https://doi.org/10.7577/formakademisk.5413

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Performance paper

Reconstructing the use of plumb level from a 19th century clinker boat tradition

ABSTRACT
Traditionally, vernacular Nordic clinker boats are built without plans or templates. The local boat traditions all have a system of design that was handed over from master to apprentice. In some local traditions, a simple plumb level was used to guide the boatbuilder. The plumb level was placed on the planks of the hull during the build to give them the right angles of inclination in certain parts of the hull. Knowledge of how to use this plumb level is still considered part of living, unbroken traditions in some areas. In some local traditions, however, there are no longer any living tradition bearers that have the knowledge of how this tool was used in the local context. In this contribution, I will discuss how this lost knowledge can be reconstructed using old artefacts as a source material. I am investigating the tradition of building vernacular, clinker-built boats called 'öka' for sailing and rowing. This specific boat building tradition was located in the 19th century Stockholm archipelago. The artefacts in this case are preserved boats built in the old tradition and preserved plumb levels from closely related traditions. A central question in this context is to locate the exact positions in the boat that were measured by the plumb level. Working with reverse engineering, the measuring can be performed on preserved boats, but the right places for measuring still must be located to reconstruct the knowledge of how and where to use the tool. Some preserved plumb levels have markings that can be used in this investigation to match the locations and angles in the preserved boats. In this contribution, I will also discuss the possibility of applying the traditional measuring methods used by the old boatbuilders in today´s surveys and reconstructions, not translating the craft object into a digital 3D model or a lines plan.

Keywords:
Boat building, Craft Reconstruction, Boat surveys, Craft interpretation, Plumb level.

INTRODUCTION

In this contribution, I present a method to reconstruct the craft knowledge of a local vernacular boat building tradition, using artefacts such as preserved boats and tools in combination with their reconstruction. In December 2021, the Nordic clinker boat traditions were added to UNESCO´s representative list of intangible cultural heritage of humanity (UNESCO, 2023). Although Nordic clinker boat traditions have common origins and many common features, they have developed to fit local conditions as well. Many of these local boat building traditions have changed or been discontinued due to changes in technology and society. The transition from sail to motor and the use of modern tools and milled lumber are examples of novelties that have caused changes in the design and building processes of local boats. Some local traditions have proven more resilient to change and found new markets for the traditional boats, and some traditions were well documented when there were still living tradition bearers.

There are inspiring examples of how vernacular boatbuilding traditions have been researched and mapped. Eldjarn and Godal researched the boat building traditions of Nordlandsbåten and Åfjordsbåten (Eldjarn & Godal, 1988–1990). With a combination of information provided by tradition bearers and surveys of old boats, Eldjarn and Godal presented a system of design and procedures that is typical of these boat building traditions. Godal (2021) later went on to conduct similar research on another boat tradition, Geitbåten. Other Norwegian boat traditions that have been mapped in similar ways are the Oselvar (Økland, 2016) and Strandebarmaren (Helland-Hansen & Martinussen, 2014). My research project is inspired by these efforts, but I have found that the systematic approach and mapping are difficult to apply in my case study. Another important contribution to the research of Nordic vernacular boat building is Törnroos' (1968, 1978) PhD thesis and postdoctoral research about boats and boat building in the eastern Åland archipelago. Plankes' (1994: 2011) work on Oselvaren and Sognebåten provides mapping of these boat types and a deeper analysis of how design rules work within a tradition.

The tradition that I am researching within my PhD project is a vernacular clinker boat building tradition in the Stockholm archipelago, Sweden. The boat type is called 'öka' (Figure 1). These boats were built for sailing and rowing within the archipelago and the traditional way to build them was discontinued in about 1910. More information about my project can be found on the website (link anonymised). In contrast to the Norwegian cases mentioned above, there are no longer any living tradition bearers who can provide information. The available sources of information are a few remaining boats, a limited number of old photos and some interviews and fieldwork performed by the Nordic Museum in 1927–1946.

FIGURE 1. Boatbuilder building an öka in Stockholm Archipelago in the late 19th century. Photo by Axel Sjöberg.

Finding the patterns and systems of the local boat tradition

For the reconstruction of a local boat tradition that has been discontinued, it would be convenient to find a system that rules the design. This system would play the part that a lines plan on paper or a three-dimensional digital plan plays in modern boat building and boat design. The system should include both systematic guidelines that give specific measurements and dimensions for a boat of a certain size and other rules concerning its construction. This raises the question of whether a system like this for the specific local boat building tradition that I am researching ever really existed. This is not a question with a simple yes or no answer. Planke (2011) and Planke and Stålegård (2014) drew attention to ethical and hermeneutical problems in the quest to find such a system. On the one hand, it is still possible to distinguish an öka from the Stockholm archipelago today, a century later. Construction details and the shape of the boat allow them to be distinguished from the local boat types of adjacent areas. On the other hand, there is not really any evidence of specific design rules for these boats. In an interview with master boat builder Erik Söderman in 1928, he claimed that 'Plumb level and sliding bevel are the only aids used in the design of the boat, the rest is built by eye' (my translation from Swedish; Nordiska Museet, 1928). This shows that these specific aids were used, but it does not indicate how they were used. This remains to be investigated, and in this contribution, the focus is on the plumb level.

FIGURE 2. A boatbuilder´s plumb level used by Johannes Södergren, Svartlöga, mid-19th century. This is a common design in the Stockholm archipelago, made with a simple piece of wood with an adjustable wooden indicator and the plumb attached to it. Markings indicate certain angles used in the build. Photo by the author at Roslagens Sjöfartsmuseum.

The boatbuilder's plumb level

The plumb level is a piece of wood with a plumb line attached to it, usually made by the boatbuilder. An example of an old plumb level can be seen in Figure 2. The plumb level was placed on the planks of the boat to control their angles of inclination. This tool could be used to control the symmetry of the boat, but it could also serve as a guide for the design. The old plumb levels of boatbuilders had specific markings that indicated the angle of inclination for a certain plan in a certain place on the boat. For example, it was common to use it in the midship section. If the plumb level is combined with any measures for the width of the planks, this provides a complete design of the midship section. The use of the plumb level is illustrated in Figure 3.

It is worth mentioning that the plumb level is one of several different means of controlling the angles of inclination in the hull. Another example is the 'båtal', a measuring stick used to triangulate the right angle. The relevance of the measuring tools in the traditional design of boats was highlighted by Christensen (1970).

The discussion of measuring tools and hull design is an important and large discussion, and it should be referred to more precisely.

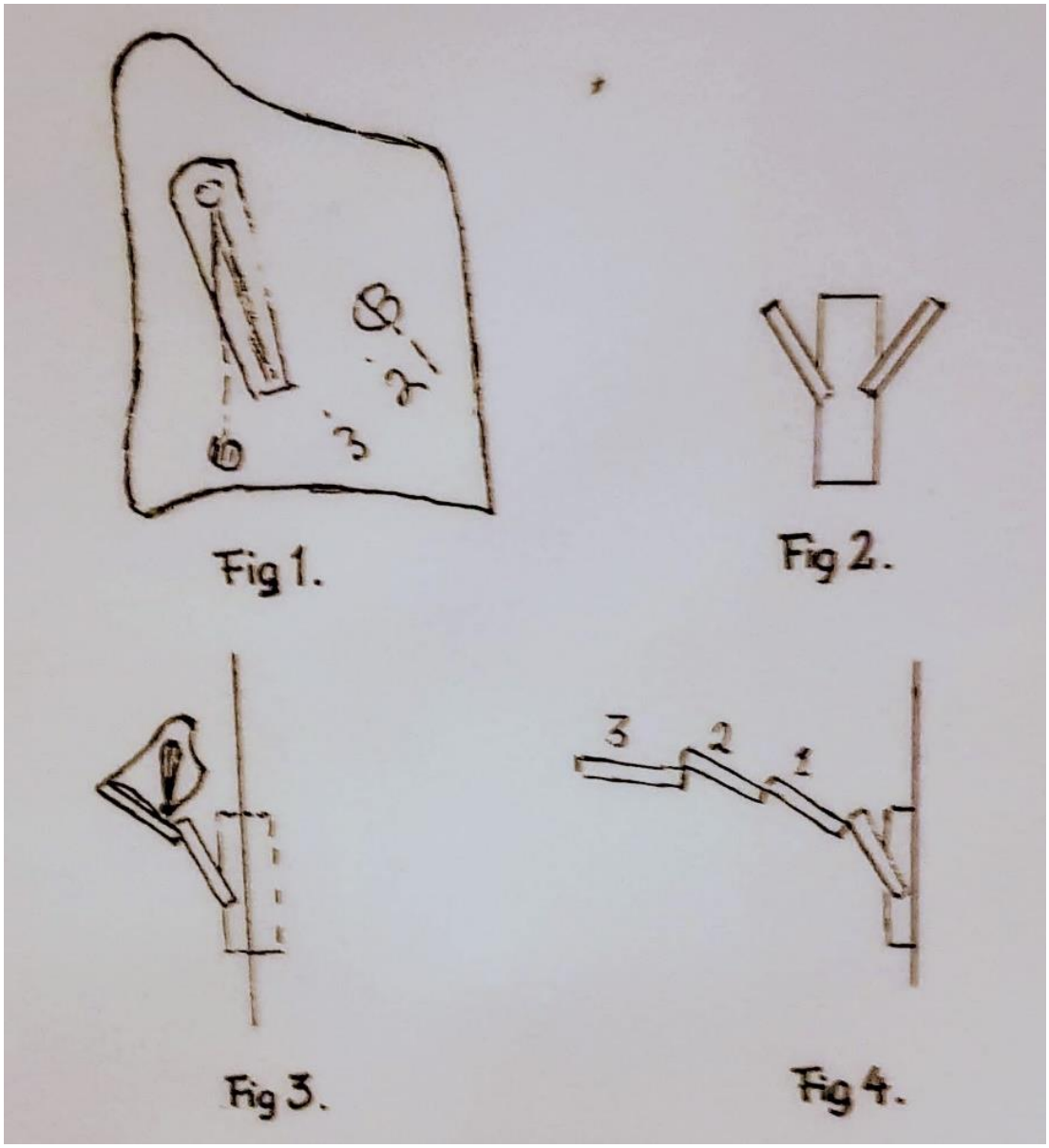

FIGURE 3. Illustration of how the plumb level in Figure 2 may have been used. Ilustration in Roslagens Sjöfartsmuseums exhibition. Photo by author.

Preserved plumb level guide

In efforts to understand the traditional skills and knowledge needed to build an 'öka', it is crucial to understand how the boatbuilders used the plumb level in this local tradition. This question is mainly about how many measuring points the boatbuilder used the plumb level on and where these control points were located. If I had both a preserved plumb level and a preserved boat, this research would be quite simple; I could simply test the plumb level on the planking and see where the marked angles fit. However, the case is not that simple, as I have not yet found a preserved plumb level for the build of an 'öka'. Hopefully, there is still one out there somewhere to be found, but in the meantime, I have tried to do my best with the available information. I have come across four preserved or well-documented plumb levels from the region, three of which are kept in Roslagens Sjöfartsmuseum, Älmsta. Of these three, one has no specific markings, just the angles divided into equal parts numbered 1–7. This one does not provide any input on the design. The second is marked with five specific angles, but I have not been able to identify these angles as relevant to the öka. The angles would possibly fit in the midship section, but the last one or two planks on the topsides would not be included. The third is claimed to have been used for the building of a larger vessel, 'piggskuta'. The 'piggskuta' or 'roslagsskuta' is a much larger version of the 'öka'. The fourth plumb level, Erik Söderman's, was thoroughly investigated by the Nordic Museum in 1928. This plumb level is also for building the piggskuta. A detailed sketch is preserved in the archives, including notes on where the specific angles were used (Figure 4).

The notes provided in the sketch indicate that the plumb level was used, for example, at '1: sta bakvindan' and other similar spots. The word 'vinda' refers to the spiral-hewn planks in the fore and aft of the bottom of the boat. My conclusion is that the angles of all of these spiral-hewn planks were made to fit the marks of the plumb level. The sketch indicates some details that I still have not deciphered. If Söderman's plumb level was used in the midship section, as is suggested for the plumb level in Figures 2 and 3, with markings 1, 2 and 3 at similar angles. In the notes, it says that the numbers outside of the scale are for 'stora borden', which translates to 'large planks' and does not have a clear meaning today. One possible interpretation is that the large planks refer to the midship section, where the planks have their greatest width.

From the preserved plumb levels, it appears that they were probably used to measure the inclination level of the planks in the midship section, and Söderman's plumb level clearly indicates that they were used to measure the angle of the spiral-hewn planks (vinda) as well. This is my conclusion from the available source material and can be revised if new sources appear.

In my performance contribution, I will show how I have recreated plumb levels with the angles of the preserved boats (Figure 5). My conclusions of how the plumb levels were used in the larger boats guided me in finding the places to measure the angles in the öka boats.

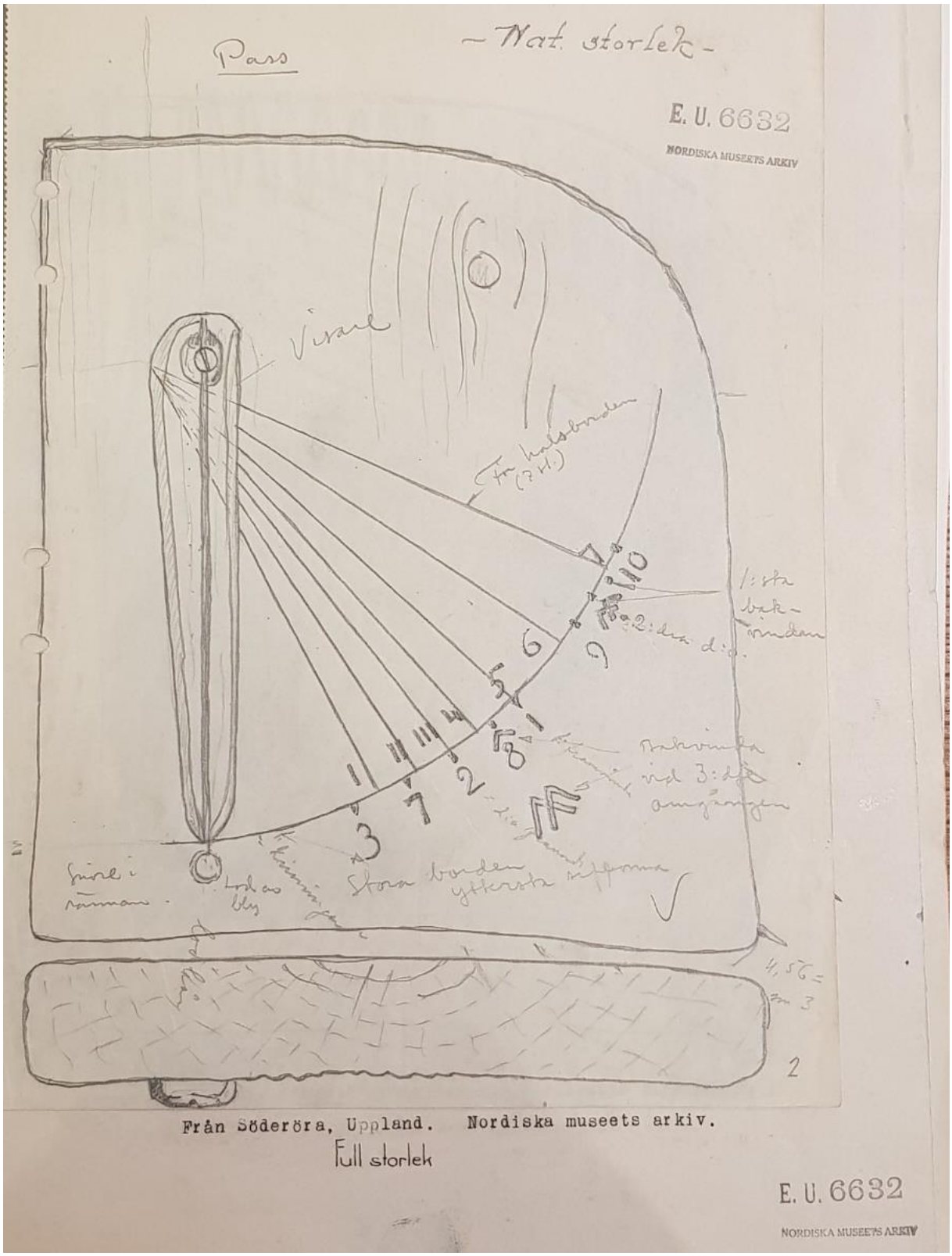

FIGURE 4. Sketch of Erik Söderman's plumb level, used to build piggskuta in the late 19th and early 20th centuries. There are additional notes on where the plumb level was used. Sketch from the Nordic Museum Archive.

CONCLUSIONS

Using the original methods of measuring provides a better understanding of the craft procedures used in the original boat building tradition. The use of the plumb level in both surveys of old boats and in reconstruction may provide a direct connection to the craft that has been lacking when the process of survey and reconstruction goes through the detour of documentation by drawings or digital models.

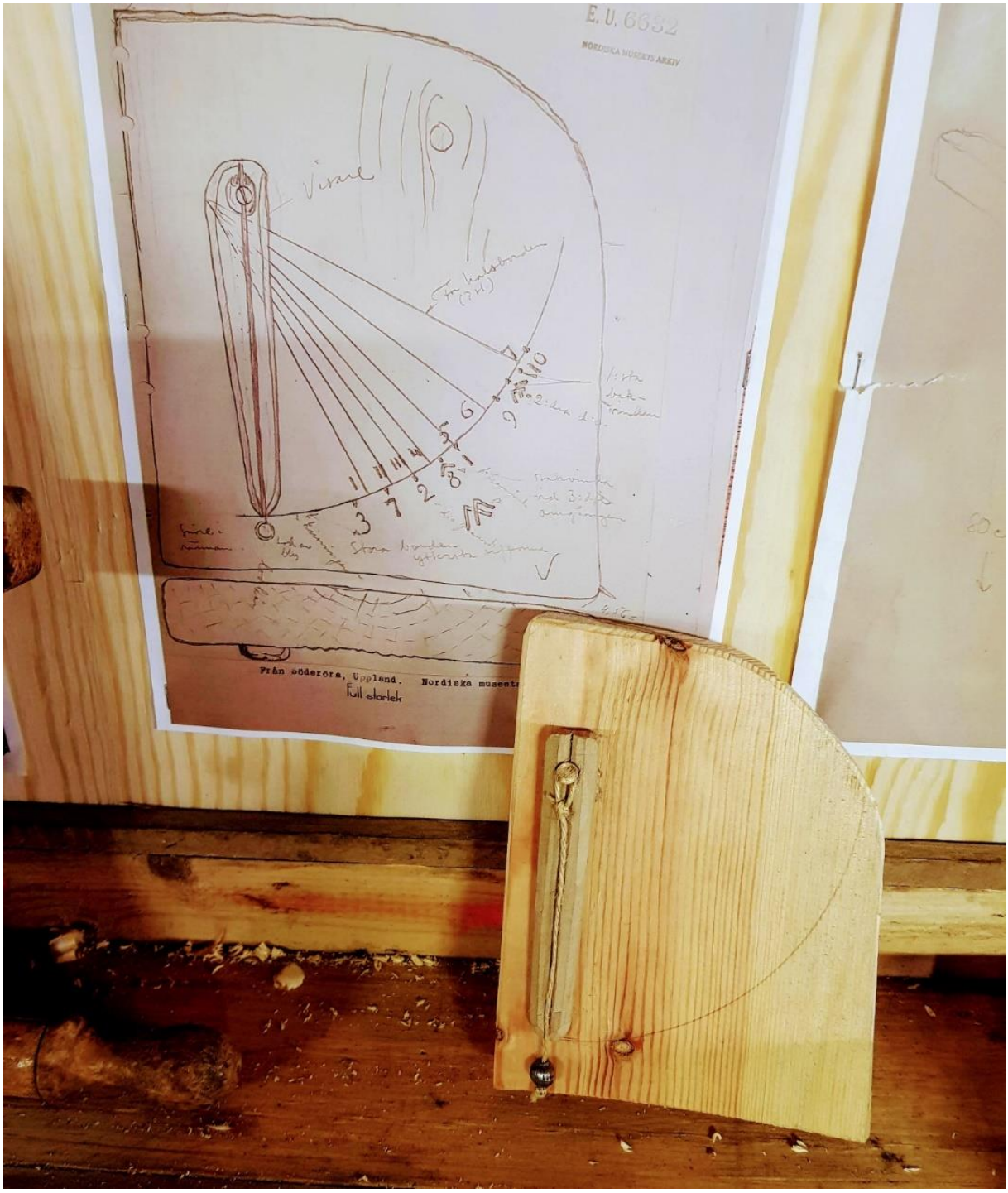

FIGURE 5. A reconstructed plumb level inspired by Erik Söderman´s original. Photo by author.

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