5. A saddle quern discovered on Site 43, in Ballyduff East, on the route of the N25 Waterford City Bypass

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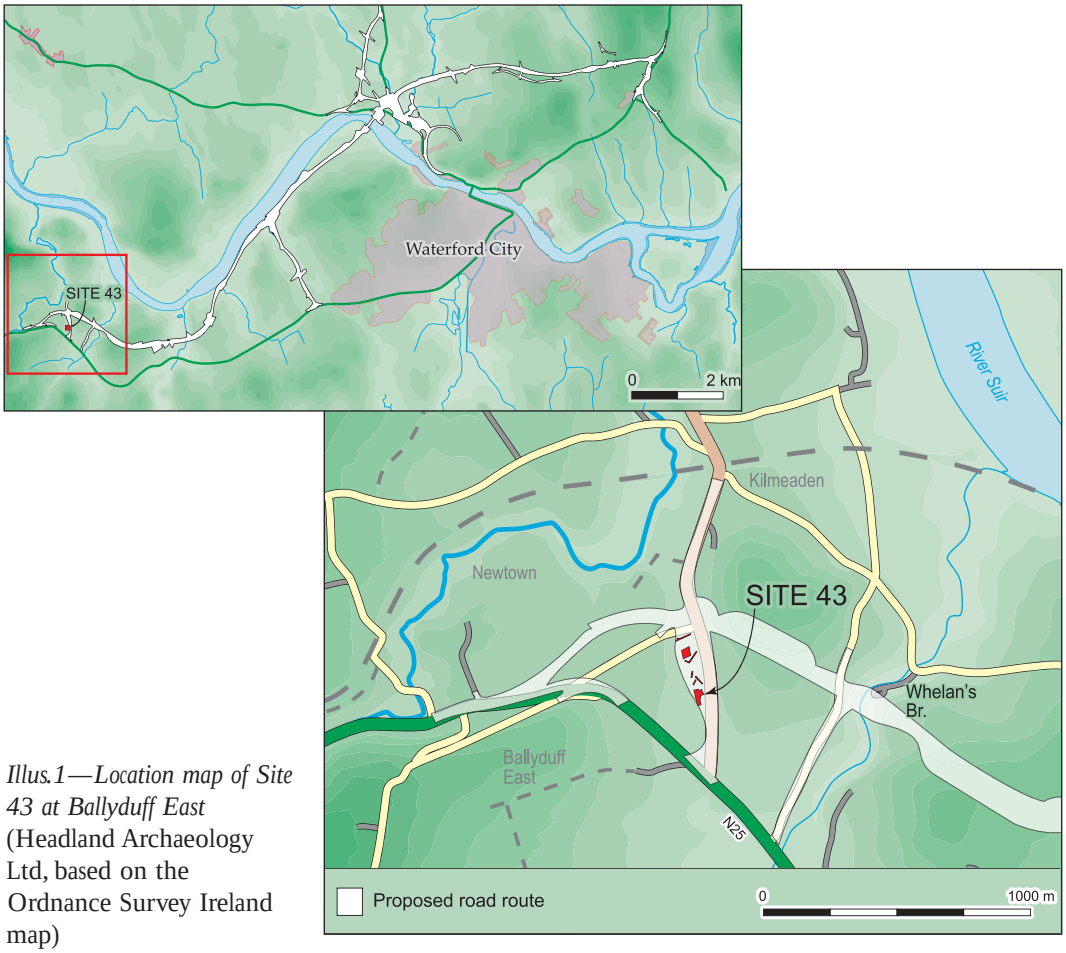


Illus. 1—Location map of Site 43 at Ballyduff East (Headland Archaeology Ltd, based on the Ordnance Survey Ireland map)

Waterford City Council, the lead authority acting on behalf of Waterford County Council and Kilkenny County Council, proposes to construct an 18 km bypass around Waterford City, with associated link roads. The route forms part of the N25 and runs from Kilmeaden in County Waterford to Slieverue in County Kilkenny. A programme of archaeological investigation was undertaken in advance of this proposed development which identified a large number of archaeological sites. Site 43 was in the townland of Ballyduff East, County Waterford.[1] The site was situated in a pasture field immediately west of the existing Carrick-on-Suir road, just north-west of Kilmeaden village (Illus. 1). The work on Site 43 followed the identification of several possible archaeological features during archaeological testing in April 2004. The work was carried out by Headland Archaeology Ltd on behalf of Waterford City Council. No archaeological sites were known at this location prior to the recent investigations.

[1] NGR 25140, 11000. Height *c.* 25 m OD. Excavation Licence No. 04E0225.

The site

On removal of topsoil, two *fulachta fiadh* were identified. *Fulachta fiadh* survive in the landscape as horseshoe-shaped mounds of heat-shattered stones and charcoal enriched soil. They are usually situated near a source of water, e.g. a bog or stream. Troughs were dug into the ground and often lined with timber or stone. These troughs would fill with water and stones heated on a hearth nearby were rolled in to heat it. After use the heat-shattered stones were cast up out of the trough and thrown in a pile around the edge creating a horseshoe-shaped mound. These mounds were reduced or even entirely flattened and dispersed over the years by ploughing, treading by livestock and general erosion. The main mound material at Site 43 was spread over a large area approximately 15 m by 30 m with an average depth of 0.35 m. A much smaller *fulacht fiadh* was identified immediately south of the main mound. This thin spread of *fulacht fiadh* material overlay a single trough.

It is generally accepted that the function of *fulachta fiadh* was to boil water, but how this water was used is very difficult to determine. So far no specific evidence has been identified from this site to indicate how the hot water was used. Possibilities include cooking, washing, tanning and brewing, and none of these can be ruled out.

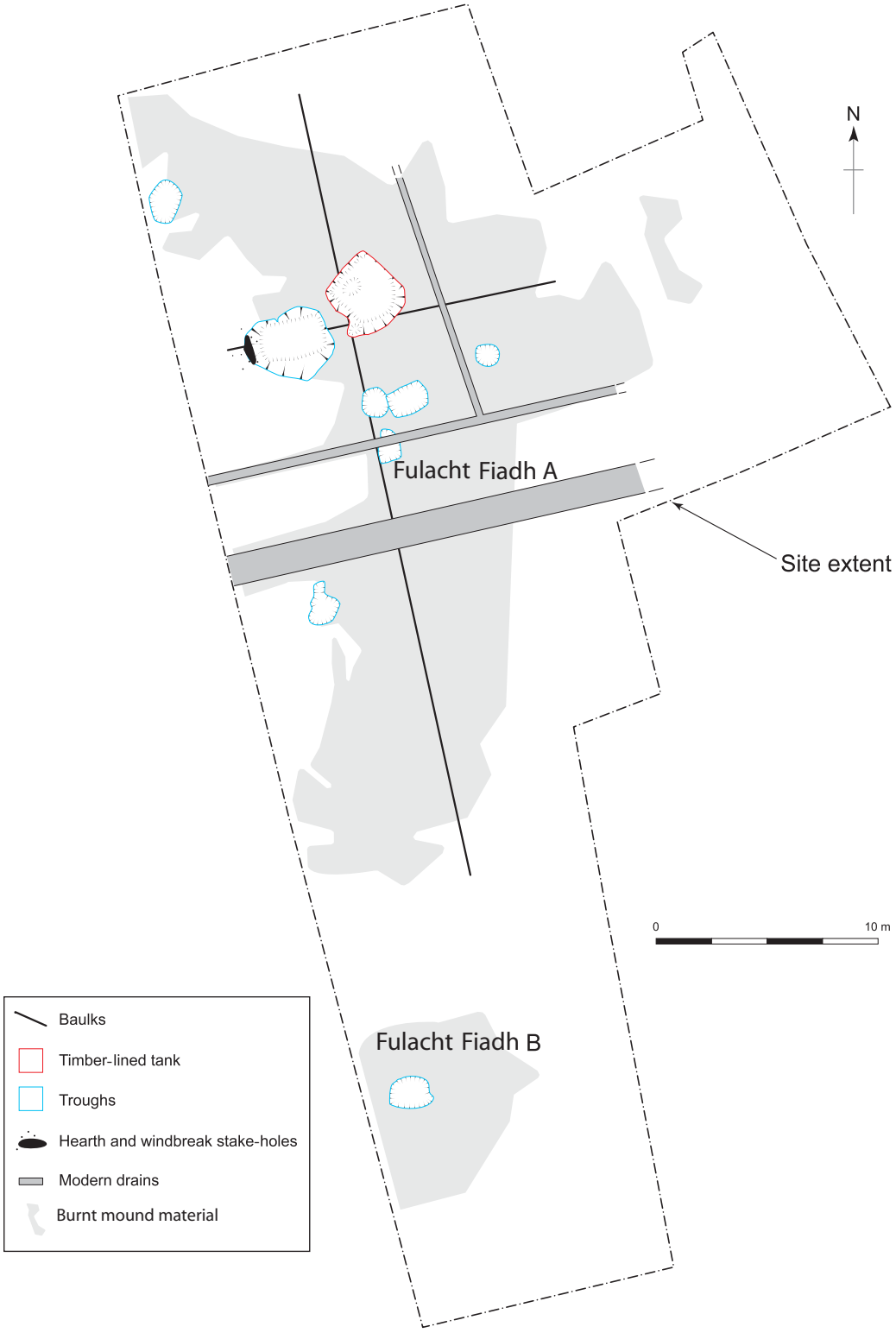
The area was excavated over a period of six weeks during July and August of 2004. The bulk of the mound material was located in a natural hollow in the field; sandy deposits under and around the mound indicate that there may originally have been streams flowing in the immediate area. The mound was truncated by a number of large modern drains, which were backfilled with burnt mound material.

On removal of the mound material, eight troughs and seven irregular features were identified and excavated, as well as a number of stake-holes and a pit associated with a large timber-lined trough. Three troughs were located on the periphery of the mound and were roughly oval in shape. Two rectangular troughs were identified under the centre of the mound. A shallow circular trough truncated the larger of these (Illus. 2).

The two largest and most significant troughs were located under the northern part of the burnt mound. The earlier of these was roughly square in plan. A half-section was excavated through this trough, revealing a timber-lined base. The base consisted of six wide planks provisionally identified as willow or ash (Illus. 3). The sides may also have been lined as fragments of poorly preserved timbers were found overlying the base timbers. These may have slipped from the sides into the trough.

The saddle quern

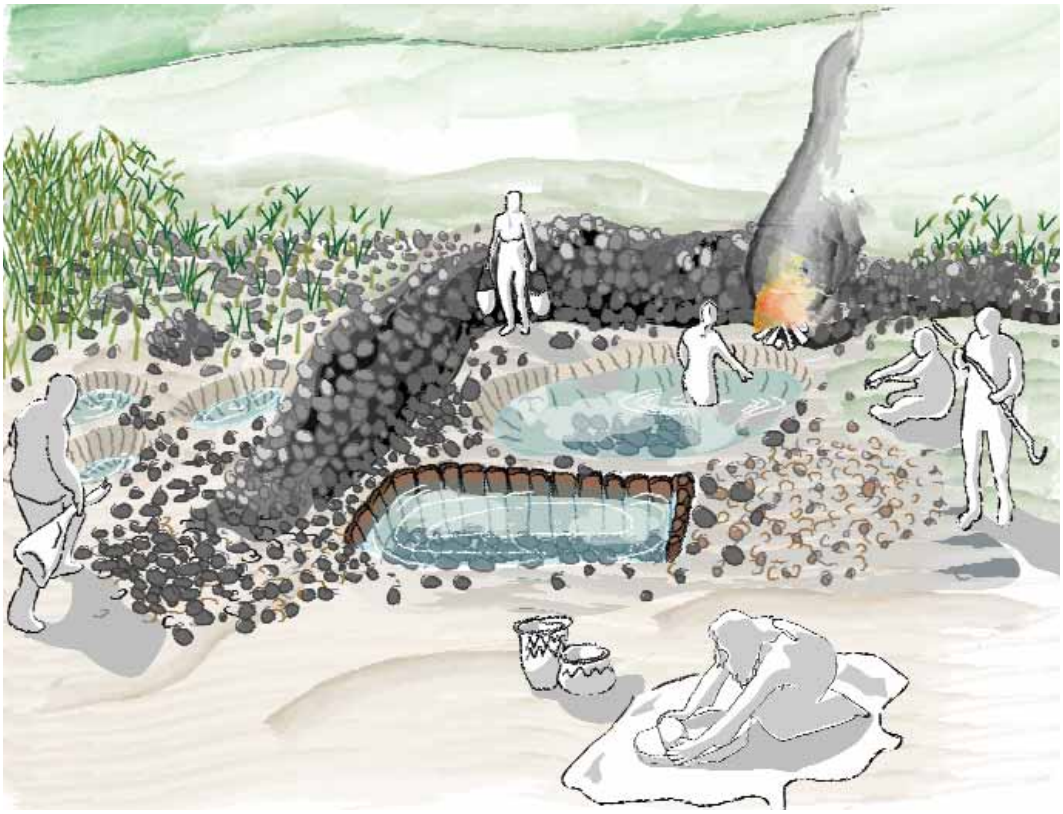
A saddle quern and rubbing stone were found in the fill overlying the timbers. The saddle quern is the base stone on which grain was placed; the rubbing stone was then used in a forwards and back rubbing motion over the grain grinding it to make flour. Both the saddle quern and rubbing stone were made from coarse-grained sandstone. The saddle quern measures 640 mm in length and part of the top end was unused. The average width of the saddle quern is 350 mm. Its maximum thickness is 110 mm and shallows to 80 mm. The rubbing stone is loaf-shaped; it measures 370 mm in length and the flat rubbing surface measures 120 mm across. This is quite a large example of a saddle quern. Located centrally on the rubbing stone is a small, incised depression (measuring 93 mm in length and 18 mm in width). This groove (Illus. 4) may be a thumb grip to aid rubbing, as suggested of a quern



Illus. 2—Plan of Site 43 at Ballyduff East, showing location of troughs (Headland Archaeology Ltd)

Illus. 3—Site 43 at Ballyduff East, with inset of timber-lined trough (Headland Archaeology Ltd)

Illus. 4—Saddle quern with incised depression (Headland Archaeology Ltd)



Illus. 5—Artist's reconstruction drawing of Site 43 in use (Headland Archaeology Ltd)

discovered at Green Knowe, Peeblesshire, Scotland (Jobey 1980, 89). On experiment, this would suggest that only large-handed people could physically use the rubbing stone in this way. The rubbing stone shows evidence of pecking, which is a method of chipping or chiselling by a sharp implement (possibly by another stone) to shape the stone.

Quern stones originated in the Middle East, at a time when people first moved away from hunting and gathering food and began to settle the land with the introduction of agriculture, cultivating crops and domesticating animals. From about 8500 BC the spread of agriculture and pastoralism throughout Eurasia began. Quern stones were invented at this transitional time to grind the grain to make flour for bread. They were used in Egypt during the fifth Dynasty, *c.* 2500 BC. This transitional period or the Neolithic Period began in Ireland in 4000 BC and with this arrived the cultivation of crops. Evidence for the use of saddle querns in the Neolithic has been identified at Ballygalley house site, Co. Antrim (Connolly 1994, 30). However, it was during the Bronze Age *c.* 2500 BC, that they were commonly used.

The saddle quern is the earliest type of quern stone, prior to this grain was shelled of husk by a pounding method. This was done by spreading the grain on a slab/stone and beating it with a hand-held stone, the hollow mortar and hand-stone evolved from this. Saddle querns were a very basic method of extracting the flour from the husked grain. Samuel (1994) undertook the process of grinding on a replica saddle quern. A few pointers she picked up on were as follows.

- The rubbing stone was placed a third of the way down the quern stone.
- A small handful of grain was carefully placed behind it.
- Short strokes broke up the grain without distributing it too far or losing it over the far edge before it had been sufficiently ground.
- The grain was easily milled into flour by leaning forward with straight arms on the down stroke, and swinging back and forth at the hips.
- On the swing up, the rubbing stone was dragged without pushing on it.
- This combination of down and up strokes pushed flour down to the end of the saddle stone but prevented whole and partly broken grain from sliding down as well.
- If the rubbing stone was pushed while bringing it up to the top of the quern stone, flour was dragged upwards and became mixed with the whole grains. This made it much more difficult to reduce the grain to flour. It was also harder to push the flour back down the stone and off the edge into the basket without getting whole grains caught up in it.
- The rubbing stone was usually held more or less flat going down, and very slightly tipped towards the back of the quern on the up stroke but to distribute grain and meal over the surface the rubbing stone was held flat while moving both up and down.
- The force of the rubbing stone against the saddle quern made little difference to speed or fineness of the flour.
- The speed of grinding depended mainly on the rate at which the rubbing stone was pulled up and down the quern.
- It took Samuel just under two hours to grind 1.2 kg of emmer grain into to reasonably fine flour. An experienced miller would probably take about half an hour.

The typical crops of the Irish prehistoric period were emmer wheat (*Triticum dicocum*), naked barley (*Hordeum vulgare var. nudum*), and to a much lesser extent barley (*Hordeum sativum*) and possibly bread wheat (*Triticum aestivum*).

Emmer wheat and naked barley were the predominant crops on the Neolithic complex at Knowth, County Meath and on numerous Bronze Age sites, such as Curraghatoor and Ballyveelish, County Tipperary (Monk 1986).

The saddle quern and rubbing stone from Site 43 is one of the best examples ever found in the country. It is not often that the two stones are found together and in such a good state of preservation. This discovery will broaden our knowledge of quern stones and help enlighten us on the use of *fulachta fiadh* and the nature of society in the Late Bronze Age.

Acknowledgements

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