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# NAILS, RIVETS, AND CLENCH BOLTS: A CASE FOR TYPOLOGICAL CLARITY

This paper reevaluates the current terms and typology used for small functional iron artifacts from medieval northwestern Europe and discusses the advantages of a more uniform terminology for understanding the morphological and functional differences between nails, rivets and clench bolts. Examination of data collected from the National Museum of Iceland illustrates some of the potential typological difficulties that compromise classification of iron artifacts. Examples from English- and Danish-language publications show that these typological difficulties are a common problem across northwestern Europe. Focusing on the inclusion of clench bolts in Viking Age graves, the final section exemplifies the interpretive potential of nuanced iron artifact type identification for yielding insights into a widespread mortuary practice. Finally, the paper presents a revised terminology for nails, rivets, and clench bolts in English, Icelandic, and Danish.

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## I. Introduction:

### Functional Iron Artifacts

Nails, rivets, and clench bolts are not glamorous. They are rarely displayed as special items in museums, and manifest no great differences in form across regions and time. Often overlooked if not perceived as particularly important for a specific research question (Bill 1992: 55), scholars have treated these functional iron objects in a marginal fashion. An example of this marginalization is evident in the comprehensive and seminal work, *Viking Artifacts: A Select Catalogue*, in which James Graham-Campbell (1980) omits any individual treatment of nails, rivets, or clench bolts.

Considering the importance these artifacts had in medieval society,

the scant mention of functional ironwork in the archaeological literature appears unjustified. Nails, rivets, and clench bolts, some of the simplest items produced by the medieval ironsmith (Tylecote 1987: 262), were used in most construction contexts. They played a vital role in the fabrication of ships, houses, sheds, doors, roofs, carts, sledges, shields, boxes, coffins, and other objects and structures made of wood, and are, as a result, frequently the most common finds from medieval archaeological sites. In most excavation contexts, these functional iron artifacts are the only remaining record of wooden objects or structures, and therefore often have a pivotal role in archaeological arguments (e.g. Skaaning 1992). The recording

and interpretation of their existence and relative position is thus of considerable importance for the reconstruction of medieval lifeways.

With notable exceptions, such as the work of Patrick Ottaway (1992), the limited attention devoted to functional iron artifacts has resulted in the lack of a uniform terminology, thus obscuring the identity and interpretive value of these artifact types. In an attempt to address this issue, I begin by advancing specific definitions of nails, rivets and clench bolts. Subsequently, my analysis employs a sample of artifacts from the National Museum of Iceland to test and elaborate on the criteria distinguishing the various artifact types. This data highlights the interpretive complications resulting from typological descriptive variability. Examination of several English- and Danish-language examples, demonstrates that this typological variability is a general phenomenon in museums and the international corpus of scholarly publications. I then employ the example of clench bolts in mortuary contexts from medieval northwestern Europe to illustrate the ways in which a consistent terminology and a refined understanding of artifact types can lend insights into the past.

## II. A Brief Introduction to Definitions

Basic descriptive definitions of nails, rivets, and clench bolts are necessary in order to frame the following discussion of functional iron artifacts. The form of each of these artifact types is constrained primarily by their function, a factor which

accounts for the similarities observed across time and space; thus, these artifact definitions are widely applicable. Understood in the modern sense, a nail is “a small metal spike with a broadened flat head, driven typically into wood with a hammer to join things together or to serve as a peg or hook” (*Oxford American Dictionary*). A rivet is “a metal bolt or pin having a head on one end, inserted through aligned holes in the pieces to be joined and then hammered on the plain end so as to form a second head” (*American Heritage Dictionary*). A clench bolt is probably the most unfamiliar of the three artifacts and is the only one made up of two separate components: a nail and a rove. As Patrick Ottaway (1992: 615) explains, “[a] clench bolt was used for joining overlapped timbers and consists of a nail which, once passed through the timbers to be joined, had a small pierced plate, the rove, set over its tip. The tip was then burred or hammered over (i.e. clenched) to hold the bolt in position.” Characteristically, clench bolts are used to join pieces of wood that either overlap, or are cut diagonally and then fit together (*Figure 1*).

## III. Artifact Identification and the Need for Typological Consistency: A Case Study from the National Museum of Iceland

The artifact analysis in this section is based on data that I collected during the summer of 2003 at the National Museum of Iceland (Þjóðminjasafn Íslands)<sup>1</sup> while doing comparative research for finds from the Mosfell Archaeological Project

<sup>1</sup> This research was made possible by the generous assistance of Halldóra Ásgeirsdóttir, conservator at the National Museum of Iceland, and the help and guidance of Guðmundur Ólafsson, Head of the Archaeological Department at the National Museum.

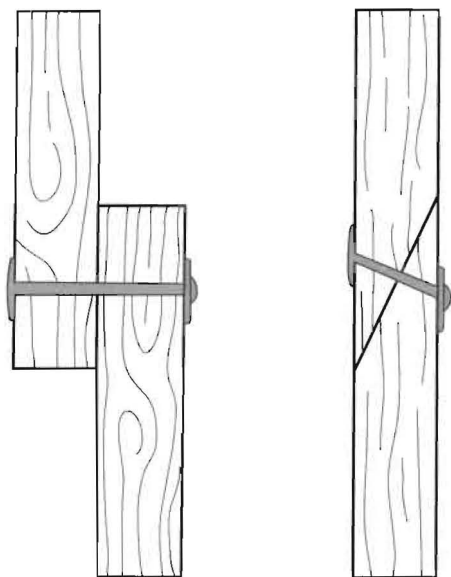


Figure 1. Clench bolts employed in two methods for joining planks (redrawn by Jennie Dillon from Ottaway 1992: 617)

(MAP).<sup>2</sup> This work led me to revisit the terminology currently in use for nails, rivets and clench bolts, and the importance of typological consistency for researchers attempting to understand the original function and use of such artifacts.

The creation of archaeological data is an on-going process that begins with labeling find bags in the field, and continues with cataloging at the project level and subsequent storage at regional or national museums. Particularly at these levels, a collection-wide database facilitates access to data. Such a database is a living tool, the creation of which is, by nature, a cooperative task involving

many individuals and projects. Scholarly use of a database can be an opportunity for reflection and adjustment in order to make the database more amenable to future research. In this paper, I reflect on possible classification adjustments to archived archaeological data concerning small functional iron artifacts.

Working with all catalog entries in the National Museum pertaining to functional ironwork, I examined the artifact types of nails, rivets, and clench bolts present in each catalog category. The National Museum has created an extensive electronic database that includes full catalog entries for all the finds in the archives. This user-friendly database is electronically searchable across several fields such as find material or identity, and easily generates complete lists of finds cataloged under those descriptions. From each of the find entries, the actual find was easily found in the storage facilities of the museum. This database and the efficient access to the finds greatly facilitate archival artifact research. The issue for this paper was that each of the three iron artifacts types (nails, rivets, clench bolts) forming the basis of this study, were found to be cataloged under variable category names that were not mutually exclusive. Because of this unintentional typological variability, an electronic search of the database for a specific artifact type did not yield a comprehensive list of the appropriate artifacts in the collections. This limited the usability of the data-system in searching for specific iron artifact types and meant that identification of the artifact types often required reference to

<sup>2</sup> MAP is an international archaeological project conducting interdisciplinary research in the Mosfell region in south-west Iceland. MAP, directed by Jesse Byock and Phillip Walker, works in collaboration with Þjóðminjasafn Íslands and Mosfellsbær.

the more lengthy descriptions of artifact morphology in the catalog or detailed study of the actual artifact.

Specific details will illustrate the issue of descriptive consistency. The Icelandic terms used to classify nails, rivets, and clench bolts are 'bátasaumur' (boat nails), 'hnoðnagli' (riveting-nail), 'hnoðsaumur' (riveting-nail), 'nagli' (nail), and 'rónagli' (nut- or rove- nail). Although ostensibly defined and differentiated by their formal meaning, these terms appear in the Icelandic archives as overlapping categories. One ramification of this is the cataloging of clench bolts in all of the aforementioned categories, 'bátasaumur,' 'hnoðnagli,' 'hnoðsaumur,' 'nagli,' and 'rónagli.'

In *Archaeological Typology and Practical Reality: a Dialectical Approach to Artifact Classification and Sorting* (1991), William and Ernest Adams stress that a useful typology must consist of discrete artifact types, identifiable by diagnostic features. There should be no possibility that an artifact belongs to more than one type.<sup>3</sup> Cataloging an artifact that cannot be grouped into any of the types within a typology should result in the creation of a new type that stresses the unique nature of the artifact. Adams and Adams (1991: Ch. 4) assert that a consistent system of classification provides the foundation for artifact analysis, allowing for the quantification and subsequent statistical analysis of artifact types. The terminology used must consistently respect the morphological differences exhibited by the various artifact types and distinguish the unique functions that can be inferred from the morphology. In an iron

collection with such similar objects as nails, rivets, and clench bolts, a strict terminological protocol would help to limit observer bias. The widespread lack of attention to distinguishing between nails, rivets, and clench bolts has not led to the adoption of such a protocol, and therefore, it can be suspected that collections of small functional ironwork, in general, have not been organized in such a way that would meet the prerequisites for a useful typology. The typological descriptive variability observed in the Icelandic collection support this hypothesis. A consistent typology, therefore, must underlie further scientific study of these iron artifacts.

In order to evaluate the artifact types that were included in each category, a total of 44 record entries in the National Museum of Iceland were examined: 1) all artifacts labeled 'rónagli' 2) all artifacts labeled 'hnoðnagli' 3) all artifacts labeled 'bátasaumur' 4) a selection of the artifacts labeled 'nagli.' Some entries, as in the boat burials, contained as many as 500 individual artifacts. If the actual artifacts were available, they were examined to determine their identity. If the artifacts were unavailable, I attempted to identify them as nails, rivets, or clench bolts by their physical description and find context, as recorded in the catalog.

#### *Criteria Used for the Identification of Artifact Types*

The 44 artifact entries from the National Museum were evaluated following the criteria for identification of nails, rivets and clench bolts outlined here.

<sup>3</sup> Often it may be impossible to securely determine the artifact type because the artifact may be broken or because of iron corrosion obscuring the morphology of the find. In such a case, x-raying the artifact may be able to reveal more accurately the original form of the find.

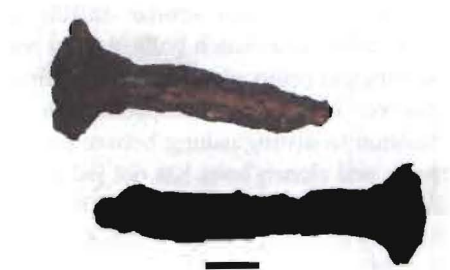


Figure 2. Two iron nails. The black bar is one centimeter long. (photograph taken by the author at the National Museum of Iceland)

Artifacts having a pointed shank with a single circular or square head were identified as nails (Figure 2). Broken rivets and clench bolts are easily confused with nails, and therefore it is often more difficult to positively identify a nail than it is to identify either of the two other artifact types.

Rivets have two heads connected by a shank that does not extend past either of the heads (Figure 3). The heads of a rivet are usually rounded, but may also have an irregular shape due to their deformation from flattening with a hammer. In working with the written catalog entries of the National Museum, I classified an artifact as a rivet if it was described as having two heads without the mention of a *ró* (rove). The find contexts are particularly important for distinguishing rivets from clench bolts, since, in the Middle Ages, rivets were used in a variety of objects, often holding together two sheets of iron, whereas clench bolts were generally used to hold together two or more overlapping pieces of wood.

Clench bolts characteristically have a round head on one end and a diamond- or square-shaped head, or rove, on the other end. The artifact commonly has



Figure 3. Rivet. Note that the shank does not protrude from either head. The black bar is one centimeter long. (photograph taken by the author at the National Museum of Iceland)

a piece of the shank extending through the hole in the diamond- or square-shaped rove, sometimes protruding several millimeters (Figure 4). When direct examination was not possible, I focused on the description of the heads or roves of the artifacts in order to identify clench bolts. In Icelandic, *ró* (plural *rær*) means ‘rove’ or ‘nut.’ When *ró* is used to refer to one end of the shank instead of *haus* (‘head,’ plural *hausar*) then the artifacts are most likely clench bolts, since neither nails nor rivets have nuts or roves. This method of classification is not completely satisfactory because the term ‘*rónagli*’ is used occasionally to describe a rivet. It is possible, therefore, that the conflation of the two types of artifacts (rivets and clench bolts) could have been carried over to the smaller constituent parts of rivets and clench bolts, plausibly resulting in heads (*hausar*) being referred to as roves (*rær*). Because of this possibility, entries were considered inconclusive unless the *ró* was described as *ferkantaðar* or *ferhyrnda* (‘square,’ literally ‘four-sided’ and ‘four-cornered’) or better still, *tigulmynduð* (‘diamond-shaped’).

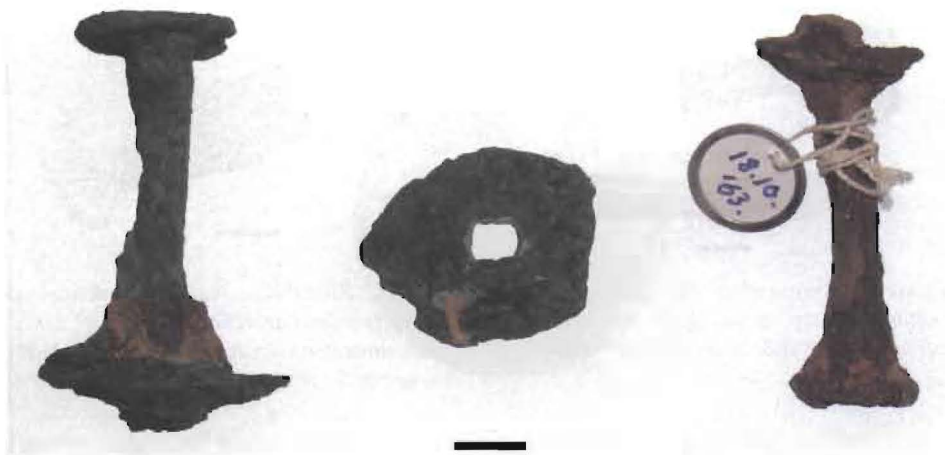


Figure 4. Clench bolts and a rove. Note that the ends of the shanks protrude from the roves of the two complete clench bolts. The black bar is one centimeter long. (photograph taken by the author at the National Museum of Iceland)

#### *Results of Artifact Identification*

The following section presents and discusses the types of artifacts identified under each of the following current database categories: ‘*nagli*,’ ‘*hnoðnagli*,’ and ‘*rónagli*.’ I identified the actual artifact types in each of the entries, noting the presence/absence of nails, rivets, and/or clench bolts. Since an individual catalog entry often contains numerous artifacts and frequently more than one artifact type, the number of identified artifact types typically exceeds the number of actual database entries. The results are depicted in the pie graphs (Figure 5), which calculate the percentage that each artifact type (nail, rivet, clench bolt) represents out of the total number of types within each of the National Museum’s database categories (‘*nagli*,’ ‘*hnoðnagli*,’ and ‘*rónagli*’).

A sample of twelve ‘*nagli*’ (‘nail’) entries was investigated to determine whether they also included rivets or clench bolts. Nine ‘*nagli*’ entries were composed solely of nails. Two entries contained artifacts that could not conclusively be assigned to a particular type. One entry (National Museum catalog # B: 1939–88) included a single whole clench bolt and eight broken artifacts that may have been either nails or clench bolts (see Figure 5). The ‘*nagli*’ entry that included a clench bolt consisted of the iron remains from a coffin. The description of the iron from this coffin burial begins, “nails with wood remains on them, eight in number, however only one whole.”<sup>4</sup> The entry goes on to address the single whole *nagli*: “the only whole one is 3.5 cm long and has a round head at one end but a square rove at the other.”<sup>5</sup> The description contained in

<sup>4</sup> “[N]aglar með viðarleifum á, 8 talsins, þó aðeins einn heill”

<sup>5</sup> “Sá eini, sem heill er, er 3,5 cm að l. og hefur kringlóttan haus á öðrum enda, en ferhyrnda ró á hinum”



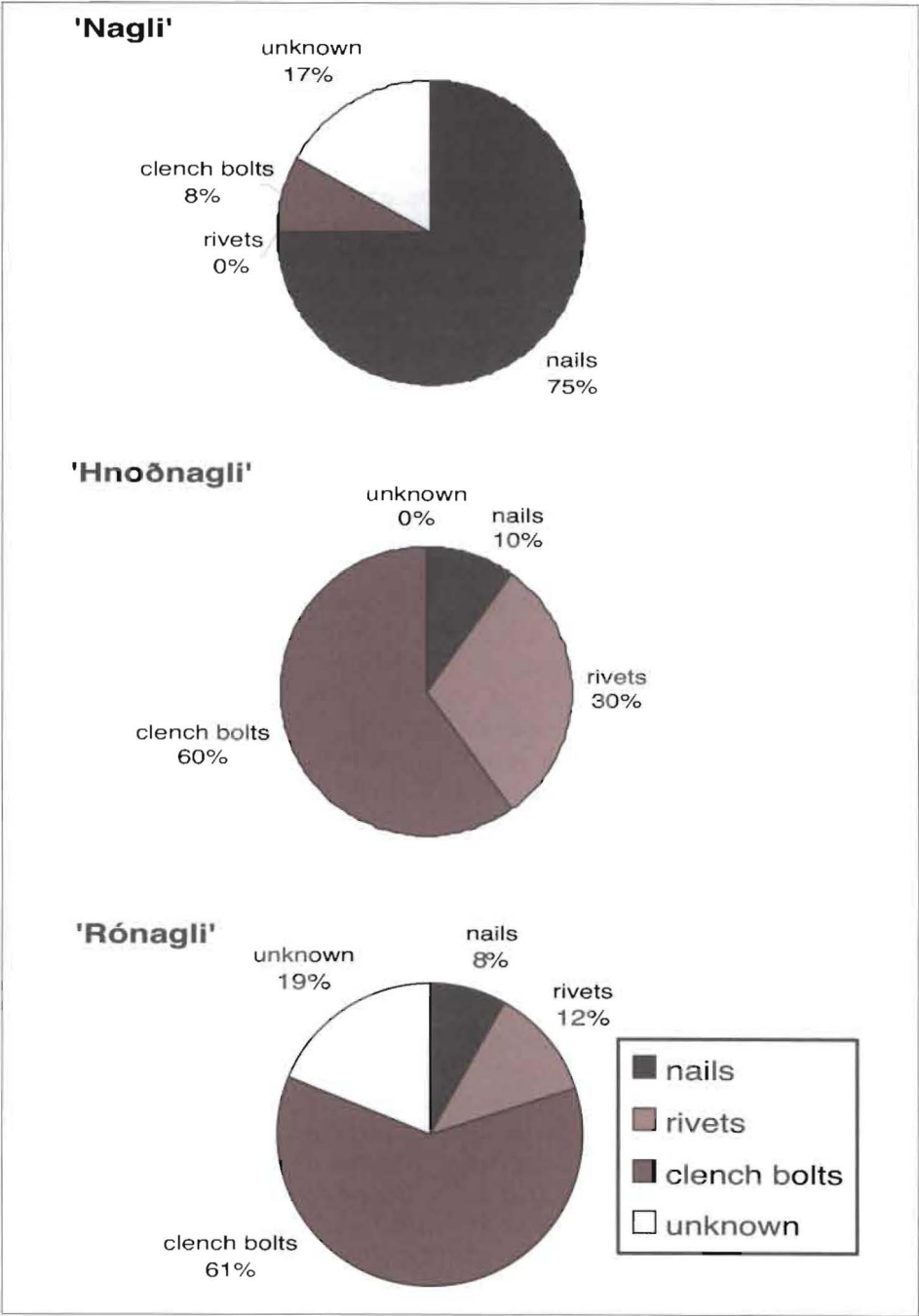


Figure 5. Pie charts showing the percentages of artifact types (nail, rivet, and clench bolt) that appear in the categories of 'rónagli,' 'nagli,' and 'hnoðnagli' in National Museum of Iceland.

this entry suggests that all of the supposed *naglar* (nails) in this context may have originally been clench bolts. The entry writer also notes as a concluding remark, “it seems that riveting did take place to some degree in the making of the coffin.”

<sup>6</sup> The *hnoðnegling* (‘riveting’) in this instance refers to the functional action of a clench bolt rather than a rivet. This example demonstrates that even though ‘*nagli*’ may be one of the simplest artifact categories in the classification system, referential inconsistency still occurs within the category.

The other two categories, ‘*hnoð-nagli*’ and ‘*rónagli*,’ yielded even less consistency than the ‘*nagli*’ category (see Figure 5). There are seven entries in the National Museum’s database labeled ‘*hnoðnagli*’ (‘rivet’). Of the seven ‘*hnoðnagli*’ entries, three contain rivets, six contain clench bolts, and one has a nail. Out of the 24 entries labeled ‘*rónagli*’ (‘rove-nail’) in the catalog, 16 contain clench bolts, three have rivets, two include nails, and five entries contain artifacts that could not be securely identified.

#### *The Effect of Typological Inconsistency*

The analysis above illustrates that the categorization of iron artifacts in the database does not consistently follow a typology derived from the functional and morphological characteristics of the individual artifacts. The two particularly pervasive terminological problems are the result of diametric typological practices. The first problem is the use of a single term to apply to several artifact types (‘lumping’). The second problem is the use of several different terms to refer to the same artifact type (‘splitting’). Ultimately, both problems complicate com-

parative and statistical analyses that rely on terminological uniformity.

The pie charts (Figure 5) document the extent of the typological problems in the database. Each of the individual pie charts reveals that a single term includes two or more artifact types that have been lumped together. For instance, the term ‘*hnoðnagli*’ is used for the nail, rivet and clench bolt artifact types. Taken together, the three pie charts show that several different terms are used to identify each individual artifact type. For example, the three terms ‘*nagli*,’ ‘*hnoðnagli*,’ and ‘*rónagli*’ are all applied to a single artifact type, the clench bolt.

The finds from boat burials illustrate that the two typological problems outlined above also appear within a single kind of archaeological context. In general, boat burials typically contain both nails and clench bolts, which partially explains why there is little consistency in the categorization of iron from boat burials. The iron hardware from one boat burial in the National Museum is cataloged as ‘*hnoð-nagli*’ (B: 1939: 71), whereas the iron artifacts from two others are cataloged under ‘*rónagli*’ (B: 1937–73 and B: 1964–110–1). Hardware from a fourth boat burial is cataloged under ‘*bátasaumur*’ (*bátur*=boat, *saumur*= nail; B: 1946–53). Cataloging iron from a boat burial as ‘boat nails’ is understandable as an attempt to avoid misidentifying some of the many artifacts in the entry with terms such as ‘*rónagli*’ or ‘*hnoðnagli*,’ but in practice the use of ‘*bátasaumur*’ relies on the find context for cataloging rather than artifact morphology and thus only increases the typological confusion. Each individual catalog entry from the boat burials lumps multiple artifact

<sup>6</sup> “Virðist hnoðnegling því að einhverju leyti hafa átt sér stað í líkkistumíðinni”



types (nails and clench bolts) under a single term, an example of the first typological problem. As a group, the boat burials include two artifact types (nails and clench bolts) that are each described by three different terms (*‘hnoðnagli’*, *‘rónagli’* and *‘bátasaumur’*), thus exemplifying the second typological problem.

Typological inconsistencies in the catalog seriously affect archaeological research by obscuring both the morphological differences *between* the artifact types and the functional consistency *within* each of the types. This results in difficulty and potential inaccuracy in the statistical analysis of cultural materials. The problem would be solved by the application of a protocol using strictly consistent terminology that recognizes the distinctions between nails, rivets, and clench bolts. Based on the preceding section, it is recommended that different artifact types from the same find context be cataloged separately. Furthermore, the term *‘nagli’* should be reserved just for nails, *‘hnoðnagli’* for rivets, and *‘rónagli’* solely for clench bolts. Finally, *‘bátasaumur’* ought to be eliminated as a typological category because it conflates objects of different functions—nails and clench bolts—thereby violating one of the essential aspects of a useful typology (Adams and Adams 1991) and adding to the overall state of classificatory confusion.

A more uniform typology will assist in the statistical analysis of nails, rivets, and clench bolts and the comparative study of their find contexts, ultimately contributing to a more nuanced understanding of daily life in early Iceland. The National Museum of Iceland is in an ideal position to serve as a pioneer among

museums in catalog consistency because of the manageable size of the national collection and quality of the electronic database that has already been compiled.

#### IV. Widespread Typological Inconsistencies

Typological inconsistencies in the categorization of small functional ironwork are not an isolated phenomenon, but a widespread terminological problem that exists in many languages and appears in other museum collections, as well as numerous archaeological publications and site reports. This section provides examples of typological inconsistencies from museum collections, site reports, and well-known publications in English and Danish in order to demonstrate the relevance of the argument in the wider geographic sphere of the North Atlantic. The identical two terminological problems found in the catalog at the National Museum are also pervasive in the sources analyzed in this section. To reiterate, the first terminological problem obscures differences in artifact morphology by lumping more than one distinct artifact type under a single term, whereas the second problem compromises the integrity of typological terms by applying more than one term to a single artifact type.

Archaeological publications frequently exhibit the first terminological problem by using a single term such as ‘nail’ in English, *‘nagli’* in Icelandic, or *‘nagle’* in Danish to refer to all three types of artifacts—nails, rivets and clench bolts—without distinguishing between them. In a Danish example from the publication *Trelleborg*, Poul Nørlund (1948) used the term *‘jernnagler’*<sup>7</sup> to refer to a group of artifacts that he illustrated with a

<sup>7</sup> Danish, *jern*=iron, *nagler*=nails/rivets/clench bolts

photograph that shows only nails. A photograph published in 1991 shows that the artifacts that Nørlund designated as '*jern-nagler*' actually include roves and clench bolts (Nielsen 1991: 132). The National Museum of Denmark in Copenhagen contains an unpublished catalog of artifacts from Trelleborg which also uses the inclusive term '*nagler*,' thereby perpetuating the terminological simplification. In an English language example from the publication *Birka IV*, Anne-Sophie Gräslund (1980: 8) separates nails from rivets and clench bolts, but employs the term 'rivet' to refer to both rivets and clench bolts. This first type of typological inconsistency, in which several artifact types are grouped into the same category, obscures the distinct morphologies of the different artifact types and renders it impossible to ascertain the actual identity of the artifacts without direct observation.

The second terminological problem, in which several terms are used to describe a single artifact type, appears in the publication *Fyrkat II*, in which Else Roesdahl (1977) uses the Danish term '*søm*' for nails, but applies two terms, '*nagler*' and occasionally '*klinknagler*,'<sup>8</sup> in reference to clench bolts (e.g. Roesdahl 1977: 85). In Danish, the term '*nagle*' is usually used to refer to a rivet, but because Roesdahl employs this term to refer to clench bolts, no distinct term remains for a rivet. The practice of applying several terms to the same artifact type leads to the implication that identical artifacts are different, as well as the identification of artifact types with certain terms that are more appropriate for describing other artifacts.

As a whole, English-language archaeological publications exhibit the

second terminological problem by using the terms 'rivet,' 'clench nail,' and 'clench bolt' to refer to the single clench bolt artifact type. In general, when writing in English, Scandinavian scholars tend to refer to clench bolts as rivets (e.g. Bill 1994; Christensen 2002; Gräslund 1980; Birkedahl & Johansen 1994). Using the term 'rivet' to refer to a clench bolt is problematic because it does not distinguish between the presence and absence of a rove and thereby fails to provide exact terms for different artifacts. British scholars, however, commonly refer to clench bolts as 'clench nails' (e.g. McGrail 2004; Richards 1991: 115; Carver 1995). A clench nail is a nail that has been bent to hold in place. The technique of clenching a nail to secure timbers without the use of a rove was also commonly employed in the Middle Ages (McGrail 2004; Christensen 2002) and as such is more appropriately considered as another functional use of the nail artifact type. The third term referring to the nail and rove combination is 'clench bolt,' favored by the York Archaeological Trust and associated researchers such as Patrick Ottaway (1992). The term 'clench bolt' has the advantage of indicating the bolting function and two part composition of the artifact type, as well as stressing the unique nature of the artifact type as separate from nails, rivets or bent nails.

The terms 'rivet' and 'clench' have been the source of much terminological confusion and inconsistency, which ultimately derives from the fact that the two words entered modern English as words of similar meaning from the Old French *river* and Middle English *cleynch* (McGrail 2004: 150). The terminologi-

<sup>8</sup> *Klinknagle* is a Danish term that refers to clench bolts employed in the clinker style construction of overlapping wooden planks characteristic of Norse ships.

cal debate is still lively, as evidenced by the recently published exchange between Seán McGrail (2004) and Arne-Emil Christensen (2002), in which they respectively provide reasons why 'rivet' and 'clench nail' are inappropriate terms. In light of the problems inherent in 'rivet' and 'clench nail,' it is my guess that, when the dust settles, the term clench bolt will be found to be the most morphologically specific and typologically useful.

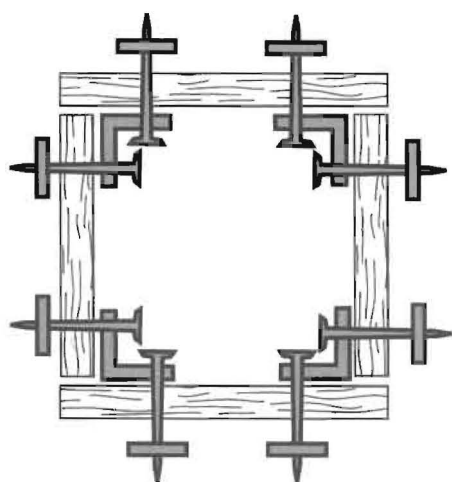
### **V. The Interpretive Value of a Nuanced Typology: An Example from Viking Age Mortuary Contexts**

The analytical benefits and interpretive potential of employing a terminologically accurate and consistent typology that recognizes the differences between nails, rivets, and clench bolts justifies the requisite effort needed to establish such a typology. The foundation for the interpretive value lies in understanding the three artifact types as distinct from each other in morphology and function. Focusing on clench bolts in Viking Age graves, this section argues that precise artifact identification and careful analysis of the unique functions of these artifacts can yield new insights into a widespread mortuary practice. Examples from cemeteries across northwestern Europe show that the phenomenon of clench bolts in burials has significance beyond the functional level and suggest ritual continuity with the pagan practice of boat burial.

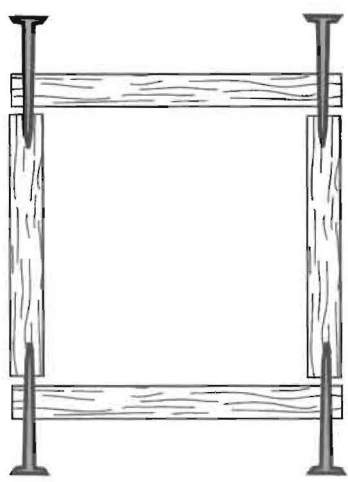
Burials with clench bolts, often arrayed in rows, appear in both pagan and Christian cemeteries from the Middle Ages across the wider North Sea region, including Fyrkat and Sebbesund in Denmark, Hrisbrú and Hófstaðir in Iceland, Birka in Sweden, and Caistor-on-Sea, Ingleby, Thorpe-by-Norwich, York

Minster, and Barton-on-Humber in eastern England (Birkedahl and Johansen 1995: 162–163; Byock et al. 2005; Carver 1992: 110; Gestsdóttir 2006: 12; Gräslund 1980: 24; Richards 1991: 115; Roesdahl 1977: 84, 113). Clench bolts in burials are unlikely to derive from coffins, which are more easily built with nails. In contrast, the construction of a box with clench bolts is cumbersome and inefficient, necessitating more iron and greater labor investment. Clench bolts join overlapping planks, but cannot fasten together perpendicular planks without the use of angled mounts for the corner joints (*Figure 6*). No angled mounts have been found in any of the graves containing clench bolts. The clench bolts must be the remnants of an object interred in these graves other than a traditional box-shaped coffin. This argument has been supported through accurate identification and careful recording of the placement of rows of clench bolts in one grave at the 9<sup>th</sup>–10<sup>th</sup> century cemetery at Birka on Björkö, Sweden and two graves at the 10<sup>th</sup> century cemetery at Fyrkat in Jutland, Denmark. The analysis of the hardware from these three graves allowed for the reconstruction of the original shape of a clinker built wooden object and the resultant identification of a type of burial in which the deceased was interred in a wooden cart (Gräslund 1980: 24; Roesdahl 1977: 84, 113).

A number of burials with a distribution of clench bolts different from that observed in the wooden cart burials indicate the inclusion of another type of clinker built object in graves. Roesdahl (1977: 111) observed that a burial at Fyrkat containing three jumbled rows of clench bolts was different from the cart burials. The clench bolts had remnants of



1) simple box constructed with clench bolts



2) simple box constructed with nails

Figure 6. Schematic drawings of box construction using clench bolts and nails

wood around them and clenched a length of 12–26 mm between the head and the rove. In Iceland, at the Hrísbú cemetery dating from the late 10<sup>th</sup>–11<sup>th</sup> centuries, a similar burial with three clearly defined lines of clench bolts and two additional burials with numerous jumbled clench bolts were uncovered in 2002 and 2004 (Byock et al. 2005a; Byock et al. 2005b). The majority of these clench bolts, clenched a length between 10 and 20 mm, were similar in length to those uncovered at Fyrkat. It seems likely that the clench bolts in these graves represent pieces of boats. The lengths of the clench bolts at Fyrkat and Hrísbú are shorter than would be expected for the planks of a clinker built ship, but fit more closely to boards from a small boat.

The interpretation of boats or pieces of boats interred with the deceased is supported by evidence from the 8<sup>th</sup>–9<sup>th</sup> century cemetery of Caister-on-Sea in

eastern England, where 12 out of the 150 inhumation burials contained clench bolts (Carver 1995: 116–117). Martin Carver (1995: 117) observes that none of these burials contain a whole boat, but that the “riveted timbers were more likely to have derived from pieces of clinker-built boats than any other source.” Also, at the excavation at Sebbersund, an 8<sup>th</sup>–12<sup>th</sup> century coastal trading site in northern Jutland in Denmark, Peter Birkedahl and Erik Johansen (1995) argue that the clench bolts found in 41 out of 468 excavated graves are remnants of broken boat parts used by poor fishermen.

The important question is whether the deposition of boat pieces in graves served a purely functional role, such as Birkedahl and Johansen suggest (1995: 162–163), or whether the practice had wider symbolic meaning for the individuals burying their dead. Considering, for example, the postulated poverty of the

fishermen at Sebbesund, it seems odd that people did not extract the iron clench bolts from the planks for resmelting, as has been observed elsewhere (Birkedahl and Johansen 1995; Fridriksson and Hermanns-Audardóttir 1992). Rather, the investment of energy into these burials represented by the deposition of clench bolts suggests a purposeful symbolic statement (see e.g. Sinclair 1995: 55).

Furthermore, in all but one of the burials at Caistor-on-Sea, the clench bolts were found on top of the skeletons, just as in the three burials at Hrísbú, Iceland. The reused boat planks therefore did not function as biers or coffins, but rather as overlying covers or even as non-functional objects placed into the grave. Although coffin lids serve a practical purpose, Julian Richards (1991: 115) asserts that "this is really too mundane an explanation. Given the Scandinavian tradition of ship burial it seems reasonable that the symbolism of the boats' timbers was intentional."

In the North Atlantic cultural area, the boat had great symbolic significance, beginning in the early Iron Age and continuing throughout the Viking Age (Crumlin-Pedersen and Thye 1992). In this larger temporal framework, Ole Crumlin-Pedersen (1992) views burials with parts of boats as belonging to the same tradition as larger ship burials (Oseberg, Ladby, Sutton Hoo) and stone ship settings (Linholm Høje, Jelling, Ales Stones) that are collectively a religious reference to the Norse and Germanic god Frey's ship, *Skiðblaðnir* (Christensen et al. 1992; Carver 1992; Green 1968; Krogh 1983; Ramskou 1976; Sørensen 1997). I agree with Richards (1991) that the inclusion of boat timbers with clench bolts in burial contexts was meant to convey a

symbolic message related to the ship-burial tradition, but would push the interpretation further and stress that the boat parts were meant to convey the same message as the whole ship, only at a different scale and more affordable cost. As noted by Richards (1991), this interpretation has wider implications for ritual continuation of the ship burial tradition into Christian cemeteries, but also for the wider theoretical possibility that the presence of *the part* is equivalent to *the whole* in ritual contexts.

The identification of the unique corpus of graves with clench bolts and their subsequent interpretation as symbolic boat burials was only possible because of careful documentation and differentiation of the clench bolt artifact type. There is little doubt that misidentification of iron artifacts has obscured other examples of clench bolts in burials and that this practice of including portions of boats in Viking Age graves is more widespread than currently appreciated. In order for extant or future examples to be incorporated into our understanding of medieval ritual and symbolic practices, a unified terminology differentiating the clench bolt artifact type is a necessity.

## VI. Conclusion

I argue throughout this paper that nails, rivets, and clench bolts are significant artifact categories for archaeological analysis. Currently, widespread typological inconsistencies exist in scholarly work concerning these three artifact types, hindering type identification, statistical analysis, and comparative research. Nails, rivets, and clench bolts have unique morphologies and functions, which dictate their use in specific situations. Examining the presence of the particular iron artifact types in various archaeological

contexts has great potential for illuminating medieval use-patterns and enriching our understanding of widespread cultural and ritual practices. The study of clench bolts in burials illustrated this potential by supporting an interpretation of the clench bolts as an expression of the Scandinavian boat burial practice. The interpretive potential of nails, rivets and clench bolts will only fully be realized with a clear typology and a consistently applied terminology that recognizes the differences between the three artifact types. I therefore suggest that the following terms be used in English, Icelandic, and Danish:

- 1) 'nail' (English) = 'nagli' (Icelandic) = 'søm' (Danish)
- 2) 'rivet' (English) = 'hnoðnagli' (Icelandic) = 'nagle' (Danish)
- 3) 'clench bolt' (English) = 'rónagli' (Icelandic) = 'klinknagle' (Danish)

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