Worthing Archaeological Society Journal

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Dear Members

I am glad to welcome you to this year's Journal, and I hope you enjoy the variety of articles within its covers.

Martin Simon and a small team of flint experts burned the midnight oil in putting together their professional report on flints found in the Bosham Channel. The Field Unit is proud of such a wealth of expertise, headed by Bob Turner. Finds sessions on the first and third Thursday mornings at Slindon are the place to come to learn about flints.

Alex Vincent has looked at possible Bronze Age barrows on Highdown.

Tony Brooks spotted this article in the Times on Roman Self-Healing Cement which perhaps suggests that the people who developed and authorised the use of faulty cement in our schools and hospitals today could have learned a lot from an acquaintance with Roman engineering.

Bill Watkins brings us up to the nineteenth century with his discovery of graffiti at Climping. This is particularly poignant as so much of the remains of Atherington (Climping) lying destroyed on the beach have been obliterated by the storms of recent years. This emphasises the importance of the work the Field Unit are undertaking under the direction of Keith Bolton in recording features and finds eroding from the beach.

The Society Field Unit completed the clearing and recording of previously inaccessible parts of the Slindon Stable Block in 2021 and the cover drawing by Bob Turner is now complete. The clearing was achieved by a process known affectionately as extreme gardening which had to be repeated as we were unable to complete the work in one effort due to the pandemic. Finally, at the very end of the planned work, a trench was dug on the west block and two brick foundation arches were revealed. These interesting arches formed the icing on the cake and we have now completed the work started in 2012. The weeds, needless to say, have already conquered the stable yard.

I would like to draw your attention to the excellent illustrations in this edition, and thank Bob Turner for his plan, Chris Lane for his wall section and Theresa Griffiths for her trench section drawings in the Slindon Stable Yard Report, and Theresa Griffiths (again) for her flint drawings in the Bosham Channel Flint Report. We are lucky to have such a talented pool of skills in the Society.

I hope you enjoy the articles and, once again, I would like to thank all the contributors to this year's Journal for their energy and time in pursuing their research. And a happy New Year to you all.

Cheryl Hutchins Editor F dítor

Report on Flint found in the Bosham Channel Vicinity, Bosham, West Sussex 2017/2018/2019

By Martin Simons



Introduction

A quantity of prehistoric flint was collected in 2017/18 by a Chichester and District Archaeology Society (CDAS) member, Jeremy Board, in the vicinity of the Bosham Channel foreshore, part of the Chichester Harbour Area of Natural Beauty. A few additions were made to the collection on a 2019 CDAS foreshore field walk in 2019. The Bosham Channel is a tidal inlet approximately 7km from the sea with salt marsh and mud flats at low tide. Each find was allocated a five-figure map reference enabling locations to be recorded. From the map references three areas of collection were identified as indicated on the Lidar location map.

The random surface collection arrived at Worthing Archaeology Society (WAS) for assessment. A flint team from WAS, under the guidance of Bob Turner, then examined the collection, allocating tool types/ debitage and estimated period of origin. Martin Simons, after further examination, research and meeting Jeremy Board for a site visit, created a Flint Catalogue. The catalogue is available and only specific artefacts are mentioned in the report. All finds were obtained from the surface, close to the foreshore edges of the Bosham Channel, where active erosion was occurring, particularly on spring high tides. No finds can be considered as *in-situ*. A total of 174 flints were examined of which 136 were deemed to be tools and 44 to be debitage. Also recovered were 68 pieces of fire cracked flint weighing in at 1.5 Kilograms.

Mapping throughout contains Ordnance Survey Open-Source Data OS Data © Crown copyright [and database right] (2023) and other public sector information licensed under the Open Government Licence v3.0.





Area 'A' is at the north, or top, end of the Bosham Channel, approximately 100 metres long and contained 60% of the total finds. It is a promontory between Cutmill Creek and Colner Creek.

Area 'B' is in the vicinity of a short shingle spit close to the current shoreline approximately 10 metres long, on the eastern shore of the Channel, running roughly north to south and contained 10% of the finds.





Area 'C' is some 250 metres further south, on the inside of a bend in the Channel, approximately 50 metres west of Lowerhone Farm and contained 20% of the total finds.



ANALYSIS OF THE TOTAL ASSEMBLAGE

The flints include struck flint as well as worked or utilised flakes. Where there is indication of use-wear, but no secondary working, a flint is categorised as a tool and shown to be a utilised flake, blade, knife etc.

For analysis purposes tool typology is used but in the case of flake debitage some assumptions are made based on the quality of the raw material, size of flake and technology used. The tools and debitage were attributed to the following time periods:

- FUP Final Upper Palaeolithic 13,000 – 9,000 BCE
- LM Late Mesolithic 7,000-6,000 BCE
- LM/EN Late Mesolithic/Early Neolithic 7,000 -5,000 BCE
- LN/EBA Late Neolithic/Early Bronze Age 3,000- 1,200 BCE
- LBA Late Bronze Age 1,200-700 BCE

Raw Material

Of the Late Mesolithic / Early Neolithic (LM/EN) flint, there is evidence for some derived from clay-with-flints outcrops, mainly light grey to grey mottled. Clay-with-flints outcrops were probably the most easily accessible source of quality flint in this period. Overall, 70% are in shades of grey and 30% shades of brown.

For the Late Neolithic / Early Bronze Age (LN/EBA) flint, shades of grey and brown are approximately the same. Observations of the eroding shoreline bank in the vicinity of one of the collecting areas has revealed a lot of flint falling out of both grey and brown shades, most of the brown flint coming from the lower levels of the shades of orange soliflucted deposits.

Of the Late Bronze Age (LBA) flint, the small amount is insufficient to make a judgement other than a general poorer quality of flint and working. The quality of the flint overall is 10% poor, 80% good and 10% very good. The majority appears to be of local origin. The most striking high-quality flint is mostly a brown and cream banded/mottled type, a natural example of which was found eroding out from the bank at the north end of the Channel.

Most cortex is thin or very thin, which is similar to the natural flint falling out of the eroded bank. A limited number have a thicker cortex which may have derived from the lower slopes of the Downs 3 kilometres north.

Taking the collection as a whole, 13% have varying degrees of patination and 10% have organic deposition staining, mainly green, which is unsurprising given the area of collection. A fairly low percentage, 14%, show signs of water rolling, mostly minimal. There were no thermal flakes or pieces in the collection, only struck flakes.

TOOLS	FUP	LM	LM/EN	LN/EBA	LBA
Blade Fragment Retouched			5		
Blade Retouched		s 5	3		
Borer				1	
Burnisher		2 0	8	1	
Combination Notch/Knife				3	
Combination Knife/Scraper			9) 	1	
Combination Knife/Piercer		s 1	55	1	
Denticulate			1	3	
Flake Notched		5 2	3	3	
Flake Retouched		1	17	54	1
Flake Utilised			9) 	1	
Hammerstone		s 0	50 50	1	
Knife Backed			2		
Knife Backed Retouched		2		5	1
Knife Retouched			1	4	1
Knife Utilised		5 	2	1	
Microlith		1	10 0 20		
Piercer			2	4	
Scraper		2		2	1
Scraper Button		5		1	
Scraper Discoidal				2	
Scraper End		s 0	1	2	
Scraper Side				1	
Scraper Side/End		2		2	
Zinken Piercer	1	5	3 3		
TOTALS	1	1	37	93	4

Worked Flint Tools



The majority fall into the LN/EBA category 68%, then LM/EN 27%, LBA 3%, the single LM microlith 1% and single FUP Zinken piercer 1%.



Retouched flakes predominate 54%, then knives 13%, scrapers 9%, and blades 6%.



Without retouched flakes in the equation, knives predominate (27%), then scrapers (19%), blades (13%), piercers (11%), notched flakes (10%), combination tools (8%) and denticulates (6%). The variety of tool types indicate possible activities from hunting, flint working, butchery, hide preparation and wood working, along with day to day living activities where the use of retouched flakes, used and soon discarded, may have occurred. Limited farming activity may have occurred in the Late Neolithic/Early Bronze Age period. There is a noticeable lack of Late Bronze Age artifacts although those that were found were present in all three finds areas.

Debitage

DEBITAGE	LM/EN	LN/EBA	LBA	
Blade Fragment	2			
Bladelet Fragment	2			
Core	4	1	1	
Flake	1	32	1	
TOTAL	9	33	2	



Debitage shows a slightly different pattern to Tools with LN/EBA predominant with 75%, LM/EN 20%, and LBA 5%, although with the small numbers involved it is difficult to draw any firm conclusions apart from the cores. The presence of cores from all four periods confirms activity in the area from the Late Mesolithic through to the Late Bronze Age.

The 1.5 Kg of fire cracked flint recovered was found mostly in two locations, on the promontory between the two creeks (Area 'A') and at the South Eastern end of the Bosham Channel (Area 'C').

Individual Tools 2021 (Drawings by Theresa Griffiths)

Tools comprise 78% of the assemblage. A selection of noteworthy tools is described below:

Blade Retouched, Size 25x15mm, Thickness 3mm. Cat No: 3.

Dark grey mottled, no cortex. Rounded, retouched proximal end, retouched lateral edges, dorsal ridges, distal end hinge fracture. Late Mesolithic/Early Neolithic.

Knife Backed, Size 83x37mm, Thickness 10mm. Cat No: 14.

Cream/brown mottled, no cortex, abraded back edge. Retouched/worn cutting edge, hard hammer, quality flint. Flake taken from dorsal side, proximal end, to provide thumb grip, right-handed. Late Neolithic/Early Bronze Age.



Piercer, Size 27x20mm, Thickness 5mm. Cat No: 28.

Grey/light brown mottled, thin cortex on one edge. Worked point 8mm tapering to 2mm, 8mm long. Late Mesolithic/Early Neolithic.

Scraper, Size 60x40mm, Thickness 11mm. Cat No: 33.

Light grey mottled, some organic staining, small cortex patch on distal end, three flakes taken from dorsal side, coarse retouch. Late Bronze Age.

Scraper End, Size 58x40mm, Thickness 9mm. Cat No: 39.

Grey mottled, cortex on one lateral edge. Roughly triangular in shape, proximal end 17mm wide to 40mm wide at retouched distal scraping edge. Late Neolithic/Early Bronze Age.

Combination Tool (Knife/Notch), Size 53x20mm, Thickness 8mm. Cat No: 66.

Light grey, no cortex, milky patination, small patches of iron staining. Flaked dorsal side, retouched/worn cutting edge, 10mm worked notch on distal end. Late Mesolithic/Early Neolithic.

Borer, Size 50x25mm, Thickness 10mm. Cat No: 67.

Grey/brown mottled, no cortex. Borer 14-15mm wide, 12mm long, worked/retouched both lateral edges and distal end. Late Neolithic/Early Bronze Age.



Scraper Discoidal, Size 50x45mm, Thickness 6mm. Cat No: 76.

Grey mottled, no cortex. Thin, finely made, 75% retouched edges, thumb grip flake on dorsal side. Late Neolithic/Early Bronze Age.



Denticulate, Size 57x30mm, Thickness 8mm. Cat No: 78.

Grey mottled, no cortex, dorsal ridge, five denticulations. Late Mesolithic/ Early Neolithic.



Core, Bi-polar, Size 65x28mm. Cat No: 84.

Light grey mottled, no cortex, Blade core. Evident knapping error hinge fracture from one end. Mesolithic.



Combination Tool (Knife/End Scraper), Size 85x70mm, Thickness 23mm. Cat No: 90.

Dark brown flaked dorsal side, grey mottled ventral side, thin cortex on one lateral edge and on dorsal distal end. Retouched/worn cutting edge near proximal end, distal end scraper 45mm wide. Late Neolithic/Early Bronze Age.

Scraper discoidal, Size 42x42mm, Thickness 16mm. Cat No: 97.

Dark grey mottled, cortex dorsal side, thick flake. 80% abrupt retouch around edges, worn. Late Neolithic/Early Bronze Age.



Burnisher, Size 60x45mm, Thickness 10mm. Cat No: 98.

Cream/grey banded, minimal thin cortex one lateral edge, retouched on other. Quality flint, hinge fracture 35mm wide at the burnishing end, probably used for hide preparation. Late Neolithic/Early Bronze Age.

Flake Notched, Size 45x28mm, Thickness 6mm. Cat No: 113.

Light grey mottled, very small cortex patch on one edge, flaked dorsal side with minor knapping error, fine retouch on other lateral edge and distal end, small worked notch 4mm. Late Mesolithic/Early Neolithic.

Zinken piercer, Size 46x13mm, Thickness 6mm. Cat No: 116.

Grey/blue mottled, small patch of cortex proximal end, pale patination. Worked fairly blunt point, intermittently worked lateral edge, other edge has 10mm of retouch cutting through patination indicating modified at a later date, possibly to convert to a borer? Final Upper Palaeolithic.



Flake Notched, Size 35x20mm, Thickness 5mm. Cat No: 121.

Grey/brown mottled, thin cortex proximal dorsal and one lateral edge. Two worked notches 10mm and 4mm. Late Neolithic/Early Bronze Age.

Scraper Side/End, Size 30x19mm, Thickness 6mm. Cat No: 141.

Dark brown/grey, cortex on one half of dorsal side, small. Abrupt retouch one lateral edge and distal end. Late Neolithic/Early Bronze Age.

Interpretation

All the assemblage is considered to have derived from erosion of the Channel margins in modern times, probably relatively recently. Sea levels are currently rising at 3-5mm a year (Met Office). Every spring tide the estuarine water laps against the eroding banks, in particular the three areas of the collection. There is no effect from coastal waves from the sea which is approximately 7 kilometres away. However, there are locally produced waves which, with a generally southerly wind up the Channel, will create waves high enough to accelerate erosion. Winds from other directions will have little effect as the width of the Channel is insufficient to produce significant waves. The most dramatic erosion is occurring at the top end of the Channel, Area 'A'. The photograph shows a section of the bank showing topsoil and soliflucted deposits below.

From observation on site it is apparent that the eroded material collapses onto the foreshore, then, over a period of time, the 'fines' are gradually washed away by the spring tides to leave any flints behind in a layer, the bigger flints trapping the smaller ones in position. There is not enough energy in the waves to move this static layer, only the fines and the smallest fragments are moved. This carpet of larger flint extends approximately 15 metres in Area 'A', merging into a gravely layer then into mud. The worked and struck flint found in this static carpet can be considered to be within a metre of where it was eroded out. The photograph below shows the layer of eroded flint.





The flint from Area 'B' was fairly scattered but close to the eroding shoreline, whereas the Area 'C' flint was all very close to the eroding banks.

The collection contains artefacts from the Final Upper Palaeolithic to the Late Bronze Age. The majority of both tools and debitage are allocated to the Late Neolithic / Early Bronze Age and the period quantity percentages are roughly similar in both tools and debitage, which is what would be expected.

The finds are all likely to have derived from the erosion of the plough soil and subsoil, although the FUP Zinken piercer may have originally derived from a soliflucted deposit. A few finds showed mainly minimal evidence of water rolling. Therefore, we can surmise that many flints having entered or fallen into the creeks were not subjected to strong currents and have not moved very far from where they started.

Two possible Mesolithic flint-working sites are known, near Apuldram, 4km to the east, and Chidham, which is about a kilometre south east of the Bosham Channel head. A late Mesolithic flint scatter and evidence of Late Bronze Age activity in the form of pottery and a small number of flints were found at Knapp Farm (Gardiner, Hamilton 1997), about 1500 metres north east of the Bosham Channel head. Other Mesolithic material found nearby has consisted of stray finds. Chidham is also a Neolithic site, although there have been no Neolithic settlements identified in Chichester Harbour. Only scatters of Neolithic flint have been found previously in the area. Again, in the Bronze Age, there is only a scatter of flint tools across the AONB with no settlements located.

Conclusions

The Late Mesolithic Sea levels were lower than the present, between 5 metres lower around 7000BP gradually rising to 3 metres lower around 6000BP (Sturt F et al 2013). There are other factors to consider such as the rising of the land mass in the south. However, the coastline would have been several kilometres further south. By the end of the Early Neolithic (5000BP) sea levels had continued to slowly rise to about one metre lower than current levels. The landscape had evolved from pine forest to deciduous forest, oaks and limes with hazel and elm by the end of the period, with the potential for trapping game and gathering other food. Freshwater streams flowing through the landscape, cutting through the ice age deposits, would have provided fishing opportunities and attracted an abundance of game and wildfowl. Butchery and dismemberment are likely to have occurred at the kill sites. together with hide preparation at temporary, probably seasonal, camps. Tools were fashioned as they were needed, knives, scrapers, piercers etc.

The Late Neolithic/Early Bronze Age period, with the inlets gradually becoming tidal, although still some distance from the open sea shore, would still have supported fishing and hunting, particularly of wildfowl. The range of tools found would indicate hunting and fishing rather than farming activity although some seasonal grazing of animals may well have occurred. No evidence of settlement or field systems has been found in the area. The large number of retouched flakes indicates tools made as and when needed and then discarded.

The small quantity of Late Bronze Age flints may indicate that with the increase in mudflats and saltmarsh, the area became less desirable for hunting and foraging and unsuitable for farming other than seasonal grazing on the drier land.

The evidence from this collection would make it probable that the surrounding fields of the Bosham Channel contain a consistent scattering of struck and worked flint in similar period proportions.

The Future

Area 'A' at the top of the Bosham Channel is particularly interesting. The continuing erosion may provide an opportunity for ongoing monitoring of the banks to detect any possible pits, ditches, burning, flint scatters, post holes etc. A visit once a month after spring tides may yield more information in the long term and there are struck/worked flints still to be found. The current rate of erosion is estimated at up to one metre per year.

Other features observed adjacent to Area 'A' were rows of posts stretching south and a row of stakes, both visible in the mud (Jeremy Board is aware of their location).

Also, at the east end of area 'A', approximately 20 metres north, is a shallow depression with a diameter of 15 metres (SU 80132 04994). A further 35 metre saucer depression occurs about 65 metres north (SU 80088 04994). Both depressions are visible on the LiDAR location map. These may be from excavation of brickearth as the Ordnance Survey map of 1888-1913 shows a brick field approximately 250 metres to the north which went out of use in 1918.

Acknowledgements

I would like to express my appreciation to Bob and Gill Turner for their valuable and constructive suggestions during the planning and development of this report. Thanks go to Theresa Griffiths for her excellent flint drawings, to Connie Shirley for producing the location map and to the flint team at WAS. Finally, thanks to Jeremy Board for originating this impressive collection.

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25 May 2023

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Highdown: Possible Bronze Age Barrows

By Alex Vincent

There are at least two possible Bronze Age barrows on Highdown. One of these is where the 16th century windmill once stood at the south -western end of the hillfort. The grassy mound looks as if it was once a barrow and later became a base for a windmill. This is probably the main barrow on the hill. The earlier windmills dating to the medieval period, which were recorded on Highdown, may have stood on the same site as the 16th century mill worked by John Olliver in the 18th century.

A number of Bronze Age barrows were reused as windmill-steads mainly in the medieval period. These are known as barrow mills. The roundness of a barrow was adequate for a windmill to be placed on them. The medieval windmills were smaller than the later ones and would have been



Photo 1 - Highdown Windmill site, which may have once been a Bronze Age barrow. (Alex Vincent)



Photo 2 - Possible barrows west of the hillfort. The one in the foreground may have been used as a windmill-stead. (Alex Vincent)

open trestle sunken post mills. A number of barrows have a dip in their centre, which is either due to antiquarians or partial excavations by archaeologists. Some could be due to where a medieval windmill once stood.

The second possible Bronze Age barrow is on the hill to the west of the hillfort centred at ca TQ 092 042 and is about 170 metres west of the windmill site. This exists today as a slight mound. The mound is just visible from below the hill in Ferring village and the Ferring Rife. This mound could also have been a barrow mill or was it only just a mill mound for one of the medieval windmills?

There could be other Bronze Age barrows on Highdown stretching in an east to west direction and according to the LiDAR map of Highdown there may be as many as nine. These are shown as slight mounds on the LiDAR map. There seems to be two rows of four and five barrows, which means that there may be a barrow cemetery on Highdown. Resistivity is planned in this area soon and may reveal if there were barrows here.

The author went to Highdown on March 20 2022 and noticed that the barrows west of the hillfort may well be aligned on the setting Sun at the Spring Equinox. He went back at the Autumn Equinox on September 22 2022 and noticed the same alignment. He took photographs on both occasions, but the Sun went into cloud at the Autumn Equinox.

On a recent visit the author noticed a few other slight mounds to the south, which could be barrows. The westernmost one is centred at ca TQ 091 042. This means that there could be three or four rows of barrows stretching from the hillfort going westwards and all aligned with the Equinox sunset. Two rows are north of the eastwest track and two rows are south of it. Could the track have once been a central avenue between the rows of barrows? The distance between the westernmost barrow and the windmill site is about 325 metres.

It is also possible that the hillfort destroyed some barrows when it was built. Other barrows may have existed east of the hillfort and a slight mound just west of the Miller's Tomb may have been one. As this mound is slightly elongated, it may even be a Neolithic long or oval barrow. This mound could also have been a base for a windmill, possibly the medieval windmill mentioned in Goring Manor in 1320.



Photo 3 - The westernmost possible barrow on Highdown. The trackway may have been a central avenue for the rows of barrows. (Alex Vincent)



Photo 4 - Possible barrow west of Miller's Tomb which may have been used as a windmill-stead. (Alex Vincent)



Photo 5 - LiDAR Map of Highdown, showing the mounds, which could be barrows. (From ARCHI MAPS LIDAR; Digital terrain Map (DTM). https://www.archiuk.com.)

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Roman Self-Healing Cement

Weather Eye By Paul Simons, Spotted in The Times by Tony Brook

The Romans invented a remarkable way to make cement that could help reduce modern sources of greenhouses gases and make long-lasting structures.

Producing cement is incredibly polluting, responsible for about 7% of all greenhouse gas emissions. Huge amounts of fossil fuels are used to heat cement kilns to over 1,000 C, turning limestone into lime and, in the process, also releasing CO2 from the limestone.

But the Romans made self-healing cement, which also had the ability to heal any cracks that appeared in the concrete. With this remarkable invention, they built structures that have lasted millenia, such as the Pantheon in Rome, the world's largest unreinforced concrete dome. In contrast, many modern concrete structures have decayed and crumbled after only a few decades.

The secret to Roman cement was thought to be a single ingredient, volcanic ash from the Bay of Naples, which was so important that it was shipped all over the Roman Empire. But a recent study also revealed a strange feature dotted around in the ancient concrete----microscopic, bright-white minerals called 'lime clasts'. They are well known these days but are treated as impurities in concrete, and so it was thought the Romans were shoddy at mixing concrete or used poor-quality materials. It has now been found that these tiny crystals have an extraordinary ability to self-heal. The lime clasts were formed at high temperatures, thanks to a chemical reaction using quicklime, a highly-reactive form of limestone, instead of the slaked lime mostly used in modern concrete mixtures. That hot mixing in Roman concrete production also accelerated the chemical reaction, allowing for much faster construction.

Strangely, the lime clasts easily crack, but a chemical reaction with water quickly fills the cracks before they can spread. It is hoped that these new findings will help to cut greenhouse gas emissions in concrete production and lead to longer-lasting concrete.

From The Times, Monday 27 March 2023

- Climping: 19th Century Graffiti on old concrete wall capping

By Bill Watkins

First found laying on the beach in front of Bread Lane in October 2008, next to what at the time was the second groyne along, east of the old overspill car park, this large piece of concrete wall capping was found to have been inscribed with a date of 1883 and three letters 'ITE' at the left side of the broken slab, together with what looked like half of the letter 'H' at the point the slab was broken on its left edge (Photos 1 & 2). It was next and last seen in April 2009, partially buried under shingle, (Photo 3). Following a period of stormy weather, it was never seen again and is now believed lost. The dating of the Graffiti to 1883 at least provides us with a date when the initial concrete capping of the old flint walls was made prior to further concrete capping of the sea defences taking place during the First and Second World Wars.

Further research revealed that between 1841 and 1881, census records for Clymping showed several families called WHITE were found to be living in the area and it is therefore suspected that this is the name that is inscribed on the slab with the first two letters of the name having been lost when the slab broke away from the wall.

Photo 2



Photo 1: Graffiti on concrete wall capping, (chalked letters to assist with reading).



Photo 3: Slab last seen April 2009

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1881 Census for Climping



Approximate location slab was last seen, marked with a red X

Addendum to 'A Report on the clearance of the Slindon House Stable Block by Worthing Archaeological Society, 2012/13' on work completed 2019/2021

By Keith Bolton & Cheryl Hutchins

In 2019 Worthing Archaeological Society (WAS) was asked by the National Trust to complete its plan of the stable block at Slindon House begun in 2012/13, and to draw the outer wall of the western wing. This is the only remaining wall of the building and has recently been consolidated. A late 19th century map shows the stable block in relation to Slindon House.

The unfinished plan can be found in the report by John Green and Peter Brannlund given to the NT at the time entitled "A report on the clearance of the Slindon House Stable Block by Worthing Archaeological Society, 2012/13" and published in the Society's Journal in 2015 (Green J, 2015, p.5). While drawing the plan, Bob Turner observed that the ground on which the stables were built appears to be an artificially-levelled platform, created by moving earth dug from the east side of the site to build up the west side. The land is visibly higher on the east outside the outer stable block wall, and falls away fairly steeply from the outer west wall down to the workshops and sheds.

Bob Turner's completed plan is shown in Figure 3. The section drawing of the internal (east-facing) elevation of the outer western wall, drawn by Chris Lane, is shown in Figure 4.



Fig. 1: Sussex Series XLIX surveyed 1875/6, published 1880, showing stable block (National Library of Scotland, Nov. 2021)



Fig. 2: 1 metre contour map

Contains Ordnance Survey Open Source Data OS Data © Crown copyright [and database right] (2021) Maps are generated using ArcGIS (GIS Software) Version 10.8.1 Redlands CA USA Environmental Systems Research institute 1992 – 2021 Contains Environment Agency information © Environment Agency [and database right] (2021) Bob Turner's completed plan is shown in Figure 3. The section drawing of the internal (east-facing) elevation of the outer western wall, drawn by Chris Lane, is shown in Figure 4.



Fig. 3: Plan of the Stable Block completed in 2021



Fig. 4: Internal West Elevation of the West Wall

A description follows of the floors of the northwest and west wings of the stable block as they were cleared of debris.

Northwest Wing

The 1940 War Ministry Schedule of Condition describes the stable building's north elevation as follows: "The central arched entrance is badly chipped and disintegrated at the base and the two spur stones are old and much worn. Above the entrance is a gable stone fixed and carved with heraldic shield. The carving appears old but generally intact, whilst some of the stones are cracked and broken away at joints, slightly disintegrating and the cement surface broken, stained and peeling in parts." (Schedule, 1940 p.217).

The area outside of the western side of the north wing was cleared in order to find the outer wall in line with that just visible adjacent to the grass verge on the eastern side, and to identify a floor surface. The foundations of a substantial mortared flint outer wall measuring 1ft 6ins wide were revealed (Fig 5). This wall forms the return of the brick and flint wall of the west wing, a small section of which projects north beyond the back wall of the NT office building and is shown in Figure 13 of the original report. A sondage, dug inside the wall, showed coursed flints to a depth of 1ft 2ins but due to time constraints the bottom of the wall foundations was not reached (Fig 6). A clump of malleable red clay, the source of which is unknown but is evident at other sites on the estate, was found in this sondage. A layer of building rubble and degraded chalk covered the remains of the north wall and to the area to the south inside the building.

An incomplete and damaged brick-lined channel runs along the centre of the building for 36 ft from the central entrance, and ends at a drain in the northwest corner (Fig. 7). The alignment of this channel corresponds to the visible one on the east side of the entrance, in the brick surface outside WAS' finds sheds. The end drain in this brick surface on the east reveals a brick-lined chamber but the drain in the northwest wing was filled with debris.

The degraded chalk- and rubble-strewn surface inside the northwest wing continues south of the channel and corresponds with the Schedule's description "Part stone flags, part cobbled, with brick channel along middle. All old, worn undulating surface, stones disintegrating, area of stone flagging missing just inside door for about five square yards. Generally very dilapidated rotten condition." (Schedule, 1940 p. 227). A more defined cobbled surface close to the inner wall may be a corridor floor. The Schedule describes the remains of four timber constructed





Fig. 5: Northwest outer wall corner with west wall



Fig. 6: Foundation wall of northwest outer wall

stalls on the ground floor and it would appear that the horses kept here were not so highly regarded as those in the eastern half of this wing where the stalls had attractive brick-lined floors.

It was therefore established that the brick-lined floored surface of the eastern side of the central arched entrance is different from that of the western side. The Schedule states that on the eastern side the floor is "brick-on-edge, herringbone design to gangway. Brick channel to centre with gully." (Schedule, 1940 p.218). This floor can be clearly seen with the brick-on-edge surface lying outside the sheds currently used by Worthing Archaeological Society, the channel in the centre and the herringbone design close to the internal wall (and under the sheds) and is detailed in Green's report (Green J, 2015, p.6). This brick-lined floor does not extend to the western side of the central entrance and the only matching features are the two gullies.

The yellow paving bricks which lie east/west in the courtyard lie north/south in a single row against the remains of the inner northwest wall. The background of a family photograph from the 1920s/1930s shows a glimpse through the west wall into the courtyard where the inner wall of the northwest wing looks substantial with plinth and band course as described in the Schedule of Condition (Schedule, 1940, pp 216-7), and where there are no inside walls lining the pathway of yellow stable yard bricks.

West Wing

The only remaining stable block wall is that of the outer wall of the west wing, with the areas of render at its northern end, shown in Fig. 9.



Fig. 9: East-facing internal face of the outer west wall of Stable Block taken from inside the stable yard (courtesy of K Bolton)



Fig. 7: Brick-lined channel ending in a drain in the northwest corner of the wing. Drain is debris-filled.



Fig. 8: Photo taken through the west wing into courtyard (by courtesy of the National Trust)



Mrs Norah Harding's oral history account of her memories of the early 20th century to John Green describes the west wing being used to store carts and wagons, with open arches and bays behind them. She also recalls that the grooms, Bob Witner and Mr Hayes lived above the west wing, and that the ground floor was used to garage a Riley, a Sunbeam and an Armstrong Siddeley (Green J, 2015, p.13).

The Schedule describes the west wing floor as "Earth floor, rough and uneven, except to area between East and West entrances which is paved with stable bricks, old worn, chipped, marked disintegrated but generally firm". (Schedule, 1940, p.226). The concrete surfaces recorded may in fact post-date the 1940s as, according to the NT staff, the stable block was used for agricultural purposes post the Second World War (pers.comm.).

The area between the small gate and the first large arch at the southern end of the wall, for simplicity known as Bay 1, consists of a completely flat concrete surface with a single posthole measuring 6ins x 5.5ins, placed off-centre.

Bay 2 measures 14ft 3ins wide, and immediately adjacent to the standing wall is a concrete ledgelike platform which may have been inserted to support the wall in modern times, i.e. after the fire. A modern gas trench runs north from the small doorway at the south end of the wall and lies 2ft 5ins from the wall. A concrete surface lies from the gas trench to a broken concrete line 10ft 7ins from the inner wall facing the yard. This changes to a more worn concrete-rubble surface to the beginning of a line of bricks 4ft 3ins from the yard. As an extension from these bricks, a line of 6 small concrete-set holes (3.5ins x 3.5ins) runs north across the bay and into the yellowbricked central pathway, and measures 15ft 6ins. These are spaced as three pairs 2ft 4ins apart, with two intervals of 4ft 3ins between the pairs. The most northerly pair is set into the yellow bricks of the pathway. The line of 6 concrete holes may have been a temporary structure, possibly built after the fire when the stable yard was used for agricultural purposes.

The entrance for vehicles in the west wall was through the central arch, along a yellow-bricked pathway measuring 23ft 2ins long and 6ft 8ins wide and exits through a slight projection into the internal stable yard. Two small concrete-set postholes, 4ft 9ins apart, are in line with the inside wall's inner face. They appear to be older than a second pair of postholes set in what appears to be later concrete, 2ft 2ins back from the narrower postholes and which measure 12ft apart.



Fig. 10: Concrete floor in Bay 1



Fig. 11: An example pair of small concrete holes, part of a line of 6 in Bay 2, the right hole against the central yellow-bricked pathway to the right



Fig. 12: Cobbled floor in Bay 3 ending at the inner wall of the west wing with overlying concrete floor at the top of the photograph



Fig. 13: Foundation arches in chalk/brick and tile-rubble fill

Bay 3, measuring 14ft 7ins wide, is similar to Bay 2 and both were open to the central pathway. This space would have been highly suitable for garaging cars used in the early part of the twentieth century. The concrete ledge and gas pipe trench continue through Bay 3 with a concrete floor extending east, in somewhat better condition than that in Bay 2. Approximately half way through the bay and at a slightly lower level, the floor changes to that of laid cobbles. This cobbled floor extends as far as the inner wall to the stable yard.

Immediately outside Bay 3 in the yard, there is a red brick-lined inserted rectangle near the junction of the northwest and west wings measuring 7ft 10ins x 2ft 1in which was interpreted as an inspection pit. This pit lies adjacent to a concrete rectangle (10ft 8ins x 9ft 6ins). A concrete slab to the southeast (3ft 7ins x 3ft 6 ins) was probably the site of a disused petrol pump tank, and these features are interpreted as an early 20th century re-use for car maintenance.

Bay 4 lies against the totally bricked-up archway and has a mixed chalk and rubble surface. The concrete ledge extends along the wall. Bricks were removed from the west/east wall at the bay's southern side to accommodate the gas pipe trench. Courses of brick on the north-facing side of this wall (between Bay 3 and Bay 4) were discovered and a sondage dug to establish their depth. This revealed 10 courses of bricks and the beginning of the curve of an arch, and led to an excavation of a double-bricked feature consisting of 1 complete arch at the trench's eastern end, and an almost complete second arch close to the gas pipe trench and the west wall. These arches were built in a chalk/brick and tile-rubble fill which was removed from the east side of the stable block. For more details, see Appendix 1.

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Cheryl Hutchins 14/09/2021

Appendix 1

Slindon – Stable Yard Excavation Report

Introduction

This report details an excavation undertaken over two days in September 2021 by the Worthing Archaeological Society's (WAS) Field Unit in the stable yard at the National Trust's estate offices in Slindon, West Sussex.

The stable yard of Slindon house is centred on NGR SU95929 08560.

Background

In 2011, the National Trust asked WAS to investigate the remains of the stable yard adjacent to the NT offices at Slindon. There followed a two-year long project, which involved clearing the scrub from the site and recording the features found (see site plan). This work also involved the excavation of a trench on the eastern side of the stable yard, covering the area between the exposed eastern wall of the stables and the retaining wall (Green 2015, 11).

The research undertaken for the 2012-13 investigation found that underneath the courtyard there is at least one large cistern to collect the rainwater from the stable roofs. There is also reference to an estate worker who saw what was thought to be a sewer consisting of brick pillars and arches - but is likely to be part of the cistern (Green 2015, 10). Unfortunately, the investigation was unable to completely record the four sides of the stable block as the western side was fenced off for extensive repairs. By 2019 these repairs had been completed, so that in that year and 2021 WAS Field Unit was able to return and complete the recording of the northwest and west wings.

During this clearance a modern service trench was located, this had been dug to accommodate a gas pipe for the Slindon Estate office. Having defined the extent of the service trench it was apparent that the trench had cut through the brick foundations of the third bay (located in NW corner) of the west wing (see figure 1).



Figure 1: Sondage revealing top of an arch



Figure 2: Detail from 1880 OS Map Sussex Sheet XLIX

It was noted that the foundations consisted of five courses of brick, which is more than had been found elsewhere on the site. A sondage was excavated and revealed 10 courses of brick and what appeared to be the left-hand side of an arch (see figure 1 showing foundations during excavation of sondage).

Following this discovery, the NT agreed for WASFU to undertake an excavation to determine the extent of these foundations.

Historical Background

This section is not intended to be an in depth note on the history of Slindon House and the associated stable yard. For a comprehensive history see John Green's article in WAS Journal vol. 4 No. 2.

The original Slindon House was constructed by the Archbishops of Canterbury either in the late 12th or early 13th century, with Stephen Langton supposedly dying here on July 9th, 1228 (Whitfield 1994, 56). After the Reformation, the estate passed to Anthony Kempe who re-built the house around 1560 (Whitfield 1994, 56). Further major rebuilding work took place in the 18th and 19th centuries (Whitfield 1994, 57). Whilst a date for the construction of the stable block is unknown, documentary evidence suggests a construction date between 1800 and 1810 (Green 2015, 5) and the stable block appears on the Tithe map of 1840 (Green 2015, 5).

The four-sided stables can be seen on the OS map of 1880 (see figure 2).

The map evidence shows that the plan of the stable yard remained the same on the 1879, 1897, and 1914 OS maps. A Schedule of Condition survey conducted in 1940 by the War Department gives a detailed impression of the buildings and their usage and state at that time.

By the time that the stable block was destroyed by fire in the 1960's, the building had fallen into disrepair, and once the remaining debris was removed, the space was used as a yard.

Methodology

Using the line of bricks visible on the surface a rectangular trench (Trench no. 1) measuring 4.0m long and 1.5m wide was excavated to reveal a section of wall foundations. The chalk rubble fill was removed from the trench until the bottom of the foundations was reached.

The foundations (feature 1) running east-west were recorded as was the abutting foundations (feature 2) running north-south. Due to the presence of a modern service trench containing the gas pipe for the estate offices, it was not possible to establish the relationship between feature 1 and the main western wall of the stable yard.



Figure 3: Plan of Stable Yard showing location of trench 1

Excavation Results



Figure 4: Plan of area under investigation showing features 1 and 2

Feature No. 1

This feature consists of a Wall foundation containing two arches built on an east-west line. The western arch is truncated by a modern service trench for a gas pipe to the NT office building.

The feature is two courses of bricks wide, and each arch is constructed of two courses of bricks, with both key stones covered with mortar. A tile on-end appears in the western arch lower course. The finish throughout is poor with mortar overspilling the bricks. The foundations are placed directly on chalk (context 5).

Sand (context 4) was used in both arches, possibly to assist with the building of the arch,

it is especially noticeable in the eastern arch. No specific bond is used, mainly stretchers with occasional headers.

Figure 5 below shows a section of the foundations and parts of both arches.

Feature No. 2

This is the north/south wall foundation consisting of chalk, flint, foreign stone, and the occasional brick with mortar. Wall steps out slightly a third of the way down.



Figure 5: Centre of Feature 1 section facing North



Figure 6: Feature 2 Section facing West

Discussion

During the excavation on this site, there was much debate among the excavators as to why the builders of the Stable yard built two arches as part of the foundations when they were never to be seen. The conclusion being that firstly an arch is structurally sound and would support the infrastructure above ground and secondly because that is what the builders knew.

The lack of documentary evidence allows this author to suggest that the builders were local and that the same team built the masonry structures above ground as well as the foundations. The remaining western wall bears testament to their skills (see figure 7 below for arches in western wall).

It has been reasoned (Mr. Turner pers. comm) that chalk was moved from the SE corner of the site to provide a level surface. Given that the chalk infill to the north of feature 1 is over 1.5m deep, this would be highly likely. It is possible that this material has been supplemented by the chalk removed to construct the other known void on the site, which contains a tank used to store rain water from the yard (Green, 2015).

If there are two voids, could there possibly be more in the yard? Any plans for the use of the yard should bear this in mind and allow for a survey or further investigation beforehand.

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Keith Bolton August 2023



Figure 7: View of remaining Western end of Stable Yard

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