby, it is a way to communicate music (from past and present) and preserve future generations' learning of the art. The same is true for industrial music such as pop music, but is not necessarily true for all music traditions in the world. Music can be communicated without a musical notation system, but not preserved in the same way nor would the communication be possible at the same level of complexity.

The Western music tradition has served as a strong foundation for development of new music and new musicians who have to learn the craft of musicianship. It used to be something only few people had access to, but is today widely distributed all over the world. Far less is known about music before the musical notation system was invented. It is, however, important to emphasise that a musical score doesn't tell the whole story of a musical piece, how it should be played, or what it was intended to communicate, but it provides the key information needed to develop the skill that is required to perform. It is therefore important to make the knowledge form understandable and capable of being communicated, without the performer being present. The physical instruments and the mental music practice can both disappear when the performer and the tradition disappear. Notation systems are therefore important tools for maintaining and developing knowledge and traditions.

The development of a craft notation system needs to be considered as a challenging task, even if it is limited to research purposes only. There are signs, symbols, and systems from other disciplines already known that could serve as a base for the beginning, as discussed previously in this chapter, but a developed system needs to be more easily accessible and user-friendly if it is to generate value for the user.

Is there a need for a notation system for craft? An audio-visual recording visualises much of what written language is unable to communicate (see Groth in this anthology). Video documentation as a method for documenting actions of craft is alone, however, not sufficient; the pictures/scenes pass quickly and one must constantly rewind and even stop the video to study the details. Pictures, on the other hand, communicate static scenes that can be studied in great detail, picture by picture. However, as they do not convey the movements and actions, they are also not sufficient if the complexity of a bodily action in its entirety is to be grasped.

There are grounds for believing that the documentation and research of craft in archaeology yields the best results by combining different forms of approaches. A craft notation system has the ability to highlight the details of what happens in action-based knowledge in a very profound way and offers an alternative for the documentation of craft with great potential in several craft contexts. Combining a variety of methods yields better results.

CONCLUSIONS

In this chapter, notations in craft practice have been introduced as a means of documenting, preserving, and communicating craft knowledge. This includes aspects of practice that may not be conveyed using verbal language only. Standardised notation systems from other practices such as music and dance have been discussed in the context of developing a practical method for craft notations to demonstrate what could be achieved by such a system. The objective, as stated earlier, is to pave the way for further development of notation systems as an alternative tool in craft research.

A number of questions have been discussed, such as why we should document craft gestures,

how knowledge related to bodily activity can be analysed more systematically, and how this form of tacit knowledge can be better preserved and conveyed. It has been shown that the documentation of tacit craft knowledge is possible with the help of a craft notation system and that it could yield significant benefits for craft research, documentation, and preservation purposes, especially in archaeology of wooden structures. A well-developed craft notation system, as an alternative tool in craft research, has profound potential for deep systematic analysis of craftsmanship.

In the context of craft research on historical timber structures, tool marks found in building remains represent an important starting point for craft notations. Such marks are a result of a craftspeople's actions imprinted in the timber surface. Translating such signs into an academic format requires the development of a spatial three-dimensional understanding of the bodily actions and movement patterns of craftspeople—in space and time—as the timber constructions were produced. Thereby, as previously demonstrated, a reconstruction of the process is necessary in order to be able to document the craftspeople's bodily activity systematically in the form of craft notations.

Further development of a practical craft notation system is needed if it is to be applied efficiently as an alternative tool in craft research. As pointed out previously, notation systems do exist both in dance and music. They are widely used and have been proven to be very practical. Dance and music notation systems are flexible communication platforms for dance and music and for their respective industries, for research, art history, and musicology. The dance and music notation systems are very efficient tools for describing movements and sounds in a systematic way, with consideration of both space and time. This chapter has stated that a si-

milar communication platform could be developed for studies of bodily action related to craftsmanship and that similar levels of sophistication and practicality could be achieved with further developments of craft notation systems.

It was also presented how craft researchers have started to develop such systems for the communication of knowledge on craftsmanship. As a supplementary research tool, craft notation systems have the potential to add a new dimension to traditional craft research methodologies. A fully developed bodily action notation system for craftsmanship has the potential to promote deeper understanding and to systematically preserve knowledge in the field. Furthermore, such a system may make craft more accessible to researchers and students and could thus be used for pedagogical purposes. It also has potential for conservation purposes, in building restoration, and for museum visitors and craft enthusiasts in general. In the process of research, documentation, and communication of the knowledge of craft, such notation systems should therefore be studied and applied in combination with the spoken and written language.

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ENDNOTE

1. A freehand sign writing (notation) by an observation of a performing craftsperson.