

The cup-mark: the smallest, most frequent, cosmo- politan and *most complicated* symbol

Abstract

In Adoranten 2018, a collection of articles have been assembled centred around the theme of the context of cup-marks. Recent notable discoveries of cup-marked stones in dateable contexts across Scandinavia have given research one of the most significant insights to date concerning the most numerous and widely distributed figure: the cup-mark. In this contribution, we wish to commit to paper a proposal developed by the first named author, presented at the Annual 2017 Working Seminar, concerning a suggested categorization of the contexts where cup-marks are found and the ways that cup-marks are represented. At the same time, the authors explore the universal symbolism of cup-marks across time and space.

Introduction

Cup-marks and the contexts in which they are found is the selected theme of this issue of Adoranten. The cup-mark is perhaps the most universal worldwide symbol. It is known from many cultures in all parts of the world, but it is far from certain that this worldwide symbol had the same meaning or function in different periods. The evidence to date indicates that it has been attributed to different qualities, due to changing beliefs over prehistoric time. Also, it has undergone transformations in response to subsequent superstitions and legends, as well as having been subject to influence from Christianity.

Cup-marks have been given various names in various cultures, including 'cup stone', 'cup hollow', 'cup symbol', 'butter stone', 'elf grinding mill', 'sacrifice stone', 'altar stone', 'skittle alley', 'map of stars' and 'fertility symbol'. Some are very objective, like cup hollow (from the Danish *skålformede fordybning*), whilst others indicate associations with various beings and actions. Many of the names connect

cup-marks with elves, dwarves and various other-worldly beings (the so-called *underjordiske*). Others seem to refer to actions, what one might call rituals, carried out at the sites. Some of these have religious connotations, like 'altar stone', whereas names like 'butter stone' and 'sacrifice stone' refer to a practice whereby materials or artefacts were placed in the depressions. This activity can be linked to fertility rites and a wider suite of non-Christian religious practices. These in turn gave rise to names such as 'fertility symbol' and names of individual stones like 'The Devil's Bowling Alley' (*Fandens Keglebane*, for example in Nexø, East Bornholm, Denmark).

Within Southern Tradition rock art (the rock art produced by agrarian societies of Scandinavia), as within many parts of the world, cup-marks are widely distributed across space and time and are the most numerous symbol represented, with the most recent study (Nimura 2015) suggesting that they amount to 81% of all known images. Whilst that figure is subject to

adjustment in both directions, the general conclusion that they comprise the overwhelming majority of images is probably true. Despite their ubiquity, it is not possible to pin down their dating to one period or to one specific context. This makes the study of cup-marks somewhat of a challenge and under-represented in studies.

In this article, the authors make a proposal for a methodology to pick apart the major trends from the vast body of information presented to us. Cup-marks can be categorized in a number of ways: according to how they are represented and the contexts where they are found. Both context and representation should be defined in a very broad sense and neither category should be considered without reference to the other. In this case, the authors define context as the media they are found upon and the find categories of archaeological features with which they demonstrate associations. Representation refers to the visual appearance of the symbols. Here three major groups can be identified: cup-marks associated with or forming part of other figures, cup-marks arranged in various kinds of compositions, and unorganized distributions. In the following sections we will explore each of these categories, thereby outlining our methodological approach to cup-marks. As a consequence, the authors hope that some useful frameworks for understanding the most widespread and numerous symbol in rock art can be proposed, and at the same time our understanding of the structure of the material can be enhanced. By enhancing our understanding of the structure of the material, we can start to ask more specific questions of subsections of our data and gain greater insight into its various meanings and functions within past societies.

In association with or part of figures

Cup-marks are frequently found in association with or form part of other figures. In some cases, it might be that their occurrence is purely functional, as one of

the stages in the creation of figures, for example: heads of anthropomorphs. However, their occurrence may also have been highly symbolic. When one looks at the associations between the cup-marks and other images, including cross-culturally in the fields of archaeology and anthropology, certain associations appear to be more prevalent than others. These associations further inform aspects of the use of cup-marks, some of which appear to be similar, some of which appear to differ, according to the particular circumstance and period of time in question.

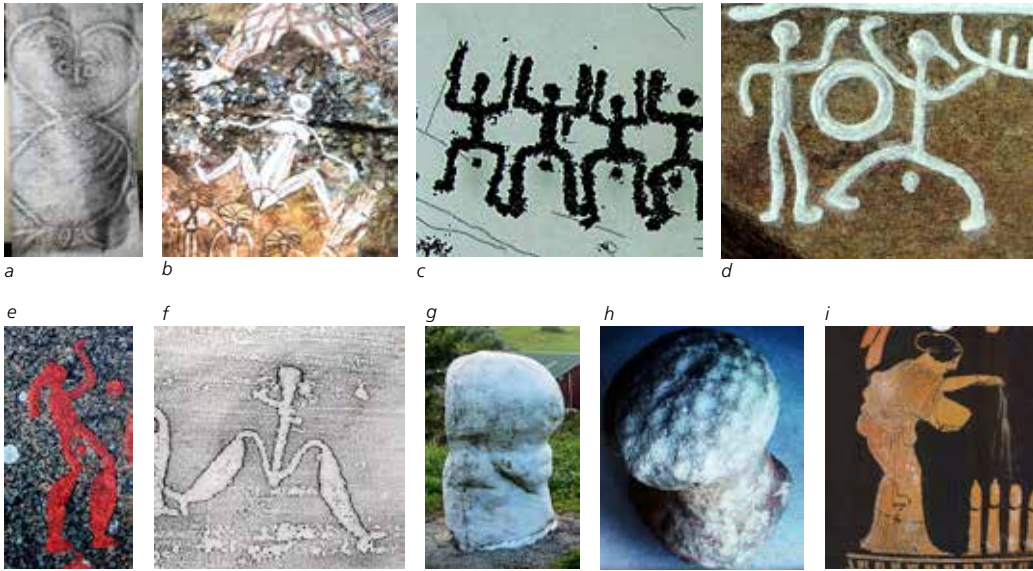
On the one hand, one can see a degree of continuity, in the form of long-term symbolism as a marker of sex and fertility, and as part of varying connections with water and water symbolism. On the other hand, we can also see differences that suggest the symbol must have had many meanings and functions in different cultures, indicating the symbol was reinterpreted and reinvented, several times, which may explain the variety of meanings across space and time.

Sex and Symbols

When looking at the cup-mark as a worldwide symbol, it becomes clear that there are some recurrent connections between fecundity, fertility and cup-marks. In Figure 1, some selected examples are gathered. The cup-mark is often placed between the legs of anthropomorphs, which has led these figures to be interpreted as female. This assumption has been based upon more explicit representations in many parts of the world, created over a long period of time. Figurines from within the Upper Palaeolithic, and more contemporary examples of carvings from British Columbia (a) and paintings from Arnhem Land, Northern Territory (b) all have the female reproductive orifices clearly represented. In the case of examples from Valcamonica, Northern Italy (c), the Englestrup stone, Denmark (d), or the figure with a pony tail hairstyle from Fossum, in Bohuslän, Sweden (e), the detail of the organs is not present, and has here

become more schematic. Nevertheless, it is interesting to compare the strikingly similar stance of the example from Australia with two rock carvings from Sotetorp, in Bohuslän (f). Therefore, we might say on the cognitive level, that humanity appears to demonstrate a propensity to show certain things in a particular way.

Figure 1: Collage of selected examples found across the world illustrating links between sex, symbols, fecundity, fertility and rock art.
 a: Renate von Lamezan, b, c, d, e, g, h: Gerhard Milstreu, f: Tanums Hällristningsmuseum, i: Greek pot



The cup-mark is not exclusively tied to female symbolism, but is also associated with male sexuality. Perhaps the most obvious examples are phallic shaped stones with cup-marks on the very top, or all over the stone. In Figure 1, the authors have presented some examples from Northern Norway (g) and Bornholm (h). In all cases, there is some doubt about the find context. Therefore, it is difficult to determine what the function of such stones might have been. One suggestion might be found on the decoration of a Greek pot, which shows an offering of corn being made to phallic shaped stones during the spring time to guarantee a bountiful harvest (Figure 1 i).

posed to sex. Cup-marks are sometimes placed in particular places, close to figures. One example that comes to mind are the figures of oxen on Tanum 12 at Aspeber-

Figure 2: Phallic oxen with cup-marks placed beneath the tail. Tanum 12, Aspeberget. Photo: Gerhard Milstreu



Such circumstances lead us to think of the cup-marks as symbols of fertility as op-

get. The animals are clearly phallic, but have a cup-mark placed beneath the tail near to the position of the anus (Figure 2). Bovine manure would have been an important source of fertiliser during prehistory, and it is clear that manure facilitated the growing of crops and the enrichment of pasture, leading to the development of associations with fertility, and thereby cup-marks.

Additional clear examples of the importance of fertility can be seen in depictions of hierogamy, also known as *hieros gamos* (derived from the Greek "holy marriage"), which is a sexual ritual recreating a marriage between gods. The phenomenon is widely attested across many religions, including in Ancient Greece, Hinduism and Tantric Buddhism. Within European rock art, such representations can take various forms, depending on the area and the composition, but the basic elements appear to be a pair of anthropomorphs phys-

ically related to each other in some way. Figure 3 presents a selection of examples from Valcamonica, Tanum and Denmark. The relationship can be categorized in a number of ways. There is often physical contact in the form of an embrace (Tanum 1:1, Vitlycke) or contacts of other kinds (Valcamonica). However, it is clear that contact itself is not essential, as shown by the two figures on the small slab covering a cremation urn from Late Bronze Age Denmark (Figure 3). Indeed, it may merely be enough for two figures to be side by side in close proximity to each other (Figure 3, Rished). There have been a number of suggestions as to what this may symbolize. One possible explanation may be coming of age rituals. Within the Indus Civilisation, there is an example of temple sculpture where it is believed that young adolescents had a ritualized first sexual experience with the goddess represented by the statue.

Figure 3, Askum 69 (a) and Tanum 1 (b), in Bohuslän. The Engelstrup stone (c), Denmark. Stone slab of cremation urn, Maltegårdens Mark, Gentofte, Denmark, after Glob (d). Human figures in Valcamonica (e). Wooden figurine, Verucchio, Italy, after Nordblad (f). All images unless otherwise indicated Tanums Hällristningsmuseum Underslös (THU).



a



b



c



d



e



f

Fertility, fecundity and ploughing scenes

Fertility, fecundity, and holiness are three key themes that connect the symbolism of cup-marks as an indicator of sex with hierogamy. Given that the origin of hierogamos stems from religion, this also allows us to think about the use of cup-marks and the depiction of fertility and holiness in a wider sense. Ploughing scenes have obvious connections with fecundity, as well as penetration during sexual intercourse. Cup-marks can often be found as part of ploughing scenes, which are believed to depict a ritual rather than a purely economic scene (Figure 4). Various versions of the ritual are discussed by Glob (1951: 105-108), supported with reference

to contemporary ethnography from the Far East and oral history from Sweden and Denmark. In essence, during early spring, a man would go out, to conduct the first ploughing of spring, sometimes making offerings. An interesting point to consider in the context of Scandinavian Bronze Age power structures is that within the Far East (Thailand and China), the person conducting the power was, on occasion, the emperor.

Besides ploughing scenes, there are other even more tangible associations between cup-marks and crops, in the form of corn. A number of grindstones have cup-marks around the edges of their upper surface.



Figure 4: Ploughing scene from Finntorp, and Litsleby in Tanum, Bohuslan. Illustrations, THU, and a grindstone with cup-marks around the edges circled with chalk, Svendborg, Denmark. Photo: Gerhard Milstreu.

Foot-soles and holiness

Of all the figurative motifs with which cup-marks are associated, one of the most frequent combinations is with foot-soles. In Figure 5, we can see a wide range of examples from Sweden and Denmark. As can be seen within Figure 5, at Brændesgård,

Truehøjgård, and Hou, in Denmark, it is not unusual for the cup-mark to be placed within the heel of the foot-sole. Within many religions where it is prohibited to represent the body and face of a god, it is not uncommon for their footprints to

Figure 5.

a

b

c





d



e



f

Figure 5: Footprints and cup-marks at Fossum in Tanum, Bohuslän (a), Truehøjgård, Jutland (b), Hou, Langeland (c) and Brændesgård, Bornholm (d). Painted illustrations, as applicable, Kaul & Milstreu 2000. Detail of a painting from Maria Church (e), Israel and Buddhas' Feet (f) after Westergaard.

be depicted instead. Footprints, such as those of Buddha, are also used as ways of indicating a place where a deity has stood, and are considered powerful symbols.

Cup-marks and water

Water has often been associated with holiness, due to its sustaining, life giving and transformative properties. Cup-marks are also very strongly associated with water, be it running water, springs, basins or even glacial pot-holes (Figure 6). In Tanum, it is extremely common for cup-marks to be found within water runs, which are places where the natural undulations of the topography of the bedrock cause water to flow according to the easiest path available. Not only within Scandinavia, but also Scotland and Northern Italy, this can be part of a complex miniature landscape of basins and streams (Figure 6)



Figure 6: Cup-marks within water runs, Kalleby, Tanum (below left) and Valcamonica, Italy (below middle), in association with a pot-hole Bro, Tanum (above right) and forming networks of basins and streams Masselberg, Bohuslän, Sweden (below right). In the case of the Italian example, the water runs out from a small basin surrounded by cup-marks. According to oral history, the place was known in folklore as “the witch’s bathtub”. Photo: Gerhard Milstreu.



The cup-mark is connected to water at an umpteen number of localities across Europe. The mystique of the spring, appearing to issue from within the Earth, has attracted people during all periods and caused springs to be considered as holy. Spring water was regarded as the offspring of the Goddess herself and came direct from her noblest inner parts, the origin for the birth of all life. The meaning of the spring as a fertility symbol continued long into the Christian era, with many legends and myths connected to springs and their meaning. The naming of prehistoric monuments within folklore is known from other contexts (Lidegaard 2004), for example graves, which acquired names such as "The giant's sitting room" (Danish: *Jættestuer*) and "The Giant's Mounds" (Danish: *Kæmpehøje*). As was also discussed within the introduction, stones with cup-marks were given names with similar connotations, such as "The Devil's Bowling Alley" (Danish: *Fandens Keglebane*).

Arrangements of cup-marks and their associations

Cup-marks do not only occur in proximity to or form part of other figures. They can also be arranged in various ways to create associations, not only with other figures, but also themselves. The concept that the appearance of cup-marks can be categorized in a number of differing ways is not completely new. Scholars, such as Marstrand (1963: 290-291) discussed the importance of arrangements of rows and lines of cup-marks, such as the composition of a cup-mark surrounded by a ring of cup-marks. The presence of patterns was also suggested by Glob (1969: 111), but in this case with regard to the use of connecting lines linking cup-marks to form larger compositions. This is indeed an important category, but, in this section, we wish to focus more on the arrangements formed by the cup-marks themselves.

Cup marks on metal and rock

Some of the arrangements of cup-marks bear direct resemblances with decoration

on metalwork from the Bronze Age, or are used to form a variety of figurative elements as of themselves. In a few cases, such as the Viksø helmets, it can even be both.

The motif of a cup-mark surrounded by a ring of cup-marks, is found in places as different and dispersed as Hammer VII, near Steinkjer, in Trøndelag, Norway, to Qatar, in the Middle East. Amongst the metalwork of the Nordic Bronze Age, a round dot or convex, bowl shaped protuberance, surrounded by a ring of similar circular motifs is a recurring symbol. One of the most informative examples is found on the Nebra sky disc, from Sachsen-Anhalt, Germany, which has been dated to between 1800 and 1600 BC, during the earlier part of the Early Bronze Age (Meller 2012: 5). One of the many remarkable features of this object is the dot, surrounded by a ring of dots, or "rosette". The dots of gold are believed to represent the stars. This particular grouping is considered to represent the star cluster of The Pleiades. Particular positions of The Sun, The Moon and the Pleiades precede the onset of Spring, thereby indicating, within the Northern Hemisphere, the time for the planting of crops. Given the presence of depictions hinting at the significance of the theme of fertility, including depictions of ploughing, the validity of these interpretations seem more likely.

This so-called "rosette" symbol has a long term significance during the Late Bronze Age. If one considers the blowing pipe of a lur as a substitute for the centrally placed cup-mark, the round protuberances and / or the corresponding depressions on the opposite side, around the base of certain lurs form a rosette pattern (Figure 7). A similar pattern is known from the patterning on the front of a shield found at an unknown location within Denmark. Various combinations of concentric rings of round protuberances are also found on a lur from Late Bronze Age, as well as round shields of the so-called Herzsprung style, which are characterised by rings of

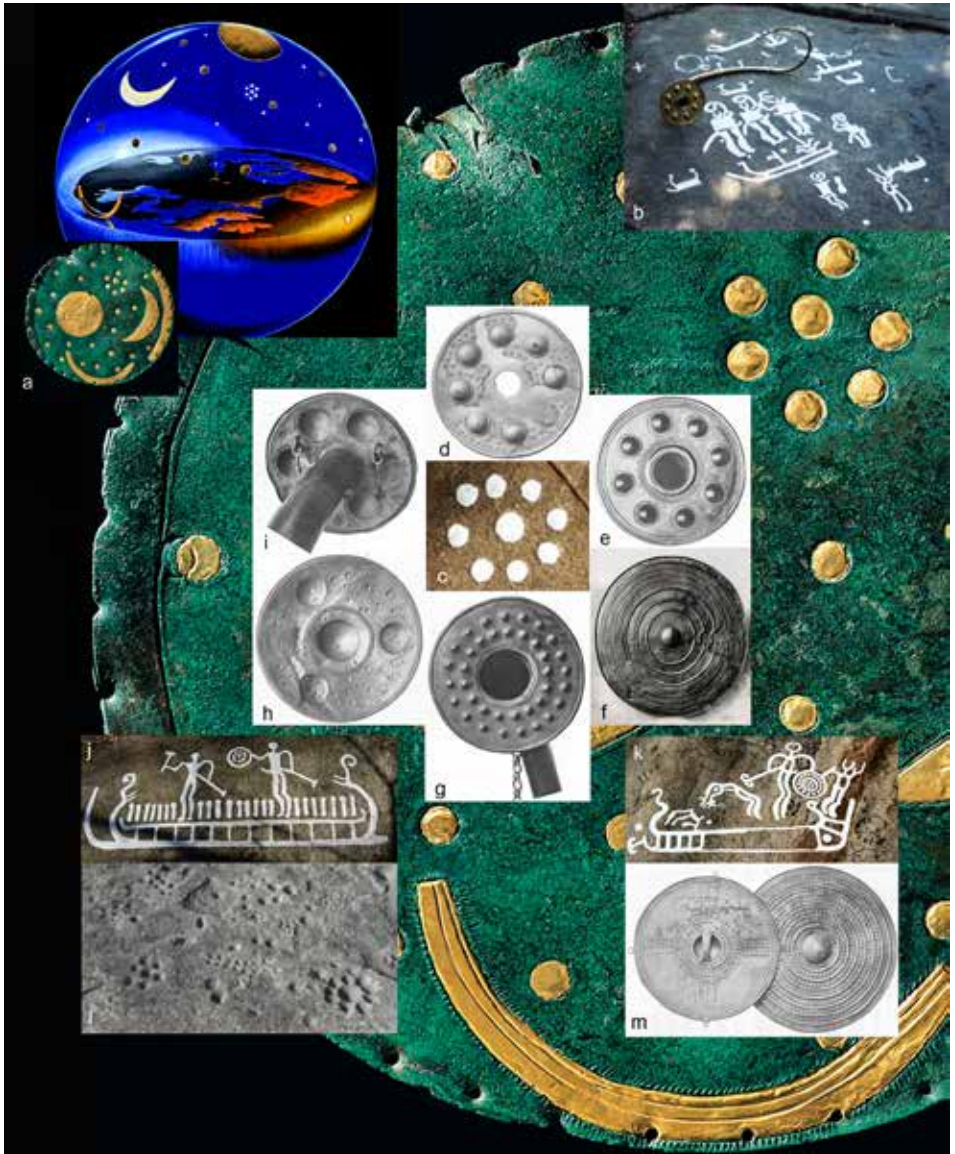


Figure 7: Cup-marks on metal and rock.

Credits from top to bottom, left to right: Artist's interpretation of the cosmological conception of the world depicted on the Nebrat Sky Disc (a) (Copyright: LDA Sachsen-Anhalt, Juraj Liptak). Replica of a lur placed alongside lur blowers on Tanum 406 (b) (photo: Milstreu/THU). Collage, centre: Painted illustration of a cup-mark within ring of cup-marks Tanum 66 (c) (2016 working seminar, THU), (clockwise from top): Lur plates from Boslunde (d) & Tellerup (e) (Broholm 1946: 165), Herzsprung style shield (f) from Svenstrup (National Museum of Denmark), lur plate from Folvisdam (g) (Broholm 1949: 221), shield from an unknown location in Denmark (h) (ibid: 33) reverse side of lur plate from Brudevælte (i) (Broholm 1946: 165; 1949: 221). Rock carvings at Svenneby (j) and Hede (k), Sweden (painted illustrations: Milstreu/Kaul). Rosettes and rows of cup-marks in Qatar (l). Front of a shield with concentric rings separated by ridges and the reverse side of a shield embossed with concentric rings and a cross-in-circle pattern from Eskildstrup (m) (Broholm 1946: 184).

concentric ornamentation and sometimes an indentation in a v or u shape in the boss (Hencken 1950: 295). This ornamentation can take the form of concentric rings of round protuberances. They are widely distributed across Europe, including Eastern Turkey, Greece, Crete, Northern Italy, Central and Northern Germany, Iberia and South Scandinavia (Hencken 1950; Kristiansen 2014). Depictions of round shields within rock art show similar rings of concentric dots, separated by concentric rings, once again, as found on the shields, in the form of ridges (Figure 7).

There may be a strong ritual, religious and / or cosmological dimension to the rosette motif, as well as other representations that occur on both rock art and metalwork. On Tanum 14:1, at Aspeberget, in Bohuslän (Figure 8), cup-marks form the outline of a particular kind of artefact: a bronze holder decorated with an inlaid amber disc, with integral decoration in the form of a cross-in-circle motif. In the case of the design on Tanum 14:1, the cup-mark within a ring of cup-marks is used to form the design. The cross-in-circle motif, as found upon many bronze artefacts besides the example shown in Figure 8, is interpreted as a sun symbol, and can be seen amongst the rock carvings, either on its own, or associated with another figure. One such figure is the horse. Within the cosmology of the Bronze Age as proposed by Kaul (1998), a horse, termed the sun horse, draws the Sun across the sky. This is physically represented in three dimensions within the artefact known as The Chariot of The Sun, where the Sun is represented as a disc, gilded with gold. Amongst the rock carvings of sun horses, this disc is

sometimes substituted for a cross-in-circle (Milstreu 1978; Kaul 2018). If we can accept the links between the cross-in-circle, sun horses and sun symbolism, we may suggest that the cup-mark within ring of cup-marks motif, or rosette, and similar iconography on bronze objects, may have been a sun symbol within certain contexts. However, the authors caution that the icon of the rosette is not exclusively linked to sun symbolism. It is very strongly associated with the stellar constellation of The Pleiades and therefore perhaps fertility and the passing of the seasons. The strongly attested associations with lurs propose a logical association with the symbolism lying behind the sounds that were



Figure 8: A carving at Tanum 14:1, Aspeberget (THU), resembling the bronze holder with inlaid amber disc from an unknown location in Denmark (photo: The National Museum)





Figure 9: Cup-marks, cross-in-circles and The Pope's glove. Left to right: Madsebakke, Bornholm, Lago di Garda, Northern Italy, The Pope's glove, and Finntorp, Tanum. (all illustrations except The Pope's glove: Milstreu)

played and their intended effects. The association with shields proposes further associations with the domain of the male warrior.

Cup-marks, cross-in-circles and sun symbolism

We have already seen that there are associations between cross-in-circles and sun symbolism. Amongst the rock carvings, cup-marks are sometimes directly associated with cross-in-circles. (Figure 9) In a number of cases, one cup-mark is placed within each corner. The example from Bornholm, is unusual in that it is supplied with a ring of 17 cup-marks around its circumference. In the example found on the shores of Lake Garda, the cross-in-circle justifies use of the term 'sun cross', which is sometimes used to refer to this kind of motif, with the short lines radiating out from its edges resembling the rays of the sun. Each quarter of this cross-in-circle has a large number of cup-marks in each quadrant. Similar infilling of the quarters of cross-in-circles can also be seen on Tanum 184:1, at Finntorp.

Cup-marks and the circle: a special connection

It would appear that the cup-mark is also connected more generally with the concentric circle. As we have discussed previously, rings of round protuberances are found on shields and are often divided by concentric rings of ridges. When we look at the rock carvings, there appears to be dualism between concentric circles and concentric rings of cup-marks. This is perhaps clearest in an example from Bornholm (Figure 9). Cup-marks can also be

placed within one or more rings, forming cup-and-ring marks. Both concentric circles and cup-and-ring figures are widely attested amongst rock art from many parts of Europe, including Northern England, Parco Luine, in Valcamonica, as well as Norway and Sweden (Figure 10-11).

The symbols of the ring of cup-marks and the cup-mark within concentric circles can also be seen combined on the Copper Age statue stele of Northern Italy (Figure 12). In the example from Cemmo, one human figure has a type of head dress with rays, like a sun symbol. Another stele from Pontremoli is depicted with breasts and has a line of cup-marks around the waist and a cup within a series of concentric rings on

Figure 10: Hammersholm 67, Bornholm. A cup-mark is surrounded by a ring of cup-marks joined together to form several concentric rings. Photo and painted illustration Kaul & Milstreu 2009.





Figure 11: Concentric circles, cup-marks and cup-in-ring figures from (clockwise, left to right) Austre Åmøy, Rogaland, Norway, Värmland, Sweden, Parco Luine and Sonica both in Valcamonica, Italy, and Ketley Crag, Northumberland, England. Photos: Sonica: Milstreu / Kaul. All other images: Gerhard Milstreu

Figure 12: (left) Statue stelae from Naquarne National Park, Capo di Ponte, Lombardy (photo: Milstreu)

either the ears or perhaps the shoulders of the figure.

Cup-marks forming figures

Cup-marks can also be used to form a variety of figurative elements in rock art besides rosettes, thereby extending the ritual and symbolic associations to other categories of object. On Tanum 326:1, Kasen, Ryk, cup-marks are used to form an ard, which can in turn be linked to the earlier discussions of fertility, ploughing scenes, the Pleiades and rings of cup-marks in the shape of a rosette.

Ships are another category of objects that can be represented, or associated with lines of cup-marks. In the case of the example in Figure 13, at Ås III, near Skien, in Telemark, Norway. This use of round

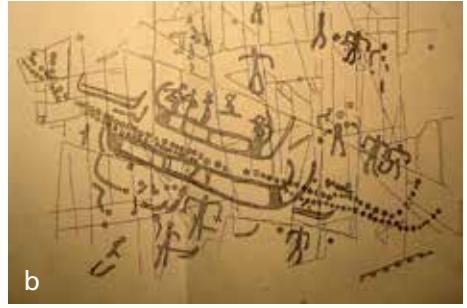


Figure 13: An ard formed of cup-marks on T326:1 Kasen (a), Ryk, Bohuslän, (THU) and a ship formed of cup-marks at Ås III (106206-1) (b), Telemark, Norway, (David Vogt). Stylized ships made up of dots with s-shaped prows are also found on artefacts such as the Viksø helmets (c-d) (Detail from Kaul 1998: Figure 20. Photo of helmets: Lennart Larsen National Museum of Denmark).

protuberances to form ship figures is also seen amongst the metalwork: on shields, cauldrons and the Viksø helmets.

Rows and lines of cup-marks

Of all the different kinds of arrangements, lines, two or more parallel rows of cup-marks, or rectilinear grid patterns of cup-marks are the most frequent. In a particularly exceptional case, at Släbro, Nyköping, Sweden, these form a diverse range of combinations, including many examples and permutations of multiple rows of cup-marks collected together in a rectangular grid and enclosed within a square. In one case, cup-marks and lines form a complex composition, almost resembling head and body of an anthropomorph. Combinations



of grid-like patterns of cup-marks enclosed by square or circular lines, forming part of a larger composition, are also known amongst Valcamonica rock art, such as Bedolina 2 (Figure 14).

Rows of cup-marks frequently occur. Figure 15 collects two of the many examples from the island of Bornholm, at Hammer-

Figure 14: Complex compositions of cup-marks enclosed and linked by lines. Left to right: Släbro Sweden (rubbing and night photograph: Milstreu 2005) and Bedolina 1, Valcamonica (photo: Milstreu).



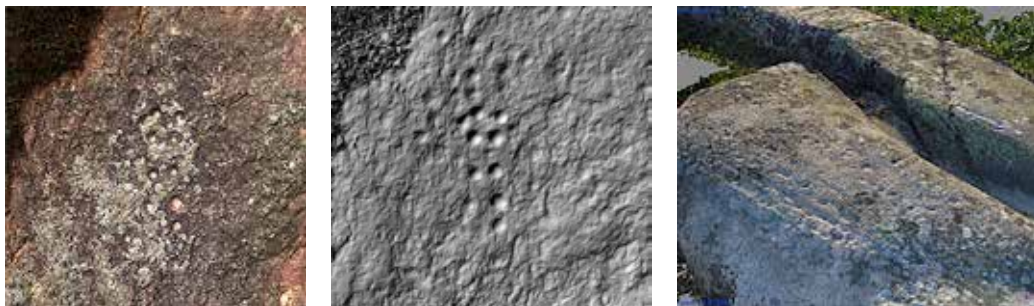
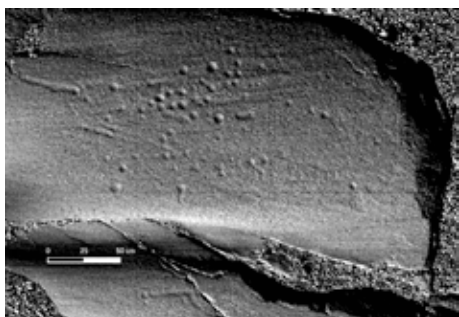


Figure 15: BMR 2866, Østergård, Risehøj, Østermarie (upper left) & BMR 2262-2 Hammersholm 2, Allinge-Sandvig (left and upper right). Models J. Dodd, Aarhus University in association with Bornholms Museum. Processed on The Danish e-Infrastructure Collaboration's High Performance Computer, Abacus 2.0.



sholm 2, Allinge-Sandvig, and Risehøj, in Østermarie. The meaning of rows is uncertain, but perhaps one clue can be found in some rare examples found at Sotetorp, in Bohuslän. Two parallel rows of cup-marks are placed above the crew lines of ships dating to the Late Bronze Age. The human figures in the crew bear cultic axes and carry swords. Above, either one or two acrobats somersault over the whole scene. It has also been proposed that certain linear arrangements of cup-marks may have been related to a system of marking the

Figure 16: Parallel rows of cup-marks above ships at Sotetorp, Bohuslän, Sweden.



passage of time. Certainly, there appears to be a tangible association between the reach of outstretched fingers of the hand of the human figure on Tanum 120:1, and the four rows of seven cup-marks each (Figure 17). Given what we have previously outlined with regard to the use of the Pleiades in determining the onset of Spring, it is not inconceivable that there may have been systems in place for marking the passage of time.

Unorganized distributions

In many cases, there does not appear to be any apparent system of organization of the figures, with figures in some cases

Figure 17: Rows of cup-marks and a human figure, Tanum 120:1, Aspeberget, Tanum.





Figure 18: Cup-marks spread over the upper and sloping surfaces of BMR 3779, Rømersminde, Østermarie, East Bornholm. Painted illustration J. Dodd, Bornholms Museum, 2015. Model processed on Deic's HPC Abacus 2.0.

seemingly spread over the surface (Figure 18). However, this does not mean that the placement of the figures on surfaces, or the selection of surfaces is necessarily random. To a large extent, perhaps this is because we have not yet understood the structure of this part of the archaeological record and ascertained reasons to explain it.

Placement and colour

However, ongoing fieldwork suggests that it may be possible to go a little further (Dodd in prep. 2021). A pilot study of 47 panels on Bornholm (Dodd 2018), suggests that half the panels have figures located on the uppermost surfaces. At least a third are located near or on the edges of surfaces. When one considers the attributes associated with portable and non-portable stones, boulders and erratic stone blocks only, it appears that preferences are expressed for certain shapes and colours. Rectangular, rounded or triangular shapes are preferred, in that order. Pink and red coloured stones are preferred, but white stones also form a significant grouping. Figures 19-21 gather a selection of examples, all from Østermarie Parish, East Bornholm

There is an interesting ethnographic parallel for cup-marks on the edges of rectangular shaped stones. Figure 22 shows



Figure 19: BMR 2872, Randkløvegård, Østermarie: A rounded, white erratic near a field boundary of a fossilized field system. Painted illustration J. Dodd in collaboration with Bornholms Museum, 2017.

Figure 20: BMR 2971 Brunsgård, Østermarie. Figures cluster on the flat, uppermost surface of this red, triangular shaped erratic block. Model J. Dodd in collaboration with Bornholms Museum, 2017, processed on Deic's HPC Abacus 2.0.





Figure 21: Oblique view of model of BMR 2971-1, Skrulle 1, Østermarie, a stone rectangular in both plan and profile. The natural colour of the stone is very light pink, reflecting the high number of quartz crystals mixed with the gneiss. Shaded mesh (left) and textured model (right). J. Dodd in collaboration with Bornholms Museum, 2017, processed on DeIC's HPC Abacus 2.0.

cup-marks being used by a medicine man to heal a patient with earache by using a hammerstone to hit the stone, creating, or enhancing pre-existing cup-marks. The recently carved stone shows up in a much lighter colour, which may in turn lead us to think about the possible significance of colour, such as outlined within ethnographic studies focused on prehistoric archaeological contexts (Jones and MacGregor 2002).



Figure 22: A 'medicine man' in North Cameroon, healing a patient with earache by "activating the power of the stone" / cup-marks (source: Gudnitz Archive, SSFPA)

Large 'oversized' cup-marks

Large oversized cup-marks are not unknown, particularly on very coarse surfaces. They can also be the result of repeated carving events, as the painted illustration of Parken 1, Svaneke, Bornholm, shows (Figure 23).

In Denmark, stones with large bowl shaped depressions are known, but are often thought to have been created during the historic period, and perhaps may have been used for grinding some kind of material. However, not all examples were created during the historic period, and there are a mounting number of examples of very large cup-marks being recognized within Scandinavian prehistoric rock art, in studies such as those by Wikell and Hammar (2009). Very large cup-marks have also been discussed in conjunction with glacial pot holes found near certain rock art sites, with Tangen (2018: 232-233) highlighting the similarities between the words in Norwegian and Swedish used to refer to cup-marks, trolls and pot holes (refer also Figure 6).

Proof that at least some of these large cup-marks must have been created during prehistory is offered at Parken 1, Svaneke, East Bornholm. The panel has been subject to several carving events, with one figure demonstrating multiple superimpositions. In the inset photograph, the lowermost cup-mark in the sequence has been superimposed by a foot-sole, which has in turn had several cup-marks superimposed within it.

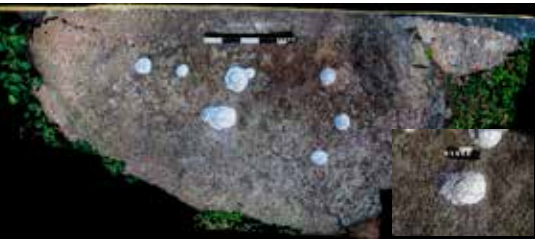


Figure 23: BMR 3831-1, Parken 1, Svaneke, Bornholm. Painted illustration Dodd & Kofod, Bornholms Museum, 2015. Model processed on DeIC's HPC Abacus 2.0. Inset photograph showing detail of cup-mark superimposed by the foot-sole.

Cup-marks in particular contexts

Cup-marks can also be found in specific contexts that can tie them to a particular use and give insights into chronology.

Cap-stones of dolmens

Overview studies of Danish rock art by Glob (1969), and more recently by Felding (2009; 2018), have confirmed that many of the examples where cup-marks are found in their original location are upon the cap-stones of dolmens, which date between 3500-3300 BC (Nielsen et al. 2014a: 38). Although this may be the result of factors governing the preservation of remains in the archaeological record, it is nonetheless significant. There is a tendency for figures to be clustered towards the edges of the selected stone, often, but not always, upon the highest cap stone. The phenomenon of cup-marks on the cap stones of dolmens is not confined to Denmark, but also at-

tested in Sweden, Western Wales (Darvill and Wainwright 2003), South West England (Jones and Kirkham 2013), The Isle of Man (Darvill et al. 2005), Brittany, South West France, Catalonia (Jones and Kirkham 2013: 641) and Galicia (Bradley 1997: 41). Historically, most scholars have asserted that the rock art found upon these cap stones is a later phenomenon from the Bronze Age, based upon the presence of cup-marks alongside representations that can be dated by their visual similarity to depictions of bronze artefacts, like axes and swords. For example, at Kirke-Stillinge, we see cup-marks and ship carvings on the same surface.

A date that might be contemporary with the dolmens and passage graves of the Neolithic was not ruled out, even by early antiquarians such as Petersen (1876: 435; 439), Vedel (1886: 53), and, much later, by Glob (1969: 297-299).

However, conclusive proof of this has been lacking. Two stones, both evidencing 9 cup-marks on one surface, have been discovered in the fills of a causewayed enclosure and in the fill of a post hole forming part of a network of enclosures at Vasagård, on Bornholm (TV2 Bornholm 9/6/2016; dir. Seehusen and Stenstrop 2017; Persson 2017). The causewayed enclosure phase (3500-3300 BC) predates the construction period for the palisades (2900-2800 BC). Given that the stones are

Figure 24: Sømarke, Møn, Denmark, (left) Photo: Milstreul Prøhl. Kirke Stillinge, Sjælland, Denmark, (right) Photo: KaulMilstreu



in a fill dated between 2900 and 2800 BC, at the end of the Late Funnel Beaker Period (Nielsen et al. 2014b: 94-8), this means that the stones are in a secondary context that occurred during the filling of the ditches of the causewayed enclosure and the post holes of the palisade (Bornholms Museum Beretning for 2016: 21; 2017: 21-23). The consequence of the findings is that they cannot be younger than the fills that have sealed the layer in which they have been found. Therefore, whilst we await the full publication of these two interesting finds, the details of these discoveries that are in the public domain nevertheless force us to consider the possibility that a large number of the cup-marks found on the cap stones of dolmens may date to at least the end of the Middle Neolithic.

When we look at the practice of pecking cup-marks on boulders, it appears this is a very deeply rooted phenomenon, with examples known from the Upper Palaeolithic, in the Dordogne, France, at La Ferrassie (Figure 25). When we look further on, into the Bronze Age within Denmark, we see that this practice continues, with the cup-mark being joined by motifs including the cross-in-circle and the ship, as outlined within previous sections.

Figure 25: Ornamented stone blocks dated to 43,000-37,000 years B.P. (Aurignacian Period of the Upper Paleolithic), La Ferrassie, Dordogne. Left hand image: Milstreu. Right: Don Hitchcock, donsmaps.com, Wikimedia Commons (License: <https://creativecommons.org/licenses/by-sa/4.0/deed.en>)



Cup-marks and funerary monuments and burial practices during the Bronze Age

Whilst Glob identifies a very strong correlation between the placement of cup-marks on the upper surfaces of dolmens and passage graves, the other find contexts seem to be quite well defined, namely, locations on the upper surfaces of supporting stones, around the kerb of the monument, free standing, or within the chamber (Glob 1969: 297). Whilst there are only a few examples of stones preserved in their original context, these suggest that there may be at least two periods of carving activity: one focused on the cap stones during the Middle Neolithic, the other during the latter periods of the Early Bronze Age and the Late Bronze Age.

At Vindblæs, Eastern Jutland (Lok. nr. 140410-110), we see cup-marks and a ship carving on two kerb stones found in situ around a burial mound. The style of the ship is considered by Kaul (2001) not to date to the earliest part of the Bronze Age. The in-turned prows and small up-turned keel extension forward suggest the earliest origin might be around Period II (1400-1300 BC), but dating within later periods cannot be completely ruled out. In Djursland, at Lille Dyrhøj, Ørun Sogn, also within Eastern Jutland (Lok. nr. 140119-31), cup-marks were found on the uppermost surface of two orthostats of a dolmen. One concentration was located on the uppermost surface, the other on the sides of the orthostat opposite.





Figure 26: Painted illustration of cup-marks and a ship on the kerb stones of a burial mound at Vindblæs, Vindblæs Sogn, Denmark. Photo: Kaul/Milstreu 1999.



Figure 27: Stone ball decorated with crosses and cup-marks, Denmark. Photo: National Museum.

Although the chamber was sealed by a large cap stone, a cremation burial was found within the cist, the practice suggesting that the dolmen had been the focus of later burial practice, during the Late Bronze Age (Glob 1969: 276).

The practice of covering urns, or, more generally, cremation graves, with a small stone slab ornamented with cup-marks or other signs, (Glob 1969: 139; 278) is a burial practice characteristic of the Late Bronze Age (ibid: 297). Decoration can be on one or both sides. As the authors have discussed in a previous section, this context is also connected symbolically with hierogamy and thematically with fertility.

Given the chronological evidence available at these two locations, it is possible to suggest that different preferences were expressed during the Bronze Age for the placement of cup-marks within and around burials. Key evidence supporting this change can be drawn from the definite association between cremation burials with cup-marks and other symbols on stones covering cists or urns.

Small stones with cup-marks

Small portable stones with cup-marks form one object category. (Glob 1969:

113; 126-9; 296-8). There is a problem of classification and a lack of find context for most examples of this particular find category. However, Sørensen and Moe Henriksen (*this volume*) address both issues in detail, in light of recent discoveries made within datable context. Some may be tools for use in hammering or grinding material, however, the finds of Bronze Age figurative art, evidencing motifs such as the cross-in-circle with a cup-mark placed within each quadrant (Figure 27) indicate that the cup-mark can have more sacred functions in this instance. In turn, this forces us to reconsider the place of the "pocket" sized cup-marked stones, or *lommeskålsten*, in Danish, particularly those with several cup-marks on multiple surfaces.

Field systems and routeways

In most cases, it is difficult to assess the role of cup-marks within the prehistoric landscape, particularly in light of agricultural practices during the last 100 years. However, where preservation conditions have been more favourable, cup-marks can be found within field systems.

In some cases, these actually lie within or near field boundaries (Rankløvegård, East Bornholm, BMR 2872), sometimes near

corners (Lobbæk Skov 1, BMR 2923-1), at other times within the field (Randkløveskov Vest, East Bornholm, BMR 2873) and also on the border of enclosed and unenclosed areas (Blemmelyng, South West Bornholm, BMR 3832). What is notable about all of these examples is that the media is too large to be moved and the topography around them suggests they are too deeply buried to have been moved to their current locations. Therefore, this suggests that stones were not dragged to conform to the division of the landscape, but that they were already part of it, shaping its structure to some degree. The stone's distinctiveness in terms of colour, shape and sheer size may have all together served to mark them out in the landscape. Whatever significance or symbolism these rocks may have had, it seems that the attributes of the cup-mark are closely connected.

Within Norway, Brevik (2018) has demonstrated that the location of rock art, including several cup-marked rocks, can be related to the course of routeways that are still in use today, and may conceivably reflect routes that ran, due to the constraints of local topography, on a similar alignment during prehistory. Also, Brevik's proposals are interesting when considering the very close correlation between the location of cup-marks, upland summer pastures and mountain farms within Western Norway (Lødøen 2015). For example, some rock art sites located in the upland area between the Hardanger and Sør fjorden, such as Lote, Utne and Hauso, in Ullensvang municipality, are either located on cols, or are on the course of old routeways climbing up the mountain side.

Later incorporation within the fabric of churches

When reflecting on the uses of cup-marks over time, they have a long chronology and a wide range of uses and meanings. There appear to be some universal qualities about this symbol that cut across cultures and the ages. One of the many possible reasons for its longevity may be the

incorporation of old traditions, cultures and customs in order to link the old belief systems to the new religion. The inclusion of prehistoric rock art into the fabric of churches may be a relevant example. Through this practice of incorporation, places can remain holy over a very long period. One such example is the Church of Le Sante, Capo di Ponte, Italy, where an outcrop with two hands carved upon it forms a sacred shrine beneath the church built above.

The incorporation of rock art within the fabric of churches is also a feature of the Danish archaeological record. Cup-marks, as the most frequently occurring symbol within Southern Tradition rock art, naturally predominate, alongside other symbols, including ships, foot-soles and cross-in-circles. The stones are often used as or near the foundations of the building, suggesting that they have been brought there deliberately.



Figure 28. Stege Church, Møn, Denmark. Photo Prøhl Milstreu.

Stones evidencing cup-marks are frequently used as the flag stones for the church entrances for females. Perhaps this indicates the continuing use of the cup-mark as a fertility symbol, as discussed in the first section. It is known from study of folklore, that such associations persisted into the historic period. Goldhahn (2018)



Figure 29: Cup-marks used as flag stones at the female entrance of churches. Left to right: Birkerød, North Zealand, Nyker, South Bornholm, Magleby, Møn. All Denmark. Photos: Gerhard Milstreu.

has recently conducted a survey of these historical sources which tell of various vernacular religious practices involving cup-marks. The cup-mark is also linked to stories of *de underjordiske*, spirits that could sometimes take physical form as elves, and also other creatures or objects in nature.

Exploring the structure of relationships between cup-marks and the attributes with which they are associated

The relationship between the attributes associated with cup-marks that the authors have highlighted in this article are complex, making it challenging to obtain an overview of how the different factors are related to and connected with each other. Relationships between attributes can be represented diagrammatically as a network. In the case in question, each attribute associated with the cup-mark is represented by a circle, known as a node. The presence of a link between one attribute and another attribute is shown as a line, known as an edge. Many of the nodes are also connected by their use, appearance, location in the landscape and symbolic associations. Membership of these groups has been represented by assigning each attribute to a particular colour (Figure 31). The categories the authors have defined are subjective. Consequently, our findings should not be seen as a representation of reality, but a visualisation of a series of interpretations.

The authors have visualised the relationships between attributes associated with cup-marks using the open source application Gephi (<http://gephi.org/>). Readers who are interested to explore our model in more detail can download the project files and supporting spreadsheets by visiting the page for this article on the museum website. The links between a node and its immediate neighbours in the network can be viewed interactively by hovering the mouse over a node.

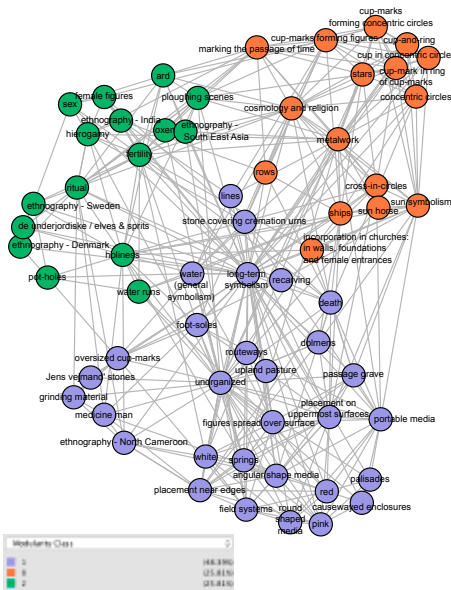
Two visualisations are provided. Both graphs use the same visualisation, ForceAtlas2 (Jacomy et al. 2014). The algorithm arranges the nodes according to how connected they are with one another. Groups of connected attributes cluster together. Differences in the number of connections in relation to the overall total determine the placement of these clusters within the graph. The greater the number of connections, the closer the node is to the centre. Figure 30 colours the nodes according to how connected the nodes are statistically, using the technique of modularity analysis (Blondel et al. 2008; Lambiotte et al. 2015). The colour assigned in Figure 31 reflects group membership assignment, based upon whether the attribute is associated with representation as part of figures, as part of arrangements, usage, symbolism, the kinds of archaeological features where they are found, the placement of figures on the surface, as well as the colour and shape of the media.

The model is three dimensional (FisherKeller et al. 1974). If one views the project files and runs the ForceAtlas2 algorithm, clusters of nodes revolve around the centrally placed node long-term symbolism. The colouring within the modularity visualisation (Figure 30) closely correlates to the three main clusters of nodes in the graph. When archaeological understanding is integrated (Figure 31), we can see how physical evidence, such as find context, colour, or the type of figure, relates closely to certain themes, such as fertility and the stars. Also, it is interesting to note that whilst communities are apparent, certain nodes, such as metalwork and water, have linkages running between clusters.

Overall, three main groupings are apparent. In the modularity visualisation,

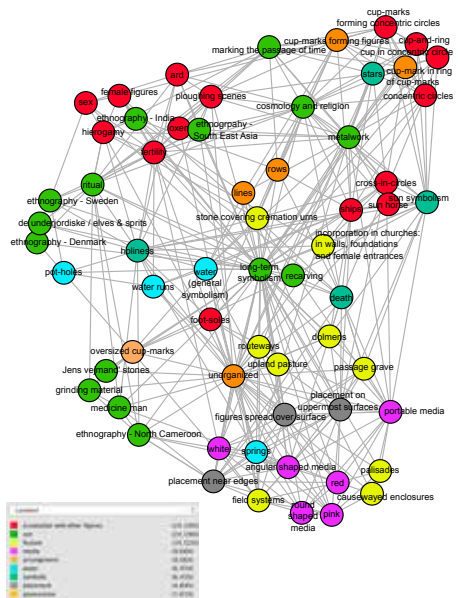
Model, Figure 30-31: Unweighted one-mode network. Visualized with ForceAtlas2, Linlog display, resolution setting 1. Both figures J. Dodd. To inspect and explore this dataset further, please see page for this article on www.rockartscandinavia.com

Figure 30: Links between cup-marks and the attributes with which they are associated, coloured according to modularity class. The colouring of the clusters is determined according to their connectiveness and broadly reflects the location of points in 3D graphical space



the orange cluster appears to have many nodes centred around attributes strongly associated with Bronze Age cosmology, the cosmos, metalwork and ring motifs of various kinds, particularly the cup-mark within a ring of cup-marks. The green cluster seems to be centred around the themes of fertility, ritual and holiness. The purple cluster, which comprises the largest part of the network, appears to separate the placement of unorganized distributions of figures on the surface, the colour of the stone, and most of the contexts where they are found. Long-term symbolism is placed at the centre of the network as the attribute with the greatest number of connections.

Figure 31: Links between cup-marks and the attributes with which they are associated. Nodes coloured according to their assigned categories. Note how different kinds of relations and attributes interact and form various communities.



Conclusion

This article has explored the attributes associated with cup-marks. The preceding discussion has explored how variations in the circumstances where cup-marks are found influence their usage and possible meanings. Through an understanding of the associations with other figures, the identification of specific arrangements of symbols, and examination of properties of the media upon which unorganized distributions are found, groups of connected attributes can be identified. When combined with analysis of the contexts where these associations occur over time, on artefacts or as part of archaeological features, we can identify further sub-sets of connections.

Sex and fertility, together with associated rituals, such as ploughing scenes, are strongly linked to occurrences of cup-marks in association with figures. On a symbolic level, foot-soles are strongly linked within contemporary religion to holiness. As a consequence of the propensity for foot-soles and cup-marks to occur together, a link is proposed between holiness and water symbolism, which is connected to a diverse range of aspects. Associations between the past symbolism of cup-marks, holiness and female fertility appear to have been perpetuated by Christianity, with many Danish churches incorporating cup-marked stones in their foundations, or using them as flag-stones at the entrances for women.

Arrangements of cup-marks are an easily identifiable group. Some arrangements appear to be linked to the passing of the seasons, cosmology and the cosmos. In particular, it appears that the arrangement of a cup-mark within ring of cup-marks, and all its various permutations on both rock and metal, occupies an important place amongst the symbols of the Nordic Bronze Age, being found in many contexts besides rock art, such as on the sky disc from Nebra, the bases of lurs and shields. The symbol may depict the constellation of the Pleiades, whose position is impor-

tant within the Northern Hemisphere, for signalling the onset of spring. Associations are not only confined to the night sky, but also sun symbolism. Here, a linkage appears with the use of cup-marks to form figures. On rocks, these arrangements can take a more abstract form, that may or may not be related to the same themes and concepts, as is the case with associations with figures both in rock art and on metalwork.

Even amongst unorganized distributions, there seem to be principles structuring the record. Within the Scandinavian material, which forms the key empirical basis of this study, placement on upper surfaces, near the edges of white or reddish, angular, stone blocks form a distinct sub-group.

The articulations with archaeological features offer insights into chronology, use and symbolism within prehistoric societies. Within the Scandinavian area, burial monuments feature significantly, although where, what and how cup-marks are represented, changes over time. However, cup-marks are not solely linked to death. Their occurrence across many parts of Northern Europe, in Estonia, Northern Germany, Denmark and Western Norway, within field systems or upland mountain pasture, indicates cup-marks were part of the everyday landscape of the living.

In the last section, the authors set out to represent and explore the structure of these complex relationships using network analysis. The long-term symbolism of cup-marks across space and time is most apparent, along with three main clusters of associations. Some of the clusters within each community have links spanning one or more of the main groups. This suggests that the symbol may have some associations in common, but the specific use and appearance is different according to the context in question. One group of related attributes seems to be centred around Bronze Age metalwork and cosmology, another fertility, ritual, holiness and water, whilst the largest community of closely connected attributes relates to the place-

ment of figures on the uppermost surfaces, near the edges of stones coloured pink, red or white, which are either of an angular or rounded shape.

Understanding the context of cup-marks can provide a framework for deepening our understanding of the nature and articulations of the relationships for this widespread, long lived and most complex symbol. By categorizing its uses, appearances and occurrences, perhaps we can see some of the patterns and groups of associations across time and space. The cup-mark did not have the same meaning in every context or culture, but there are some recurrent themes. The author's constructions are not intended to be a representation or explanation of reality. Moreover, they are intended to be a conceptual framework to act as a basis for further discussion and work. There is still much research to be done, many discoveries to be made and great insights to be gained.

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Note

This article is based upon a lecture given by Milstreu at Arbetsseminar 2017 and discussions between the authors, who both independently reached similar conclusions concerning distinctions in the contexts where cup-marks occur and the importance of arrangements as a sub category.

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Appendix

Rune Iversen

A short notice on the recently discovered Neolithic cup-marked stones from Vasagård, Bornholm

Cup-marks are by far the most common rock art motive in southern Scandinavia and they are evidently part of the Bronze Age iconography due to their association with typical Bronze Age motives such as ships, human figures, animals etc. In parts of western Europe, cup-marks form part of the rich megalithic art in particular Ireland, Brittany, central western France together with northern and western Iberia. In comparison, southern Scandinavia lacks such megalithic art even though cup-marks are found on dolmen and passage grave capstones but these have usually been conceived as later Bronze Age engravings (Ebbesen 2011, 398-99, Glob 1969, 119).

However, recent excavations on Bornholm have brought new evidence on the appearance of the non-figurative rock art tradition, which has made it necessary to reconsider the emergence and use of rock art in southern Scandinavia (Iversen 2019). During the last five years, Bornholm's Museum and the National Museum of Denmark have carried out excavations at the Neolithic site Vasagård, on southern Bornholm. From 2014, the investigations took place in corporation with archaeological field school teams from Aarhus University and the University of Copenhagen. Two Early Neolithic causewayed enclosures (Vasagård East and West), separated by a river valley, constitute the main features at



Figure 1. Cup-marked stone in situ, palisade trench, Vasagård East, 2017 (Photo: Rune Iversen).

Vasagård in addition to a Middle Neolithic palisaded enclosure, parts of which has been documented at both sites.

For the first time, the excavations at Vasagård have uncovered cup-marks in secure Neolithic contexts as two cup-marked stones were uncovered in situ from contexts dated to the early 3rd millennium BC. The first stone was found in one of the system ditches of the Vasagård West causewayed enclosure in 2016 whereas the second stone was recovered the following year from a section of a trench belonging to the Middle Neolithic palisaded enclosure (Iversen and Thorsen in prep.) (fig. 1). These finds prove that the cup-mark tradition in southern Scandinavia dates back to at least the Middle Neolithic.

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