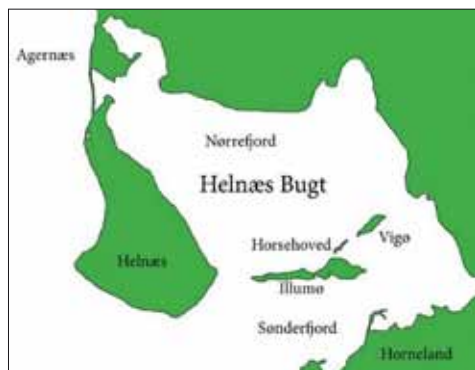


Cupmarks and Beaker Marks on Southwestfunen

Fieldwork and chipping experiments

Stone constructions on the islands in the Bay of Helnæs

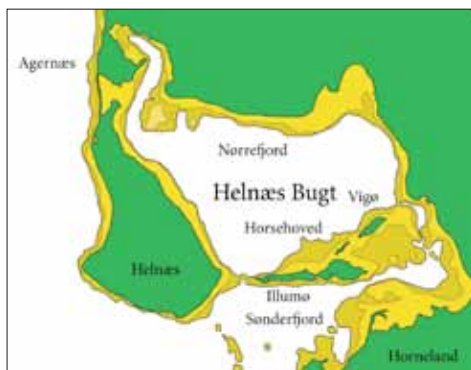
In 1996 we found the first signs of a large prehistoric construction on the islands of Vigø and Illumø in the Bay of Helnæs on South West Funen. Up until then this large prehistoric construction was completely unknown and seemed to us to be a culture-historical mystery.



The settlement by the bay

The landscape of West Funen surrounding the Bay of Helnæs tells of a rich territory with settlements and activities dating back to the late Mesolithic, Neolithic, Bronze, Iron and Viking Ages. The archaeological material bears witness to the heydays of the settlement during the Neolithic (Sarup) and late Bronze Ages (Voldtofte). From the late Iron Age there are three rune stones with the name "Roulv." Two of the stones describe him as "Næsboernes Gode" i.e. "Priest of the Peninsula". Helnæs stone: Hróðulfr, {nuRa}-priest/chief, placed the stone in memory of Guðmundr, his nephew. They drowned ... Ávarr coloured. Flemløse 1: In memory of Hróðulfr stands this stone; he was {nuRa}-priest/chief. Sons placed in memory. Ávarr coloured

The map shows former structures in the landscape



The rune stones say that the territory was a priestdom for a period leading up to the Viking Age.

There are signs from the late Germanic Iron and Viking Ages, that there was a craft or workshop area on the northern shore of the bay near Strandby, and evidence shows that the bay was open to navigation through an excavated channel near Agernæs. In the 12.-century local rulers built a solid barrage between the island of Illumø and Helnæs, closing off sea access and thereby protecting the settlement against hostile seafarers.

The landscape of South West Funen has gradually sunk in to the sea over the past millennia. Settlements near the bay dating back to the late Mesolithic Age are now to be found two to three metres under sea level. It is estimated that the large barrage from the 12.-century stood on a sea level that was a metre lower than today.

From this research we know that the islands in the Bay of Helnæs were a joined landscape for a period in time in the past. There is also evidence that suggests that the islands were connected by land to the peninsula of Helnæs.

The surroundings of Helnæs Bugt.



Fieldwork on the islands

The prehistoric construction on the islands of Vigø and Illumø in the Bay of Helnæs consists of a four kilometre long fragmented row of menhirs, many of which contain small, pounded circular marks. Our first impression was that these were cup marks, but closer inspection showed that the marks were deeper compared to their diameter, than the cup marks we knew of.



Menhir with beaker marks on Vigø.

We decided to classify them with the name **beaker mark**. Over the past decade we have measured the diameter and depth of the beaker marks on the menhirs on the islands. Among many hundreds of large stones on the islands 58 out of 163 of the stones have beaker marks. 14 of these 58 stones stand as monoliths in their original location. The others lie toppled over on the beach due to agricultural activity or erosion. The location for each stone has been reported to Odense City Museums with GPS reference as have all the precise dimensions of the beaker

Beaker mark





Row of menhirs with beaker marks.



During our fieldwork we found an undiscovered and undated stone row on Horne Næs.

marks. This material is included in our mathematical processing in order to get closer to a description of the specific characteristics of the beaker marks. All tables and registers of the menhirs and the measurements of beaker marks are to be found in Annex 1 of the book "Skåltegn og bægermærker på Sydvestfyn. Feldtarbejde og forsøg med hugning. Ravnerock 2013.

Fieldwork on Funen

In order to achieve a wider basis for comparison between the cup marks we knew of previously and what we now have classified as beaker marks we initiated new fieldwork in Funen's coastal region near the Bay of Helnæs. We received data from Odense City Museums concerning localities with cup marks, some on megalithic graves (dolmens) from the Neolithic Age and some on in situ and secondary position stones. We visited many localities and had to rule some of them out, as they contained marks of a different kind. The mathematical material for this report includes 41 localities and 658 cup marks.

Position of the menhirs on the Islands.
Primary: Green. Secondary: Red.



Fieldwork results

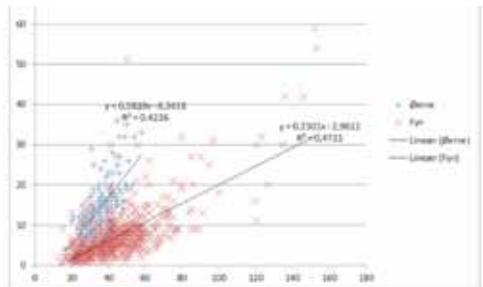
The results of our fieldwork showed that the beaker marks on the menhirs on the islands in the Bay of Helnæs have an average diameter of 37 mm and an average depth of 15 mm. The mean value of the ratio between diameter and depth is 40 per cent. The beaker marks have a grainy surface.

The cup marks on Funen have an average diameter of 44 mm and an average depth of 7 mm. The mean value of the ratio between diameter and depth is 16 per cent. The cup marks have a smooth inner surface.

Along with the traditional cup marks, there are cup marks with the characteristic measurements and ratios of what we have classified as beaker marks, in five localities on Funen. Furthermore, there are cup marks with the characteristics of beaker marks in three other localities that had not previously been acknowledged.

25% of the deepest traditional cup marks on Funen have an average depth of 8 mm. 25% of the shallowest beaker marks

Blue dots are beaker marks. Red dots are cupmarks.



on the islands in the Bay of Helnæs have a depth of 9 mm. This result shows us that 25% of the marks on the islands can, with good reason, be classified as cup marks.

Chipping experiments based on fieldwork results

Based on the results of our fieldwork we were able to carry out experiments to try and replicate cup marks and beaker marks using different tools. We gained particular advantage from Jørgen's sculpting experience in granite. On a large granite boulder, typical for our region, we marked out areas for 44 mm diameter cup marks, where the idea was that we would try to chip 7 mm deep cup marks. In similar areas we marked out 37 mm diameter circles, where the idea was that we would try to chip beaker marks with a depth of 15 mm.

The chipping experiments were carried out with a precise count of the number of blows and how many minutes it took.

Our chipping tools for the cup marks were made of bone and antler, stones from indigenous rocks and bronze (copies of Bronze Age tools). Tools made of bone, antler and bronze proved to be unsuitable. Flint and quartzite proved to be the most effective types of stone. It is worth noting that the quartzite stones we used included original Bronze-Age-Early Iron Age pounding stones on loan from Odense City Museums.

Stone for chipping experiments.



Stone tool	Weight in gram	Rem. Mat. pr. beat	Rem. Mat. pr. min.
Red granite	840	1,03	93,38
Unsharpened flint	910	1,15	165,93
Sharpened flint	950	0,94	110,47
Kinnediabas	1155	0,10	16,77
Vestervik platkvartsit	1240	0,67	101,40
Kvartsitisk sandstone	1190	0,58	126,56
Arkose sandstone	1140	0,30	48,43
Kvartsit	1270	0,57	82,88
Sharpened milch kvarts	1440	0,99	127,72

The effectivity of the stone tools

Attempts to chip beaker marks with a depth per cent of 40 proved impossible using tools made of stone, as the diameter increased significantly along with the depth.

Based on this experience we decided to chip beaker marks using tools made of iron. After studying the chipping methods used for building the early ashlar stone churches in the Middle Ages, we chose to use hammer and chisel, a light pick hammer and a heavy pick hammer. We could chip beaker marks using these kinds of tools.

All the chipping experiments have been described in full schematically as shown in Annex 4 of the book "Skåltegn og bægermærker på Sydvestfyen. Feldtarbejde og forsøg med hugning. Ravnerock 2013.

The results of our chipping experiments

The experiments showed that cup marks can quite effectively be created using flint stone, milky quartz and quartzite sandstone. It was not possible to create beaker marks using stone tools. They could be made using iron tools.

In the coastal regions surrounding the Bay of Helnæs beaker marks are to be found partly on megalithic graves along with cup marks that were already registered and partly on megalithic graves and monoliths that hadn't previously been registered.

The time consumption for creating the cup marks was significantly larger than the

Type of tool	Weight in gram	Rem. material pr. beat	Rem. Material pr. min
Small pighammer	300	2,06	376,08
Iron biggert	1500	11,07	1344,50
Pointed iron chisel		2,95	488,90

Effectivity of the iron tools.

time consumption for creating the beaker marks using iron tools.

Conclusion on the difference between beaker marks and cup marks

Fieldwork and chipping experiments showed how it made sense to distinguish between cup marks and beaker marks. Based on our mathematical data we approach a definition of respectively beaker marks and cup marks on South West Funen:

The cup marks of South West Funen are round or oval shaped marks on stones with a smooth inner surface, an average diameter of 44 mm and an average depth equivalent to 16 per cent of the diameter. Cup marks are often found in clusters on the stone surface.

Cup marks are created using tools made of stone.

The beaker marks of South West Funen are round marks on stones with a grainy inner surface and an average diameter of 37 mm and an average depth equivalent to 40 per cent of the diameter. Beaker marks are often found scattered over the body of the stone.

Beaker marks are created using tools made of iron.

Overall conclusion re. the beaker marks on the islands

The purpose of this report is to close in on a solution to the riddle that is to be found on 58 menhirs with 163 beaker marks in a 4 kilometre long construction among hun-

dreds of other stones on island arc in the Bay of Helnæs.

We conclude that the solution ought to be sought in or after the Iron or Viking Ages.

The authors' reflections

The name Helnæs means "The holy peninsula." Three rune stones dating back to the late Germanic Iron Age mention "Roulv – priest of the peninsula dwellers'." We naturally imagine that the landscapes of Vigø, Illumø and Helnæs formed a coherent landscape in the late Germanic Iron Age. In this perspective the vast stone constructions on Vigø and Illumø could be the sacred ground where the priest Roulv carried out religious acts in honour of the gods.

The stone constructions with beaker marks on Illumø and Vigø stand in fragmented rows along a road for the islanders' travel across the island arc, as shown on the oldest maps known. We also consider whether the beaker marks on the stone rows bear witness to a prehistoric track.

These two considerations are not mutually exclusive.

We hope that this report will motivate other researchers to solve this riddle.

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