



SHARP INTERIM REPORT

SEASONS 2014 TO 2018

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Introduction

This is our first interim report to be written since the publication of the SHARP monograph - "Digging Sedgeford - A Peoples' Archaeology" in 2014 (ISBN 9781909796089 Poppyland Publishing). That is not to say that SHARP has been inactive during the last four years. On the contrary there has been considerable activity and progress.

Jon Cousins completed his work on the settlement site in Chalkpit Field at the end of the 2016 season, leaving a significant un-excavated area to be revisited at a later date when further advances in our understanding of the site as a whole suggest that further evidence - particularly environmental sampling - may be needed. An interim report on the settlement site (written by Gary Rossin and Melanie van Twest) has appeared in the 2018 edition of Norfolk Archaeology.

Gary Rossin and Brian Fraser are continuing their researches into Sedgeford Aerodrome during the Great War. Gary has written a book - Sedgeford Aerodrome and the aerial conflict over north west Norfolk in the First World War (ISBN 978 1 90979642 3 Poppyland Publishing). During the 2018 season a memorial stone was dedicated to all in the RFC and RAF who had served there during the Great War.

Eleanor Blakelock, when not carrying out metallurgical research on the Staffordshire Hoard, continues to run courses at SHARP on archaeometallurgy, smelting ores and casting metal.

SHARP now possesses its own magnetometer, purchased in 2016. David Wood, Melinda Barham and Yvonne Bolton-Smith are all active in the field. Most of Chalkpit Field has now been covered as has 'Saggy Horse Field'. Further work is under way in West Hall Field, Hall Field, Polar and Shernborne Brecks. The results have been spectacular, and the work is on-going, with a geophysics course being run during the 2019 season.

The focus of excavation since 2017 has been in Trench 23, where a series of middle Anglo-Saxon malthouses dating to the 8th/9th centuries are under excavation. This is a first, as no other examples of malthouses from this period have ever been discovered.

The Human Remains Team have been awarded a Heritage Lottery Fund grant to study our large collection of disarticulated human bone. Their results will be an integral part of their pending monograph on Sedgeford's middle Anglo-Saxon cemetery. In addition to skeletal research, the Human Remains team are working with the Max Planck Institute on the DNA of some of our Anglo-Saxon dead, research which may well shine new light on the nature of the Anglo-Saxon migration into East Anglia and to what extent native British DNA mixed with that of the incomers.

The Finds team remain active and work is about to start on re-evaluating ceramic finds in Boneyard and Chalkpit fields. A particular target is to look again at the grass-tempered ware, since some may, in the past, have been mis-identified as

being Iron Age in origin. Clarification is essential as this type of pottery pre-dates Ipswich ware (720-850 AD) and will give important supportive evidence about phasing of the settlement site.

The medieval research group - John Jolleys, Brian Fraser and Kathryn Oliana - have been working closely with the landscape group - David Crease and Melinda Barham - looking at the riverine environment and its uses during the Anglo-Saxon, medieval and post-medieval periods. They are also looking at documents, secondary sources and SHARP's earlier reports with their stated aim of 'Reconstructing Medieval Sedgeford'. Progress has been encouraging. Another of their ongoing interests is to make a record of the large number of medieval graffiti in Sedgeford church - an insight into the medieval mind, haunted as it was by demons and the need to protect the human soul from their baleful influence.

Terry Baxter has researched and written on the 1852/3 epidemic of typhus fever in Sedgeford, the record of which appears on one of the pillars to the church gate and Sue Crump has produced a within-living-memory record of discipline at Sedgeford school during the inter-war years. Their articles appear in this Interim report and both make us glad that we are alive today and not then.

2018 saw a first win for SHARP in their annual cricket match against Snettisham. The SHARP XI were 125 for 5 (15 x 8-ball overs), with a Snettisham XI 118 all out, giving a win for SHARP, making them the current holders of the John Hensby Trophy.

John Jolleys 2019.

I. Professor Bernard Campbell

Professor Bernard Grant Campbell died on 11 March 2017 at the age of 86. He had long been suffering from Parkinson's Disease, but had been nursed at home by his loving and much loved wife, Susan Campbell, and he finally passed away peacefully in her arms.

Bernard's funeral took place on 25 March 2017, and his mortal remains were laid to rest on the chalk downland overlooking Sedgeford Hall – that is, on the estate to which he was so deeply attached, and of which he had been the owner for so long.

Bernard was a scholar with an international reputation as a physical anthropologist. He was known to students across the world for the textbooks which he edited and which were regularly reissued in new editions. One of my first memories of Sedgeford Hall is seeing the skull of a fossil horse named after him resting on a shelf. Not many of us make discoveries which come to bear our names.

But this is not a formal obituary notice: it is personal testament to a man who bestowed his friendship and warm hospitality upon me for more than two decades. It was an honour, because Bernard was a considerate, gentle, modest, and generous friend, and one who, because of the Sedgeford Historical and Archaeological Research Project, had an enormous impact on my own life and that of so many others.

SHARP happened because Bernard – always fully supported by Susan, and latterly by his son Charlie – wished it so. He was not only an academic in the forefront of his own discipline: he was an academic who owned an estate rich in archaeology, and, as a highly responsible and socially concerned landowner, wished to facilitate the academic researches of others on that estate.

We met by chance on a foreign holiday. Bernard and Susan invited me to visit their estate. I took them up on that and was hosted by them for the first time in 1995. Our enduring friendship began that year, and SHARP ran its first field season in the summer of 1996.

That friendship was extended to my partner, Lucy, and my three children, Tiggy, Rowena, and Finnian. The Sedgeford dig is bound to feature prominently in my children's memories, since all of them have spent at least a week in Norfolk every summer for as long as any of them can remember. Not least, they are likely to remember to the open invitation to use the Sedgeford Hall swimming pool whenever they liked!

The scale and the significance of the Campbell family's commitment to the project could hardly have been greater. We have had the use of Boneyard Field as our campsite and the Old Village Hall as our archive for two decades. We have been able to undertake fieldwork in all corners of the estate, without restriction, subject only to the requirements of the agricultural regime. We have enjoyed enthusiastic support for our policy of making archaeology available to all and of maximising access for people of all aptitudes and abilities. The relationship between

landowner and project could not have been more positive and untroubled.

Many hundreds of people have benefitted. Some have been students gaining fieldwork experience towards a university degree. Others have been people engaging in archaeology as a hobby. A good number have been postgraduates or academic archaeologists with a research interest in Sedgeford, and a good number have been career archaeologists, eventually working in commercial, museum, or university archaeology, after having learnt much of the trade at Sedgeford.

And as well as being a leading summer research and training project, Sedgeford has, of course, emerged as a major Mid Anglo-Saxon excavation, providing exceptionally rich data-sets from our cemetery, our settlement, and our cereal-processing plant for the understanding of this period.

Bernard Campbell and his family made all this possible. I am pleased that he lived long enough to see *Digging Sedgeford: a people's archaeology*, our interim summary monograph, published in 2014 (to which he contributed a foreword). I am sad that he will not see the richer fruits of his patronage yet to come: our planned series of detailed monographs on different aspects of the project. When these volumes appear, they will be very much part of Bernard's legacy.

I am sadder still that I have lost a dear friend. My thoughts are with Susan and Bernard's four children, James, Sophie, Hatty, and Charles, all of whom, I know, miss him deeply.

Neil Faulkner
August 2017



2. Janet Hammond

All SHARPIes will be saddened to learn that Janet passed away during 2018. Janet had a long-standing and passionate interest in local history and archaeology. She was a founder-member of the Project back in 1996 and her influence and the respect in which she was held by the local community was instrumental in placing SHARP firmly within that community.

In the earliest years she hosted our headquarters and our developing archive, we were also able to use the showers (created in some of her outbuildings) - albeit at the considerable personal risk of upsetting Wally, Janet's highly territorial and rather irascible turkey.

During these early years, Janet was always on-site on Saturday evenings to meet and greet new arrivals, all of whom she treated as close friends - which, of course, they all became.

Janet remained a staunch supporter, but sadly was less and less able to visit the site as her health declined, although she always made an effort to be there on Open Day.

She leaves behind a considerable corpus of historical and archaeological research work, which her son, Tim Snelling, is kindly placing in our archive. There will be much to be learned from this and SHARP's historical research group are taking responsibility for it.

The Project could not have had a better friend than Janet.

We shall miss her.

John Jolleys.

Chair of the Trustees of SHARP

3. From the Finds Hut

Naomi Payne and Ann Smith report on some interesting and unusual small-finds from Sedgeford.



Photo 1 Fipple flute



Photo 2 8th century dress accessory



Photo 3 Pivoting knife

Fipple Flute

An incomplete fipple flute (fipple meaning that it was blown endwise) was recovered from the upper fill of a pit in Trench 20 on the settlement site. The pit-feature is yet to be definitively phased, but the upper fill contained a small quantity of early medieval pottery in addition to middle Anglo-Saxon Ipswich ware (720-850) and later Anglo-Saxon Thetford ware (875-1100), hence we believe the flute to date from the 11th century or later.

The flute, which is made from the tibia of a sheep, is broken across the fifth tone-hole. Around 100 Anglo-Saxon and medieval flutes are known from England and the other examples are made from mammal bones and have between two and five tone-holes. A few larger flutes have a thumb-hole, but these are 12th century or later.

Re-worked dress accessory

This little silver-gilt object, just 25mm in length by 21mm in width, has a story to tell. If you look carefully at the beautiful animal interlace decoration you will see that it looks incomplete. Although it has been carefully selected to appear symmetrical, it is not. The design ends abruptly on three out of the five edges. This and the rather crudely made perforations suggest that this object has been re-cycled from something larger.

The original object must have been very precious and when it had broken beyond repair, someone saw the potential to re-work it. The style of the interlace indicates a date for initial manufacture in the late 8th century AD. According to Leslie Webster (formerly Senior Curator of early medieval British and Irish collections at the British Museum) this would fit with it having been originally a lozenge-shaped brooch. This shape was not in fashion for very long and by the early 9th century the style had been superseded by circular brooch patterns.

Lozenge-shaped brooches sometimes incorporated a cruciform element which could explain the vertical part of its design. It is also of the right size to have been radically cut down from one of these brooches. On re-use, it could either have been a rather small and squat strap end, or a hooked tag with a (now missing) soldered hook.

Pivoting knife

This iron object is a pivoting knife which was recovered from the Anglo-Saxon colluvium in Trench 21/23.

We have lots of Anglo-Saxon iron knives from both the Boneyard and Lower Chalkpit Field excavation sites - but this one is a little different. The blade is rather curved and towards one end there is a round element with central rivet. The knife

would have had two blades of different forms, one of which could have been folded away into the case-cum-handle whilst the other one was in use. The blade could be changed using the pivot. Where such handles have survived, they were made from bone.

Knives like this are believed to have had a specialist purpose, where frequent changes between blades was essential - perhaps wood-working, or bone-working. They are usually found in 8th to 11th century contexts.

Strap-ends - three copper-alloy strap-ends recovered from Trench 21/23

Top - this is a complete double-riveted strap-end with an even, narrow shaft and heart-shaped fixing terminal (42mm in length). It was simply decorated with three sets of parallel transverse grooves - one at each end and one mid-point of the shaft. These strap-ends date from anywhere between the late 8th to 11th centuries.

Middle - found unstratified in the top-soil, the upper surface decoration of this strap-end (41mm in length) comprises a central rectangular panel with an irregular cross design. Widest in the middle, it tapers to a long, squared-off animal snout terminal with hint of eyes and ears adding to its zoomorphic design. The remains of two rivet holes can be seen at the opposing broken terminal.

Bottom - another complete strap-end. This is the largest of the three at 58mm in length. The upper surface decoration comprises a quadrangular panel containing cross-hatched detail. The double-riveted terminal is 11mm wide, tapering to an animal head terminal 7mm across. This style is usually found in middle Anglo-Saxon contexts, dating from the 8th/9th centuries.

Pottery

Two pottery sherds are noteworthy for their unusual decoration. The first is a large sherd from a Buttermarket type bottle and was found in Trench 20 on the settlement site. These were large, well-made bottles dating to the middle Anglo-Saxon period. They were highly decorated, with a combed geometric incised pattern over most of the body. Buttermarket bottle sherds are rarely found outside their site of manufacture in Ipswich, so our find is a very interesting one.

Editor's note - it most certainly is and when considered alongside the rare mid-8th century silver denier of the Frankish ruler, Pepin 'the short', also found within the settlement site, the implication must be that Sedgford had some importance and was, by no means, a rural back-water. (See chapter "The pieces start to fit together"..)

The other sherd is stamped Ipswich ware. The annular dotted line has been impressed; the die most likely to have been made of wood. The date - between 720 and 850 AD.



Photo 4 Anglo-Saxon strap ends



Photo 5 Sherd of Buttermarket bottle



Photo 6 Stamped Ipswich ware sherd

4. The Runic Spoon From Chalkpit Field

Gary Rossin discusses this intriguing artefact found in Chalkpit Field.

In 2017, an intriguing find was discovered by metal detectorist Julian Hammond whilst detecting close to the Anglo-Saxon settlement site in Chalkpit Field. The object in question being a copper alloy fragment of a spoon or fork handle, dating to the 9th century, measuring 87 mm in length, with its width varying between 6.5–10 mm and it being 1.5 mm thick.

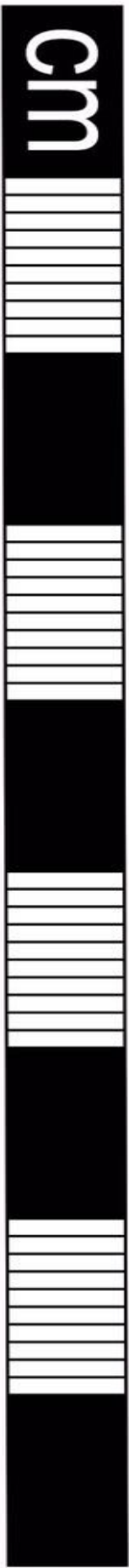
A find such as this, found close to the settlement site, will always draw interest. However, what makes this object of even greater importance, and of national significance, are a sequence of eight runes, along with a cross symbol, inscribed along its length.

The eight runes have been carefully incised and have been well preserved; the second of the eight runes being of a form that was previously unknown. The runes themselves can be read as *þ e r n f e r þ*, which is likely to have been the masculine personal (West Saxon) Old English name *Beornferþ*, a derivative form of an earlier *Beornfriþ*. Old English runic inscriptions are very rare after the 9th century. A thought-provoking observation is that six charters of Christ Church, Canterbury (AD 838 – 867) were observed by a priest *Beornfrith*.

A full copy of the paper published on the spoon by Professor John Hines, Cardiff University, (and similarly inscribed object at Elsted, West Sussex) can be found on the reports directory on the members' section of the SHARP website.

References

Hines, J. (2019). Two Personal Names in Recently Found Anglo-Saxon Runic Inscriptions: Sedgeford (Norfolk) and Elsted (West Sussex). *Anglia*, 137(2), pp. 278-302.



Non-ferrous castings, made by members of the Archeometallurgy course



5. Archaeometallurgy and furnaces at Sedgeford

Eleanor Blakelock reports on the work on smelting and casting carried out as part of her SHARP experimental archaeology metallurgy courses.

Iron smelting

Slag from iron smelting has been recovered by SHARP teams during the course of our excavations. The slag (impurities removed from the metal ore as a result of the smelting process) had been found in the fill of ditches on the middle Anglo-Saxon cemetery site in Boneyard field and also on the Anglo-Saxon settlement site, immediately to the south in Chalkpit field. It is likely that this had arrived from higher up the hillside as a result of colluviation.

It could be associated with the Anglo-Saxon settlement site or could have its origin on the Romano-British farmstead site at the top of the hill.

To date no metal-working furnaces have been identified at Sedgeford, although number of smithing-hearth bottoms have been found.

Previous analysis of Roman slag from Snettisham (6km from Sedgeford) suggests that iron was smelted from local Carstone. During a six-day course in 2014 we experimented with a bloomery smelt to test whether we could replicate this using the same material.

Smelting involved exposing the ore to a high heat (1,200 degrees C) in a bloomery furnace. The furnace was constructed of daub (a mixture of clay, sandy soil, straw and horse manure). All apart from the clay (for which there was no local source available) were procured from close-by.

In building the bloomery furnace, daub was used to line a pit dug into the ground. The walls were built upwards creating what appeared to be a wide chimney. A bellows-driven air supply was delivered to the furnace via a clay tube (the tuyere) passing through into the lower wall of the furnace. The finished structure was pre-fired for several hours to dry the daub and to prevent cracking or explosions (due to steam) during the smelt. Meanwhile, a couple of buckets of Carstone (sourced from Snettisham's Frimstone quarry) were crushed. On Day 5 of the week members of the BERT course, arriving like the cavalry to save the day, provided extra muscle power to crush enough charcoal to enable the smelt to proceed.

The fire was lit at lunchtime and the furnace slowly warmed up; the course students worked the temperature up by increasing the air supply by using the bellows. Alternate layers of charcoal and Carstone were fed in as the fire burned. By the fading light of evening, the colours of the flame could be seen, confirming that the smelt was working. The fire was kept going with work on the bellows until 1.00 am at which point the furnace was left to its own devices and the exhausted workforce retired to bed (Editor's note - this was done on the hottest day of the summer, so a mention in dispatches for all involved).

By next morning, the clink of metal above the tuyere could be detected. This is the place in the furnace where bloomery iron could be expected to form.

The furnace was still too hot for a full assessment to be made, but later in the season the furnace was sectioned and there was evidence of partial success, some bloomery iron had formed, but the temperatures within the furnace had not been constant and the iron had not coalesced as hoped. Nevertheless, important lessons had been learned for a future experiment.

The experiment was repeated by the members of the 2017 course. This time, the ore was roasted before smelting and two pairs of bellows were used. Once again, the hottest day of the year happened to coincide with smelting day. An evening thunderstorm passed by, adding to the atmospheric nature of the evening, but did not jeopardise the furnace. On the next day the furnace was opened. Some metallic iron was noted, but the yield was low, probably as the air supply was still sub-adequate.

Smelting reduction reactions in a bloomery furnace

2C charcoal + O₂ oxygen = 2CO carbon monoxide

3Fe₂O₃ (ferrous oxide ore) + CO = 2Fe₃O₄ (ferric oxide) + CO₂ (carbon dioxide).

Fe₃O₄ + CO = 3FeO (iron oxide) + CO₂

FeO + CO = Fe (metallic iron) + CO₂.

In contrast the blast-furnace operates at a higher temperature (1,450 degrees C) and produces liquid pig-iron.

Reduction smelting reactions in the blast-furnace

2 Fe₂O₃ ferrous oxide (ore) + 3C charcoal = 4Fe metallic iron + 3CO₂ carbon dioxide.

And

3CO carbon monoxide + Fe₂O₃ (ore) = 2Fe metallic iron + 3CO₂ carbon dioxide

Copper Alloys

In 2016 and 2018 the focus of the archaeometallurgy course was on copper alloys. On the first day of the course, which coincided with SHARP's open day, the students made a casting hearth, lining it with the same daub mixture as was made for the iron smelt. The students made crucibles from a similar mixture of sand, clay and horse manure.

As with the bloomery furnace, the casting hearth had to be fired to dry it out, during which process it acted as a makeshift kiln for firing the crucibles. The remainder of the second day was spent making wax models for casting.

Over the next couple of days, the wax figures were coated with clay to form the moulds. The wax was then melted out, leaving the moulds hollow and bearing the pattern of the carved wax. The 'lost-wax' process allows for fine-detailing or more complex objects. However, the moulds can only be used once and there is

a chance of miscasting if the molten metal does not fill the entirety of the mould.

The students also made moulds from cuttlefish. This is easily carved and produces instant results when molten metal is poured into the finished moulds. The students tried working with different metal alloys, including pewter, brass and bronze. Success can be measured in that each student left the course with at least one cast object.

During the 2016 season's course, the furnace was used to smelt malachite (copper ore) and also to co-smelt calamine (zinc ore). In past times this process of co-smelting the two non-ferrous ores was used to produce the alloy, brass. Metallic zinc, with a lower boiling point than copper, vaporised and the zinc vapour alloyed with molten metallic copper as it formed, to produce brass.

The copper smelt was continued during the evening with a dramatic light show - the greenish flame of copper emanating from the furnace showed that smelting of the ore was taking place, confirmed by the presence of metallic copper in the base of the furnace when examined the next day.

$\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ malachite + heat = 2CuO copper oxide + CO_2 carbon dioxide + H_2O steam

$2\text{CuO} + \text{C}$ charcoal = 2Cu metallic copper + CO_2 Carbon dioxide

And

$\text{CuO} + \text{CO}$ (carbon monoxide) = $\text{Cu} + \text{CO}_2$

An experiment to smelt zinc from its ore calamine was carried out. The signal blueish flame of metallic zinc emanating from the furnace confirmed that chemical reduction of the ore was taking place.

ZnCO_3 (component of calamine ore) + heat = ZnO zinc oxide + CO_2 carbon dioxide.

And

$\text{Zn}_4\text{Si}_2\text{O}_7(\text{OH})_2 \cdot \text{H}_2\text{O}$ (another component of calamine ore) + heat = 4ZnO zinc oxide + 2SiO_2 silicon dioxide (which becomes part of the slag) + $2\text{H}_2\text{O}$ steam.

2ZnO (zinc oxide) + C charcoal = 2Zn (metallic zinc) + CO_2 (carbon dioxide).

And

$\text{ZnO} + \text{CO}$ (Carbon monoxide) = $\text{Zn} + \text{CO}_2$

Editor's note - SHARP has a collection of 'slag' stored in the Old Village Hall. Some of the material is clearly furnace-waste and when tested its specific gravity is between 2.8 and 3.2. There are, however, much denser samples with specific gravity around 5.8 - 6.0 (metallic iron = 7.0). This material is probably bloomery iron. Whether this was smelted at Sedgeford or brought in from elsewhere for smithing to remove impurities is not certain. (J.Jolleys - personal communication).

6. Keeping it in the Family

*An examination of the last plague at Sedgeford; the typhus epidemic of 1852-3
by Terry Baxter*

In the wall of one of the gate pillars that form the entrance to the churchyard at Sedgeford is a plaque. It is mounted high up and is not easily noticeable, but it documents a tragic episode in the long history of Sedgeford.

THESE GATES WERE ERECTED BY THE REVEREND THE VICAR W.B.
ESTCOURT AND HIS PARISHIONERS TO REMIND THE LIVING AND IN
MEMORY OF THE DEAD DURING V MONTHS OF AD MDCCCLII OUT OF CL
SICK XX PERSONS DIED OF TYPHUS FEVER.

“HE DOTHT NOT AFFLICT THEM WILLINGLY NOR GRIEVE THE
CHILDREN OF MEN” LAM III XXXIII

This article will examine the causes, spread and victims of the typhus epidemic through the autumn and winter of 1852-3.

Introduction

The first national census was taken in 1841 and a census has been repeated every ten years since. The census of 1851 gives details of most of those who would fall victim to typhus some 18 months later. In addition, local records - the parish register of births, death and marriages and the parish rate book presents a record of the epidemic as it unfolded. Victims were identified in the records by a specific symbol in the margin, (§).

The plaque is not completely accurate, the epidemic lasted for six and a half months, not five, and the number of fatalities was actually twenty-one. During the 19th century, before the advent of modern bacteriology, typhus and typhoid were often confused, since both were associated with a rose-red rash on the body.

Sedgeford in 1852

The population of 655 recorded in 1841 had risen to 765 by 1851, whilst the number of dwellings had fallen from 187 to 154. Of the families in the village, many had been there for over 200 years, whilst some had moved in from outside. The census noted 125 heads of family as agricultural labourers (ag labs). Other trades recorded were shoemakers, grocers, publicans, a dressmaker, miller, wheelwright and blacksmith. Most cottages were rented.

Typhus fever

Otherwise known as gaol fever and road fever, typhus is a disease of poverty, overcrowding and inability to maintain personal hygiene. The causative organism, the bacterium *Rickettsia prowazekii*, is spread by the human body louse. The bacterium enters the gut of the louse from an infected individual and is excreted in the louse faeces. Irritated by bites, the next victim scratches and inoculates the organism into the body, or via the conjunctivae by rubbing the eyes. Louse-infested second-hand clothing can be the source of an outbreak. The disease is prevalent during the colder weather of autumn and winter, since if the air temperature is above 22, infected cells in the gut of the louse rupture, killing the insect. The incubation period is 10 – 14 days. Symptoms are high fever, severe headache, muscular and back pain. Around the 3rd or 4th day, a rose-red rash appears on the body. During the second week, delirium occurs and death from heart and organ failure may occur. Gangrene of the hands and feet may also occur.

Factors behind the epidemic

“When sorrows come, they come not single spies but in battalions.”

Shakespeare - Hamlet.

The 1852 outbreak was the culmination of an adverse chain of events. A drought during the summer of 1852 reduced the yield of the cereal crops, a problem compounded when late summer and autumn rain caused spoilage of that reduced crop by mildew, rust and secondary germination in the sheaves as they stood in the fields to dry.

Poverty (recorded by the numbers in receipt of parish relief), inadequate nutrition and domestic overcrowding weakened the resistance of the most vulnerable to infection. Maintenance of personal hygiene and the washing of clothes and bedding would have been increasingly problematic. The local newspaper, the Lynn Advertiser and West Norfolk Herald reported the emerging crisis. “It has been said that the master cannot suffer without the servant suffering also, the truth of this we now see exemplified and we cannot feel but sympathy for the situation the labourer is at present placed.” - October 1852.

Peas and beans were discoloured, locally harvested cereals thin and of poor quality, potatoes small and blighted. Fuel became unaffordable for the poor as did increasingly expensive imported foodstuffs. By the end of the year potatoes were scarce and the paper reported this “...thus throwing the labouring classes almost entirely on to bread stuffs.”

The poorest of the village were at particular risk should an infectious disease enter the equation. This it did, in the form of typhus - probably introduced through a donation of second-hand (and louse infested) clothing, donated in good faith as relief for the poor.

The victims

1st victim. Alice Forster, aged 30. Died 29/8/1852, buried 2/9/1852.

Alice's family seem to have been the victims of 'downward mobility'. Her father was recorded as a farmer in the parish records of his children's births, but as a labourer in the 1841 census. His family owned a large amount of land at the east end of the village along the Docking road. Also, unlike most labourers in the village, he and his family owned their cottages. Present at Alice's death was Elizabeth Frary, with whom Alice may have been living and the neighbour of Alice's brother Frederick and his wife Jane.

2nd victim. Algerina Potter. Aged 3, buried 8/10/1852.

She was the daughter of William Potter (hurdle maker) and his wife Frances (nee Riches). They lived in a cottage at the Cole Green end of the village. All of the Potter men had the same occupation.

3rd victim. George Smith aged 41. Died 23/10/1852, buried 27/10/1852.

George was a labourer living with his wife Mary (nee Crisp), their four children and two lodgers in a cottage near the chapel along the Docking road. His headstone which includes two of his children - William and Stephen and can be seen from the path alongside the western part of the graveyard of Sedgford church - possibly paid for by his wife's family, the Crisps, who had been recorded in the village 500 years earlier and were relatively well-off.

4th and 5th victims. Jane Forster (nee Alcock) aged 26, buried 2/11/1852 and her infant daughter Ann Maria Forster aged about 4months, buried 2/11/1852.

Jane was the wife of Frederick Forster and the sister-in-law of Alice, the first victim. The Forsters lived in a cottage along the Docking road close to the chapel. The probability was that, as a nursing mother, Jane passed the infection to her daughter. If Jane was already debilitated by childbirth and inadequate nutrition, the added burden of breast-feeding would have further reduced her resistance to infection. Ann Maria was Jane's third child. Her first, an illegitimate daughter lived with the paternal grandfather.

6th victim. Harriet Cooper, aged 24, buried 6/11/1852.

Harriet usually resided at the rectory in Roydon, Essex, where she acted as nurse to the rector's children. It is possible that she had to return to Sedgford to help in the care of the many younger children in her family, who may have contracted typhus. The family lived in a house and shop close to the church. The shop itself may have been no more than the front room of a large cottage, a room given over for the purpose.

7th victim. Joshua Rush, aged 20, buried 13/11/1852.

Joshua, a single man, was an agricultural labourer. He lived in a cottage on Cole Green with his widowed father and younger brother Obadiah. His mother Mary (nee Rix) had died 12 years earlier.

8th victim. James Mason, aged 10, buried 16/11/1852.

James was the son of Robert, an agricultural labourer and his wife Sarah (nee Bobbin).

9th victim. Ann Nobes (nee Beckerton) aged 40, buried 16/11/1852.

Ann was married to Henry, a carter, by trade. By the age of 40 she had ten children, the latest being a year of age. She would have spent her entire married life either pregnant, or breast-feeding. Her immune system would have suffered accordingly.

10th victim. Robert Henry Beckerton aged 18months. Buried 18/11/1852.

Robert's family were in a dire situation before the onset of the epidemic. His father, John, had died earlier in the year and his mother, Sophie (nee Jones) was in receipt of parish relief according to an entry in the parish rate book of October 1852.

11th victim. Ann Mason, aged 18, buried 20/11/1852.

Ann was the sister of the 8th victim, James. She had no recorded occupation.

12th victim. Humphrey Skerry, aged 27, buried 20/11/1852.

Humphrey lodged with George Smith (3rd victim) and his family. He was an agricultural labourer. His father had died in 1845 and his step-mother in 1846. The Smiths and the Skerrys were recorded as neighbours in the 1841 census and this close connection probably explains the reason that he lodged with the Smiths.

13th victim. Elizabeth Carter (nee Smith) aged 52, died 17/11/1852, buried 21/11/1852.

Elizabeth was the widow of Robert Carter. Present at death was Benjamin Smith (? her brother). Benjamin's own wife had died in January 1852. It may be that they shared accommodation in Sedgeford after the deaths of their spouses.

14th victim. Thomas Senter, aged 20, buried 27/11/1852.

Thomas lived with his parents and five other siblings in a rented cottage near the church. He was an agricultural labourer, his father, a shepherd.

15th victim. Hannah Seaman, aged 3, buried 28/11/1852.

Hannah was the daughter of Thomas and Ann (nee Crisp - and sister of Mary, the wife of the 3rd victim, George Smith).

16th victim. Thomas Farmer, aged 19, buried 6/12/1852.

Thomas was an agricultural labourer and also, like Humphrey Skerry, lodged with the Smith family.

17th victim. George Augustus Taylor, aged 6months, buried 7/12/1852.

Little is known about George. His mother, Mary, was unmarried and was probably working as a servant in Docking when she fell pregnant. It seems that she moved back to the family home in Sedgeford, a rented house and shop on the Docking road. Mary's father, Thomas Taylor, was a basket maker and moved

to Sedgford from Bircham. The infant George was baptised on the 12th of November in a private service. This unusual arrangement could be made if either the mother, or the infant were at high risk of dying and it is possible that his mother, or George himself were showing signs of typhus at this time.

18th victim. Ann Potter (nee Plumb), aged 34, buried 28/12/1852.

Ann was the wife of Thomas Potter, a hurdle maker. They lived in a cottage on Cole Green. She must have been part of the extended Potter family, all hurdle makers, of which the 2nd victim Angelina was a member.

19th and 20th victims. William G Smith, aged 11, died 13/12/1852, buried 2/1/1853.

His younger brother Stephen Crisp Smith, aged 4, died 23/1/1853, buried 25/1/1853. Both were the sons of the 3rd victim, George Smith. Their names are recorded on George's headstone in Sedgford churchyard. In all, five individuals, George, his two sons and two lodgers died of typhus in the cottage between October 1852 and January 1853.

21st and final victim. Emily Willimot (nee Forster) aged 26, buried 26/2/1853.

Emily was the sister of the first victim, Alice. She and her husband Robert lived with two of her three children in their own cottage near to the chapel on the Docking road.

Out of a village population of 765, some 150 were infected with typhus (one in five) and with twenty-one deaths, the mortality rate was 14%.

The spread of the disease

Many factors existed in Sedgford in 1852 which put the village population at high risk of falling victim to an epidemic disease.

Overcrowding - the population had risen from 655 to 765 in ten years, whilst the available accommodation had fallen from 187 to 154 dwellings in the same time.

Poverty - there was a long-running agricultural depression in mid-Victorian England, particularly since the repeal of the Corn Laws in 1845 had removed duty on imported grain, keeping its price above that of home-produced grain.

Poor nutrition - poverty, a poor harvest and high prices of foodstuffs exposed the most vulnerable to malnutrition and vitamin deficiency.

Wet and cold weather - reducing still further a sub-optimal level of personal hygiene.

Infestation - that most of the population were already infested with ectoparasites meant that the introduction of typhus-infected body lice would not have been noticed. Typhus was endemic in mid-Victorian Britain, furthermore its cause was unknown. The miasmatic theory of disease still prevailed and it was only in the first decade of the 20th century that the link between typhus and

the body louse was understood. There is no record of typhus deaths in the records of neighbouring parishes and it seems most likely that the infection was introduced through infested second-hand clothes, which were then handed out, or sold to the poor. Close family and inter-family marital links and a network of neighbourly support within the village aided the spread of the infection through the poorer elements of the community.

It is of interest that there was no outbreak of typhus at the Docking Union workhouse and the practice of boiling all clothes may have been instrumental in this.

Conclusions

“The past is a different world. It has gone, we can study it and learn from it - but we would prefer not to live there.”

In 1852, the public health reforms of later-Victorian Britain had not been instituted. The water supply was likely to be contaminated by potentially fatal pathogens - typhoid and cholera. The Metropolitan Board of Works, under Edwin Chadwick, had become enmeshed by its own bureaucracy and it was only after the 'Big Stink' of 1857, when the stench from the polluted River Thames caused the suspension of the sitting of Parliament that action was taken with the construction of the London sewers. Even then this was ordered to carry away the miasmatic stink - still believed by public health physicians to be the cause of disease. That the health of the population of the capital improved dramatically with the removal of sewage and infecting organisms therein was incidental.

The Poor Law was administered in such a way that applying for and receiving parish relief was made to be so unpleasant that it was the very last resort before total destitution. The 20th century safety net introduced in response to the 1943 Beveridge Report did not exist. Wages were low, especially for agricultural labourers. Food was of variable quality and that available to the poorest was likely to have been both contaminated and adulterated. The poorest relied on themselves, their families and neighbours to get by - it was these close networks that inadvertently helped the epidemic to spread so widely through Sedgeford.

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7. Discipline at Sedgeford School During the Inter-War Years

Sue Crump looks at an aspect of local history talking to those who had experienced it.

"...Discipline was strict during this period. I was afraid of the master - but I respected him." This comment from Jack Cox about Mr. George Roberts, headmaster from 1909 until his retirement in 1937 is echoed by several other interviewees.

Stanley Mace recalled that Mr. Roberts was; "very strict, in fact, a bit too much, but he got results. He had a gold medallist from Sedgeford, who won the gold medal for King Edward VII Grammar School in Lynn. He was very proud of that. He had a good cricket team, but he was strict. He would sit at his desk with his cane on the front. He had two or three pieces of white chalk which he used at the blackboard. There were about 36 in the class and if anyone was talking, he'd pick up a piece of chalk and throw it. He was so clever he would always hit the person on the head. He never missed. He was a cricketer you see and that person he hit had to walk up to him and within seconds you'd be holding your hand out. You'd have four across your fingers - the times I've had that done."

"The boys had to touch their cap at the schoolmaster and the girls used to have to curtsy to the teachers. And, you weren't allowed to speak, it was all nice and quiet," added Lucy Wagg.

George Teeling was no stranger to the cane. "Roberts was very, very strict and very fond of the cane, but at the same time he was a very caring man. I realised that years after. I used to have the cane probably every day. I wasn't well-behaved probably. Anyhow, the only time I got off was at Christmas time. They always had a concert on two or three nights to get a bit of money to have a party for the school and I was able to sing in those days and act a bit and the result was in the weeks leading up to Christmas, I was the blue-eyed boy. It didn't matter what happened, the cane wasn't produced. I used to suffer in the days after Christmas! I thought he was a very strict disciplinarian and a bit hard on me, but as I say my father was killed in the First World War and Roberts was arranging for me, through the British Legion, to be apprenticed to an engineer."

Violet Garwood commented; "he was quite strict. Nowadays parents would go after teachers who punished their children, but not in my day. I used to say to my mother 'I got the cane today and it did hurt,' and my father would say 'It's no good coming to me with your tales, you'll get another you must have done something to deserve it'. Asked whether she thought this was fair, Violet replied "yes, I respected him."

Robert Middleton claimed: "I hold the record; I had the most strokes in one day. I swore at him and I got 66 strokes. Every ten minutes he gave me six. Course, I shouldn't have done that ... my father was a bit upset about it, but he just let it drop."

The incident was brought to the attention of the Managers. Minutes of their December 1933 meeting record: "The question of cruelty to the boy Middleton was considered. After hearing the doctor's evidence, the Managers unanimously agreed that the charge was fully substantiated and that Major Ingleby be asked to telephone the Secretary of the Education Committee the following resolution:- That the Managers being satisfied after hearing the evidence of the doctor that the head teacher has been guilty of cruelty in punishing a boy desires the Education Committee to suspend the head teacher from duty and to hold an immediate enquiry into his conduct."

Following communication between the Managers and the Education Committee, minutes from the April 1934 meeting note; "The Managers, having received the Staffing Committee's letter of Feb 19th wish to place on record their disagreement with the view that the parents should prosecute and the Staff Committee take no action whatsoever."

Mr. Roberts retired in 1937.



8. The Norwich Cathedral Manorial Complex at Sedgeford

John Jolleys reviews the medieval documents, later maps and SHARP's excavation evidence.

The Domesday survey of 1088 recorded that, in 1066, the manor of Sedgeford was held by Earl Gyrth, the youngest brother of King Harold Godwinson. Following the death of Gyrth, alongside Harold at Hastings, the manor passed to the Bishopric of North Elmham in the name of the bishop himself - the Anglo-Saxon Aethelmaer. On his removal from office in 1070, the Norman bishops - Herfast, William de Beaufeu and Herbert de Losinga became its 'tenants in chief', holding the manor from King William.

De Losinga, who had moved the see to Norwich from its temporary siting at Thetford, had bought the bishopric in 1091 from King William Rufus for the huge sum of £1900. This was against Church law and consent from Rome was only given after de Losinga had committed to build the new cathedral in Norwich and to found Norwich Cathedral Priory.

William Taube, the third bishop of Norwich, had been prior and following his enthronement as bishop (his election having been supported by the priory monks), he rewarded the institution by leasing his manor of Sedgeford to it as a 'fee-farm' in the sum of £20 per annum. The £20 obligation was removed in 1205 by Bishop John de Grey in exchange for interests that the manor of Sedgeford held in the market place at Lynn.

In 1225, the priory bought the right to hold a market at Sedgeford from the Government of the young King Henry III. The price paid was a palfrey (a riding horse of value 5 marks = £3-6s-8d). Institutions of the Church were meticulous in their book-keeping and bureaucracy and have left a rich legacy of data to posterity in the form of bailiffs' accounts, inventories, land deeds and cases from the manorial courts. The County Record Office in Norwich holds over sixty varied collections concerning the manor of Sedgeford between the dates of 1200 and 1533. David Yaxley (1988), in his work "The Prior's manor-houses - inventories of eleven manor-houses of the Prior of Norwich, made in the year 1352" used the original documents as his primary source and has been able to provide detailed information about the manorial complex.

A tithe barn was noted in the inventories and the 1631 le Strange estate map placed it immediately to the east of the churchyard along the southern side of Church Lane. The remnants of the lower part of its outer wall can still be observed in the base of the wall bounding the residential properties now occupying the old West Hall Farm yard.

The 1631 map also has a large, unoccupied area between the tithe barn and the Heacham river. This would seem to be the likely site of the Sedgeford market place, especially on account of its proximity to the manorial complex itself.

Photo 1
Excavation of boundary wall of manorial complex at West Hall Paddock



The manorial complex

Original documents describe two courts, both moated and with a combined area of twelve acres. The river formed the northern boundary of the larger, east court. It ran between the two and formed the southern boundary of the smaller west court. Moats enclosed the other sides of the courts.

The southern moat of the east court is still visible as a ditch running from the river and forming the boundary between Saggy Horse Field and the garden of West Hall House. The eastern moat (recorded as being 20 feet wide in 1299) is possibly represented by the easternmost of the ornamental ponds in the gardens of the residential properties which now occupy the land of the old West Hall Farm and just west of the causeway which carries the road to Snettisham across the valley bottom. Anecdotal reports state that when this pond was dug out, the ground removed was very wet and loosely compacted, suggesting that it was accumulated silt. The northern moat of the west court is not visible, but a resistivity survey carried out by SHARP in the late 1990s showed a band of low resistance just south of the boundary wall of the churchyard and when this area of West Hall Paddock was excavated by Anj Beckham (1996-2000), a black, wet, organic silt was noted in the lower part of the excavation trench, corresponding to the area of low resistivity.

The implication is that this was the remains of the moat. The western moat divided the Prior's manor to that of the de Sedgefords, which is believed to have been situated in Dovecote Piece (Ladywell field), immediately to the west. (Beckham 2003). An evaluation trench in the north eastern corner of Dovecote Piece and over a linear depression running down to the river revealed a layer of dark wet silt. This linear feature is still visible in the landscape, running north-south and some 10m to the west of the path running up past the churchyard. This feature has, in comparison to the meadow, a soft and springy feel underfoot.

The boundaries and gates of the courts

Records show that 82 yards of stone wall were built in 1255, 187 yards of clay, chalk and thatch wall in 1265 and 203 yards of clay wall in 1312. Anj Beckham identified a length of chalk, flint and cobble wall foundation in one of her evaluation trenches in West Hall Paddock. The wall ran north-south, some 2m east of the path running up from the river crossing. Subsequent excavations, directed by Charlie Middleton, in 2015 (un-published) transected the same foundations 10m closer to the river - this appears to have been the remains of one of the boundary walls. These ran inside the moats and afforded the courts a further degree of security against casual, low-grade attempts at theft.

The site of the Great Gate and bridge into the complex was almost certainly represented on the 1631 map, on which bridge was recorded crossing the river from the north into the site of the former east court.

A postern gate was mentioned in 1317. This probably gave entry from the south, crossing the southern branch of the moat. The drive to West Hall House is today carried across the remains of the moat on a causeway. The 19th century walls on either side show no evidence of having subsided, as would have been

Fig 1
 West Hall in 1631. Extract from the 1631 Le
 Strange Estate Map showing the core of the
 village—a composite of two adjoining portions



expected if the moat had been filled in and it seems likely that in medieval times, this access used a causeway, rather than a bridge. Other bridges were recorded, one crossing over the river between the adjoining courts, one to the church (the 'kirkebrig') and one giving access to the sheep court. In 1278, 195 yards of hedge was planted between these two bridges.

The manorial Hall and associated structures

All buildings would have been constructed around an upright timber frame, with wattle and daub infill. The roof would have been thatched with local reed. Some of the more substantial structures were recorded as having chalk and flint foundations, some though may have rested on natural chalk bedrock.

The main hall was reported to have accommodated 41 workers at harvest time. Attached to one end was a pantry and at the opposite end, 'the lord's great chamber' and the lord's solar (1294/5). This was furnished with two garderobes, presumably emptying directly into the river. These two rooms were private accommodation for the Prior and visiting dignitaries. A steward's chamber was noted in 1312 and the construction of another timber-framed chamber with stone foundations was recorded in 1317-19.

The medieval hall typically had a central hearth, with smoke rising up to and through the thatched roof. The lord's high table would have been sited on a raised dais at the opposite end to the pantry with the other tables arranged in the main body of the hall. Doubtless the hall at Sedgeford was similar. The kitchen, at the pantry end, was a separate, free-standing building - a precaution against the very high risk of fire. It was divided into two chambers in 1294. A manorial chapel was close by, separate from the main buildings and with a paling fence screening the kitchen from it. Other documented domestic structures were a dairy, a bakehouse and a well.

Non-domestic buildings of the manorial complex

A boat-bay was close to the 'Great Gate', a boat was built in 1272/3 and repaired in 1278/9. The great barn was noted in the 1352 inventory to have in store (all in the sheaf):

16 quarters of wheat.

12 quarters of rye.

2 quarters of oats.

16 quarters of barley (4 quarters = 1 ton).

In 1305/6 the purchase of fir boards (imported from the Baltic) was recorded for the construction of a solar (living accommodation) at the head of the 'New Barn'. Two granaries were mentioned. The 'old granary' was re-roofed with oak boards in 1255 and its description as 'old' in 1327 implies that the 'new' granary was built during the 1320s.

Although there was no direct reference to a malthouse, all medieval manors had one. References in the 1352 inventory to malt skeps (baskets for carrying malted grain) and a haircloth for the kiln (a cloth spread across a slatted floor above the drying kiln) is strong evidence that there must have been a malthouse

on-site. A cart-shed, toolshed and stables were recorded and the inventory provides details information about what was kept in them.

Gardens

In 1278 a new garden was made on the site of a filled-in pond. Other areas were under cultivation; produce including leeks, garlic, onions, shallots and beans. Surplus fruit from the orchard, apples, pears and plums, was sold. An ash grove was planted in 1278 - ash timber was used for handles of tools and in the frames of carts.

Buildings related to animal husbandry

A fowl house, cattle sheds, pig sties and a sheep court. Two buildings were recorded in the sheep-court, both were timber-framed, constructed on masonry foundations and roofed with thatch. One was built in 1317/18 and the second (noted to have shuttered windows) in 1319/20. Presumably they were used for lambing and shearing. These are the only structures mentioned in the accounts and inventories where a clue is given as to their site and then, only obliquely - the information that 195 yards of hedge was planted between the kirkebrig and the sheep-court bridge. The most suitable place for these buildings would have been on drier ground, off the flood-plain and on the same side of the river as the sheep-folds (present-day Chalkpit and Hall fields and Polar and Shernborne Brecks).

On the siting of any other buildings, the documents are silent, furthermore, none remained apart from the tithe barn to be recorded on the 1631 map. Archaeology is the only way that an answer could be found. David Yaxley, without the benefit of excavation evidence, postulated that the manor house was sited in the west court. Anj Beckham, having excavated in West Hall Paddock (part of the west court) found no evidence for this and felt that the site was in the larger east court.

It seems likely that the manorial complex was laid out in a way that worked efficiently. The west court might have been given over to gardens, orchards and possibly pig sties: the east court to the manorial hall and its associated buildings as well as the barns, granaries, malthouse, cart and toolsheds, the stables and possibly the cattle-sheds.

What information has archaeology provided?

Ceramic evidence came from excavations in West Hall Paddock, Dovecote Piece and from test-pits of the Sedgeford village survey. The area in the vicinity of West Hall House and the church produced a late-pattern assemblage of Thetford ware (approx. 975-1100), un-glazed and glazed Grimston ware (1100-1500) and post medieval to modern pottery, indicating that this was the initial settlement on the northern side of the valley.

Anj Beckham evaluated a raised area in Dovecote Piece, finding foundations and an assemblage of Grimston ware, but no earlier, or post-medieval pottery. This is strong evidence that this was the site of the de Sedgefords manor - leased from the Priory between 1146 and 1166. (The de Sedgefords disappeared from

the historical record during the mid to late 15th century).

The hypothesis has been that the barns, granaries and working buildings of the Prior's manor were probably sited in the same area as the 19th century barns and outbuildings of West Hall Farm.

In 2000, these redundant agricultural buildings were converted into residential properties. Rik Hoggett directed a SHARP team to evaluate the site beforehand. A wide-area excavation of the farm yard was carried out. Unfortunately, no trace of any earlier buildings was found and so the hypothesis remains unproven. A loose, mixed top-soil overlay natural chalk and no features were found cut into this natural. It seems probable that any archaeological remains were stripped away in the early 19th century when the farm yard was laid out.

Archaeology has been more forthcoming about the site of the manorial hall. The supposition has been that the present-day West Hall House (constructed in the 16th century) occupies the site of the earlier medieval building. The house, itself, sits upon a platform of land which is slightly raised from the surrounding gardens.

During 2014 and 2015 a SHARP team, directed by Charlie Middleton, dug an evaluation trench (2.5 x 3m in dimension) in the gardens, some 25m to the south of West Hall House. The foundations of two, parallel Carstone walls, 2m apart, were uncovered. Of 17th/18th century date, these had been demolished when the house was extended at the start of the 19th century. Stratigraphy dated these walls, which overlay the same type of bricks as those used in the construction of the house in the 16th century. Late 18th century pottery was found mixed with demolition rubble of these walls, which were felt to be garden features.

Whilst the walls themselves were clearly post-medieval, artefacts recovered from the mixed and unstratified soil of the excavation trench included sherds of Grimston ware, glazed medieval floor-tiles and brick. In comparison, no similar floor-tiles were recovered in the West Hall Paddock excavations in the west court. The discovery of glazed floor-tiles is strong evidence that a building of some status stood nearby in medieval times. The likelihood is that the foundations of this building (almost certainly the manorial hall and its chambers) either lie underneath West Hall House, or were stripped away when the house was built.

Conclusion

Medieval records described the manorial complex and the contents of its buildings but gave no clue about where its buildings were sited. The accurately-surveyed 1631 map recorded only the tithe barn and it must be presumed that all medieval structures on the site had gone by that date.

Examination of the landscape, geophysics and excavation allowed the position of the moats to be determined and a length of the boundary wall of the west court was identified by the West Hall Paddock excavations. Ceramic evidence seems to place the hall itself on the same site as West Hall House.

Further excavation may reveal more information, but the possibility that most of the remains of any medieval buildings are either sealed beneath present-day structures or have been stripped away seems strong. Fortunately, contemporary

accounts record both what was there and their contents as well.

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9. What the Anglo-Saxons did along the valley floor

The Medieval Research Group, John Jolleys, Brian Fraser and Kathryn Oliana, discuss the Reeddam, the river, mills and a navigation from the sea at Heacham via Eaton and Sedgford to Fring.

The Reeddam - otherwise 'the lord's great reed bed', 'the lord's stagnum' (pond) and the 'Arundinetum domini' - was an important resource for the Prior's manor. With an area of sixteen acres, it provided the manor with an ample supply of reeds, fish and wildfowl all of which could both be used locally and also be sold for profit. There are many entries in the manorial accounts (Yaxley 1988):

1272 - a boat was built at a cost of 3s - 1 1/2d.

1277 - a court case, heard in Norwich, where an un-named individual was charged with, amongst other offences, fishing by night in the pond of the Prior of Norwich at Sedgford and 'carrying away his fish'.

1278 - the pond was renovated. Hurdles were brought in to save the stock of pike and eels and the pond was cleaned out using 20 buckets bought in for the purpose. The boat was mended and the boat bay repaired. A nesting place for the swans was constructed (possibly an island). A water-course was opened near the pond. Possibly this refers to the straight course of the river along the northern border of the Reeddam and under the Snettisham road, creating a mill-race for the 'great mill of the manor' which was situated just downstream from the causeway and bridge.

1285 - the pond was re-stocked with 1200 pike.

1287 - a bay (for the boat) was built at the eastern end.

1325 - the pond was cleaned out once more at a cost of 28s - 0 1/2d.

1352 - eels to the value of 16s - 10d were sold.

1415 - 13 cartloads of reeds were sent to one of the Prior's other manors, Hindringham, to be used in re-thatching a barn.

These are the earliest records relating to the Reeddam, however, many of the Priory's earlier records were destroyed by fire in the mid 13th century. Because of the extensive medieval records, the traditional assumption had been that the Reeddam and the associated dam were constructed after the conquest of 1066.

Archaeological evidence has overturned this opinion and has shown it to

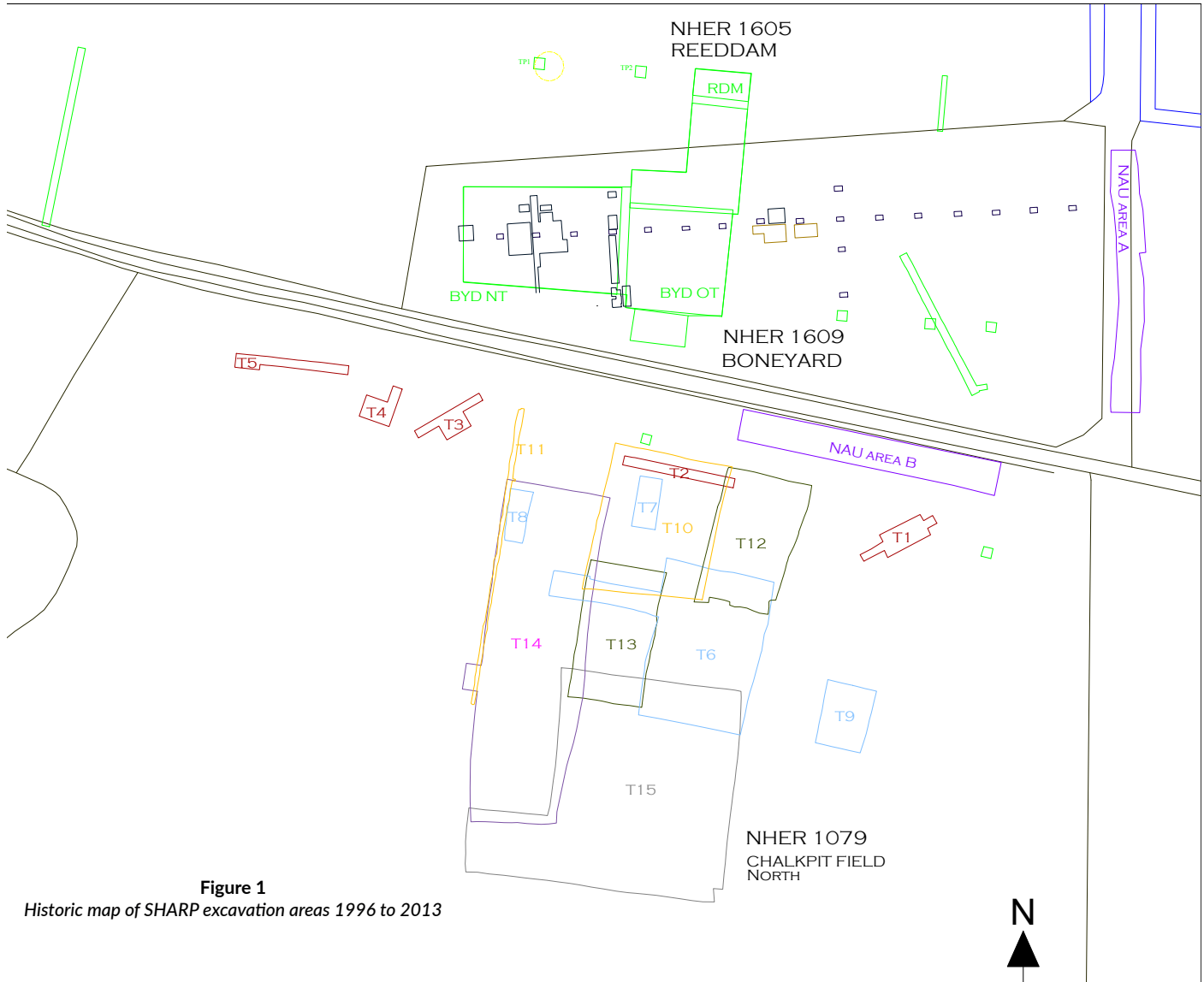


Figure 1
Historic map of SHARP excavation areas 1996 to 2013



Photo 1
Clay layer found within Reeddam test pit 1996.
The layer immediately overlies an Anglo-Saxon
occupation layer.

be of middle Anglo-Saxon origin. In 1953 C.H. Lewton-Brain, a local amateur archaeologist excavated in the Reeddam and noted middle Anglo-Saxon occupation debris - animal bone, oyster shell, a booze pin, iron objects and much middle Anglo-Saxon pottery. He also noted a clay layer which he interpreted as a clay hut-floor. SHARP has twice excavated in the Reeddam, once in 1996 when Gabor Thomas opened five test-pits and again in 2001/2 when Stuart Calow dug the 'Reeddam II' trench.

The 1996 test-pits

Five were dug, four 2m x 2m and one 11m x 1m. A layer of uniform, archaeologically sterile whiteish-grey clay, 0.12 to 0.15m thick was found in four of the five test-pits. Above this was wet, dark silt. Below, in an archaeologically-sealed context, was a layer rich in middle Anglo-Saxon occupation debris - animal bone, oyster shell and middle Anglo-Saxon pottery. No ceramic material later than Ipswich ware (720 – 850 AD) - Blinkhorn 2012 - was present.

Reeddam II trench

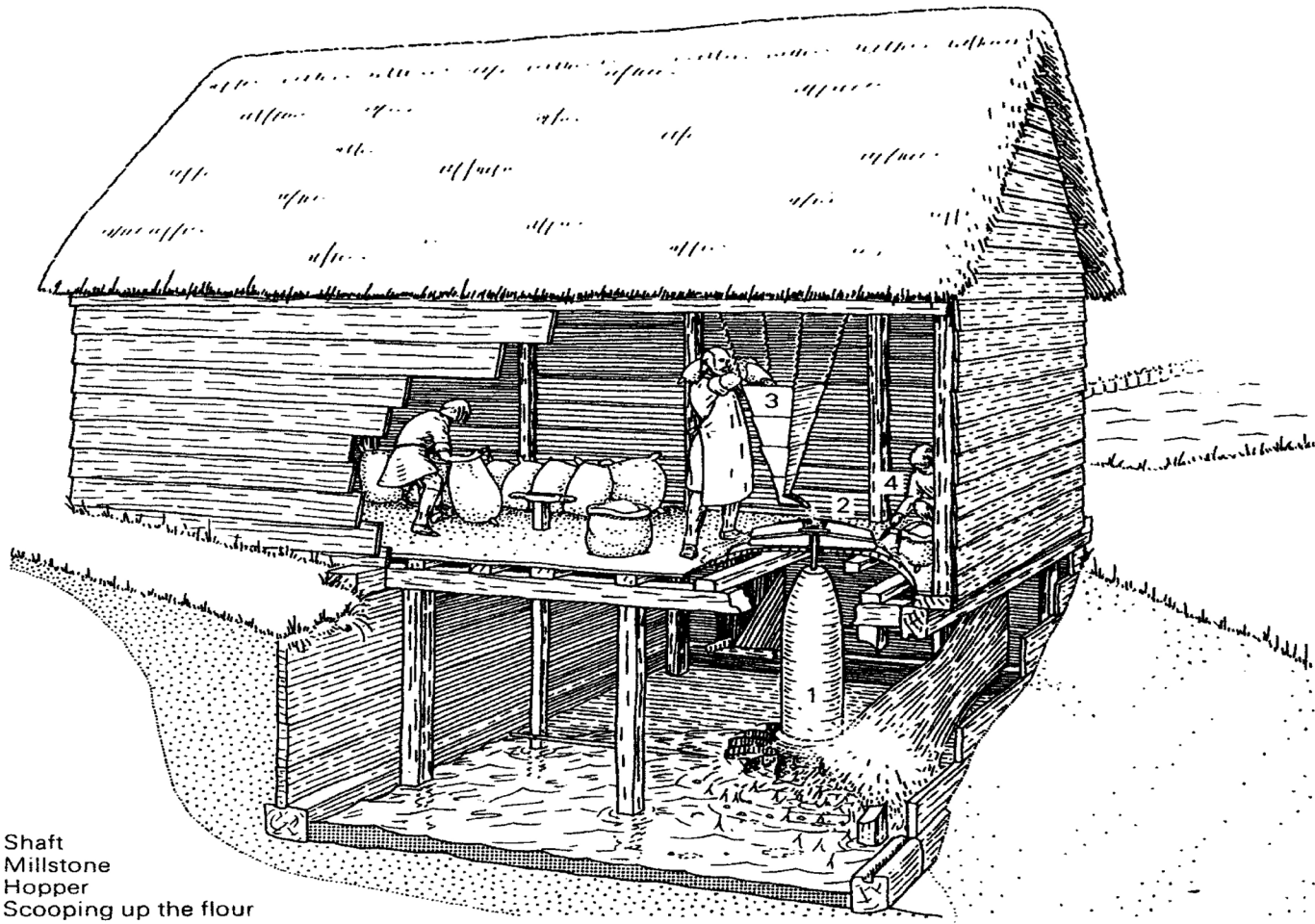
This ran from the edge of the track to the Boneyard field site in a northerly direction 35m into the area of the Reeddam. The same clay layer was found in the northernmost 5m. Sealed beneath it was middle Anglo-Saxon occupation debris, including many sherds of un-abraded Ipswich ware. No later pottery - neither Thetford ware (875 - 1100), nor Grimston ware (1100 - 1500) - was found.

In 2018, an augur core was taken at the eastern end of the Reeddam pond. The same layer of inclusion-free, whiteish-grey clay was found beneath the pond silt.

The archaeological evidence is clear; firstly, there was an intensive occupation of the valley bottom during the middle Anglo-Saxon period. Secondly, the ceramic evidence from the stratigraphy points to a date not later than 850-875 AD for the construction of the Reeddam and its associated dam/causeway. The construction would have required organisation, technological expertise, a labour force and the authority to harness all three. All structures in the valley bottom would have been cleared, the area levelled and an earth bank built at the downstream end to dam the river. The sub-soil at Sedgeford is permeable (sand and chalk), so a puddled clay layer would have been essential to make the area water-tight. Over 850 tons of clay would have been needed for an area this large. Water from the river and from springs on the lower slopes of the valley would have kept the area flooded.

Why was the Reeddam built?

The prime motives may have been to provide a constant, reliable head of water for mills downstream and to make a fishpond. Wildfowl would have been attracted and reeds would have established around the margins. The area must have been maintained regularly from Anglo-Saxon times and through the Middle Ages, since reed beds silt up rapidly, to be replaced with willow scrub, as seen in the Reeddam today.



1. Shaft
2. Millstone
3. Hopper
4. Scooping up the flour

Figure 2
Reconstruction of an Anglo-Saxon horizontal water mill at Tamworth

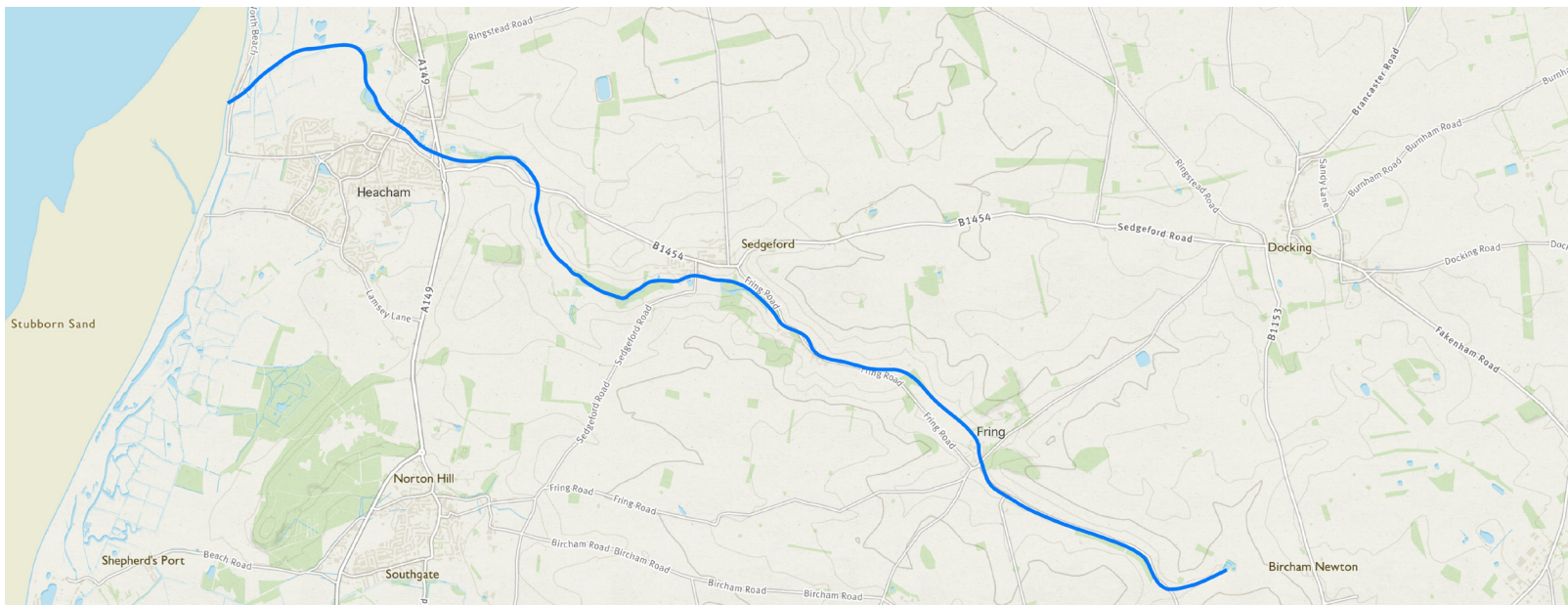


Figure 3
Course of Heacham River from Fring to the sea

Mills along the river

The Domesday survey of 1086 recorded four water-mills in Sedgeford and one at Fring. 'This Anund, the pre-predecessor to Peter de Valognes, had taken away'. Water-mills were common in the Romano-British period and re-appeared in the late 7th and 8th centuries. There are records from Ireland from the last quarter of the 7th century. An 8th/9th century mill, driven by a horizontal-axis wheel, was excavated at Tamworth during the 1970s by Philip Rahtz.

No direct trace of any of the pre-conquest mills has yet been found at Sedgeford, although a substantial piece of lava millstone was found in the river by the SHARP landscape team half way between Eaton farm and the Heacham road bridge (lava millstones, volcanic basalt, were imported from the Rhineland during the Anglo-Saxon period and into the post-conquest era. These originated from the Eifel, an area north of Meuse, west of the Rhine and adjacent to the present-day German/Luxembourg/Belgian borders).

The Heacham river valley falls at an average rate of 2.5m per km between Fring and the sea. With this gentle gradient, the only types of wheel that would work would either be horizontal axis wheels, where water held back by a weir was directed via wooden chute on to the wheel, or an undershot vertical axis wheel. Of these two possibilities, the former seems more likely. The documentary evidence that the mill at Fring was 'taken away' supports this argument since horizontal-axis mills would have been relatively easy to dismantle and to reconstruct elsewhere. The Heacham river is narrow and it would have been possible to construct a horizontal-axis mill across its width. This would have prevented navigation, but even if these mills were sited along the banks, the weirs and sluices would have been a major impediment.

Navigation on the Heacham river

Ann Cole (2005), writing in 'Waterways and Canal Building in Medieval England' comments thus - "... the Heacham river, a small stream which cannot be navigable for far and yet, kept open for just 3 or 4 miles, would provide a useful link between the Wash and the Icknield Way and the Peddars Way". Indeed, Janet Hammond and Steve Barnett (1996) had first suggested a river navigation between Fring and the sea at Heacham via Sedgeford - see SHARP first interim report.

An early 12th century 'custumal' document specified the duties required of the bonded peasantry of Heacham. This document was written using pre-conquest terminology and may reflect long-established compulsory obligations. (Beauroy 1984). These include - 'to spend a day's labour clearing the river bank to enable the transport of goods to the port of Heacham and to ensure the smooth functioning of the three water-mills' (recorded at Heacham in Domesday).

A pre-conquest canal from Heacham to Fring?

This feature can be traced from the bridge where the A 149 Kings Lynn to Hunstanton crosses the river upstream all the way to Fring. The river, at Heacham, was diverted in 1837 to create the mill-stream for Caley Mill (now part of Norfolk



Photo 2
Evidence of the canal in the woods to the
east of the Boneyard site

Lavender). The diversion appears to run into the course of the 'canal', which is seen as a sunken, waterlogged feature in the landscape passing through a meadow to the south west of the river downstream from the Sedgeford to Heacham road bridge.

Upstream from this bridge, it runs parallel to the river past Eaton (where it enters a spring fed pond) and thence from the pond upstream between the river and the Whipplegate track to Sedgeford. Most of the course can be followed in the landscape, but where not visible the course can be seen on aerial photographs. Downstream from Eaton Farm, these show a ladder pattern of ditches running between the 'canal' and the river. These are the remnants of a short-lived and unsuccessful attempt to create water-meadows in the late 18th/early 19th century. The 'canal' runs close to the southern edge of the Reeddam pond. On the northern edge of Sedgeford woods (planted by the Sedgeford Hall Estate in the early 19th century), it is separated from the pond by a low bank (1.5m wide), entering the pond itself at its eastern end.

Beyond Sedgeford to Fring - a canalised river

The river through Park field, between Sedgeford Hall and the woods, has been much altered by 18th/19th century parkland landscaping, but aerial photographs hint at a parallel course immediately to its south. This course is seen more clearly as a crop-mark to the south west of the Hall, passing under the early 19th century buildings of Glover's Farm and thence through the middle of the meadow up to Fring Cross, where it is forded by the Peddars Way. Today the river runs alongside the Sedgeford to Fring road in a cut dug in the late 19th century.

From Fring Cross, the course is direct along the eastern side of the valley to Fring, where it enters a three-acre pond, known locally as Fring Harbour. The profile is a flat-bottomed 'U'-shape with a width of around 6m. The feature runs a direct course for its entire length, with no meanders, no acutely angled bends and any curves are of gentle and wide arc.

Archaeological evidence

Two of SHARP's excavation trenches have transected the 'canal' and one has exposed it in plan.

In 2003 Anj Beckham's excavation trench in Saggy Horse Field cut a transverse section across the 'canal'. She noted that it had been re-cut at least fourteen times (indicating that it was in use and maintained over a long period of time). The sides and the bottom were a mixture of granular chalk and whiteish-grey clay. A layer of alluvial sand and gravel in the bottom showed that it had water flowing along it and that it was not stagnant.

Stuart Calow's 2000/01 Reeddam II trench also cut it in transverse section, but excavation was hampered by waterlogged ground and flooding. A depth of 1m and width in excess of 3m was measured. Several re-cuts were noted. The latest was narrower and the dark, silty fill contained 17th-19th century pottery and pieces of clay pipe. By this time it was no more than a drainage ditch. Unfortunately, neither excavation provided any definitive dating evidence.

Photo 3
Excavating the NE-facing section of the canal
in Saggy Horse Field 2003



The Boneyard and Reeddam I trenches were explored between 1996 and 2006. The 'canal' feature, named at the time as 'the medieval ditch' was seen in plan where it cut away burials in the northern part of the cemetery. This can be seen, in black, in figure 5.1 on page 80 of 'Digging Sedgeford'. The cemetery was in use between, approximately 650/725 AD and 850/875 AD at the latest (Baldry - 2014). The 'canal' therefore must have been dug after the cemetery went out of use - i.e. after 875 AD.

During the 2018 season the medieval research group studied the feature. Auger cores were taken from two sites, some 2km apart - in Sedgeford woods and by Eaton barn. It is clearly visible in Eaton meadow as a linear feature, running parallel to the river and 45m north of the Whipplegate track. Its width here is 6.3m and the profile 'U'-shaped. From bank-top to turf in the centre the depth is 0.4m. Below this, the auger core reached a layer of granular chalk mixed with whiteish-grey clay at a further depth of 1.1m.

In Sedgeford woods, where it is separated from the Reeddam pond by a low bank 1.5m wide and 0.5m in height, the width is 6m. The southern bank is steep-sided, rising 2.5m against the slope of the valley. The cut is filled with a dark humic material. Auger cores were taken across a section the ditch and at two further points in the centre, 5m to the east and the west. All three central cores found a layer of granular chalk mixed with whiteish-grey clay at a depth of 0.95m. The same layer was found in the section line of cores 0.75m south of centre, but at a depth of 0.9m, suggesting that the profile was a flat 'U'-shape. This chalk/clay layer was identical in nature to that found at Eaton and to that of the Saggy Horse Field section from Anj Beckham's evaluation.

Discussion

The uniformity of width, depth and the nature of the bottom are indications that it was constructed as a single entity. The direct course, with gentle curves rather than sharp bends is strong evidence for its use as a 'canal' allowing the passage of flat-bottomed craft to and from Heacham as far as Fring. The bottom was waterproofed with clay and the granular chalk would have given leverage for a punt-pole.

The prevailing average gradient from Fring to the sea of 2.5m per kilometre and from Sedgeford to the sea of 3.4m per kilometre would have resulted in sufficient flow to minimise silting, but not so much as to impede navigation. Other uses would have been to collect spring water emerging from the southern slope of the valley, making the valley bottom less boggy and thus usable as pastureland.

A linear channel 5.8m in width runs from the pond at Eaton on a gentle gradient into the river. Auger studies, to a depth of 1.1m reveal at least two re-cuts and in both, alternating layers of yellow sand and darker silt - the first suggesting use and flow, the second periods of disuse. These observations suggest that this feature had been a mill-race and that one of the uses to which the 'canal' had been put was to act as a leet for a mill at Eaton.

Dating

Unfortunately, the excavations in Reeddam II and Saggy Horse Field failed to provide definitive evidence and that in Boneyard/Reeddam I trenches showed only that it was dug after the cemetery went out of use (i.e. after 875). The early 12th century 'custumal' document from Heacham points to a navigation to and from the port at Heacham before the 1066 conquest.

At the time of the Danish conquest of East Anglia in 869/70, the bishoprics were dissolved and the monasteries sacked. Excavations in Boneyard show ditches from the Anglo-Scandinavian part of the Chalkpit field settlement site cutting through burials in a way which shows lack of respect for the Christian dead. The 'canal' shows a similar lack of respect where it too cuts a swathe through the cemetery. This is some evidence, albeit circumstantial, for a late 9th/10th century date.

Place-name evidence

Ann Cole (2005) expressed the opinion on the place-name Eaton (Anglo-Saxon Ea-tun, riverside settlement) reflected a duty of continuing maintenance of navigable waterways. She noted that many Eaton/Eton settlements are to be found on the upper reaches and tributaries of major rivers.

Comparative evidence

A mid-10th century canal has been identified at Glastonbury, running some 1.8 kilometres from the River Brue to the Anglo-Saxon abbey at Glastonbury. Its width of 6m and depth of 1m are identical to those of the Heacham to Fring 'canal', a similarity which might also point to a 9th/10th century date. The evidence for a 'canal' from Heacham to Fring is strong, although the dating is as yet unconfirmed. Further excavations will take place in Saggy Horse Field during the 2019 season in a further attempt to find definitive evidence.

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10. Who got a coffin burial on Boneyard?

Martin Hatton discusses evidence of different burial forms in the Boneyard cemetery.

“Coffin or shroud?” is a common question asked by, and of, archaeologists excavating human remains. It is addressed to some extent in Digging Sedgeford: A people’s archaeology (SHARP 2014, 93-95). In the main example shown there direct evidence of a coffin in the form of wood stains and iron brackets was found. Generally this is not the case and we at SHARP just took a common-sense view that jumbled up bones may indicate that there had been space available in a coffin when the body had decayed, whereas an orderly looking skeleton was generally a sign that the body had been constrained by a shroud and/or the pressure of soil directly on it.

In the last decade or so a more scientific approach, known as archaeoethanatology, has been pioneered by Henri Duday a French archaeologist and anthropologist (see e.g. Duday et al. 2009). This takes account of, for example, the fact that tissues, such as ligaments and tendons, in different parts of the body decay at different rates and that this affects the final position of the bones. To be successful this approach requires very detailed observation and comprehensive recording at the excavation stage.

Recently Emma Green, a Masters student at Sheffield University and former attendee at a SHARP human remains course, applied these methods to our Boneyard remains for her MSc dissertation (Green 2013). Her source materials were our excavation photographs and documentation of the burials. She found that a third (89/291) of our burials appeared potentially suitable for her study. (This may seem a disappointingly small proportion but it needs to be remembered that many of the Boneyard burials were highly disturbed by natural processes, such as colluvial movement, and human action, such as ploughing.) Emma then looked at six ‘key skeletal observations’ (ibid., 43 and Table 4.3). After detailed statistical analysis of the overlap of these criteria she was then able to infer the burial form of half (45/89) the burials studied: 10 had been buried in a ‘wide coffin’ and 35 in a ‘tight shroud, narrow coffin or narrow cut’ - see Table 1 below.

In her final paragraph Emma wrote: ‘With respect to Sedgeford future work should be carried out using the results of this study in order to look at the social impacts of coexisting burial practices, such as a breakdown by age at death, sex and social status.’ That is what this note seeks to do.

| Wide Coffin | Tight Shroud/Narrow Coffin/Narrow Cut | |
|-------------|---------------------------------------|-------|
| S0017 | S0004 | S0174 |
| S0035 | S0010 | S0175 |
| S0060 | S0018 | S0176 |
| S0093 | S0029 | S0177 |
| S0096 | S0024 | S0181 |
| S0123 | S0038 | S0184 |
| S0146 | S0041 | S0208 |
| S0188 | S0057 | S0212 |
| S0205 | S0058 | S0220 |
| S1028 | S0061 | S1006 |
| | S0062 | S1014 |
| | S0071 | S1016 |
| | S0073 | S1033 |
| | S0074 | S1039 |
| | S0141 | S1043 |
| | S0153 | S1052 |
| | S0160 | S3014 |
| | S0162 | |
| 10 | 35 | |

Table 1
Burials by inferred burial form as determined by the overlap of the criteria producing significant associations.
 (Green 2013, 101 Appendix G)

The age and sex of each of skeleton in Table 1 is given in Table 2. The sex categories - **F** = female, **?F** = probable female, **?** = ambiguous / undetermined, **?M** = probable male, **M** = male – are based on characteristics described in Buikstra and Ubelaker (1994, 16-23). The age categories, from young to old, are: **Early Adolescent**, **Late Adolescent**, **Young Adult**, **Mature Adult**, and **Old Adult**. In cases of uncertainty the category **Adult** is occasionally used.

The normalised age profile for the whole of the sample is compared with that for whole SHARP excavated population (data extracted from Fig 6.1, SHARP 2014, 139) in Figure 1. In Figure 2 the normalised distribution of the sex categories is compared with data for the whole population (from Fig 6.2, SHARP 2014, 140). The age at death profile of the study sample and that of the population as a whole are very similar. The distributions of the sex categories are, however, very different: the proportions in the sample are highest amongst those that were firmly sexed (F and M) whereas in the population as a whole the proportions are higher amongst those of less certain sex (?F, ? and ?M). This is consistent with the point made above: for burial studies skeletons which are more complete and less damaged would be most likely to yield useful results; skeletons sexed as 'probables' are more likely to be the incomplete and badly damaged ones. However, it does mean that we must be cautious about applying the results of this study to the population as a whole; it would be unwise to assume, for example, that 22% of all burials were in wide coffins just because that is the percentage $([10/(10+35)] \times 100)$ found in the study.

| Wide Coffin | | | Tight Shroud/Narrow Coffin/Narrow Cut | | | | | | | | |
|-------------|-----|-----|---------------------------------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
| Skele No. | Sex | Age | Skele No. | Sex | Age | Skele No. | Sex | Age | Skele No. | Sex | Age |
| S0017 | ? | MA | S0004 | M | MA | S0073 | ? | LA | S0208 | M | OA |
| S0035 | F | YA | S0010 | F | MA | S0074 | F | MA | S0212 | ?F | A |
| S0060 | ?F | MA | S0018 | M | YA | S0141 | ?F | YA | S0220 | ?F | OA |
| S0093 | F | LA | S0029 | F | MA | S0153 | ? | EA | S1006 | F | EA |
| S0096 | M | OA | S0034 | ?M | LA | S1060 | ? | EA | S1014 | ?F | MA |
| S0123 | F | LA | S0038 | M | OA | S0162 | M | MA | S1016 | M | MA |
| S0146 | F | LA | S0041 | F | MA | S0174 | F | YA | S1033 | M | MA |
| S0188 | ? | EA | S0057 | F | MA | S0175 | ?M | YA | S1039 | M | MA |
| S0205 | ?F | MA | S0058 | F | OA | S0176 | ?M | LA | S1043 | F | OA |
| S1028 | M | MA | S0061 | ?F | YA | S0177 | M | MA | S1052 | F | YA |
| | | | S0062 | F | YA | S0181 | F | OA | S3014 | M | MA |
| | | | S0071 | F | OA | S0184 | M | YA | | | |

Table 2

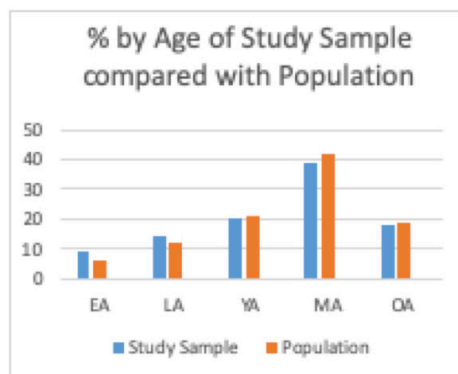


Figure 1

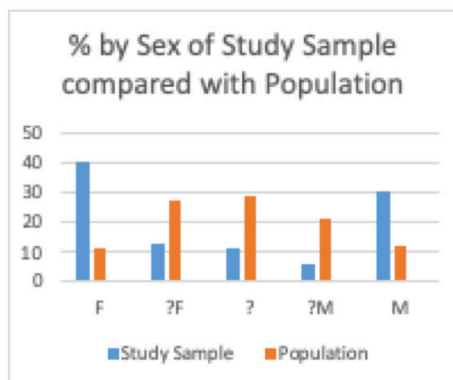


Figure 2

Summary analyses of Table 2 are given in Table 3 (for those buried in a Wide Coffin) and Table 4 (for those buried in a Tight Shroud).

| | F | ?F | ? | ?M | M | Total |
|--------------|----------|----------|----------|----|----------|-----------|
| EA | | | 1 | | | 1 |
| LA | 3 | | | | | 3 |
| YA | 1 | | | | | 1 |
| MA | | 2 | 1 | | 1 | 4 |
| OA | | | | | 1 | 1 |
| Total | 4 | 2 | 2 | | 2 | 10 |

Table 3
Analysis by Age and Sex of Burials in 'Wide Coffin'

| | F | ?F | ? | ?M | M | Total |
|--------------|-----------|----------|----------|----------|-----------|-----------|
| EA | 1 | | 2 | | | 3 |
| LA | | | 1 | 2 | | 3 |
| YA | 4 | 1 | | 1 | 2 | 8 |
| MA | 5 | 1 | | | 7 | 13 |
| OA | 4 | 1 | | | 2 | 7 |
| A | | 1 | | | | 1 |
| Total | 14 | 4 | 3 | 3 | 11 | 35 |

Table 4
Analysis by Age and Sex of Burials in 'Tight Shroud/ Narrow Coffin/Narrow Cut'

It is clear from Tables 3 and 4 that neither age at death nor sex, nor a combination of the two, has a strong influence on the form of burial. Both sexes (notwithstanding what is said above about firm and probable sexing) and all age ranges are covered by both burial forms. However, Table 3 shows that only two of the ten people buried in wide coffins were adult males. This might surprise anyone who assumed that a coffin burial was the higher status form and the status of men in Anglo-Saxon society was higher than that of women and adolescents.

An alternative view might be that the form of burial – coffin or shroud – was a family choice. A variant on this might be that it was linked to status but status was linked to family: the wives, sons and daughters of high status males also got a coffin burial (assuming that a coffin burial was the high status option). Another possibility is simply that burial form changed over the period that the Boneyard cemetery was in use. Yet another alternative explanation is based on what we know about the bodies of adolescents and females - they are usually smaller than those of adult males. Hence, what would be a 'narrow coffin' for many men might be a 'wide coffin' for many women and juveniles. For this explanation to

be tenable coffins must have been standard sizes rather than individually made to fit each person. A variant of this explanation might link it with chest burials (see SHARP 2014, 94 and Craig-Atkins 2012). If these actually reused an item of household furniture, the dimensions would have been dictated by its primary purpose rather than the size of the body it later held.

To check whether there was any spatial significance to the different burial forms, Bill Howard produced Figure 3 based on Emma Green's data. Fig 3A shows the 89 burials she used in her study (bold blue lines) against the other burials excavated by SHARP (red lines). The blue lines are well spread throughout the cemetery; so there was no spatial sampling bias introduced by her need to use the less disturbed skeletons. Fig 3B shows how the 35 burials she inferred were in tight shrouds &c. (bold crimson lines) are distributed within the 89 burial sample (pale blue lines). Fig 3C does the same for the 10 burials she inferred were in wide coffins (green lines). In both cases the highlighted form of burial is widely distributed within the pale blue of the whole sample. Hence, there is no obvious basis for linking burial forms to, say, family plots, exclusive (high status) areas, or even an orderly development of the cemetery over time.

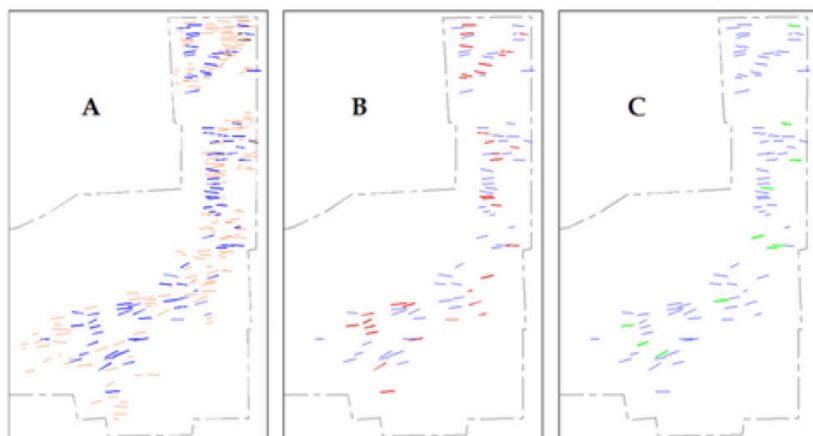


Fig. 3

(A) *Sample compared with Population.* (B) *Tight shroud compared with Sample.* (C) *Wide Coffin compared with Sample.*

In short, on the basis of the evidence presented here, it seems that anyone – male or female, adult or adolescent, thegn or ceorl – might have got a coffin burial on Boneyard.

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11. Phosphate analysis of two structures in a planned Anglo-Saxon Settlement

Phil Hill reports on the phosphate analysis survey he carried out on two of the structures excavated on the Chalkpit Field Anglo-Saxon settlement site.

Over the last few years participants on SHARP's Basic Excavation and Recording Techniques course (BERTs) have been excavating the multi-phased Anglo-Saxon settlement as part of the Chalk Pit North Excavations (CNE) including a number of Anglo-Saxon structures.

The CNE structures so far unearthed are 'standard' types for the period and include; post built (structures A,G & K), post-in-trench (F,H & I), and possibly plank-in-trench or beam slot (structure E) and beam slot, or sill beam (structure O). All are 'earth fast' structures and the evolution from post-hole to post-in-trench to beam slot construction techniques has been identified so that by the later Middle Anglo-Saxon period most structures had foundation trenches. A common feature of these structures is much shallower or even non-existent end wall foundation trenches, these structures are often called 'open ended' (Hamerow 2012, Wright 2015). Most of the structures so far excavated in Chalk Pit Field are open ended; one very notable exception is structure 'O'.

Structure F

During the 2011 season (Trench 14) BERTs uncovered the eastern wall foundation trench of structure 'F'. It was clear from the start that they had located a substantial post-in-trench structure; the foundation trench exposed in T14 was around 15m long with 4 large post-holes. The excavation of the remaining part of the structure had to wait until 2014 (Trench 18) by which time the discovery of the exciting archaeological features in eastern Chalk Pit Field had overshadowed what is still the largest structure to be excavated at SHARP.

Structure 'F' is aligned just off of north-south (identical to most of the CNE structures) and has a number of features which could be expected on a middle/late Anglo-Saxon structure: Post in trench construction, doorways in the side walls, 'open ended' and around 4.6m (15') wide. What is less common, although not unknown, is the length. The structure is in excess of 17m long. The exact length cannot be determined; there is no evidence for the end walls, which would have had no foundation trench, only shallow post (or stake) holes that were easily truncated.

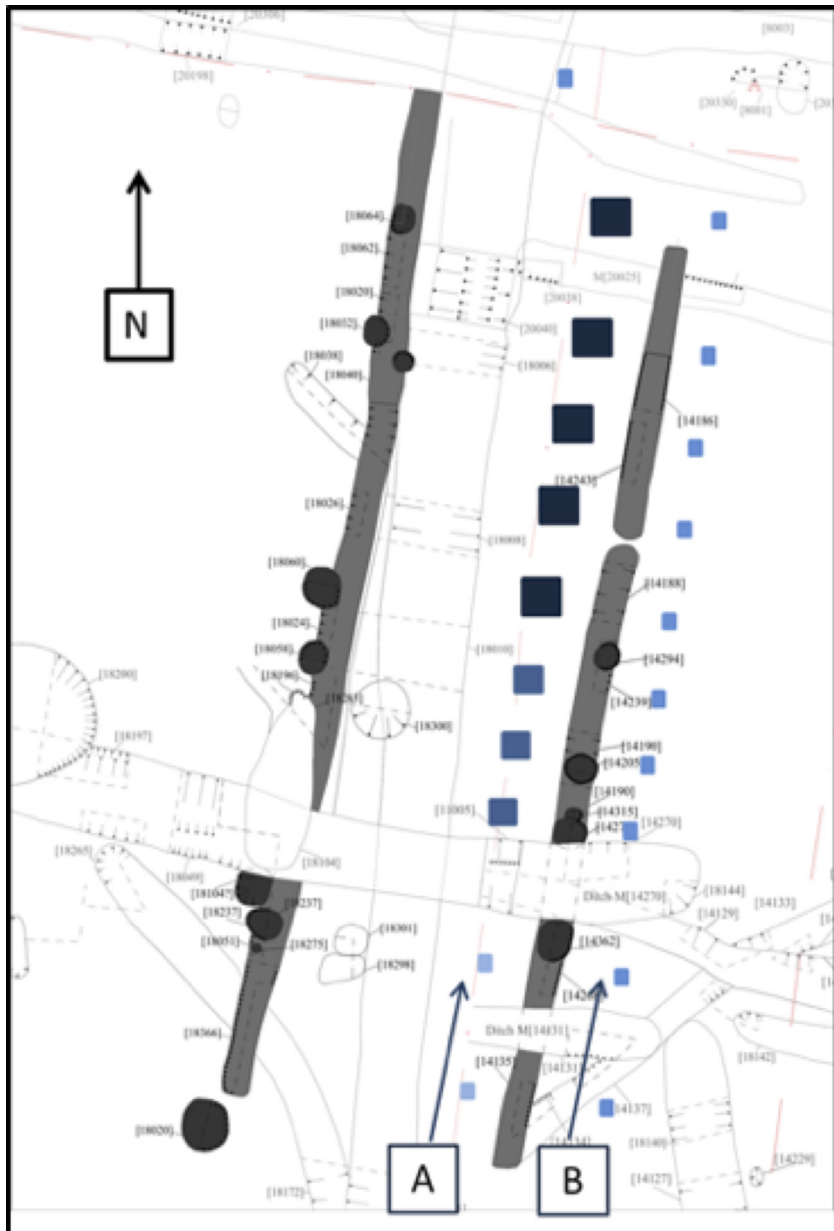


Figure 1

A part of the T18 post-excavation plan showing structure F and the location of soil phosphate samples taken from it in 2011 & 2014. North is at the top.

| Key to illustrations. | |
|-----------------------|---|
| | Natural' levels of soil phosphate. These are below occupational levels and if found inside a settlement and/or structure suggest repeated cleaning or footfall preventing phosphate uptake such as entrances. |
| | General 'background' soil phosphate levels. Consistent with the general detritus of everyday living found all over the Chalk Pit North excavation area. |
| | Raised soil phosphate levels suggesting an organic process such as food preparation or threshing has taken place. |
| | Saturation' levels of soil phosphates. Cess pits, human or animal burials, midden pits or intense animal husbandry may be expected. |

The width is about 15 feet (4.6 metres), equal to a 'short perch'; a standard unit of measurement that some authors argue provides evidence of settlement

planning (Blair 2013 & 2018). For Structure F, a length three or four times its width – 45 or 60 feet (approximately 13.7 or 18.3 metres) would be expected. This would correspond to the two-square model discussed by Wright (2015) and Marshall & Marshall (1991) where, in later Anglo-Saxon structures, the length of a structure is a multiple of the width, further suggesting planning and not simply using the available, optimum, lengths of timber..

Entrances would normally be found in the long walls often around a metre wide and flanked by two large post-holes. Unfortunately the most obvious potential location for an entrance, as indicated by the large post holes, has been truncated by a later ditch. Although usually found halfway along the long walls of Anglo-Saxon structures there are known examples where the cross hall entrances are situated nearer to one end, usually the southern end as may be the case with structure 'F'. This possible cross hall appears to divide the structure into one 4.6m (15') square at the southern end and a larger 14m (45') by 4.6m (15') northern end. This same ratio can be seen in the long halls excavated at Sulgrave (Northants), Goltho (Lincs) and Bicester (Oxfordshire) (Hamerow 2012).

A soil phosphate analysis of structure F was completed and the results are shown on figure 1. An in-depth explanation of soil phosphates is not possible in the space available but it is enough here to say that soil phosphates are a persistent and very reliable indicator of past human/animal activity.

Samples were collected from the excavated surface at 1 metre intervals from 'inside' the structure taking care to avoid other archaeological features; this is group 'A' on figure 1. A corresponding sample was collected from outside the structure; group 'B'. Larger blocks with a deeper blue colour represent increasing levels of phosphates. What is clear is that outside the structure the levels remain constant and are in fact consistent with general occupation levels found in the CNE excavation area. Inside the structure is a very different picture, there is a dramatic rise in phosphate levels immediately north of the possible cross-hall. There is another rise 4 metres further north. The phosphate levels found in these samples is approaching saturation level, except for the furthest north which was taken from a disturbed layer, possibly backfill from Trench 8.

Comparison with middle Anglo-Saxon structures excavated elsewhere combined with the soil phosphate survey suggest that structure 'F' was a dwelling. The structure was clearly divided into at least two and probably three sections. The southern upslope section has phosphate levels which hint at low level domestic activity and was probably the living quarters. The central area may well have been used for food preparation, storage or the processing of fibres, fabric etc., while the northern downslope area has phosphate levels consistent with the stabling of animals. Byre houses continued in use until at least the 10th century, and probably later (Hamerow 2012). If the structure was 45 feet long, the cross hall separated the living quarters from the functional areas; if 60 feet long, the central area was divided into two by the cross hall. Like the end walls, no evidence remains of dividing walls, which would have left

only shallow postholes.

This; when combined with construction technique and basic form, post-ex phasing (phase 5a, approximately AD 775-925) and limited evidence for repair in the form of intercutting post-holes would suggest that structure 'F' was home to a family group who occupied the site for much of the 9th Century AD. Figure 4 gives an impression of how the structure may have looked.

Structure O

During the first week of the 2015 season (T20) BERTs uncovered Structure 'O' and straight away this new structure promoted discussion because unlike every other structure so far excavated by SHARP Structure 'O' has a continuous beam slot on all four sides and at least one beam slot interior partition.

The structure is aligned east-west, 90° to the other structures in Chalk Pit Field, its end walls parallel to the side walls of at least six of the other structures. Its dimensions are also worthy of note; 4.6m wide (between the centre line of the beam slots) and around 10m long, although the distance between the western beam slot and the interior 'partition' beam slot is 9.2m (two perches). It may be that the eastern end partition was originally an exterior wall that was later enclosed by an extension or that structure 'O' was rebuilt on the same general footprint. The two interior slots at the western end are not positively identified as beam slots.

Most commentators on Anglo-Saxon settlement patterns and/or structures agree that structures generally became larger later in the period and that smaller structures may well have a specific purpose. Structure 'O', while sharing the standard, short perch, 4.6m width was only half the length of the dwelling structure 'F' and for some reason was aligned at 90° to most of the CNE structures.

The soil phosphate analysis of structure 'O' had to wait until the end of the 2016 season to allow 100% excavation of the structures features. The results are shown in the figure below:



Figure 2

Pre-excavation plan of T20 drawn by week one BERTs in 2015 showing structure 'O' and the location of soil samples from in and around it. Note that the ditch running through the centre of the structure actually runs north-south.

Structure 'O' was truncated by, or was truncating two ditches; one running north-south and one running east-west. Comparison between transects 1 & 4, taken from outside the structure, and 2 & 3, taken from inside the structure, suggests that Structure 'O' is not a dwelling. The only significantly raised phosphate readings from inside the structure come from the two ditches; neither of which is contemporary with the structure.

The phosphate readings from inside the structure are generally lower than those outside and are in fact below those identified inside structure 'F' as 'low level domestic activity'. The CNE settlement levels are the result of the general detritus of everyday living in Anglo-Saxon times. Food, human and animal waste will all raise phosphate levels and where these levels are lower inside structures it is accepted that this indicates lower 'organic' activity or regular cleaning or footfall disrupting phosphate uptake by the soil beneath.

The number 5 phosphate analysis shown on figure 2 is to illustrate settlement activity influence on phosphate uptake; the smaller/lighter pair are from the 'natural' below [22089] and [22067] and the larger darker pair are from (22150) and (22096) both fills containing animal bones.

What is certain is that for some unknown reason the people of the Chalk Pit Field settlement constructed a building in a new architectural style on a completely different alignment to their dwellings and whatever activity or use went on inside left a phosphate signature which was less than the general occupation levels outside the structure.

It is also likely that when structure 'O' was constructed seven other structures were still standing such is the similarity in the orientation. It is worth noting that structure 'H' is from the same phase as 'O' but is aligned north-south like most of the other structures in Chalk Pit Field as are structures 'I' and 'K' from a later phase (see Figure 3).

This analysis cannot prove definitively what structure 'O' was built/used for but what is certain is that it was not a dwelling, nor was it a processing/storage shed for any activity which would produce a high organic phosphate signature such as fish drying/smoking or tanning or the like. Even a barn would leave a higher phosphate signature than that found inside structure 'O'.

It is not possible to discuss the Anglo-Saxon structures of Sedgeford without considering the so called standard measurements and planned settlement patterns. During the later 8th and early 9th centuries the settlement at Flixborough is subjected to what the excavators identified as an "organised rebuilding event" (Loveluck and Atkinson, 2007). However, few structures at Flixborough share the same dimensions; widths vary between 3m and 7.5m and lengths between 3m and 19.7m although like Sedgeford many are truncated and while alignments are generally east-west there are many variations. At Sedgeford most structures have not only an identical alignment (or orientation) but also a very similar width regardless of construction type making it difficult to argue against some sort of planning or organisation. Dan Secker's Metric Analysis of the CNE settlement (2015) also provides a very good case for there having been a settlement plan based on the four short perch grid.

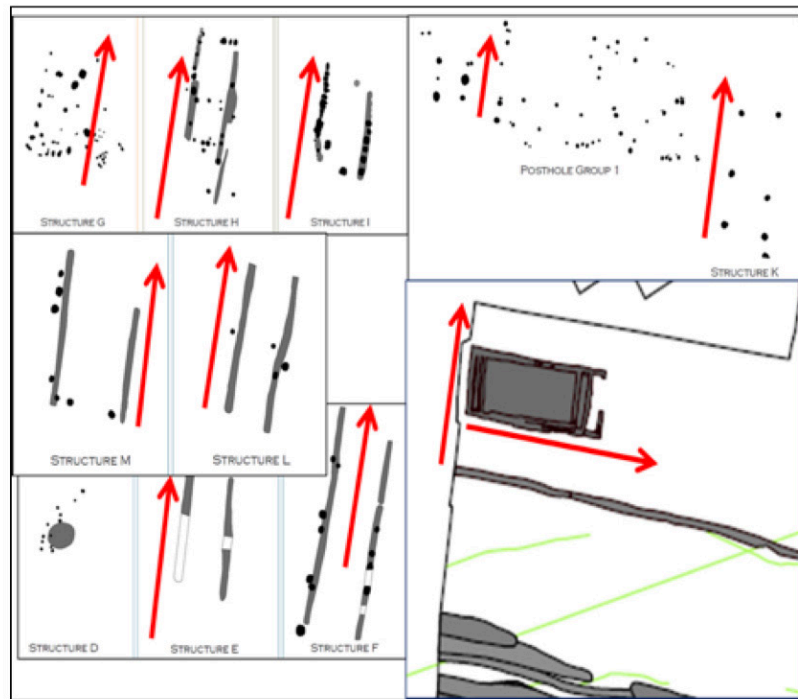


Figure 3.
A graphic demonstration of the alignment of structure 'O' (bottom right) compared to all other structures on Chalk Pit field, north is at the top. Structures not to scale.

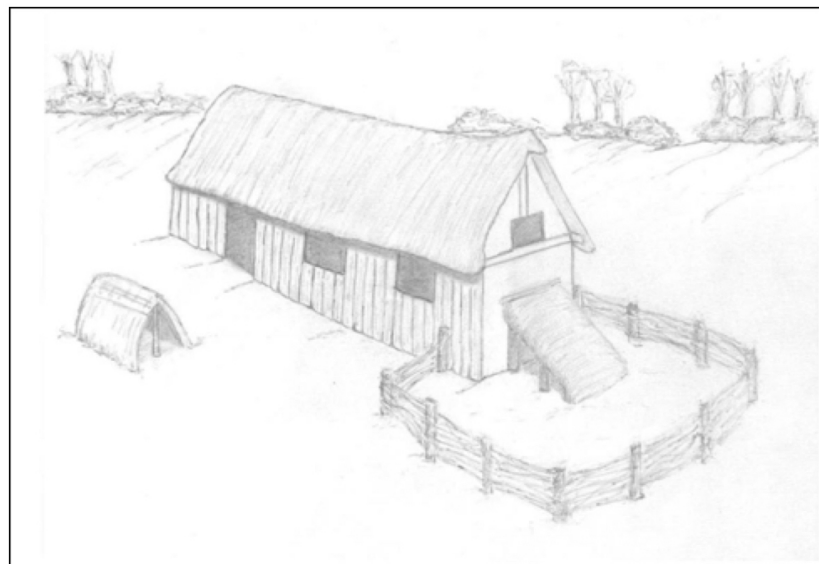


Figure 4.
An artist impression of structure F sometime in the 9th Century AD drawn by Richard Boston.

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12. Non-invasive archaeology - what a difference a gift to SHARP has made

David Wood and Melinda Barham outline what a difference a gift to the project has made to our understanding of the local landscape.

In 2015 SHARP received a very generous donation, to be used for a specific purpose that would enhance the effectiveness of the project. The Directors decided to purchase a magnetometer (or, more accurately a fluxgate gradiometer), which arrived at Sedgeford in March 2015. A training session was conducted in Boneyard by a knowledgeable SHARPie (Dave Hibbitt – who did the magnetometry survey of Chalkpit Field North in 2007 and unveiled, the now iconic, 'D' enclosure). Then the journey into the 21st Century began.



Figure 1

The Bartington 601-2 fluxgate gradiometer. Datalogger in centre, with two vertical sensors

The magnetometer (now affectionately known as 'Maggie') was transported home by the author to ensure her safety and arrange insurance. The following day came the telephone call – "Can you learn a bit about magnetometry while you are looking after it!!" After the initial shock, the business of absorbing a totally new science began. Four weeks later 'Maggie' was used for the first time during the pre-Easter fieldwalking session.

The following article will attempt to explain the wonders of magnetometer surveying, highlight some of the results we have collected, what they have contributed to the project in the last 2 years and where do we go from here.

Principal of Operation

When the Earth was formed over 4 Billion years ago, it started to cool and

form the crust. However, the central outer core, was and still remains, molten iron which is moving around as the Earth spins on its axis (Figure 3). This core creates an extremely strong magnetic field, which radiates magnetic flux through the Earth's crust into Space (Figure 4).

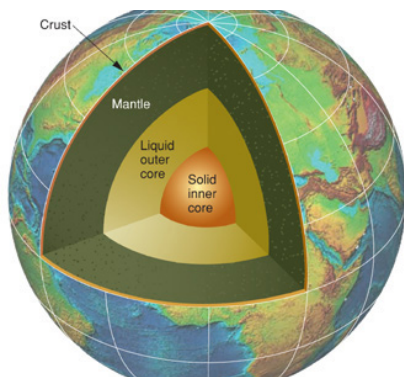


Figure 2

The Earth's crust and liquid core

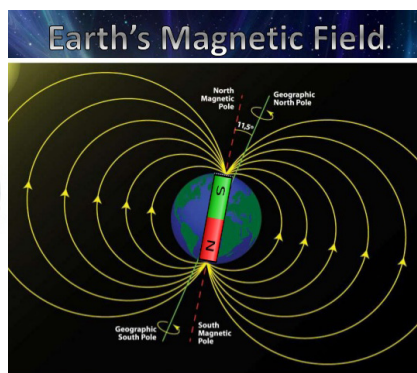


Figure 3

The Earth's magnetic field

This magnetic field, around the Earth, forms the magnetosphere, which protects our atmosphere from the harmful radiation travelling from our sun (Fig. 5). When this radiation hits the edge of the magnetosphere the interaction creates the Aurora Borealis and Aurora Australis at the Poles (Fig. 6)



Figure 4

Magnetosphere protects the Earth

Figure 5

Aurora Borealis (Northern Lights)

The magnetic flux present at the time of the crust formation is remembered by the rocks as they cool (called thermoremanent magnetisation) and this 'magnetic signature' remains unless the rock is heated above a certain temperature again. Every substance has a point at which it will lose its magnetic properties (Curie point) when exposed to extreme heat and, as it cools again, it will take on the magnetic field present around it at that time. The Earth's crust is made up of several plates which move around, changing the orientation of the magnetic flux within its rocks in relation to the Earth. So, we now have a combination of the current Earth's magnetic field created by the molten core (Figure 7) and the 'remembered' magnetic signature within the Earth's geology.

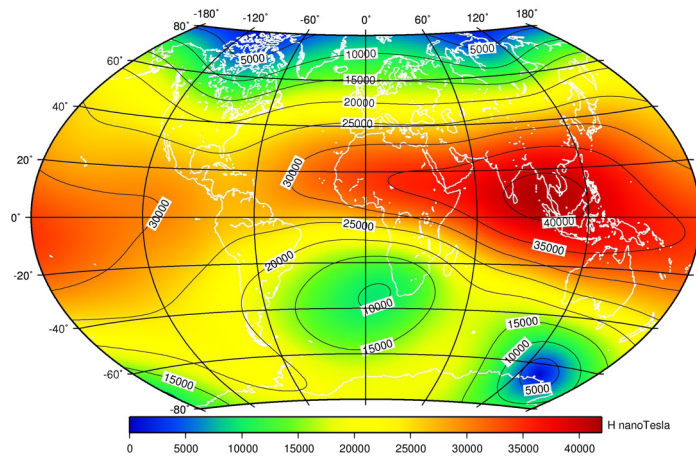


Figure 6

Earth's magnetic field varies from place to place due to differing nature of rocks

The magnetometer (Maggie) measures the strength and/or direction of the magnetic field in the vicinity of the sensors, which can be up to 50,000 nanoteslas (named after Nikola Tesla, who revealed alternating current, electromagnetic radiation and induction). A tesla is a unit of magnetic induction.

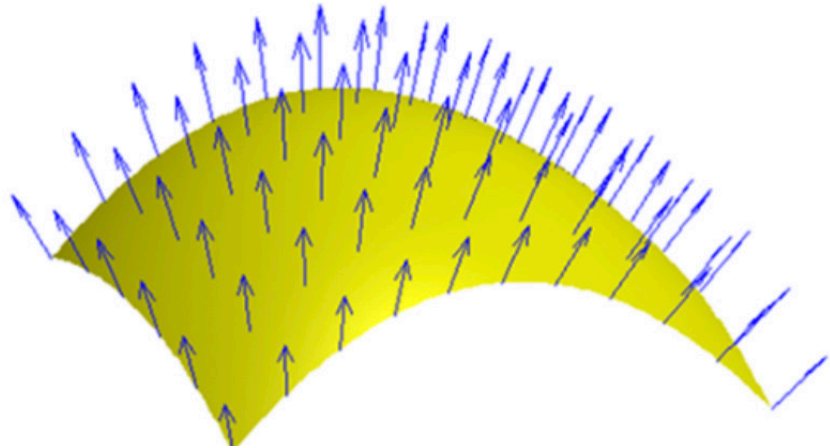


Figure 7

Magnetic flux radiates from the Earth up to 55,000 nanoteslas (nT)

Let us imagine that thousands of years ago the local populace decided to dig a ditch. Over the years, the ditch fills up with varying material – organic, pot, bones, metal objects, some of the original soil and so on. The composition of the material below the plough soil is now different from the local background magnetic flux, with different remembered strengths and vectors within the fill of the ditch (Figure 9).

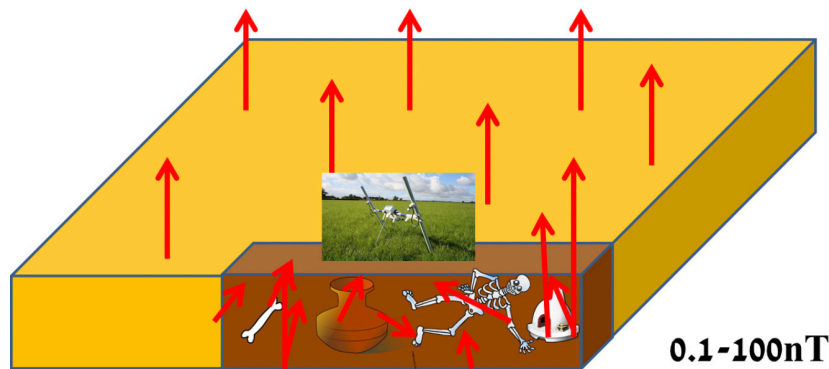


Figure 8

The magnetometer senses differences in the ground of between 0.1 to 100 nT

We programme 'Maggie' to only collect data that is + or - 100 nT above or below the 'local' magnetic field. The sensitivity is extremely small at only 0.1 nT. A grid is set out in the survey area within which we cover the ground in a zigzag pattern to collect the data sensed. In other words, it is all passive. We do not transmit anything, we just 'listen'. A 40 x 40 metre grid requires half a mile of walking with Maggie, which means on a very good day, 14 grids means walking a minimum of 7 miles. This does not include the walking required to set up the grid, returning to the car to download the data onto a laptop and the odd coffee break. It's a good workout and keeps us fit.

Methodology

We had to start somewhere! What better than to expand the magnetometry survey already conducted in Chalkpit North so there was no reason to doubt the validity of the method. But 'Magging' without a plan can easily be wasted time and effort.

A desktop review of additional available data, such as maps, LiDAR, aerial photography, geological reports, satellite imagery, SHARP fieldwalking data and previous excavations on Chalkpit Field South were added as layers onto Google Earth and the 'D' enclosure survey, to build up a more comprehensive picture of the projected area and its importance within the wider landscape.

LiDAR¹ pictures of the Parish were limited to those available as a result of the Environment Agency Surveys but proved to be extremely helpful when compared with maps and aerial imagery.

¹ An acronym for Light Detection and Ranging, which uses a laser to collect 3-dimensional points for the creation of digital models of elevation and surfaces

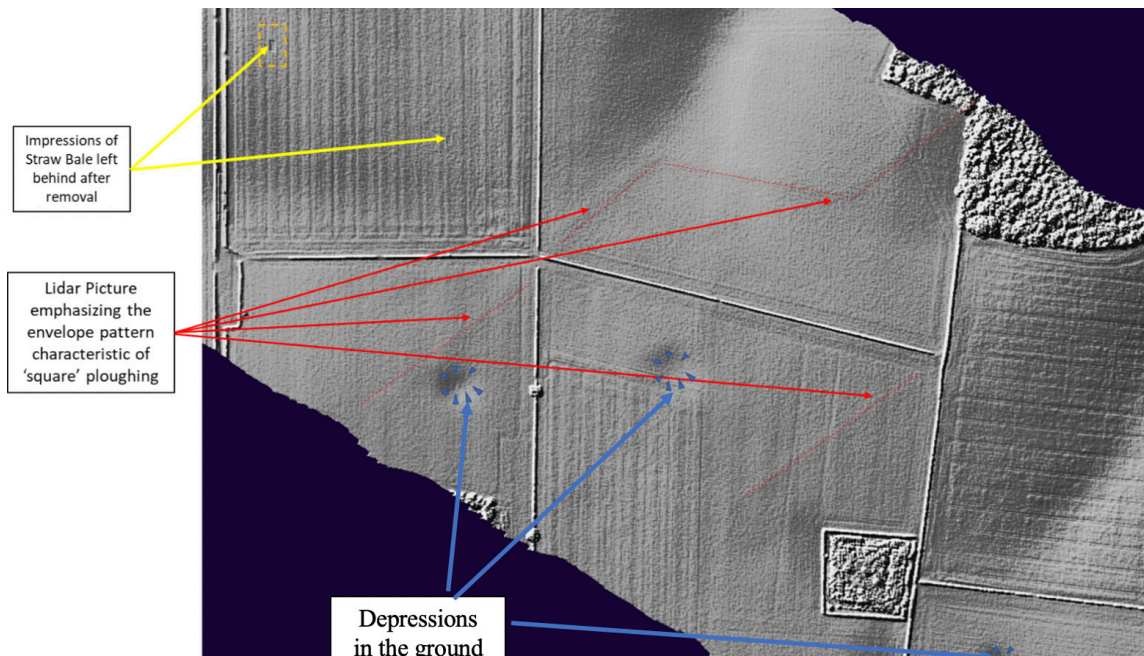


Figure 9
LiDAR picture of south end of Chalkpit Field showing hedge-lines, cultivation patterns and trees

Using this knowledge, we decided to encompass a large area at the intersection of four fields: Chalkpit Field, Hall Field, Polar Breck and Shernbourne Breck which were gridded and recorded using GPS. The combined field areas became known as 'Inmere' (named after the farm just to the south of the project area). The grid points have since been updated using more traditional equipment (tape measures) to supplement and refine the GPS co-ordinates. The grids were 40 m x 40 m where possible, but the potato crop in Shernbourne Breck (Photo 1) forced the use of 20 m x 20 m grids for the northern half of the field.



Photo 1
Shernbourne Breck potato crop after very deep ploughing

Polar Breck (Photo 2) was surveyed later than the other three fields so as to not disturb the ewes at the height of the lambing season.



Photo 2

Polar Breck from the northwest corner looking southeast

All grids were aligned north to south. Any enhancements to the magnetic field caused by buried features are mapped increasingly stronger the closer the traverse direction can get to a magnetic north/south direction.

At the commencement of each day least one grid was surveyed twice, to reduce the potential for realignment errors which may be induced by reassembly of the equipment each day. In addition, the re-surveying allowed comparisons to be made when assessing the potential differences in weather conditions, terrain and local interference from electric fences, mobile phone masts and so on. These can have a disastrous effect on the results as the magnetic interference from a mobile phone can be in the magnitude of 250,000 nT – 10 x the magnetic flux of the earth.

Results

The base data from the data-logger is uploaded to a laptop and processed using TerraSurveyor Lite, which is displayed as a grey fuzzy image initially until it is processed. This processing fine-tunes and focuses the readings to give a much clearer image. The resulting plots are presented with positive nT mapped as black and negative nT mapped as white (or you can choose lots of different colours). The data is corrected and processed using numerous filters and techniques – all of which had to be learnt on the job through trial and error, and reference to the very complicated handbook, which seems to have been written by someone more used to computer language and gobbledegook than understandable English.

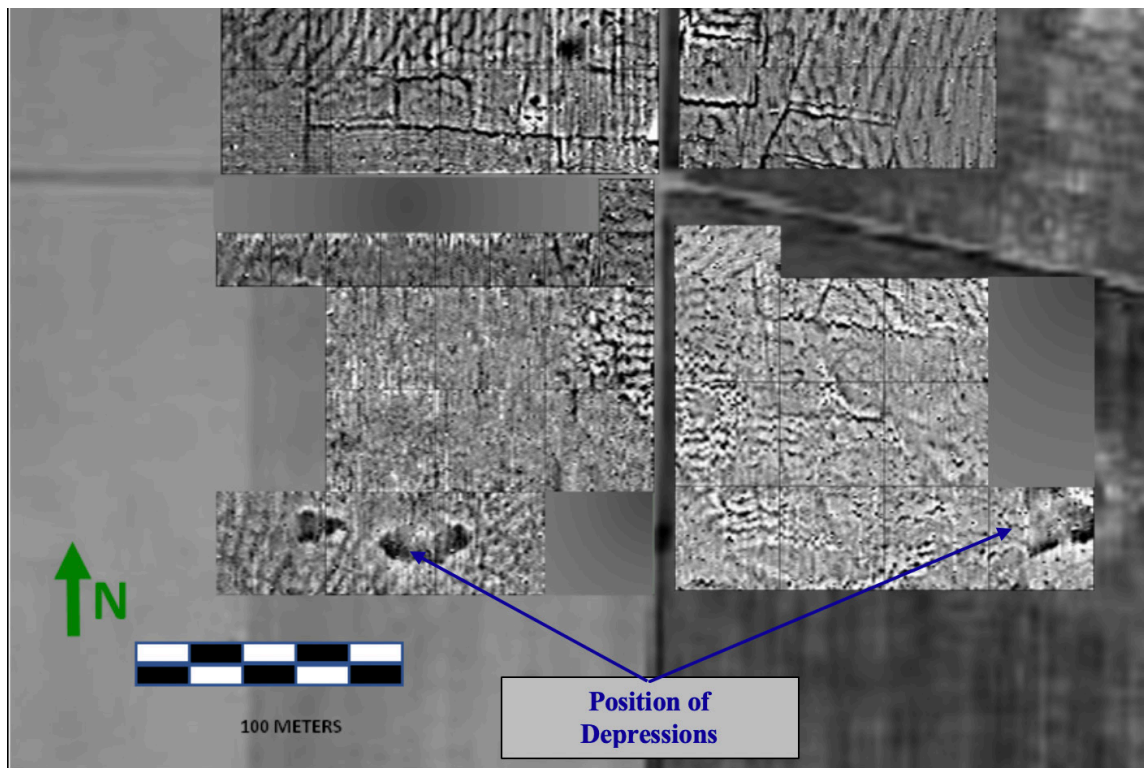


Figure 10
 Composite of all four fields superimposed on aerial photo of the Inmere Project area

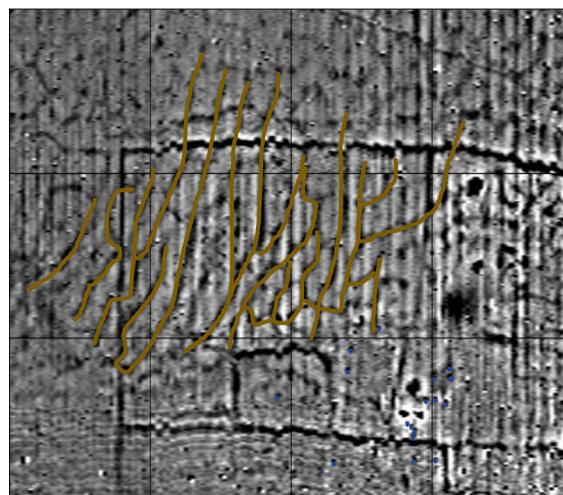


Figure 11
 Periglacial anomalies in the magnetometry picture highlighted (Chalkpit Field)

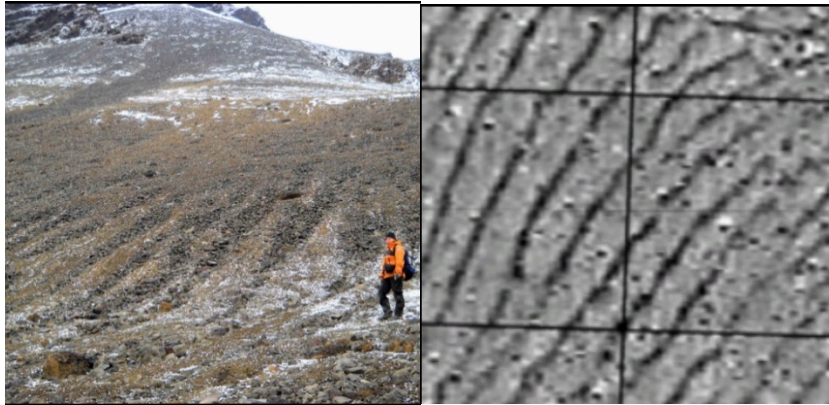


Figure 12

*Newly formed periglacial stripes on sloping ground in Canada
and magnetometry output from Chalkpit Field*

Interpretation

The most significant features are then highlighted so that they can be compared to any data, pictures or photos that are already available and can be compared with similar features on areas that have already been excavated – such as the northern Chalkpit Field ‘D’ Enclosure.

However, some of the most obvious features in the picture are not actually archaeology or anything to do with human activity. The numerous wavy lines (like sand on a beach when the tide is out) are, in fact, left over from the last Ice Age. This patterning is absent from Shernborne Breck, however. This is almost certainly due to field conditions at the time of the survey, rather than an absence of periglacial deposits.



Figure 13

*Newly formed periglacial polygons on level ground in Canada
and magnetometry output from Chalkpit Field*

Freeze-thaw weathering results in frost-shattered boulders, snow hollows, sorted stone polygons and stripes, and surface cracks. The sorted polygons comprise sand and fine to coarse gravel, surrounded by angular coarse gravel and cobbles. These polygons are formed by the development of vertical ice wedges in the ground, or through regular needle ice-growth. Wherever you have sloping ground the deposits appear as stripes as shown in Figure 12 below.

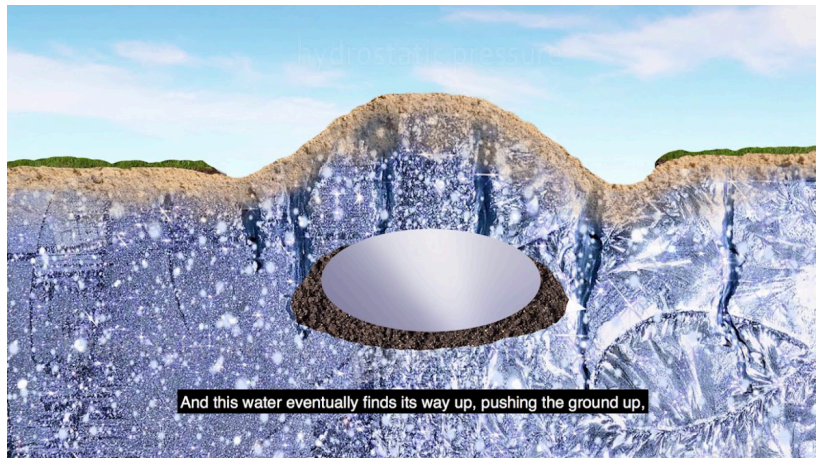


Figure 14
How pingos are formed

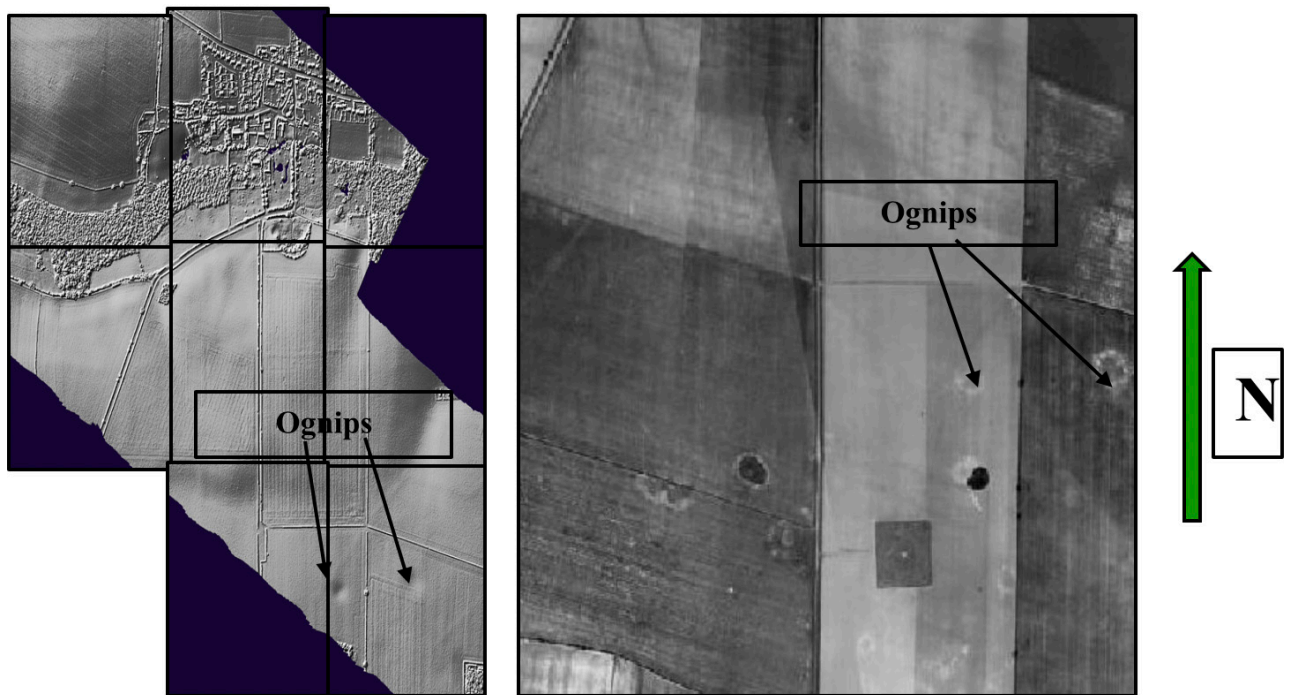


Photo 3
Ognip at Docking with water still flowing from the spring and aquifer below

The polygons appear wherever there is a lack of gradient or level ground, as shown below in Figure 13.

Another prominent set of features in the Norfolk landscape are the shallow depressions as can be seen in the LiDAR picture at Figure 10. These can also be seen to coincide with the position of anomalies in the magnetometry results as indicated at Figure 11 above. There have been many explanations of how these depressions came to exist (from marl pits to WW2 bombs dropped on the landscape), however, the most compelling explanation is that they are pingos, which are formed during the Ice Age.

The water in the artesian wells below the Norfolk Chalk was forced upwards by the weight of the ice above it. This pushed the ground up, fracturing the chalk geology and making an expanding ice core. When the ice



Photos 4 and 5

LiDAR and aerial photography of the ognips at Inmere

sheet retreated the pingo collapsed (becoming an ognip). The ground beneath the ognip was still fractured and artesian water flowed, as a result of its own hydraulic pressure – resulting in a spring.

Having removed the anomalies associated with the geology of Norfolk. In-depth initial analysis of the magnetometry results can now be examined.

The 2017 results are dominated by a series of linear and curvilinear ditch-type anomalies, many of which are flanked by faint negative responses. These are suggestive of enclosure ditches, boundary ditches and other ditch/cut features. The most striking of these is the east/west-orientated ladder effect in Chalkpit Field, which continues into Hall Field. This feature is indicative of a ladder settlement, but this hypothesis is not supported by current academic understanding of settlements in Norfolk.

Both the ploughing marks at the southern end of Chalkpit Field, and the marks of unidentified agricultural activity in the north-east corner of Shernborne Breck are particularly strong readings (greater than +20 and -25 nT). Those in Shernborne Breck are indicative of ridge-and-furrow ploughing.

The trackways running west then northeast through Chalkpit Field (north of the settlement) continue into Hall Field. A further track through the western end of the settlement turns south and is visible as a continuation in Shernborne Breck, next to the unknown agricultural ploughing anomaly at the eastern edge of Shernborne Breck. These correlate with the trackways on the 1631 Le

Figure 15
Simplified graphic interpretation of Chalkpit Field

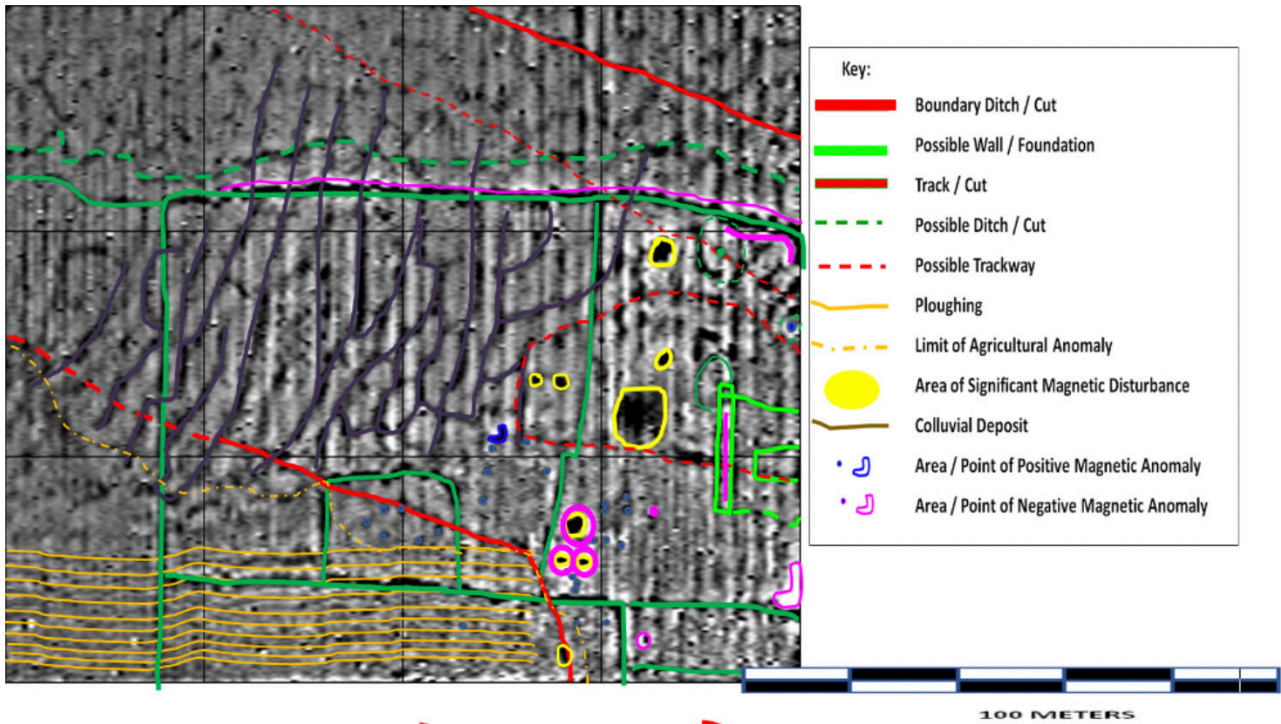


Figure 14

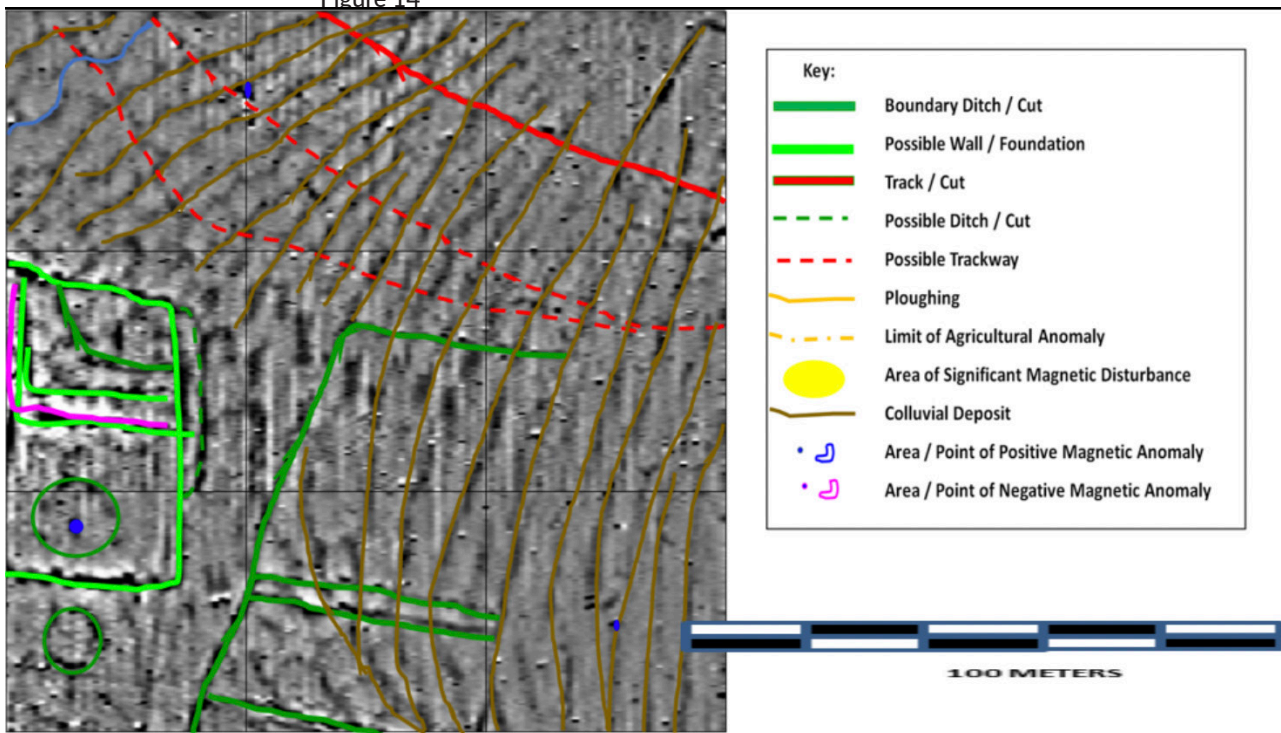


Figure 16
Simplified graphic interpretation of Hall Field

Figure 17
Simplified graphic interpretation of Shernbourne Breck

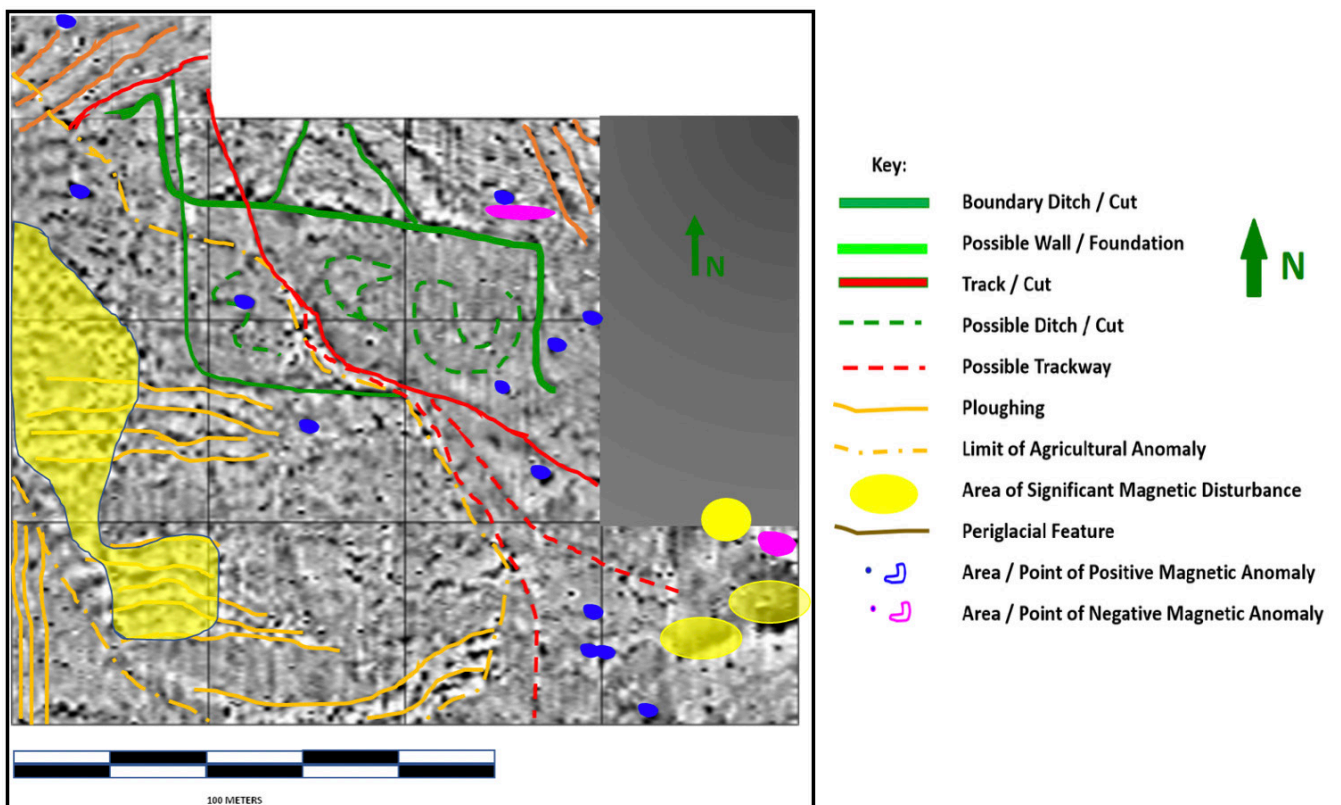
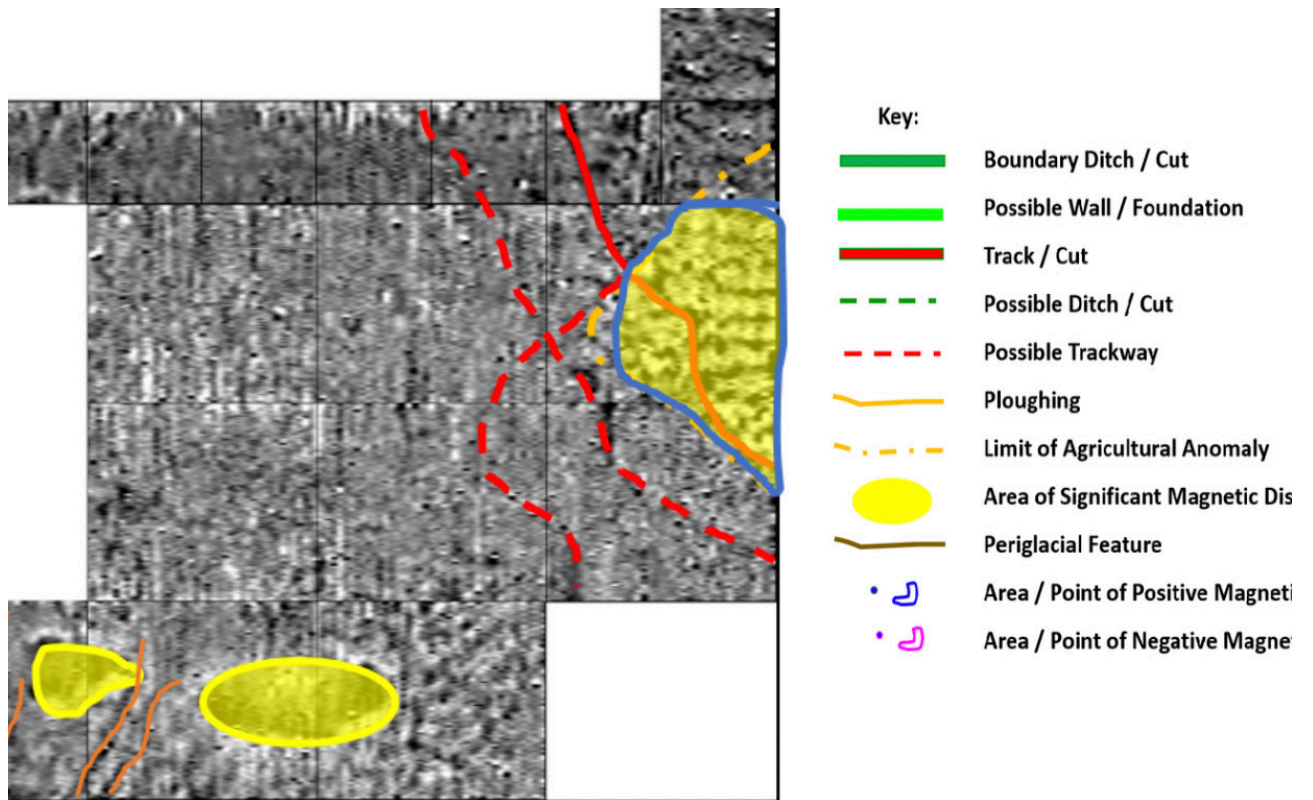


Figure 18
Simplified graphic interpretation of Polar Breck

Strange map thus indicating that they were in use at that time.

The 40 m oval anomaly in Shernborne Breck, is adjacent to one of the large depressions visible on the LiDAR picture. There is also a large (20 m) oval to the west of it, which is not associated with a depression on LiDAR, nor does this appear on any map of the area. Exactly the same result is apparent with the possible Ognip in Polar Breck, with an oval shaped positive anomaly nearby.

Several areas of magnetic disturbance up to +10 nT have been recorded, one of which is greater than +80 nT. This appears within the settlement and covers an area of 5 m². There is another area to the north which is greater than +50 nT. The material in these areas is significantly more magnetic than the surrounding soil, which may indicate areas of industrial activity.

A further pair of high readings are located within the settlement in Chalkpit Field. These were identified as a grain dryer during the excavation of an exploratory trench in 2008.

Two circular anomalies are found within the boundary of the settlement in Hall Field. One is large (20 m in diameter) with a central positive spike. The other, just outside the boundary to the south, is smaller (10-12 m in diameter). Additional circular anomalies (normally associated with Iron Age round houses) resembling those found during exploratory excavations in Polar Breck in 2005, are visible in the area of mixed magnetic disturbance at the northeast corner of Shernborne Breck.

The geophysical survey has revealed a plethora of linear, curvilinear, pit-type and ditch-type anomalies likely to be associated with anthropogenic activity over a long period of time. Most of the anomalies appear to be concentrated in the southern end of Chalkpit Field and Hall Field but continue into Shernborne Breck and Polar Breck. They represent more than one phase of activity.

Many of the anomalies appear to be truncated and/or cut by other anomalies. Tracks, ploughing, boundary ditches, ring ditches and areas of possible industrial activity have been disturbed by later activity, supporting the suggestion that occupation took place over a prolonged period.

The dating of linear and curvilinear anomalies by geophysical means alone is fraught with difficulties. These anomalies represent anthropogenic activity and may have followed similar courses for centuries, if not thousands of years. However, datable artefacts from the two exploratory trenches, and from fieldwalking suggest that the settlement is Romano-British and may have been built on Iron Age or even earlier occupation and activity. Activity may have continued into the Early Anglo-Saxon period, as evidenced by the ploughing techniques evident in the substrata.

How does this all contribute to the SHARP Project?

The magnetometry surveys continue and we will be completing the remainder of Chalkpit Field, hopefully before the dig season starts in July 2019. Saggy

Horse Field has been surveyed with Maggie, although we are going to fill in all the gaps in our surveys there. This will be part of the preparation for and pinpointing of the exact location of this year's excavation in Saggy Horse Field.

The emphasis and working hypothesis for settlement and industry throughout the ages seems to have centred on the availability of water. Maggie has been instrumental in revealing some of the hidden secrets without putting a spade in the ground.

Overall the big picture is starting to emerge from under the plough soil. We began our journey with no experience. Now we have successfully added to the archaeological research of Sedgeford. In addition, we now run a Non-invasive and Landscape Archaeology course during the summer – see www.sharp.org.uk for details of the course.

13. Anglo-Saxon Sedgeford: the pieces of the puzzle start to fall into place

The SHARP Team

Over the last 23 years our work has answered some questions and posed many more, but as we are about to enter our 24th season we are now able to see a larger part of the picture and as a result are better placed to focus our excavation strategy.

Shift and/or shuffle of the settlement

Ceramic evidence has pointed to a significant occupation of the valley bottom (in the area now occupied by the Reeddam) during the earlier part of the middle Anglo-Saxon period (which, taken as a whole dates from about 650 - 850 CE). Earlier middle Anglo-Saxon pottery (grass-tempered ware, which dates up to about 720 has been identified on the Chalkpit North-East (CNE) settlement site and this is evidence that this area too was occupied during the late 7th to early 8th centuries.

What is evident is that the Reeddam occupation was ended sometime during the ceramic dominance of Ipswich ware (720 - 850 AD) and bounded plots were established higher up the valley slope in what is now CNE.

The CNE settlement produced both Ipswich ware and Thetford ware (875-1100 AD), but virtually no Grimston ware (1100-1500). On the north side of the valley, the pattern is different, a Thetford ware assemblage typical later of its later period (975-1100 AD) - Rogerson, personal communication - and Grimston ware, but virtually no Ipswich ware.

For some reason, at some time during the 11th century, the settlement on the southern side of the valley was replaced by one on the northern. What is uncertain is whether this was a sudden event, or a more gradual process.

What is now becoming clear is that the reason behind this was a progressive failure of the water supply.

David Wood and Melinda Barham have studied aerial photographs and Lidar images as well as carrying out a comprehensive magnetometry study of Polar and Shernborne Brecks as well as Hall and Chalkpit fields. They have identified artesian springs and water courses emanating from them. These date from the end of the last Ice Age. Furthermore, their geophysical survey shows intensive occupation at the top of the slope during the late Iron Age and Romano-British periods. Apart from one small and rather insignificant trickle of water emerging from the ground these springs are now dry and the area is devoid of settlement. During 2018 the Sedgeford Hall Estate, considered sinking a borehole to access this water, but its depth, 85 feet below the surface, rendered this uneconomic

Excavation evidence on Chalkpit Field North has identified wells.

Presumably these were dug in an attempt to reach water that was no longer as plentiful as in the past. The continuing diminution of this supply is likely to have rendered the southern side of the valley unsuitable for habitation and it is probable that people drifted away to the northern side where springs were (and still are) flowing.

A new direction during the 8th to 9th centuries

Evidence is now falling into place that this period was time of rapid technological advance and innovation at Sedgeford.

Trench 23

Evaluation excavations from 2013-2016 investigated a series of strong magnetic anomalies seen on a 2007 magnetometry survey of the northern part of Chalkpit Field. These evaluations showed that these anomalies related to cereal processing kilns and associated structures. Environmental samples produced much burnt grain (wheat, barley, oats and rye), some was germinated, some was not.

Since 2017, a full, and ongoing, excavation has been underway and it has become clear that, as more of the site has been explored, the features identified during the 2013 to 2016 seasons were a complex of malthouses.

So far one structure, 'malthouse 1,' has been definitively identified. A full report on this will shortly be submitted for publication (Blakelock, E. and Faulkner, N., - 2019).

The complexes have been dated on ceramic evidence to the 8th/9th centuries. No pottery later than Ipswich ware has been found in the same context.

Recent magnetometry surveys suggest that the malthouse complex may extend beyond the margins of Trench 23 to the south.

The completion of the magnetometry survey of Chalkpit Field has shown that the valley in which the malthouses were built had a natural spring-fed water supply and also that this had been augmented by water from other springs in the area. One additional supply was noted on the survey to have been directed along a straight conduit into the natural water course supplying the complex.

Malthouse 1 has been shown to have all the features of a traditional malting house.

At the southern end of the building was a steeping pit in which sacks of grain would have been soaked to allow the process of germination to begin. An iron hook found during 2015 was probably used to suspend the filled sacks in the water. Next to the steeping pit was a working surface and adjacent to this was a clay germination-floor, where the wetted grain would have been spread and raked to start germination. This converted starch within the grain into malt-sugar (maltose).

The clay floor was some 4.5m in width by 6.5m in length and was noted to be raised by about 2.5cm along its long axes, where the floor met the side walls.

At the north eastern corner of the building was a kiln constructed of baked clay and daub which would have convected warm air at a temperature of 60 to

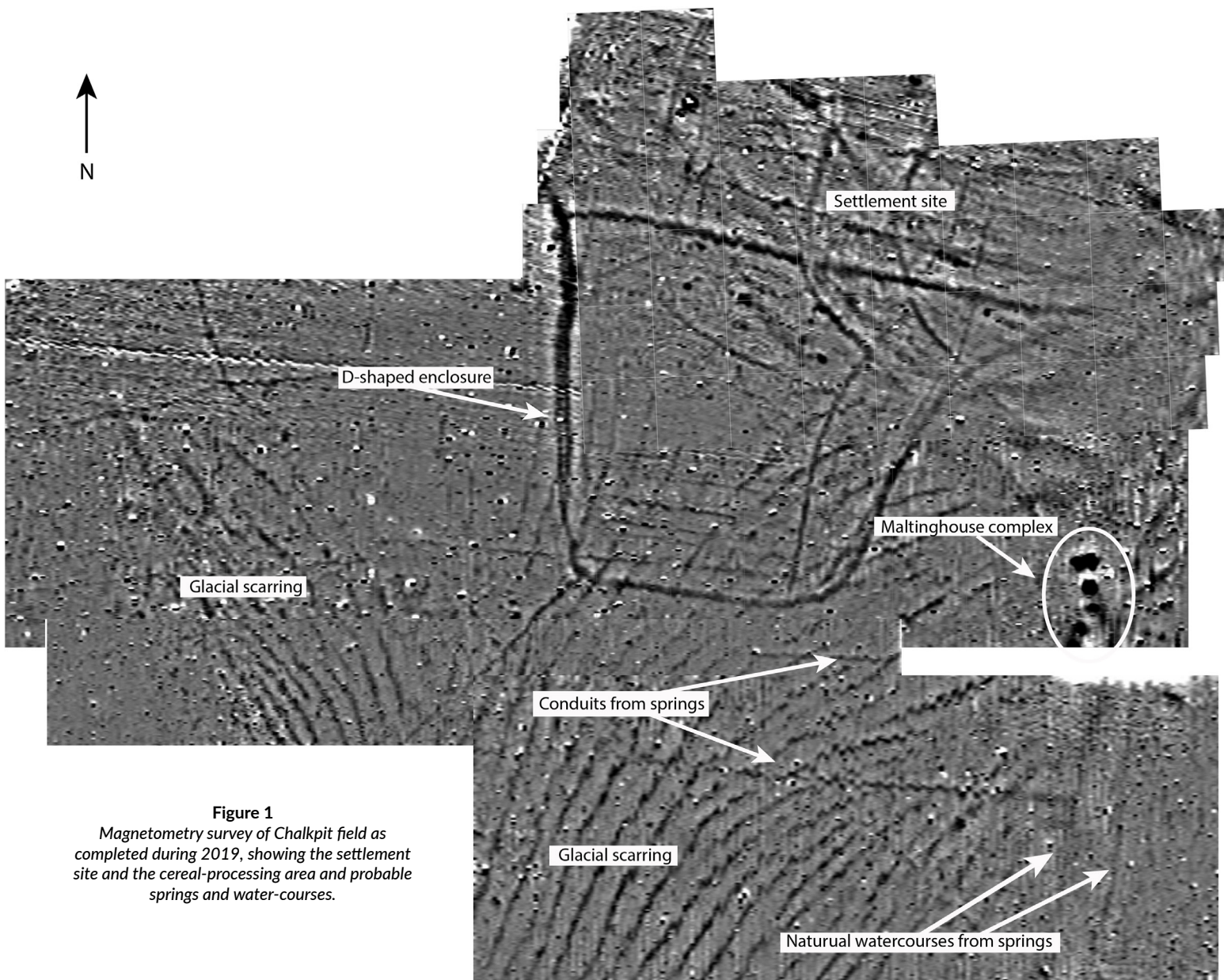


Figure 1
 Magnetometry survey of Chalkpit field as completed during 2019, showing the settlement site and the cereal-processing area and probable springs and water-courses.

80 degrees C.

The maltster judged the point at which sprouted grain would need to be transferred from the germination-floor to the drying-floor above the kiln - wooden slats, covered by a malting cloth and supported by substantial timbers. Rising warm air would have killed and hardened the grain, which would then be stored and transported for use in brewing.

Substantial post-holes to support both this floor and the rest of the building were identified during the 2018 season.



Photo 1

An aerial view of Malthouse 1 showing the steeping pit, germination floor, kiln and associated postholes.

A second malthouse was identified during 2014. This also has a kiln and a clay floor. It is planned to excavate further during 2019/20 and also to explore a possible third malthouse also within the complex. ** Dried malted grain was noted in contemporary Anglo-Saxon law codes to have been a tax render to be provided to the ruling elite. (Laws of King Ine of Wessex - 7th century).

The cemetery

The cemetery was in use between AD 650 and 850/875. It has not been excavated completely and a chance finding at the start of the 2018 season suggested that it was significantly larger than suspected previously. A burial was uncovered by a JCB, whilst digging a soak-away, close to the eastern boundary of Boneyard field with the north-south track alongside the woods. This was aligned east-west as with all other burials in the cemetery. This discovery points to the cemetery having been larger than previously believed. Over 1000 burials and possibly as many as 2000 are likely.

Water management

Middle Anglo-Saxon occupation debris, including much un-abraded Ipswich ware, sealed beneath the clay lining of the Reeddam pond has confirmed a construction date from the later 8th to mid 9th centuries.

The Chalkpit Field North settlement site

The settlement site seems to have been occupied from the late 7th century through to the 11th. At some point during the later 8th/early 9th centuries dwellings of standard dimensions on linear, bounded plots were constructed. This standardisation implies a directing authority.

Three high-status artefacts, two from the settlement site and one from Boneyard may be very significant. In CNE, the rare mid 8th century Frankish coin and the Buttermarket bottle - a rare find beyond its production site in Ipswich. On Boneyard, a copper-alloy writing stylus. (see 'Digging Sedgeford p 113, plate 5.19).

The Anglo-Saxon sites in Chalkpit Field North and Boneyard do not show evidence of particular wealth. The site as a whole is 'coin-poor', there are few 'high-status' non-ferrous objects and yet, during the 8th/early 9th centuries, Sedgeford was changing rapidly.

There was a large Christian cemetery. A planned settlement was built, a complex of malhouses was active and the valley floor was remodelled to construct the Reeddam as part of an integrated water-management system.

This could not have been done as a local initiative but would have had to have been directed by an organisation with the technical expertise, the authority and the ability to mobilise the population in these tasks. The three high-status finds are not in keeping with the rest of middle Anglo-Saxon Sedgeford and may be an indication of the supervising presence of an outside authority.

Potential authorities?

:- The ruling royal elite or the Church or a partnership of the two. The find of a writing stylus on the Boneyard/Reeddam excavation points to an authority that was both literate and educated, supports the idea that the Church had a significant role. The Church was successor to the western Roman state, wielding spiritual authority over the various kingdoms of western Europe. It carried with it not only religious power, but it was also the repository of the technological and cultural expertise of the early medieval and late classical world. Once the Christian conversion of the Anglo-Saxon rulers and their people had become established, it was able to bring those skills to bear.

Anglo-Saxon remains at Sedgeford have been remarkably well preserved. From the late 7th to the early 9th century the community experienced a radical, controlled re-organisation. The site is of national importance in developing and furthering the understanding of the significant developments in Anglo-Saxon society during the 'long 8th century'.

There is much to be done and much to be excited about.



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