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EARLY ROMAN EVIDENCE FOR INTENSIVE CULTIVATION AND MALTING OF SPELT WHEAT AT NONINGTON

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During September 2009 the Canterbury Archaeological Trust was commissioned by EDF Energy to monitor the installation of a new underground high-voltage electricity cable at Mill Cottage, Coldblow, Nonington (NGR 626892 151707) (**Fig. 1**). The cable trench, which measured 1.2m wide, extended some 750m across open farmland, down a south-east facing valley slope, to Kittington Farm (NGR 627440 151630).

The route crossed an extensive concentration of previously identified cropmark features, which form a palimpsest of linear, rectangular and circular enclosures representing later prehistoric and Roman land use (**Fig. 2**). Archaeological excavation (in 1983) by the Kent Archaeological Rescue Unit ahead of a water pipeline sampled fourteen such ditches and identified a further six pits (Frere 1984, 332). One ditch related to an Iron Age circular enclosure, the others to at least three sub-rectangular enclosures or field boundaries, indicating a succession of farmsteads dating from the late Iron Age to early Roman periods. More recently, archaeological evaluation by the CAT at Mill Cottage identified segments of an undated field boundary ditch which probably formed part of the same late Iron Age to early Roman complex (Parfitt 2008).

The underlying geology is composed of Margate Chalk, above which are localized superficial deposits of Clay-with-Flints identified on the higher ground around Mill Cottage. The depth of the underlying geology varied between 0.12m and 0.77m below the existing ground surface level, which measured between 74m OD at Mill Cottage dropping to 39m at Kittington Farm.

The Excavated Features

The cable trench truncated some 153 archaeological features, all of which were sample excavated to ensure preservation by record of the buried archaeological resource. The majority of features extended beyond the

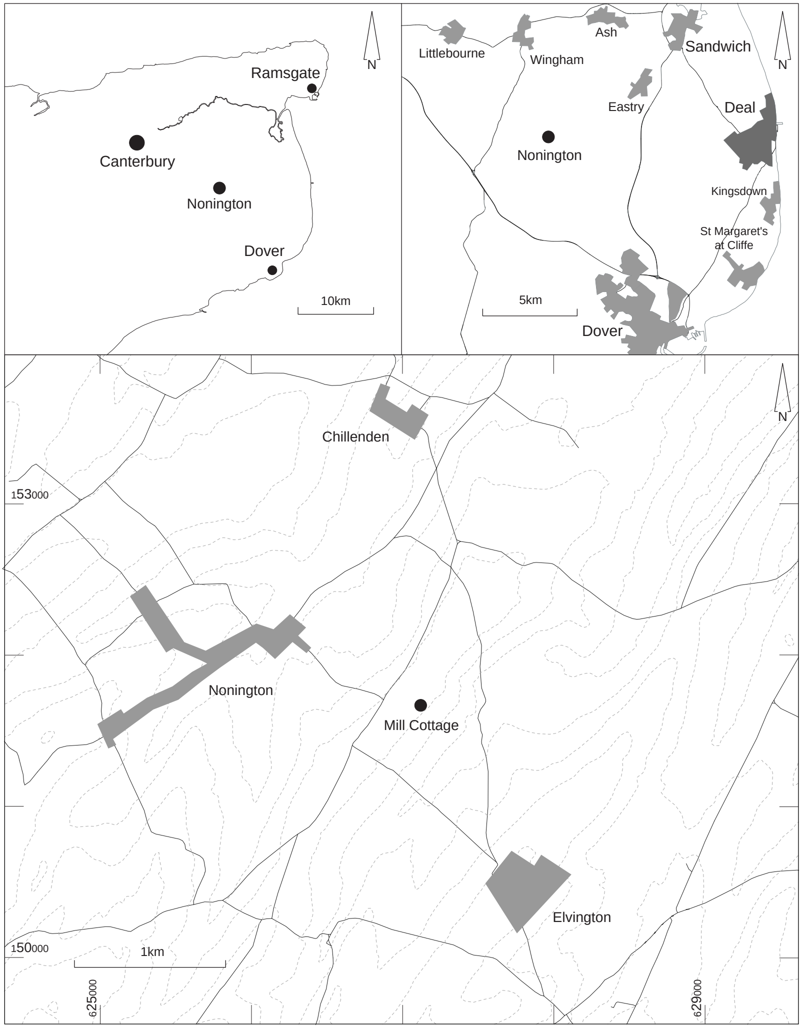

Fig. 1 Site location. [Ordnance Survey mapping is reproduced by permission of Ordnance Survey of behalf of HMSO © Crown Copyright, all rights reserved, under licence no. AL100021009].

confines of the cable trench preventing full characterization and features were often stratigraphically isolated. In many cases, no or limited finds were recovered preventing confident dating. However, the general preserv-

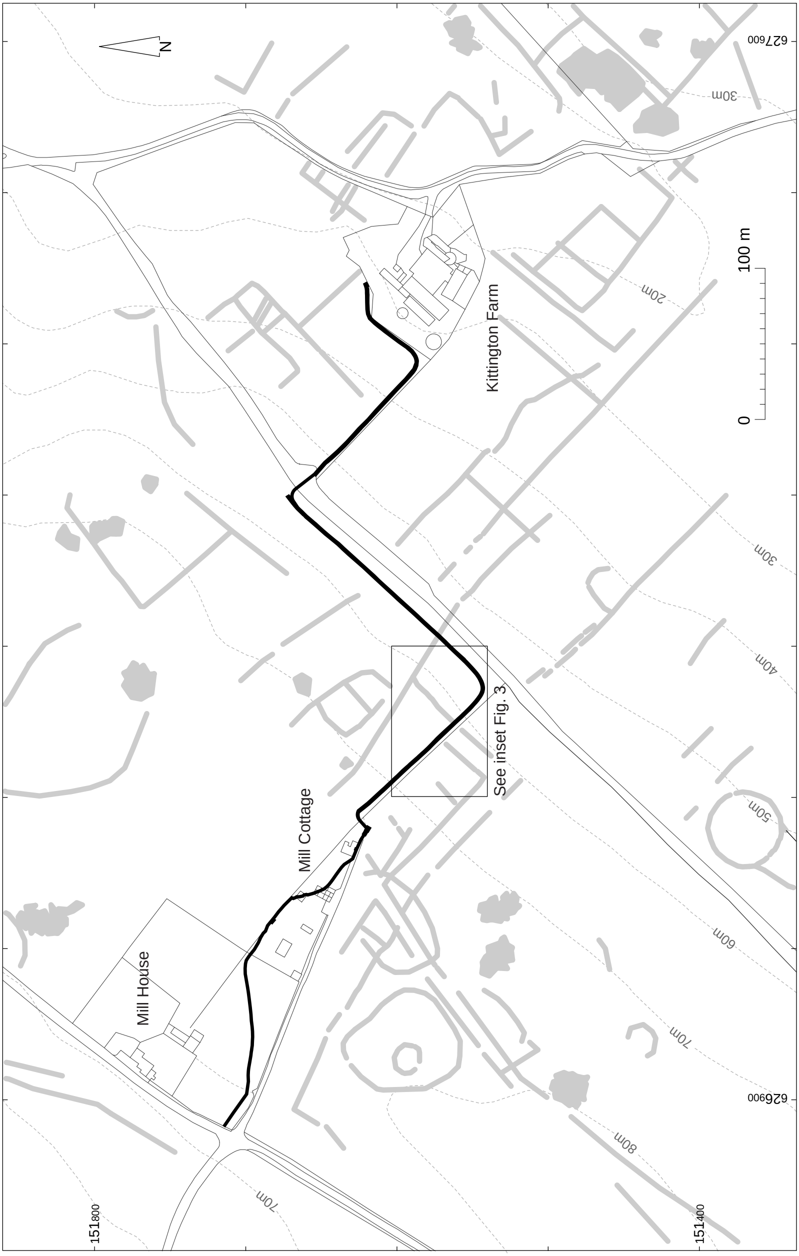

Fig. 2 Plan showing excavated trench route (black) and previously recorded cropmarks (grey).

ation of archaeology was good, with little or no impact evident from the existing agricultural land use. This was in part due to a colluvial subsoil, formed by the movement of soil downslope, which in places survived to a thickness of 0.57m, sealing archaeological features from the modern ploughsoil above.

Late Mesolithic to late Bronze Age (c.6500-800 BC) Sixty-seven residual prehistoric worked flints were recovered from later contexts. Most of this worked flint consisted of waste flakes and chunks, which had been struck from large flint pebbles collected from secondary deposits such as local river gravels. Chronologically diagnostic material was scarce in the assemblage, but included some recognizable late Mesolithic to early Neolithic and late Neolithic to Bronze Age elements, though none of the tools and waste was closely datable. The small assemblage size and broad chronological range is probably representative of sporadic and low intensity activity within the surrounding locality.

Early to mid Iron Age (c.800-120 BC) Eight sherds of abraded and residual pottery with coarse-to-fine calcined flint inclusions of early to middle Iron Age date were recovered from later contexts. The low quantity is too limited to be interpreted as evidence for activity within the locality during this period.

Late Iron Age to early Roman (c.120 BC-AD 150) The majority of features were attributed to the late Iron Age to early Roman period and represent parts of an early Romano-British farmstead occupying the south-east facing slope, and active from the early second century BC until the mid second century AD (**Fig. 3**). Features comprised field boundary ditches, a possible trackway, pits, miscellaneous post- and stake-holes, early plough-marks and part of a building containing a concentration of malted spelt wheat, most likely associated with the brewing of beer. These are described below.

Field boundary ditches: twenty were identified, of which six could be confidently dated to the late Iron Age and early Roman period. The ditches all extended beyond the limits of the excavated trench, with three ditches traceable as previously recorded cropmarks, and were approximately aligned either north-east to south-west or south-east to north-west forming a rectilinear field pattern. Not all the ditches would have been in use at the same time, evident from the sometimes narrow spacing between ditches and by slight variances in the dating of the ditch fills. Ditch widths varied between 0.38m and 2.76m. Depths varied between 0.15m and 1.03m, with the ditches located on the lower valley slope notably shallower. Ditch fills were relatively uniform, comprising mid to dark grey brown silty clays with inclusions of chalk.

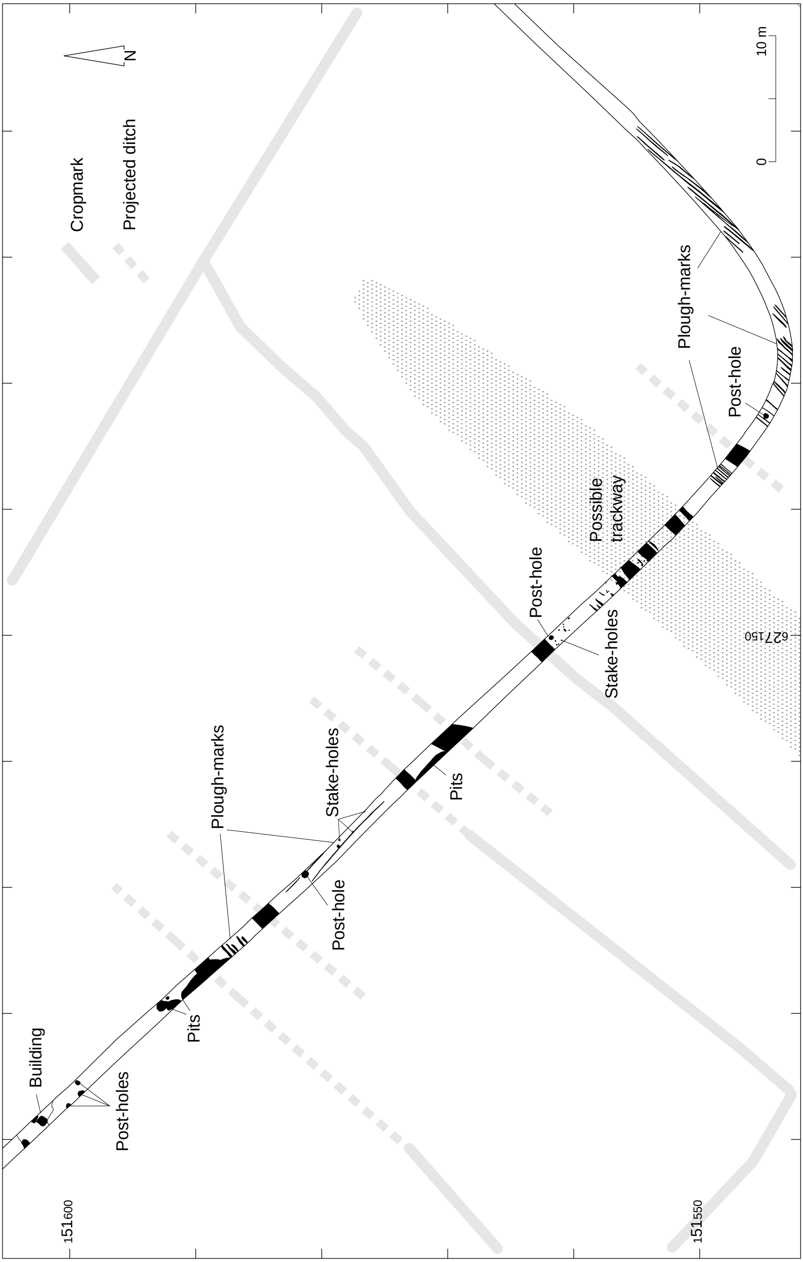

Fig. 3 Plan showing detail of Romano-British features.

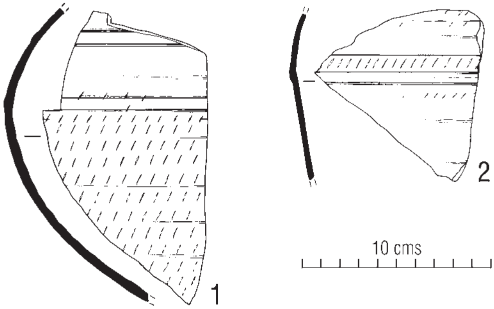

Fig. 4 Pottery from Romano-British ditches.

1 Butt beaker of Monaghan Class 2B2 in North Kent Fineware Fabric R16 with incised decoration on lower part of body in imitation of rouletting. External rim diameter 80mm. *c.*AD 50-90. Context 2021.

2 Fragment from another Class 2B2 butt-beaker in similar fabric but with different decoration. *c.*AD 50-90. Context 2021.

A small assemblage of pottery (84 sherds), with a date range of between *c.* 25 BC-AD 150, was recovered from six ditches, of which 25 sherds were derived from a single fill. This assemblage comprised 'Belgic' grog tempered wares (fabrics B1 and B2.1), in addition to two decorated butt-beakers of Monaghan Class 2B2 in North Kent fineware (fabric R16) (Monaghan 1987) (**Fig. 4**).

Four ditches contained poorly preserved animal bone, the range of species dominated by cattle and sheep/goat, though small numbers of pig, horse and dog were also present. The cattle elements, mainly skulls and teeth, indicated primary butchery was taking place nearby. In contrast, the sheep/goat elements were more characteristic of general food and secondary processing waste.

Mollusc remains were of mainly land snail taxa, and were dominated by species found in sunny open calcareous places suggesting an environment of short turfed calcaereous grassland. However, a number of the ditch fills contained species more suited to damp, shaded conditions and greater vegetative cover, and this juxtaposition might indicate different environments of settled/grazed areas and woodland or hedges separated by ditches.

A small quantity of burnt flint and daub was recovered from the ditches, along with a single fragment of curved blue-green Roman bottle glass and an iron nail. The bottle glass could not be closely dated since it was too small to determine the form of the bottle it originated from, as different shaped bottles have differing date ranges throughout the Roman period (Price and Cottam 1998, 215).

Trackway: five shallow gullies formed a parallel, north-east to south-west aligned group, bounded to the north-west and south-east by adjacent field ditches. The gullies varied between 0.42m and 1.16m wide and had shallow, concave bases, between 0.06m and 0.24m deep. The gullies were spaced between 0.47m and 2.08m apart and potentially represented wheel ruts formed along an un-surfaced trackway, which measured up to 8m wide and would seem to have followed the contour along the lower south-east facing valley slope.

The gullies were each filled with light to mid grey brown clay silt. A singe sherd of fine grog-tempered pottery dated to *c.* 25 BC-AD 70 (fabric B1), and a fragment of Roman tile, were recovered.

Pits: fourteen were excavated, seven of which could be confidently dated to the late Iron Age and early Roman period. The pits were all sub-circular in plan. Full dimensions for the majority of pits could not be obtained as they were not fully exposed in the narrow trench, but maximum visible widths were recorded with a range of between 0.54m and 4.35m. The depth of pits varied between 0.14m and 0.96m.

Pit fills comprised mid to dark grey brown silty clays with chalk inclusions. The finds assemblage from pit fills while small, indicated disposal of domestic waste. No evidence for other functions, such as grain storage or cess, was identified.

Pottery (40 sherds) from the pits indicated a general date range of *c.*120 BC-AD 150 and included 'Belgic' grog-tempered wares (fabric B1, B2 and B3) including combed and furrowed jar fragments and a Thompson Class C1-2 bead-rim jar (Thompson 1982). Other local wares included sandy black fabric B9, sand and chalk-tempered fabric 75, and a jar in fabric F172 with quartz-sand and glauconite filler, both probably from the Folkestone area, and early Romanised wares from Canterbury, including a Stuppington Lane type jar (fabric BER1), and a flagon in oxidized Canterbury fabric R6.1. A small number of wares were also derived from further afield, including the base of a beaker in North Kent Fineware (fabric R16), a Gauloise 4 wine amphora from southern Gaul, and the base of a *lagena* or small amphora in Rigby's fabric WW4 (Rigby and Freestone 1995).

Other finds included a very limited assemblage of animal bone and evidence for local exploitation of marine shellfish, including oyster (*Ostrea edulis*), mussel (*Mytlius edulis*), cockle (*Cerastoderma edule*) and whelk (*Buccinum undatum*).

Post-holes: six post-holes, with no obvious structural association evident, were distributed along the cable trench. The post-holes were all sub-circular in plan, and varied between 0.30m and 0.93m wide, with concave bases between 0.06m and 0.92m deep. Fills comprised mid to dark grey brown silty clays mixed with inclusions of chalk. None of the post-holes had evidence for post-packing and none of the post-holes could be individually dated. Only one sherd of late Iron Age to early Roman 'Belgic' coarse grog ware (fabric B2) was recovered. However, all of the post-holes were sealed by the later colluvial subsoil, which appears to have formed from the mid to late Roman period onwards.

Stake-holes: twenty-six were located in three clusters comprising groups of four, ten and twelve stake-holes respectively. Again, no obvious structure or alignments could be determined from their distribution and an absence of finds prevented their direct dating. The stake-holes were all sub-circular in shape, and varied between 0.04m and 0.24m wide by 0.04m and 0.16m deep, and were filled with a relatively uniform mid grey brown silty clay with chalk inclusions.

Plough-marks: some seventy-seven linear striations scoured the surface of the underlying Margate Chalk. Interpreted as plough-marks, they were all sealed by the later colluvial subsoil and were seen to be aligned parallel with the late Iron Age and early Roman field boundary ditches, perhaps representing contemporary cultivation of the fields.

Individual plough-marks varied between 0.01m to 0.19m wide, and within each area were spaced irregularly, between 0.10m and 0.28m apart. Where excavated, the plough-marks had u-shaped profiles which varied between 0.01m and 0.06m deep, and were filled with a mid grey brown silty clay mixed with chalk inclusions.

Building remains: part of a building was identified, comprising a shallow cut, up to 0.23m deep, characteristic of a sunken-floored structure, and three post-holes. The post-holes, which measured 0.59m to 0.77m in diameter by 0.26m to 0.41m deep, each contained abundant flint nodules forming a compacted packing material. The shallow cut was filled with a thin deposit of dark brown clay silt, and sealed by a layer of mid grey brown silty clay. This deposits was characterized by large quantities of daub fragments (over 48kg) and charred plant remains.

To the north-west, the edge of the structure had been completely removed by a modern service trench, while to the south-east, a further three post-holes, between 0.40m to 0.58m in diameter by 0.20m to 0.24m deep, and backfilled with a mid grey brown silty clay mixed with chalk, potentially represented parts of the same structure.

The extent and shape of the structure could not be determined within the confines of the excavated area. However, the structure would have been formed from upright timber posts, potentially supporting a raised timber floor above the shallow cut.

The structure's backfill contained the largest recovered assemblage of

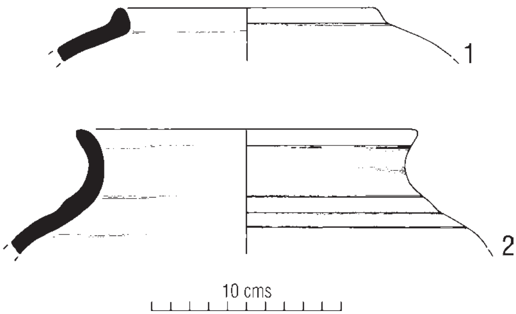

Fig. 5 Pottery from Romano-British building structure.

1 Barrel jar of Thompson Class B5-1 (1982) in black fabric B2 with external polish. External rim diameter 140mm. *c.*25 BC-AD 50. Context 2058.

2 Necked-jar in brown fabric B2 with white-painted band around the neck. Ext. rim diameter 200mm. Painted decoration is more characteristic of *c.*25 BC-AD 70 dated grog-tempered East Sussex Ware: it is probable that this vessel is of similar date. Context 2027.

pottery (118 sherds) with a date range of between *c.* 25 BC-AD 120. Two thirds of the sherds were of fine and coarse 'Belgic' grog-tempered ware (fabrics B1 and B2), including fragments from storage-jars, a barrel jar of Thompson Class B5-1 (Thompson 1982) and a necked jar with a painted band (**Fig. 5**).

Hand-made vessels in sandy black fabrics B8, B9 and F172 from the Folkestone area (Thompson 1982; Lyne forthcoming) included one fragment each from a furrowed jar and a polished closed form but no rim or other diagnostic sherds. Early Romanised wares from Canterbury comprised fragments from a lid-seated bowl of Pollard Type 59 (1988, *c.*AD 70-120), a closed form of indeterminate type in greyware (fabric R5) and from flagons in sandy oxidised fabrics (R6.1 and R6.3) (*c.*70-150). Other wares included North Kent Fineware (fabric R16), of which one is from a dish of Monaghan Class 7A1 (1987, *c.*43-120), another from a Dressel 30 bowl copy (*c.*50-150) and another from a necked-bowl of ?Class 4B4 (*c.*43-90). A further sherd of a Gauloise 4 amphora was also recovered.

Other finds included burnt flints, a few traces of animal bone, four iron nails, and two quernstone fragments from a rotary quern made of coarse-grained sandstone (**Fig. 6**).

It appears, however, that the most significant feature of this structure was the concentration of charred plant remains, in particular malted spelt wheat, found within its daub-rich backfill, which might suggest a function

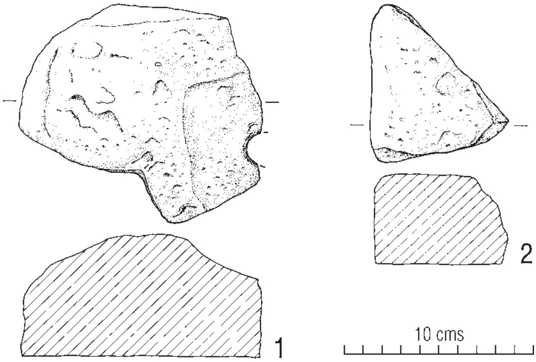

Fig. 6 Quern fragments.

1 Quernstone fragment from a rotary quern, made of coarse-grained sandstone. The fragment is smooth on one side but lumpy and irregular-shaped on the upper surface. It has a groove at its centre where it was broken at the central hole. Dimensions: 110mm × 110mm × 70mm. SF 90a. Context 2058.

2 Quernstone fragment from a rotary quern, made of coarse-grained sandstone. Dimensions: 75mm × 75mm × 42mm. SF 90b. Context 2058.

associated with either the storage or processing of malted grains. These plant remains are the subject of a special report below.

Charred Plant Remains *by Wendy Carruthers*

It was clear that the building structure was of particular interest in containing probable malted spelt wheat. However, for comparative purposes it was considered important that sufficient samples from elsewhere in the vicinity were also examined. For this reason the flots recovered from bulk soil samples from ditches were also examined, since they contained chaff-rich assemblages (cereal processing waste) which contrasted with the malted spelt from the building structure. In addition, samples from pits containing moderate levels of ‘background domestic waste’ were also examined.

Malted spelt wheat from the building structure

Five bulk soil samples evenly placed across the building were examined. The character of the structure is uncertain, since there was no clear evidence for burning *in situ* (as might be expected in an oven/corn-drier), but only a small area was exposed. The three post-holes forming the structure were packed with flint nodules, perhaps suggesting that they formed pads or footings for a raised timber structure. This could suggest that the interpretation was more likely to be a store rather than oven.

Spelt wheat was the dominant component of each of the five samples. Although in some cases sprouts of varying length could be seen along the dorsal surfaces of the grain, evidence for sprouting was also indicated in grains with the following attributes:

a groove along the dorsal surface made by the sprout (demonstrating that sprouting had occurred whilst the grain was still enclosed in the husk);

and/or collapsed grains, sometimes having completely lost the starchy endosperm during sprouting leaving a hollow shell;

or grains with ‘damaged’ embryo ends, whereby up to half of the grain had been completely ‘used up’ by the sprouting embryo and the surviving fragment had a glassy, heat-affected embryo end (thus distinguishing it from grain fragmented post-charring at a later date). The fact that it was always the embryo ends that were lost in this way confirmed that these were not merely broken grains.

Out of the five samples, an average of 80 per cent of the grain had been affected by one or more of these changes brought about by sprouting. The ‘damaged’ grains made up the highest proportion of grain considered to have been sprouted. This type of damaged grain has also been found on a site in west Wales (South Hook LNG, Pembrokeshire, Carruthers forthcoming) where a large deposit of sprouted hulled barley was recovered from a seventh- to ninth-century AD corn-drier. A similar type of damage has also been recreated by the author by charring wheat grains that had been left to sprout for several days.

At least half of the charred grain in these samples (by volume) was present as crushed cereal fragments of around 2mm in diameter. These fragments were different from the highly vacuolated, poorly preserved fragments of grain present in many of the ‘background waste’ samples described below, since they were well-preserved and appeared to have been produced by crushing or ‘milling’ sprouted grain.

The remaining whole or almost whole cereal grains consisted almost entirely of spelt-type wheat. This is recorded as emmer/spelt wheat (*Triticum dicoccum/spelta*), since grain morphology is very variable and unreliable (Jacomet 1987). In each of the five flots, spelt-type wheat made up at least 85 per cent of the assemblage. It is likely that the traces of bread-type wheat (*T. aestivum*-type), hulled barley (*Hordeum vulgare*), oats (*Avena* sp.) and rye (*Secale cereale*) present in some of the samples (in no cases higher than 7 per cent) were accidental inclusions, originating from crops previously grown in the spelt fields. In the case of oats, however, the weed species, wild oat (*Avena fatua*), could have been

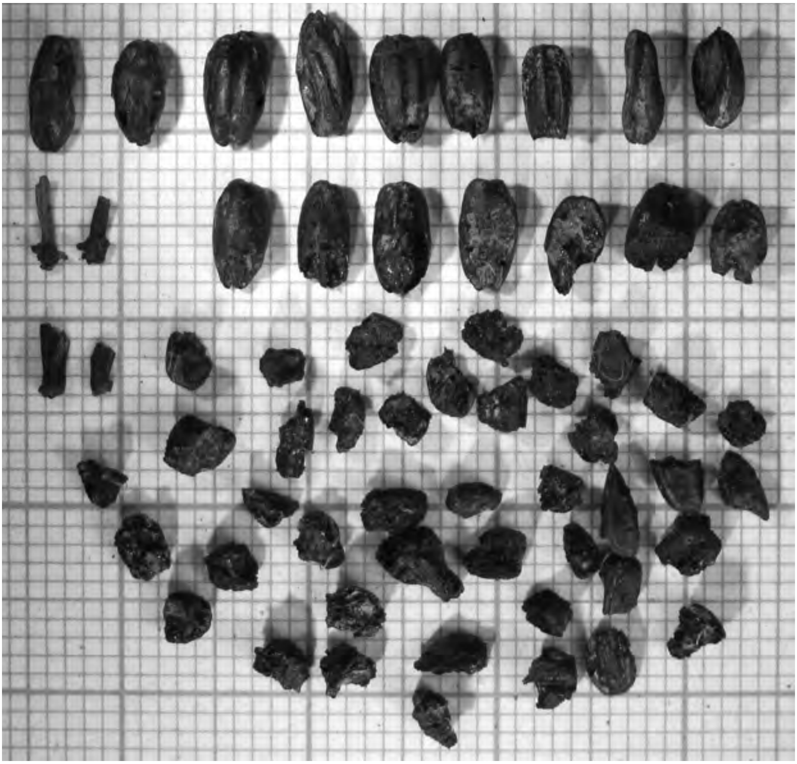

Fig. 7 Malted spelt (*Triticum spelta*) grains, glume bases and grist from the building. From top left, grains with signs of sprouting (dorsal view), including extended sprouts, dorsal grooves made by sprouts, collapsed grains and loss of embryo ends (increasing towards right of second row). Two detached cereal sprouts (left, second row) and two spelt glume bases (below sprouts). Below the whole grains are fragments of crushed malted grain or 'grist'.
(Scale: one small square = 1mm)

present rather than cultivated oat. Since many of the 'accidental' grains had also sprouted they had obviously been present when the spelt was initially soaked and left to sprout.

Other contaminants were equally scarce, i.e. weed seeds and chaff fragments. Weed seeds amounted to less than 1 per cent in all five samples. The weed species comprised a few common general weeds of disturbed and cultivated land, such as chess (*Bromus* sect. *Bromus*) and dock (*Rumex* sp.). Chaff fragments amounted to an average of 12 per cent of the assemblages, never exceeding 16 per cent of the quantified charred plant remains. As confirmation that spelt was by far the dominant (if not the only) species present, only one glume base of emmer wheat (*T. dicoccum*) was recovered from the daub spread samples, compared with 128 spelt (*T. spelta*) glume bases and eight spelt spikelet forks. This scarcity of emmer was reflected across the entire site as a whole.

Detached cereal sprouts, a component that can be abundant in some deposits of sprouted cereals (van der Veen 1989), were also present in low numbers. Although high charring temperatures could have caused differential preservation, destroying more chaff and sprouts than grain (Boardman and Jones 1990), when taken together with the high proportions of crushed grain and scarcity of chaff, the various factors suggest that the following interpretation of the charred deposit is more likely. Clean spikelets of spelt (i.e. the semi-processed crop, with most weeds sieved out but husks still enclosing the grain) would have been moistened and left to sprout for several days. Once the sprouts had reached the end of the grain, sprouting would have been halted by drying the malted grain in a corn-drier. Drying would also make the grain brittle enough to crush coarsely into 'grist', and this action would have caused most of the sprouts and brittle chaff fragments to have been destroyed or removed. Removal of the husks at this stage is desirable because husks can taint the beer with tannin and make separation of the wort more difficult (Eβlinger 2009). It is possible, therefore, that some degree of crop cleaning was carried out at this point, such as winnowing, but this is not known. The grist would then have been placed in hot water to dissolve the fermentable sugars, producing the liquid 'wort' that feeds the yeast during fermentation. When milling the grist, it needs to be fine enough to allow the fermentable sugars to dissolve into the wort, but it must be coarse enough to allow for easy separation of the wort. The grist may be re-soaked to remove more sugars, but it is eventually dried to be used as animal feed, or used as wet feed.

The Nonington samples clearly represent fairly clean grist, but whether this became charred after the wort had been removed (during drying for animal fodder), or at an earlier stage is uncertain. The fact that a fairly high proportion of cereal grains were not completely crushed (i.e. the quantified half grains or larger) is perhaps not surprising if milling had to be carried out with caution, so as not to reduce too much grain to flour which would cause separation difficulties and make a cloudy beer.

In her study of Roman corn-driers, van der Veen (1989) listed three sites that produced clear evidence for the production of malt from spelt wheat, including Catsgore, Somerset (Hillman 1982), Hibaldstow, Lincolnshire (Straker 1978) and Mucking, Essex (van der Veen 1988). Because the samples came from corn-driers some of them produced abundant detached sprouts, chaff and weed seeds, and these were interpreted as malting waste being used as fuel (e.g. Catsgore, *ibid*). The Mucking deposit appeared to represent entire sprouted spikelets of spelt that had become charred at the stage when heat was used to halt germination. The Hibaldstow sample contained no chaff and few weed seeds, so may represent a similar stage to Nonington.

Spelt wheat was grown in large quantities across parts of southern England during the Romano-British period (e.g. Stansted, Essex; Carruthers 2008), as indicated by the sudden appearance of corn-driers on sites of this period (van der Veen 1989). Corn-driers would probably have served a variety of purposes, including drying grain to aid the removal of chaff, prior to milling, following sprouting in the production of malt and drying the spent grist following removal of the wort. Grist would have been a valuable commodity both before and after the production of wort, and if dried sufficiently, it may have been sold at market to enable households to produce their own beer. The Nonington deposits may represent small-scale production of grist for market, or for brewing on the site. The five samples were fairly uniform, suggesting that the remains represented either one large deposit of burnt grain that became spread around the area, or successive deposits of burnt grain that were being treated in the same way over a period of time. The calculation of factors such as whole-grain concentration, percentage fragmentation, flot volume and purity of the assemblage provided no clear trends across the area, except that one sample, next to a post-hole at the northern end of the trench, produced the largest volume of charred grist and spelt grains.

Cereal processing waste

Three soil samples analysed from successive layers in one of the ditches produced fairly large quantities of cereal processing waste, with the highest concentration occurring in the middle layer (35.5 charred fragments per litre). Apart from differences in concentrations, there were no significant changes through the layers in species or types of remains, so the assemblages have been discussed together.

The predominant component of the assemblage was chaff fragments, which made up 82 per cent of the remains. Spelt (*Triticum spelta*) glume bases were the most frequent identifiable items, and it is clear that burnt waste from processing spelt wheat had been deposited in the ditch. Other cereals represented by very small amounts of chaff were emmer (*T. dicoccum*; two glume bases, *cf*. two spikelet forks) and rye (*Secale cereale*; one rachis fragment).

Cereal grains made up 13 per cent of the assemblage, with all except three bread-type wheat grains (*T. aestivum-type*) probably being spelt wheat grains (but recorded as emmer/spelt). An average of 15 per cent of the grains showed signs of sprouting, and detached sprouts (or coleoptiles) were quite common. It is likely, therefore, that these remains relate to the malting activities occurring within the building to the north-west of this ditch.

Weed numbers were surprisingly low, amounting to only 5 per cent of the items. Small-seeded taxa such as clover-type leguminous weeds (*Trifolium/Medicago/Lotus* sp.) and ribwort plantain (*Plantago lanceolata*) were most frequent, although a few larger cereal-sized grasses such as chess (*Bromus* sect. *Bromus*) were present. The scarcity of weeds suggests that either the spelt crops had been exceptionally well-maintained and efficiently weeded, or that the waste originated from the final de-husking of semi-processed, cleaned spelt spikelets. Small weed seeds can become lodged amongst the chaff during the cleaning of spikelets, and following de-husking they are more likely to be found amongst the light, winnowed waste product. Glume bases would have made up the bulk of winnowings, being light and papery. Therefore, these burnt cereal processing waste deposits may have originated from the cleaning of grist prior to the preparation of wort. Of course it is also possible that they could have come from domestic, food-preparation activities that involved the final cleaning of sprouted grain, since sprouted grain was sometimes used in cooking.

The small weed assemblage from this feature provided only a little ecological information, since most of the species were general weeds of cultivated and disturbed land (e.g. knotgrass (*Polygonum aviculare*)). The relative frequency of clover-type weeds and small-seeded vetches (*Vicia/Lathryus* sp.) suggests that soil impoverishment could have started to become a problem with more intensive cultivation of spelt wheat. However, as noted earlier, some selection for small weed seeds may have occurred as a result of crop processing activities in these deposits, so bias is a possibility.

General background charred waste

For the purposes of comparison a few of the samples assessed as containing ‘general background burnt waste’ (GBW) were fully analysed in case the cereals used for malting were different from those used on a day-to-day basis for cooking. General background waste is the waste produced on a daily basis which becomes spread around the site during the preparation of food, burning of fuel on hearths, feeding of livestock etc. The material can become burnt accidentally or deliberately, either by being swept up from floors and being used as kindling and fuel on household hearths, or by the larger-scale disposal of waste on bonfires. Waste from industrial hearths and the stabling of animals may also become burnt and spread around the site in the same fashion. Features that are left open for a length of time may accumulate burnt material, with remains being blown in, trampled, washed in or redeposited in low concentrations amongst mixed waste. The state of preservation of this type of waste is often very poor, as it may have been subjected to trampling and weathering for some time. These types of assemblages were present in all of the other sampled ditches and pits, including pits located approximately 15m to the south-east of the malting area.

Comparison of these assemblages with the malted deposit indicated that spelt wheat played the dominant role in the diet as well as being used for malting. Sprouted grain was not observed amongst the twelve GBW samples, although much of the grain was in a poor state of preservation so this was hard to determine. A few detached sprouts were present, but not as many as in the malt samples or cereal processing waste. Although bread-type wheat was present in the GBW pit samples at a rate of 0.12 grains per litre of soil processed, the malt samples produced a greater number of grains at 0.44 grains per litre. It should be noted that, being free-threshing and so not requiring contact with fire during processing, bread-type wheat may have been much more important in the diet than the charred record suggests.

It is interesting to note that the occurrence of barley in the malt samples (1.76 grains per litre) was much greater than in the GBW (0.12 grains per litre), even though it may have only been present as an accidental inclusion in the former. This supports the suggestion that barley was probably mainly used to feed livestock rather than being consumed on a regular basis. Pliny the Elder notes that barley-meal was useful for medicinal purposes, and that barley gave great strength to livestock (*Plin. Nat.*18.18).

No evidence for the consumption of rye or emmer was found (although admittedly, few samples were fully analysed). Two fragments of large legume seeds may have come from peas or beans, as evidence for the consumption of pulses during the later Iron Age and early Roman period is common in Kent. Two small fragments of hazelnut shell (*Corylus avellana*), provided evidence for the collection of nuts for food. The range of weed seeds was very similar to those from the other features, although the additional large black seeds of black bindweed (*Fallopia convolvulus*) found in two of the assessed samples could represent contaminants that had been hand-picked from grain being prepared for consumption.

Summary and comparisons with other sites in the area

The scarcity of weed seeds and dominance of spelt wheat in the assemblages from Mill Cottage suggests that the farmstead may have been growing spelt almost on an industrial scale, as has been found on the Essex clays at Stansted during the Roman period (Carruthers 2008). In order to produce good malt, sprouting needs to be as even as possible, and this would require a genetically fairly uniform crop, such as is found in larger-scale agricultural systems. The recovery of malted spelt grist from the daub structure may provide one explanation for large-scale spelt cultivation. If the daub structure was some sort of storage building, brewing or the production of grist for market must have been undertaken on a fairly large scale, rather than just to meet the needs of the farmstead.

Other samples from the farmstead provided evidence for crop processing activities and for the production of day-to-day domestic waste. The fact that spelt continued to dominate these other types of waste confirmed the specialisation of this farmstead. On many Romano-British sites emmer continued to be cultivated, sometimes in fairly large quantities. It may have been tolerated as a contaminant of spelt for some time, but at this farmstead only a trace of emmer was identified. Perhaps this relates to the need for even sprouting, so efforts were made to keep the spelt crops pure.

It is possible that bread-type wheat was being grown on a larger scale than the charred assemblages suggested. Hulled barley, rye, and possibly oats and peas or beans, appear to have been minor crops, and these may have been primarily grown for fodder.

Other possible evidence for malting spelt during the Romano-British period in Kent includes small amounts of sprouted grain, chaff and weed seeds from a possible corn-drier at Wainscott Northern By-pass (Pelling 2009), and some chaff-rich samples from a boundary ditch at Downlands, Walmer (Pelling 2010). The Walmer ditch samples showed similarities to the Nonington crop processing waste, in that detached sprouts were common, spelt chaff was abundant, and emmer chaff was very scarce. However, weed contaminants were more frequent and diverse in the Walmer samples, perhaps suggesting less thorough crop husbandry practices. Pelling suggested that the ditch deposits represented processing waste from the malting of spelt wheat (the ‘comings’) which had been removed after the malted grain had been parched. Since Walmer is located on the coast about 7 miles due east of Nonington it appears that malting was an important industry during the Romano-British period in Kent.

Conclusion

The cable trench offered the opportunity to examine a transect through a landscape with known high archaeological potential. The work proved particularly successful in dating and characterising previously identified cropmarks. In addition, the work demonstrated that the previously identified cropmarks represent only a small proportion of the actual buried archaeological resource.

The recovered data identified evidence for peripheral prehistoric activity in the area, comprising residual late Mesolithic to early Neolithic and late Neolithic to Bronze Age worked flints, and early to mid Iron Age pottery. However, known cropmarks, including a potential prehistoric barrow cemetery and prehistoric curvilinear enclosures located to the south and north of the cable route, seem to indicate that the landscape was more intensively occupied during the prehistoric period than the recovered data perhaps suggests.

The majority of features date to the late Iron Age to early Roman period. The alignment of excavated ditches corresponded well with the more extensive pattern of linear field boundaries and rectangular enclosures visible as cropmarks. Other features, including the possible trackway, refuse pits, post-holes and stake-holes, and building structure all point to an adjacent settlement or farmstead associated with this field system.

While the date range of the pottery recovered from features did not enable a refinement of the phasing, it is probable that not all features were necessarily contemporary. Similarly, it remains unclear to what extent the character, form and production of this farmstead might have changed over time. It was not possible to differentiate, for example, between data associated with what might have been assumed to have been an original late Iron Age domestic farmstead and the apparent emergence, by the early Roman period, of what appears to have been a specialised agricultural estate, focused on the cultivation and malting of spelt wheat. Such issues of continuity are significant in understanding the so-called process of Romanisation in late Iron Age society and a visible expansion of settlement in the late Iron Age which was perhaps encouraged through a more formalised system of land tenure.

A second issue raised by the data is the apparent decline of the farmstead or estate from the mid second century AD. What might have led to this decline was not evident from the archaeological data available at Mill Cottage. However, a comparable pattern of decline in rural settlement is now emerging for at least some sub-regions in Kent (Booth 2007, 18), and it is probable that what happened at Mill Cottage forms part of this same phenomenon.

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