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Reviewed Article:

Where Were the Viking Brew Houses?

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The authors have over 15 years' experience in experimenting with recreating ancient and traditional techniques of making ale from malted grain. Graham is a craft brewer, with 30 years' experience making beer from the grain. Merryn is an archaeologist, with an interest in malting and brewing technologies. Much of her research is available at http://independent.academia.edu/MerrynDineley. They think that the most likely potential candidates for brew houses in the Viking era are structures that have been previously interpreted as bath houses.

> So, where were the Viking brew houses? We think that they have already have been excavated, but not recognised or identified as such. (...) They tend to be outbuildings beside the large hall.

This preliminary study examines the archaeological evidence from a craft brewer's perspective, experience and knowledge, considering the practicalities and the necessary equipment that a brewer needs and whether or not these sites had them.

There is no doubt that the Vikings drank ale; it is written about in the sagas. We know what the ale was made from: malt. King Haakon Haraldsson (920-961 AD), the first Christian king of Norway, decreed that Yule was to be celebrated on Christmas Day. Every farmstead "should brew two meils of malt into ale, one for family and one for guests and thereby keep the Yule holy for as long as it lasts" (*Heimskringla*, Haakon the Good's Saga, 15). Later, the *Gulaþing Law*decreed that there would be fines for noncompliance. If they failed to brew for three years in a row, their farm was forfeit. If they were not Christian, they could be expelled from the country. The Yule ale was a very important part of the midwinter feast.

Nor is there any doubt how and where the ale was stored. It was kept in large vats, close to the drinking hall, or skaill. The *Orkneyinga Saga* (Chapter 60) tells how Svein Breastrope was ambushed and killed by Svein Asleiferson, who had hidden behind a large upright stone slab beside the ale vats, in the entrance of the drinking hall at Orphir, Orkney. This is a significant detail. Vats are large and open topped. They are usually covered with a wooden lid and it is not easy to move a large ale vat. The best way to transport ale for any distance would be in barrels, from which the ale is then dispensed. If the ale is stored in large vats, as is described in the Sagas, then it must be transported from the fermentation vessel into a storage vat using buckets. Therefore, it is logical to conclude that the ale was brewed very close by.

In this paper, we use the term 'Viking' to refer to the Norse culture, between the ninth and the 12th centuries AD in Northern Europe. This includes Scotland, Orkney, Shetland, Scandinavia and Iceland.

The brewing of ale from malt

The products and by-products of brewing are ephemeral and biodegradable. They leave no trace in the archaeological record. The ale is drunk, the draff, or spent grain, is fed to the animals and any liquid waste is washed down the drains. All that is left are the installations and maybe some of the equipment. To recognise these in the archaeological record, it is necessary to understand how to make ale from malt. This is something that few people do nowadays. Making the Yule malt and ale has been traditional on Orkney until recently. There is a very detailed description, written by William Scott of North Ronaldsay, of how to make malt and how to brew ale (Scott 1967, 72-79). These fundamental processes remain unchanged since Viking times.

You need suitable equipment and it must be kept clean, or the ale will spoil. Typically, the brewer uses five to ten times as much water in washing the mash tuns and fermentation vessels than is turned into ale. Therefore, substantial drains are essential. You also need large containers for hot water and these can be metal, wood or even a wood-lined trough in the ground. The mash tun is used to heat crushed malt and water to make liquid fermentable sugars, the wort. What the mash tun is made of dictates how the water and the mash is heated. For several years Huib van der Stam and a group of brewers have re-created mashing, medieval style, at *Eindhoven* Open Air Museum (See Figure 2). They used a cauldron for mashing, a lauter tun to separate the wort from the mash and jugs. The brick mash oven is based upon illustrations in medieval manuscripts (See Figure 3).

A cauldron can be heated either over a long hearth or a mashing oven. There is a fine example of an oven at Cubbie Roo's Castle, on the island of Wyre, Orkney (See Figure 4). The castle, the oldest in Scotland, was built circa 1145 by the wealthy and powerful Norse chieftain, Kolbein Hruga. The stone-built oven is ideal as a mash oven and, being in a room close to the drinking hall, it is in the most practical place. This room is equipped with several large drains and a substantial stone shelf, suitable for the fermentation and ale storage vats.

If a wooden tub is used as a mash tun, the contents can be heated with hot rocks, as can a wooden or stone trough in the ground. The rocks, once heated in the fire, break up with the heat shock in a characteristic manner when they are dropped into water or into the mash tun (See Figure 6). Hearth stones, oven stones and sauna stones do not crack in the same way.

Fire cracked rocks are found at many Viking sites. For example, there are piles of them around the drinking hall at Jarlshof, the Norse settlement on Shetland (See Figure 5). They are so commonplace, at sites dating from Neolithic to Viking times, that they are often interpreted as domestic debris, pot boilers or as archaeological evidence for a bath house or sauna. They are, however, good indicators for a facility that was used for the brewing of ale. In Norwegian Iron Age and Medieval archaeology, these fire cracked rocks are referred to as bryggesteinslag or brew stone layers.

Malt contains very little sugar, but it does contain starch and the necessary enzymes (amylase) that convert starch into fermentable sugars. To make these, the malt is 'mashed'. The malt is crushed to break the husks, then mixed with hot water for about an hour in a mash tun (See Figure 7). It must not get too hot or too cold, about 65°C is perfect (Line 1998). Hot rocks are good at keeping the mash temperature up. As the mash cools, a hot rock or two will warm it up again.

When the mash is done, it is allowed to cool. The grain husks settle to the bottom, acting as a filter bed. It is possible to extract a large volume of clear, sweet fermentable liquid (the *wort*) from the

mash using a technique called lautering or sparging (Line 1998). This is a messy process involving hot water, sweet sticky liquids and the transference of liquid and mash from one vessel to another. The wort is boiled with herbs to flavour and preserve. There are traditions of using a variety of herbs and plants, as well as filtering the wort through juniper branches. Then it is fermented into ale and stored in a vat or barrel. There is inevitably spillage and, unless there is adequate drainage for washing this away, things quickly become very messy (See Figure 8).

So, to summarise, the brewer requires a good floor to accommodate sticky and messy spillages, paving would be ideal and good drains are essential. The brewer must also have a means of heating large amounts of water. This can be done using a mash oven, as at Cubbie Roo's Castle, or a large hearth to heat a cauldron. Alternatively, rocks can be heated in the fire, ready to be then immersed in a wooden tub or trough. The brew house must be near a reliable source of water and, for convenience, situated close to the drinking or feasting hall where the ale is consumed.

Some of the Archaeological Evidence

Cubbie Roo's Castle, Wyre, Orkney

There is substantial evidence for the early medieval brew house of the powerful Norse chieftain, Kolbein Hruga. Surprisingly, it has not been identified as such before. At this 12th century castle, there is a well preserved stone built mash oven with stone steps for access (See Figure 9). There are substantial stone shelves for the fermentation and ale vats to stand on, with a drain running beneath, another significant detail. The vats would have had a spigot near to the bottom. To dispense the ale, a jug was held beneath it. For this, the vat must be off the floor, on a strong shelf and the drain running beneath would catch spillage. The room is supplied with several other drains as well. It was the brew house (See Figure 10). At other sites, the archaeological evidence is less spectacular but no less convincing once you understand how ale is made and what equipment and facilities are required to make it, store it and dispense it.

The Brough of Birsay, Orkney

There are the remains of a large Norse settlement on a tidal island off the north coast of Orkney,

inhabited between the ninth and 11th centuries (Ritchie 2006). The hall has been destroyed by sea erosion, but the footings of buildings that stood beside it remain. One of these is described, questioningly, as a ‘Norse sauna? or bath house’ (See Figure 1). It was equipped with stone shelves, drains, a large central hearth and fire cracked rocks, all suitable facilities and equipment for a brew house. Another building has a large stone shelf, a well-paved area,

a hearth and a drain along the wall (See Figure 11). It is also described as a 'sauna'. There are many drains around the buildings - some of them are huge (See Figure 12). A sauna does not require such huge drains. These buildings would have been impressive brewing facilities, supplying ale for magnificent feasts that took place in Viking times. Both Sigurd the Stout and Thorfinn the Mighty, his son, were renowned for their hospitality and this was their home base.

Jarlshof, Shetland

At Jarlshof there are the remains of a Norse settlement, in use between the 9th and 12th Centuries, and it was excavated by Dr Alexander Curle in the 1930s. He is the first archaeologist to interpret structures with drains, hearths and fire-cracked rocks as bath houses or saunas (Curle 1935b). Beside the remains of the huge drinking hall there is an interesting, much smaller, building equipped with drains, a long hearth and the possible stone footings of a grain dryinggrain-drying kiln (See Figure 13). Curle interpreted it as a bath house (Curle 1935:129). It was in use for a short period of time before being replaced by a larger structure of two rooms, both paved with stone slabs and with upright stall stones. These were interpreted as a stable and a latrine. It appears that a first small brew house was replaced by larger facilities - perhaps a brew house and ale store. They were using wooden mash tuns at Jarlshof, since there are several large piles of fire-cracked rocks.

Brewing at smaller Viking farmsteads, Orkney and Shetland

Studying the classic summary of Viking archaeology in Scotland, (Graham- Campbell & Batey 2001), we noticed several farmsteads with facilities suitable for brewing ale. At Underhill, Unst, Shetland, there was a 'drying chamber probably for grain'(ibid: 183). The room was square with a large central fireplace littered with fire-cracked stones and provided with "flues". Alternatively, these features that are described as "flues" may have served as drains. At Sandwick, Unst, Shetland, the authors describe two exterior rooms, of late Norse date, with paved flooring and a drainage channel at one side. They interpret it as a lavatory or a byre or shed for sheep (ibid:184). On Orkney, two excavations caught our eye. At Skaill, Deerness, a building 11.6m X 4m, had patches of paving and clay, and a "heating duct" was identified. It was interpreted as either a large bathhouse or a grain storage room (ibid:195). Finally, at Westness, on Rousay, Orkney, there was a building, 5m X 5m, with a paved floor enabling good run off or 'waste products' (ibid:195). These data demonstrate that even the small farmsteads had a brew house.

Stöng, Iceland

Not every vat was an ale vat. Some were used in the dairy, to process milk products. Evidence exists for huge wooden vats at Stöng, Iceland, the farmstead of the chieftain and farmer, Gaukur Trandilsson. This was one of about twenty farmhouses in the valley. It was destroyed

by the eruption of Hekla in 1104. The foundations, however, were well preserved beneath the pumice. Excavations took place in 1939. In 1975, the decision was made to construct a replica building nearby. To this end, research was conducted and today it is a museum. There was a long hall, a smaller room at the end and two annexe rooms.

One room had contained three large vats, partially set into the floor. This would not be practical for a brewer. Circular depressions in the floor indicate that each vat was 1.4m in diameter. They were probably used to make and store skyr or whey. Perhaps they were also used for storing meat in whey.

The other annexe was interpreted as latrines, or a toilet, being well equipped with drains. There was, apparently, enough room for the whole family to use it together, plus guests. It seems strange, unhygienic and most unlikely to have such a huge toilet right beside the living and sleeping area, dairy, food store and kitchen. The farm at Hofstaðir in north Iceland had a separate latrine with drains built some distance from the longhouse. Chapter 47 of the *Laxdaela Saga* describes the use of outdoor toilets, well away from the main dwelling. The practice of pole latrines is well documented, but they were usually in a separate building, away from the living area. Perhaps, at Stöng, the facilities with drains that have been interpreted as the latrines within the main farmhouse were actually the brewing area.

Keeping clean Viking style: bath house or brew house?

The Vikings had a good reputation for cleanliness and there is no doubt that they bathed regularly. Did they have purpose built bath houses and saunas? The Scandinavian word Laudag [Saturday] means wash day. In the Sagas warriors are described washing away the blood and dirt of battle by bathing in lakes, streams or rivers. If they lived in Iceland, they could make use of the natural hot springs and pools. A fine example of this is Snorri Sturluson's open air bathing pool at Reykholt, which even had an underground passageway to his farmhouse (See Figure 14). Snorri Sturlusun (1179-1241) was a wealthy, influential chieftain and scholar and the author of the *Heimskringla Saga*. It seems that most Icelandic Vikings made use of the hot springs for bathing.

The sagas describe other forms of bathing, kerlaug [tub washing], the tradition in regions where geothermal hot springs were unavailable. The 13th Century Icelandic saga, *Bjarnar saga Hitdaelakappa*, describes how proud the Icelandic Vikings were of their unique bathing culture, compared with the way others bathed. Even the Norwegian king had to bathe in a wooden tub in the porch because "no other facilities for bathing existed in Norway" (BHd 3,9:133). The *Heimskringla Saga* has a description of how Thorolfr asked his mother to prepare a tub bath for his brother, Thorstein. In the *Vatnsdæla Saga* (Chapter 44), Glæðir bathed in a tub in the porch or *anddyri*.

The sagas indicate that there were no separate 'bath houses' in the Viking era. The idea of a 'bath house' or 'sauna' originated in the mid 1930s, when Dr Alexander Curle excavated at Jarlshof, Shetland (Curle 1935b). He writes about "the *badstofa* or bath room, used for steam or tub baths" (Curle 1935b, 283). In fact, the badstofa was the room in an Icelandic farmstead where people lived, worked, ate and slept. It had no fireplace or drains and was the place where people spent much of their time in the winter.

Conclusions

So, where were the Viking brew houses? We think that they have already have been excavated, but not recognised or identified as such. Not all will be as fine as Cubbie Roo's, the Brough of Birsay and Jarlshof, but every Viking or Norse farmstead had a brew house, providing ale for seasonal feasts. There is a pattern to Viking or Norse brew houses. They tend to be outbuildings beside the large hall, often square, from 3.5 to 5 metres, equipped with drains, a large hearth, good flooring and, if the mash tun was wooden, lots of fire cracked stones.

Link(s)
Cubbie Roo's castle
Brough of Birsay
Jarlshof, Shetland
Stöng, Iceland
A good collection of images of the interior of the building, the whey vats and ...

Keywords beer
brewing
archaeology

Country Iceland
United Kingdom

Note

How much was a meil of malt?

Traditional Orcadian weights and measures were based upon those used in Norway and they probably date back to Viking times. A meil of malt weighed 177 pounds and 12 ounces, 12 Imperial stone or 80 kilograms (Shirriff 1814, 160). Using Graham's experience as a brewer, one meil of malt could produce about 80 gallons or 350 litres of ale.

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Heimskringla saga

Orkneyinga saga

Vatnsdæla Saga

Bjarnar saga Hitdaelakappa

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Gallery Image

FIG 1. THE NORSE 'SAUNA' AT THE BROUGH OF BIRSAY, ORKNEY. BUILDINGS EQUIPPED WITH DRAINS, FIRE CRACKED ROCKS AND A CENTRAL HEARTH HAVE BEEN EXCAVATED AT MANY VIKING AND NORSE SITES. THESE FACILITIES ARE SUITABLE FOR BREWING AND HAVE SO FAR BEEN INTERPRETED AS BATH HOUSES OR SAUNAS.

FIG 2. BREWING EQUIPMENT AT EINDHOVEN MUSEUM (NL). BRICK BUILT MASH OVEN, MASH TUN AND LAUTER TUN.

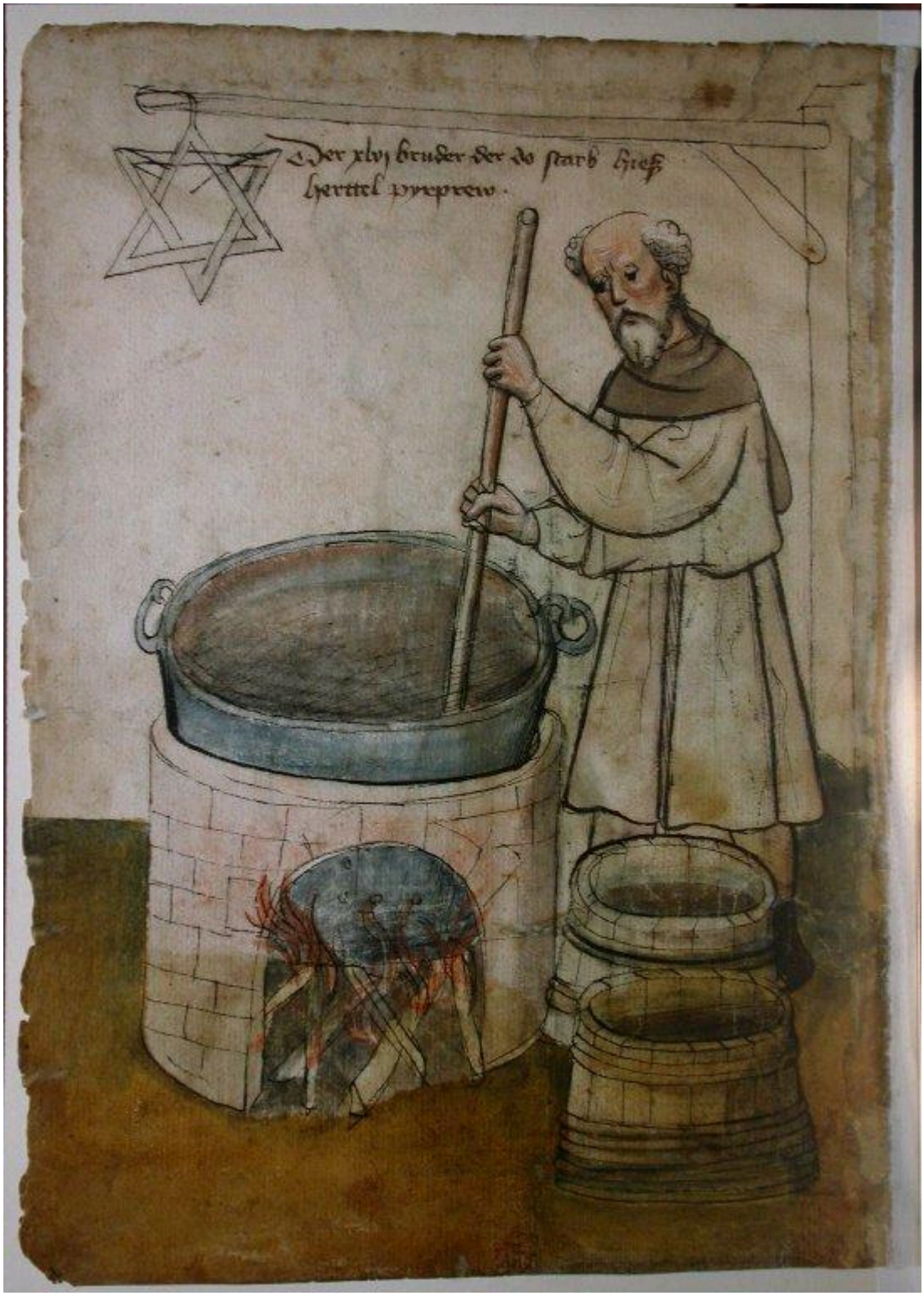

FIG 3. DEPICTION OF A MEDIEVAL BREWER, C1425 (TRUM 2002).

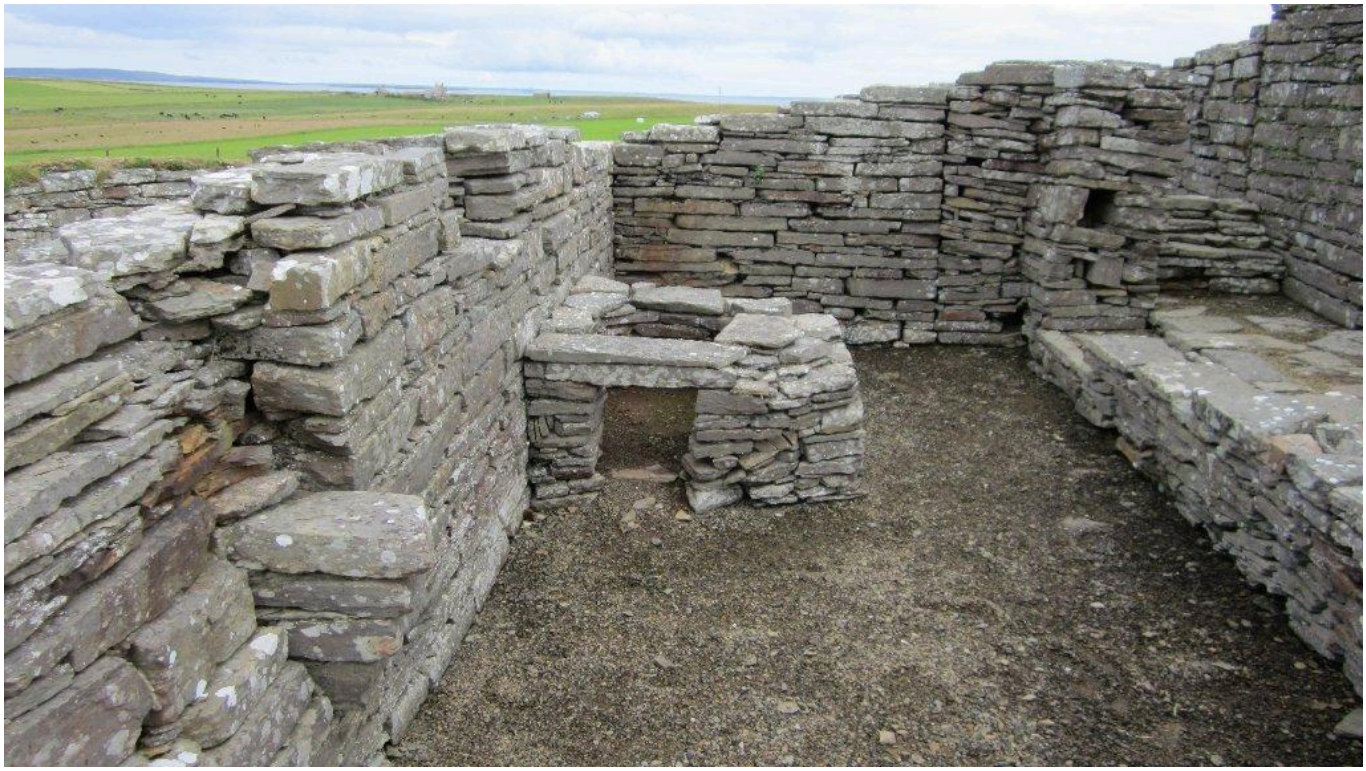

FIG 4. THE MASH OVEN AT CUBBIE ROO'S CASTLE, WYRE, ORKNEY.

FIG 5. FIRE CRACKED ROCKS AT JARLSHOF, SHETLAND.

FIG 6. HEATING WATER IN A WOODEN MASH TUN USING HOT ROCKS. THEY CRACK BECAUSE OF IMMERSION IN THE WATER.

FIG 7. ADDING CRUSHED MALT TO HOT WATER IN THE MASH TUN. THIS IS CALLED THE 'STRIKE'.

FIG 8. WASHING THE BREWING EQUIPMENT AT EINDHOVEN MUSEUM. BREWERS NEED DRAINS.

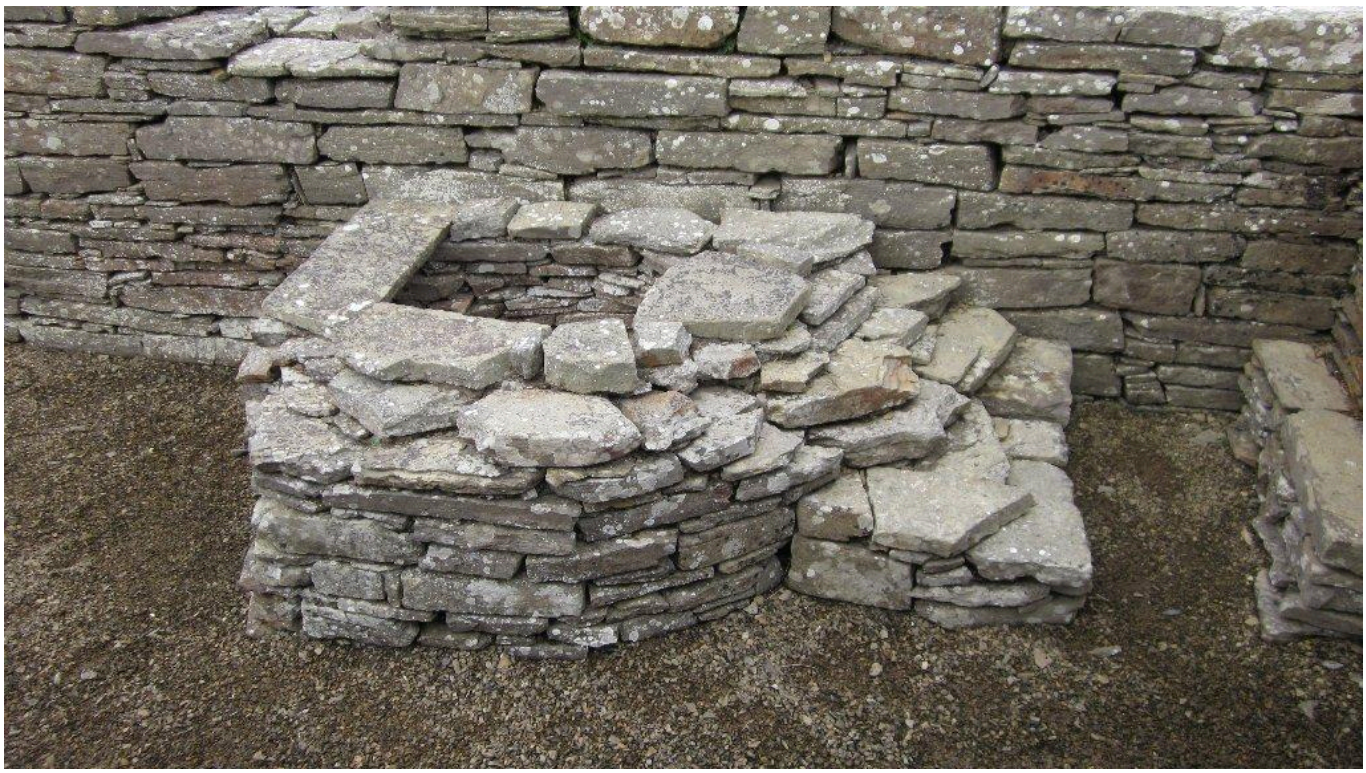

FIG 9. THE MASH OVEN AT CUBBIE ROO'S CASTLE, WITH STONE STEPS AND PERHAPS THE FOOTINGS FOR A SHELF OR PLINTH.

FIG 10. CUBBIE ROO'S CASTLE, A VIEW OF THE BREW HOUSE, SHOWING THE MASH OVEN AND THE STONE SHELF, ON THE RIGHT.

FIG 11. THE SECOND NORSE 'SAUNA' AT THE BROUGH OF BIRSAY, WITH PAVING AND A LARGE CENTRAL HEARTH. DID THEY NEED TWO SAUNAS, OR WAS THIS A BREW HOUSE.

FIG 12. THE BROUGH OF BIRSAY, WITH A HUGE DRAIN BENEATH THE PAVED AREA, AND A VIEW OVER ONE OF THE TWO 'SAUNAS'. THE EXTENT OF COASTAL EROSION IS SEEN.

FIG 13. THE 'BATH HOUSE' AT JARLSHOF, WITH THE FOOTINGS OF A KILN, A CENTRAL HEARTH AND A DRAIN.

FIG 14. SNORRI STURLUSON'S 'BATH HOUSE' , A THERMAL POOL IN ICELAND.