

APPENDIX X

The Plough Pebbles

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Introduction

Plough pebbles must be among the humblest of artefacts, yet they are also one of the few closely dateable objects to survive from the medieval period in Ireland. The recovery of 67 examples from across the excavation site at Bective represents a significant contribution, not only for what this assemblage tells us about ploughing at Bective, but also for the support their discovery provides for the site's chronology.

Background

Professor O'Kelly first brought attention to the presence of plough pebbles in Ireland, when he recognized a few within the ploughsoil at Newgrange, Co. Meath (O'Kelly 1976). The subsequent discovery of other examples quickly drew attention to a distributional focus on the east of Ireland, and an association with Cisterican and Anglo-Norman activities (Brady 1988). The expansion of excavations across Ireland between 1994 and 2008 has helped to reinforce the essential aspects of what was becoming clear in the 1980s. It has also permitted the occasional observation of

these stones west of the River Shannon, in areas that lay away from direct Anglo-Norman influence, but where a Cistercian presence can yet be felt (Brady 2009). It would be incorrect to associate the use of these objects exclusively with the Cistercians, but the association is a strong one, and so it is fitting that large numbers of plough pebbles have been found at Bective Abbey, where the innovative approach of the excavators to consider the area outside the claustral precinct has resulted in an important illumination of an associated workyard.

Plough pebbles are simple field stones that have been fitted into the base of timber ploughs to slow down the wearing-away of the plough sole, by acting as an anti-wear shield (fig. X.1, pl. X.1). Over time, the pebbles are themselves worn down, developing a distinctive wear surface, and this is what distinguishes them. The pebbles fall out of the plough and end up in the ploughsoil. On occasion they are picked up and refitted to the plough sole until they fall out again. It is much less common to find plough pebbles within former structures or buildings (Brady 2009, 65). When plough pebbles are found within such buildings, we can conclude that the pebble is what remains today of the timber plough that would have been stored in that location but has otherwise rotted away or, as was the case at Bective Abbey, burned.

The plough pebbles from Bective come from a range of contexts, and include a direct association with one structure. As the excavators observed from

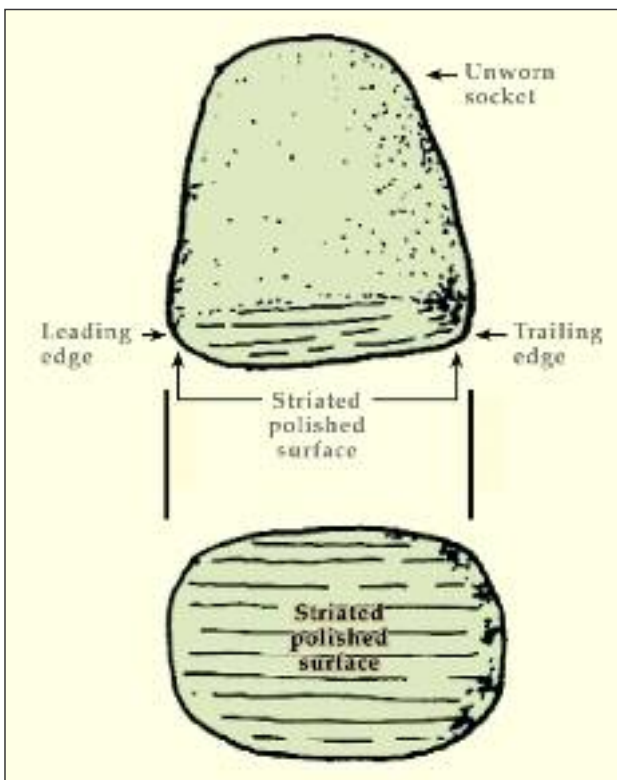


Fig. X.1 Plough pebble features.



Pl. X.1 Danish plough soles from the late middle ages with plough pebbles *in situ* (Photo: Grith Lerche).



Pl. X.2 Plough pebbles from Bective Abbey mentioned in the text.

other evidence, this building served as one of the monastery's storage buildings, which lay within the workyard adjacent to the claustral complex.

Form and Function

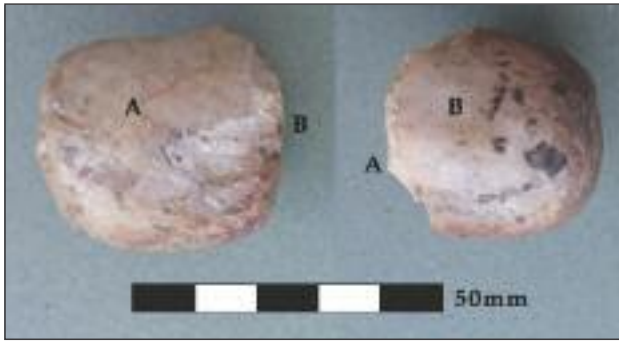
The pebbles used to protect plough soles are hard stones, such as basalt, flint, quartz and some mudstones. In Ireland, they are typically of quartz, with flint and mudstone being used on occasion. Those from Bective are all of quartz, but for one mudstone example (SN02.28, pl. X.2). Plough pebbles come in various shapes and sizes and are obviously smaller than their original size, but it seems to be the case that they would have been within c.60mm long, 30–40mm wide and 40–50mm deep. The stones used are simple rounded pebbles. The pebbles may have been sourced from gravel ridges as inclusions within glacial till, or they may as easily have been collected from the surface of the many fields across Ireland that were developed above boulder clay till.

Plough pebbles have not yet been found in Ireland in association with a timber plough frame. They are sometimes associated with plough furrows, as at Knowth, Co. Meath, and at Ballybarrack, Co. Louth, where they were recovered from the bottom of cultivation furrows that had been cut into underlying features (Brady 1988). The direct association with ploughs is known from the discovery of plough pebbles embedded into the soles of medieval wheeled ploughs in Denmark (pl. X.1), where anaerobic waterlogged conditions preserved the essential wooden elements (Lerche 1994). Experimental ploughing using reconstructions of the Danish wheeled ploughs have confirmed the interpretation, and have provided a secure context for their use (Lerche 1994).

The Danish plough soles were made from blocks of timber that were otherwise fully exposed to the attrition of the topsoil through which they would be pulled by a team of oxen or horses. The use of iron on these ploughs was restricted, and was employed mostly in the active cutting parts of the plough: the iron share, which undercut the sod to separate it from the underlying topsoil; and the knife-shaped iron coulter, which cut the sod vertically on one side to define its width. Rather than sheathing the timber sole in iron to protect the base of the timber frame from wear, a solution was found that relied on more easily resourced materials. No doubt the time required to insert plough pebbles was greater than fixing an iron sheath to the sole, but the raw material would have been more freely available, while iron was costly and required a blacksmith.

The Danish plough soles are drilled with multiple holes across their base and sides (pl. X.1). The stones were then fixed into the holes, presumably by being hammered, and were held in place with the help of glue. The result was a timber sole festooned with pebbles that protruded from its exposed surfaces, much like a bed of rivets or studs might adorn a door, but in a random fashion. As the plough is pulled through the soil, the protruding pebbles absorb the brunt of the attrition, protecting the sole from rapid deterioration, while also being worn down themselves.

The wear surfaces on the pebbles are quite distinct (fig. X.1). A smooth facet develops that appears almost polished on the fine-grained hard field stones. These surfaces often cut through the natural patina that has otherwise developed around the quartz and flint pebble. Closer inspection reveals fine striations or scratches across the worn surface. The scratching is



Pl. X.3 Plough pebble with the wear across two surfaces, forming a continuous right-angled facet (09E4028:103.33b).



Pl. X.4 Plough pebble with two distinct wear surfaces (09E4028:013.2).

quite distinctive. It runs in one direction and reflects the forward movement of the plough. A leading edge is sometimes evident, where perhaps the edge facing forward on the plough sole is more rounded than that at the rear, which is often seen as an abrupt angle. The worn surface is also convex in profile, with the striae running across the curvature.

On occasion, one sees the wear surface continue across two surfaces, forming a continuous right-angled facet (pl. X.3); this suggests that the pebble was located at an angle in the plough sole that met the soil on two sides. It is most common to see pebbles with only a single wear surface, but sometimes a pebble will retain two distinct wear surfaces, where one cuts across the other or is otherwise clearly distinct from it (pl. X.4). In such instances, it is clear that the pebble fell out of the plough and was reinserted, to expose a new surface to wear. These occasions are testimony to the detailed and laborious work of the ploughman, and the importance they attached to repair and maintenance of their tools.

Chronology

The association of plough pebbles with ploughing in Denmark belongs to the later middle ages, where they have also been associated with the axle-trees of contemporary heavy agricultural devices that would

have spent much of their working life being pulled through deep clays, where the timber would have been exposed to similar wear. Plough pebbles are also known more widely. They occur in Scotland, where the first observations were considered to be late medieval in date. More recently, excavation has revealed them in early medieval contexts, and they have been associated with the two important ecclesiastical sites of Whithorn and Portmahomack (Hill 1997; Carver 2008, 51, 73). The pebbles from Portmahomack occurred in stratified deposits and are quite small pebbles made from basalt. Pebbles also occur in more recent contexts, and have been associated with nineteenth-century agrarian practice in France, where they were used on light ards or simple ploughs rather than heavy wheeled ploughs (Dauzat 1934).

The evidence reveals a variety of geographic areas, contexts and time-periods where plough pebbles have been used in Western Europe. The situation is, however, quite particular in relation to Ireland. It is becoming increasingly common to see plough pebbles in Ireland, but they usually occur in isolation in the ploughsoil, and they cannot often be associated with a closely dateable context (for example, O'Donovan 2012, 78). However, on those occasions where dating is possible, they occur consistently in thirteenth-century contexts (Brady 2009). They do not appear in Ireland earlier than this, and they are not seen any later. They are specific to this narrow period, and this is an important point. Not only do plough pebbles offer a solid thirteenth-century context to excavators who may otherwise be bereft of closely dateable sources on their excavation, but their presence can be associated with a particular moment of intense agrarian enterprise that is witnessed across the medieval world. The thirteenth century was a protracted moment of intense expansion and economic prosperity; it was a period of economic boom which was followed by one of economic crises in the following century. The pebbles represent the presence of enterprising ploughing devices to exploit the boom period. Their occurrence at Bective underlines the understanding that the Cistercian order was at the forefront of economic enterprise, while the context in which they occur at Bective has provided a wonderful insight that suggests where ploughs were stored at the monastery.

The Bective Context

The recovery of 67 plough pebbles at Bective Abbey represents a large assemblage of these objects. The fact that they were found by archaeological excavation increases the value attached to their discovery, and this is further enhanced by the realization that 16 of



Pl. X.5 A selection of plough pebbles from Bective Abbey.

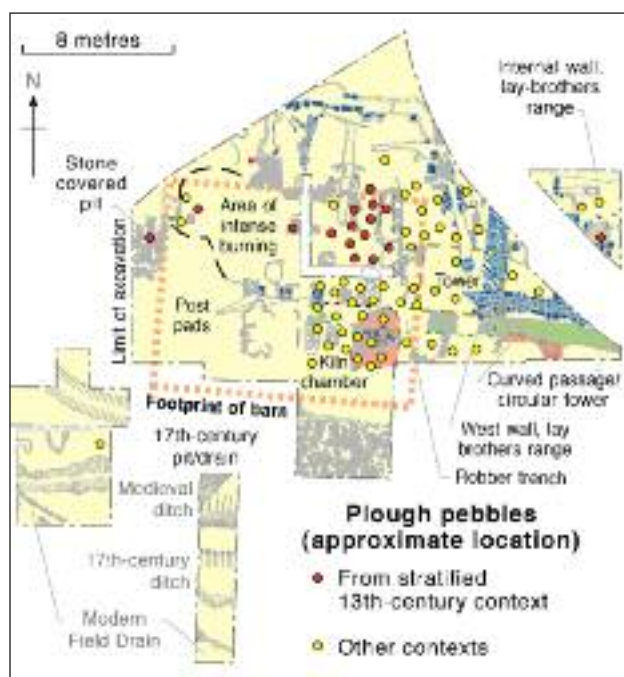


Fig. X.2 The approximate locations of plough pebbles from the precinct area of Bective Abbey. One additional plough pebble was found in the garden topsoil.

the pebbles are associated with securely stratified and dateable medieval contexts.

The context associations of the plough pebbles from Bective Abbey are summarized in table X.1, and the catalogue of individual descriptions is presented in the full table of finds. Table X.1 is shown in a chronological manner, with the pebbles recovered from unstratified and later levels at the top, and those from earlier levels following below. It is in keeping with the recovery of plough pebbles from other excavations that a number of pebbles were found in the uppermost and unstratified deposits; this is a result of post-deposition disturbances, and there were a considerable amount of later works at Bective which cut into and disturbed earlier deposits, as the wider excavation has revealed.

The focus of attention lies in those pebbles recovered from securely dated medieval contexts. Excavation in Cutting H sought to determine the eastern extent of the possible barn building. The excavation revealed a collapse level filled with medieval-period objects and some post-medieval inclusions, and this level sealed the remains of a small stone-built tower building (feature H04), whose interior was filled with a redeposited boulder clay (feature H10) intermixed with rubble. Dating of the layers associated with the use of the tower suggests that it was built some time between 1312 and 1438. It provides a *terminus ante quem* for the deposits underneath. Although three plough pebbles are associated with the tower's foundations (H04.1, H04.5 and H10.4, pl. X.2), it seems clear that these

Table X.1 – Plough opebble contexts

Precinct		
Phase 02	Barn, kiln rake-out	1
Phase 02	Barn, on ground surface	11
Phase 02	Barn, hearth	1
Phase 02	Barn, medieval waste layer	1
Phase 02	Pit/sump wast of barn	1
Phase 02	Barn, post hole	1
Phase 04	Small tower	2
Phase 04	Redeposited layer in small tower	1
Phase 06	Robber trench	4
Phase 07	Pre-stony layer	1
Phase 08	Stoney layer, post-Dissolution	35
Phase 10	Unstratified	7
Garden		
Phase 04	Garden, unstratified	1
Total		67

stones are absorbed into the fourteenth-century works by a disturbance of the underlying levels. It is within the lower levels that the excavation recovered 16 pebbles that appear to be part of a sequence of activity layers associated with the use of the barn or storage building.

The building partially exposed in the south precinct area has revealed a complex rectangular structure (see pp x-x). There were three internal padstones which were used to support timber posts which in turn would have held a timber-framed roof. A corn-drying kiln occupied the eastern side of the building, with its flue extending to the north. A shallow pit or sump lay to the west, and is thought to have been just outside the west wall, to aid drainage. The interior was otherwise open and it was filled with a sequence of related contexts that were rich in artefacts (contexts B26, H08, H18, H23, J04, J05, L04, L07, 006, 146, 147, 302). The contiguous contexts were filled with charcoal, and this is interpreted as representing the destruction of the building due to a catastrophic fire event. In principal then, the objects recovered from this level represent a contemporary moment.

Among the objects recovered from this agricultural building were the 16 plough pebbles (fig. X.2). One of the pebbles is associated with rake-out from the kiln (306.3, pl. 2), and another was recovered from the sump feature outside the building (J06.5, pl. 2). Of the remaining pebbles, one came from a possible post hole within the barn (context 013.2, pl X.4), a further pebble came from a hearth feature (SN08.89, pl. 2) and another from the cultural



Pl. X.6 Plough pebbles from context 302..

layer that reached over the sump (J04.4, pl. 2). It is however the cluster of 11 pebbles from context 302 that is most interesting (pl. X.6). The sheer number of pebbles our attention here. The pebbles were recovered by bulk-sieving the context. As such it is not possible to plot the distribution of the individual pebbles, but it is clear from the record that the pebbles are closely related spatially.

It is very likely that the cluster of pebbles refers to the presence of at least one plough, which was otherwise lost in the conflagration that destroyed the building. It remains the clearest indication so far to be seen in Ireland for an intact plough but, as in so many other occasions, the nature of the timber frame can only be guessed at in the absence of timber fragments.

The sequence of contiguous layers that context 302 is part of has not provided a radiocarbon determination to date the level in its own right, but related layers have been dated and these indicate that the building and its use belong comfortably within the thirteenth century. A deposit associated with the construction of the building is dated to 1265 (context B27), while the samples associated with the kiln have produced dates of 1178–1271 (RC4) and 1263–1384 (RC2) respectively. Samples associated with the burning of the building have indicated dates of 1268–1391 (RC5) and 1434–1618 (RC4), the late date of the latter suggests that it may represent contamination.

Discussion

It comes as no surprise that plough pebbles were recovered from Bective Abbey. What is known of these objects in Ireland indicates a clear association both with the thirteenth century and with Cistercians and related activities. It helps to reinforce the appreciation that Cistercians were at the forefront of agrarian enterprise at this time of economic prosperity. The degree to which we should accept the Cistercian philosophical desire to conquer wastelands must be tempered with pragmatism and their keen sense of economic acumen. Bective lay within an existing and developed settled landscape. Ireland was however in a process of rapid transformation during the late twelfth century and long before the Anglo-Normans took advantage in 1169 or indeed before the foundation of Mellifont in 1142. Yet the Cistercians had the ability to coordinate aspects of this transformation, by bringing to bear a logistical structure that was previously missing. The fact that plough pebbles existed in Ireland for such a short period that is directly associated with the prosperity of the thirteenth century allows us to conclude that these must have been associated with new plough types, and ploughs that were innovative for their day. Contemporary Anglo-Norman sources refer to winter ploughs and summer ploughs, suggesting the presence of different types of plough (Brady 2010). The humble pebble represents the only

material remains for actual ploughs from this period that have been found to date. Coupled with the context of their discovery, which is revealed on individual sites and nationally through their wider distribution, it is logical to conclude that the stones recovered at Bective were used as part of new technology introduced to take advantage of the opportunity for increased agricultural production, and which saw much of Ireland momentarily focus on tillage production.

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