

RESEARCH NEWS



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The well-preserved earthworks of Whitley Castle are seen against the Miner-Farmer landscapes of the North Pennines AONB - story on page 12

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RESEARCH THEMES AND PROGRAMMES

A Discovering, studying and defining historic assets and their significance

- A1 *What's out there? Defining, characterising and analysing the historic environment*
- A2 *Spotting the gaps: Analysing poorly-understood landscapes, areas and monuments*
- A3 *Unlocking the riches: Realising the potential of the research dividend*

B Studying and establishing the socio-economic and other values and needs of the historic environment and those concerned with it

- B1 *Valuing the historic environment: Quantifying the economic and social value of historic assets*
- B2 *Gauging the mood: Establishing perceptions and attitudes to the historic environment*
- B3 *Understanding the needs: Delivering sector intelligence*

C Engaging and developing diverse audiences

- C1 *Opening Doors: Understanding public participation in the historic environment*
- C2 *Making Friends: Building understanding and appreciation through education and outreach*

D Studying and assessing the risks to historic assets and devising responses

- D1 *Heritage at risk: Quantifying and analysing the historic environment*
- D2 *Measuring threat: Studying the reasons for risk and developing responses*
- D3 *Keeping it safe: Protection and conservation*
- D4 *Rescue! Threat-led last resort analysis*

E Studying historic assets and improving their presentation and interpretation

- E1 *Presenting the past: Research to inform the presentation to the public of historic places*

F Studying and developing information management

- F1 *Navigating the resource: Developing standards for Historic Environment Records*
- F2 *Wired! Studying and developing information management*

G Studying and devising ways of making English Heritage and the sector more effective

- G1 *Sharpening the tools: Developing new techniques of analysis and understanding*
- G2 *Defining the questions: Devising research strategies, frameworks and agenda*
- G3 *Impact and effectiveness: Measuring outcomes and effectiveness of English Heritage and the sector*

Research News 11 reports on some of the new discoveries and interpretations resulting from recent Research Department projects, and continues to examine some of the themes and locations that have been reported upon previously.

The development of new facilities for events at Chiswick House presented the opportunity to explore aspects of the little-known Jacobean predecessor to the present building and added enormously to the results of the previous work reported in *RN2*. Similarly, the development of a new garden at Carisbrooke Castle necessitated further excavation, which has added important detail to that reported in *RN9* with the discovery of a hitherto unknown twelfth century range of buildings. *RN* has often reported on projects that facilitate the participation of volunteer groups. In the Ridgeway Long Barrows Project, this important aspect of our work is again highlighted. At Cokersand Abbey we see another example of a monument at risk from coastal erosion (*RN9*).

The development of St Pancras International Station as the terminus of the high speed Channel Tunnel Rail Link called for sensitive redevelopment of this important group of listed structures. When built, the train-shed roof with its massive cast-iron ribs and great glazed expanse, was the largest covered area in the world. Research into the paint schemes used in the early decoration of the roof by Helen Hughes led to the choice of the blue paintwork used on the ironwork to create a truly stunning effect. This work is a spectacular example of how English Heritage research can contribute to contemporary life.

The wild beauty of the North Pennines AONB around Alston is not obviously an industrial landscape, but its appearance was created by the activities of farmer-lead miners over hundreds of years. A new landscape investigation project will record and document this landscape for the first time. The spectacular Roman fort of Whitley Castle may have been the administrative centre for exploitation of the lead deposits, and its investigation is timely, as the International Congress of Roman Frontier Studies will visit the site in August.

The fresh air and countryside of the Mendip Hills led to the establishment of sanatoria for the treatment of the pulmonary tuberculosis that was such a scourge of the industrial towns of the nineteenth century. These philanthropic private and state enterprises employed good architects, and much of the built heritage of this period remains.

The prevalence of the motor car has had a radical effect on the built environment, with the domestic garage one of the ubiquitous features. One of the first such structures still exists, in Southport.

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Research News appears three times per year.
Published April 2009. © English Heritage 2009.
Edited by Tony Wilmott. Designed by Vincent Griffin.
Printed by The Colourhouse
Product code 51500

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‘Each day in danger of being drowned by the sea’: a Scheduled Monument at risk

Earthwork survey at Cockersand Abbey in Lancashire has revealed the extent of the monastic precinct and the level of threat to the surviving above and below ground archaeology from marine transgression.

In July 2008, the Archaeological Survey and Investigation team carried out a rapid survey and analysis of Cockersand Abbey at the request of Dr Jennie Stopford, English Heritage Inspector of Ancient Monuments. The initial intention was simply to assess the nature of remains under immediate threat of erosion; however it became apparent that to better understand these remains and create a useful record, survey of the complete monastic precinct and its environs would be beneficial.

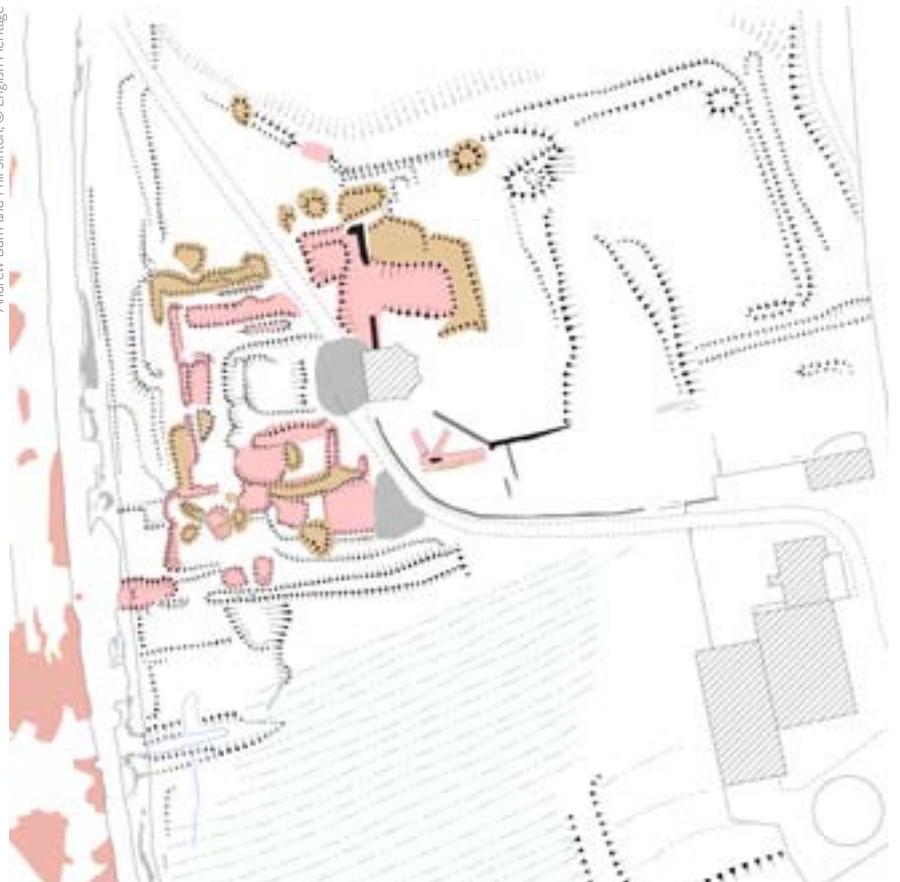
Cockersand Abbey is located 9km south west of Lancaster at the mouth of the Lune estuary on the southern fringe of Morecambe Bay. The only standing remains are those of the Chapter House, converted into a mausoleum in 1750 for the local Dalton family, and a few fragments of monastic walling. The rest of the abbey buildings have been robbed down to ground level. They were extensively excavated during the 1920s, and all that can now be seen are the earthworks of monastic walls amongst the remains of trenches and spoil heaps. These remains are protected as a scheduled ancient monument while the Chapter House is also listed at Grade I. The Chapter House was placed on the Heritage at Risk Register in 2000 due to risk from erosion, marine transgression and repeated storm damage. Because of this, repairs were grant aided by English Heritage in 2007.

Although the monastic buildings had been extensively excavated, the earthwork remains beyond the church had remained untouched. Investigation of the whole monument allowed the identification for the first time of the small monastic precinct, and of the limits

of the outcrop of sandstone that the abbey sat upon, now reclaimed by the construction of a post medieval sea wall. Analytical survey contributed to the understanding of the form and functions of the outlying earthwork remains, and placed them and the conventual buildings within the context of the monastic precinct. A previously unknown inner boundary, three possible entrances and two outlying buildings were recorded for the first time.

Extract from hachured plan of Cockersand Abbey reduced from 1:1000

Andrew Burn and Phil Sinton, © English Heritage





Above: Interpretive plan of Cokersand Abbey showing the extents of the newly discovered precinct boundary



Lidar data showing the topography surrounding the abbey, red denotes the highest ground

Andrew Burn and Phil Sinton, © English Heritage

The abbey was built upon a low sandstone outcrop surrounded by peat bog and salt marsh on the landward side. The remoteness and isolation of the site probably accounts for its choice, first as a hermitage, then a hospital and finally as a Premonstratensian abbey. Evidence was discovered during the survey for a northern gate out of the monastic complex. This suggests that the origins of the current sea wall, apparently constructed during the 18th century, could in fact date back to the medieval period with the canons constructing a causeway to access the resources to the north, or simply to give easier access to the abbey. The later sea wall would have then followed this line during the 18th-century reclamation of the marshy areas to the east. The development of the sea wall, together with the rest of the history and archaeology of the site will be discussed in more detail in a forthcoming English Heritage Research Department Report.

Evidence for the effects of erosion was also recorded. Although the sea wall protects against direct erosion of the face of the cliff, numerous locations were identified along the top of the sandstone cliff where the overlying soil had slipped down onto the foreshore. In some places, this had destroyed archaeological features recorded in the 1920s excavations. Other locations remain directly at risk of further erosion. The comparison of historic maps with the current survey has shown that, those areas that have suffered the most erosion, have been affected by artificial factors as well. The location of a medieval wall labelled 'Johns wall' on an excavation plan of 1927 has now been lost. It is possible that this area, which appears to have suffered considerably more erosion than areas further north, was lost as a direct result of the destabilising effects of the excavations.

Andrew Burn and Trevor Pearson (using data from Next Perspectives) © English Heritage

Artificial destabilisation of the cliff is further demonstrated by an area of post medieval ridge and furrow ploughing to the south. These rigs are cut by the edge of the sea wall showing that the tip has been eroded away. Erosion here is more extensive than areas to the north and south, suggesting that the ploughing has actually destabilised the cliff edge leading to further erosion. This artificial increase in the rate of erosion is a strong case against any rescue excavations of further remains under threat, if the earthwork and below-ground remains are to be preserved.



The remains of the chapter house viewed along the sea wall from the north

Storm damage and erosion has led to the protective sea-wall being breached in several places and the wall has been patched with concrete as a result. The main threat to the site comes from landslips caused by intense storms eroding the soil at the top of the cliff and sea wall. In times of rising sea levels, storms of greater frequency and intensity will place the site at increased risk. However for now the site is placed on the highest point along the coast protecting it from the worst of the erosion and showing that the canons knew exactly where to place their monastery in 1189. The canons themselves found coastal erosion a problem. In 1378 it was

written 'each day they are in, danger of being drowned and destroyed by the sea.'. They had also seemingly built their own sea wall for the Relaxation granted by Pope Gregory in 1372 to penitents who would give alms for the repair of the monastery, 'stating that it was so near to the sea that the walls built for the preservation of its buildings were being worn away and destroyed by the waves'. So the problem of erosion is nothing new and the abbey remains have survived against the odds for 820 years and will hopefully be preserved for the future as well.

Andrew Burn



View of standing remains around the chapter house showing conservation work in progress

NEW DISCOVERIES AND INTERPRETATIONS

Salubrious Mendip; health institutions in the Mendip Hills

The Mendip Hills, along with landscapes such as the seaside, became associated with good health because of their contrast with the industrial urban environment.

The climatic and environmental health treatises rediscovered and reinterpreted from the 16th century onwards acquired new relevance in the 19th century with the rapid growth of industrial towns. The Mendip Hills, and other landscapes such as the seaside, acquired significance because they were seen to be diametrically opposed to the industrial urban environment. This re-creation of the salubrious landscape, together with progressive medical theories, led to a belief that the Mendip Hills was a landscape that sustained health, and even improved mental and physical wellbeing. The significance of the health-related institutions in the area has been researched by the

Swindon Architectural Investigation team as part of English Heritage's Mendip Hills AONB project (*Research News 5*).

The first institution to be established in the Mendip Hills because of its association with health was actually educational rather than medical. In 1699 William Jenkins of Hertford committed to establish a school for children of Quaker families at Sidcot because it had 'a very healthy, serene air.' The school's first incarnation closed in 1728, but when it was resurrected in the village around 1784 it was done so on the grounds that Sidcot was in a 'very healthy and pleasant situation'.

Former Somerset County Lunatic Asylum. Mendip Hospital closed in 1991 and the site acquired for residential and commercial use. Despite the loss of some hospital buildings and the addition of some incongruous housing, Scott and Moffat's main administration and ward block remains an impressive site





It was from the middle of the 19th century that the Mendip Hills acquired its most notable institutions devoted to health. The chosen location for the Somerset County Pauper Lunatic Asylum reflected contemporary attitudes towards mental health care. The Parliamentary Bill of 1808 For The Better Care And Maintenance Of Pauper And Criminal Lunatics recommended that asylums ‘shall as far as conveniently may be fix upon an airy and healthy Situation with a good supply of Water, and which may afford a probability of the vicinity of constant Medical Assistance’. The Somerset justices identified a suitable site approximately 2 km north-east of the centre of Wells, to the south-east of the Bath road. It was accessible, yet suitably isolated; it was on the southern slopes of the hills, having a pleasant outlook as well as being sheltered from north winds, and in an area where water was in plentiful supply. In 1844, a year before legislation was enacted to compel counties to provide asylums for the insane poor, George Gilbert Scott and William Bonython Moffatt won the competition to design the asylum for Somerset. Opening in 1848, the Elizabethan-style building included a central administration block flanked by south-facing corridor-plan ward wings and airing yards, enabling patients to receive the full benefits of fresh-air, sunshine and picturesque countryside.

The Mendip Hills landscape was also believed to be particularly suitable for the care and cure of those suffering from pulmonary tuberculosis, and found favour from physicians specialising in the disease both at the beginning and the end of the 19th century. In 1818, John Mansford,

member of the Royal College of Surgeons, published his findings into the Influence of Situation on Pulmonary Consumption and concluded that the area around Axbridge on the southern slopes of the Mendip Hills was highly favourable for consumptive patients. Mansford’s publication may have held influence for some time, as the first of the area’s sanatoriums dedicated to the treatment of victims of pulmonary tuberculosis was built approximately 1km north-east of the centre of the town, opening in 1878. St Michael’s Free Home for Consumptives was established and endowed by Matilda Blanche Gibbs, wife of the merchant and philanthropist William Gibbs of Tyntesfield House, and was designed in the Gothic revival style by William Butterfield. The spiritual needs of the patients was so significant that wards for the severely ill flanked the central chapel and included shutters that opened onto the nave so that the patients could hear services from their beds.

Towards the end of the 19th century, tuberculosis was still a widespread disease, causing around one in eight deaths in England and Wales. One of the most significant tuberculosis sanatoriums to be opened during this period was established high on the Mendip plateau. Opening in 1899, Nordrach-upon-Mendip was the direct result of the ‘open-air’ treatment received by Dr Rowland Thurnam at Dr Otto Walther’s influential Nordrach sanatorium in the Black Forest. Following his cure, Thurnam assisted Walther for nearly a year before setting out with his colleague Dr Neville Gwynn to find a suitable site for an ‘exactly similar sanatorium in England.’ After two years inspecting and rejecting locations,

Left: Former St Michael’s Free Home for Consumptives, Chapel of St Michael and All Angels. In 1967 the site was acquired by the Cheshire Foundation Homes and renamed St Michael’s Cheshire Home, and became a residential centre for the permanently and incurably sick and disabled. The chapel, dedicated to St Michael and All Angels, still plays an important role in the life of the home

Right: Former St Michael’s Free Home for Consumptives, former cemetery. The sanatorium had its own mortuary and cemetery. The former was demolished and the stone used to construct an extension to the sanatorium, and the latter was eventually deconsecrated and the headstones moved to the edge of the site to create a garden



Former Nordrach-upon-Mendip Sanatorium. In World War II, the sanatorium was purchased by Bristol Corporation and was used to house the city's Children's Hospital patients during the Blitz. After the war, it reopened as an annexe to Ham Green Fever Hospital and Sanatorium, finally closing in 1956. It became a hostel to house refugees from Hungary and was sold in 1958, but efforts to transform it into a country club never materialised. The site was subsequently divided into separate plots for private dwellings. Unsurprisingly, no traces of the sanatorium's bungalows or glazed shelters survive

Thurnam eventually selected a site that fulfilled the criteria that Walter had specified for successful sanatoriums. Described as being 'situated in the neighbourhood of a vast tract of open moorland with sheltered valleys, on the Mendip hills, famous for their healthy climate,' the site faced south and south-east, and was protected from severe winds by woods of pine and beech trees. A new sanatorium building was added and the grounds laid out with a lawn, rose garden and picturesque dell. Patients were housed in the main sanatorium block and timber chalets in the grounds. The 'open-air' treatment also extended to the communal dining hall, which was timber-framed and almost entirely glazed.

Following the success of Nordrach, Mendip Hills Sanatorium was established at Hill Grove country house in around 1900. It was considered suitable as a sanatorium for sufferers of pulmonary tuberculosis because of its altitude of around 840 feet, its remoteness and its extensive grounds. An assessment of 1902 exhorted: 'It would be difficult to imagine a more secluded and attractive spot for the open-air treatment'.

As well as the adapted house, the sanatorium had several residential chalets, and revolving shelters for daytime outdoor rest. Like other privately-run tuberculosis sanatoriums, Mendip Hills was an exclusive institution; in 1908 it accommodated only twenty-four patients. However, this exclusivity may have been a contributory factor to its closure between the World Wars.

While the Mendip Hills offered suitable locations for a county asylum and sanatoriums from the middle of the 19th century, the area's relationship with health did not stimulate the creation of a health resort on the long-established models of the inland spas and the seaside. During the 19th century, the area was promoted as an excursion destination for those who had made Weston-super-Mare, or the inland spas of Bath and Bristol, their primary destinations for health and amusement. A century later, however, the Mendip Hills was actively promoted as a health tourism destination, countenanced by the naming of health institutions that had recently been established in the area. The Homeland Handy Guide claimed:

Facing page top:
Former Mendip Hills Sanatorium. By the 1960s the house was only partly occupied and in a poor state. It is now all but completely derelict

‘Nothing can excel in delight the long day on the hills ... returning each evening to the vale, fit as the proverbial fiddle. For these hills of Mendip and this vale of Winscombe are boisterously healthy. The Mendip breeze – never searching – is dry and bracing, if a little cold; while in the valley the breezes are tempered but still soft, light and energising. It is for this dry, vigorous climate that so many doctors recommend the Winscombe district to sufferers from throat or chest affections, and the sanatoria for consumptives, as St. Michael’s on the Axbridge slopes of Callow and Nordrach-on-Mendip have a national reputation.’

The Mendip Hills health institutions were created as a result of philanthropic benevolence, private enterprise and state responsibility, and included the work of renowned architects. The sites evolved and expanded in accordance with changing practices and demand for bed spaces. However, the advancement of pharmacological treatments at the expense of geographical and environmental health care, and changing Government attitudes towards the treatment of the mentally ill inevitably led to functional changes, and eventually resulted in the closure of all but one of the sites. Despite this, and through a combination of continued occupation and the redevelopment of adaptable buildings, much of the historic fabric has survived. The health institutions of the Mendip Hills provide outstanding examples of health institutions that have an explicit relationship with the landscape in which they were built.

Gary Winter

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Below: Former Mendip Hills Sanatorium sign

© English Heritage



NEW DISCOVERIES AND INTERPRETATIONS

The earliest surviving motor house?

The domestic garage is a ubiquitous part of the urban landscape. The motor house built by Dr Barrett of Southport was one of the first...

The first motor cars, fragile machines with bodywork largely constructed of wood, arrived in England in the mid 1890s. In common with the horse-drawn carriages they were eventually to replace, they had to be kept under cover. If they were left outside for any prolonged period, their coachwork would rapidly deteriorate. Indeed, it was advisable for them to be thoroughly washed down and dried each time they were taken out for a drive.

So for every car, there had to be adequate covered accommodation, what we would today call a domestic garage but known in the early years of motoring as a motor house or, if it was on a grander scale, motor stables. Very few are known to survive.

On the 7th October 1899, *The Autocar*, the earliest motoring journal to be published in England, published an interview with

Dr. W. W. Barrett, a pioneer motorist from Southport, Lancashire. Dr Barrett was one of the first doctors in the north of England to use a car for his rounds instead of a horse and carriage. He acquired his first car, a 5½ horsepower Daimler in May 1898 and the second, a specially built covered-in Daimler, in December 1898. He was a keen motorist, extolling the virtues of using a car for his work and was a Vice-President of the Southport Automobile Club.

Dr Barrett designed a motor house specially to house the cars, located to the rear of his large late nineteenth century house at No. 29 Park Crescent, Hesketh Park. It was a two-storey building in red brick matching the house and linked to the dining room by a corridor. On the ground floor was the accommodation for the cars with a brick floor laid on concrete. This garage was



The interior of the motor house in 1899, showing the two Daimler cars belonging to Dr Barrett



Left: The exterior of the motor house in 1899

Right: The exterior of the motor house in June 2008

electrically lit and, like the house, heated by hot water. The Doctor was therefore able to go from the warmth of his centrally-heated house to his car without venturing into the cold, an important consideration for someone who might have to travel at all hours in the course of his work. The garage had an engine pit on two levels (two feet and four feet deep) and was fully equipped with tools and equipment, some of it designed by Dr Barrett. The first floor was occupied by a billiard room and the Doctor's workroom, filled with lathes, cutting machines and a circular saw, and where he was able to indulge his interest in mechanical matters. The motor house was almost square with a projecting bay to the front. A broad opening with a moulded segmental arch provided the vehicle entrance. The doors were set back behind this so that the projecting bay formed a two-storey porch. While the building was quite plain, corner buttresses to the projecting bay and stone surrounds to the windows provided a few decorative touches.

Although many of the large houses around Hesketh Park have been replaced with blocks of flats since 1945, No. 29 has survived, converted into flats, and with it, the motor house, now also entirely in residential use. The garage doors have been replaced with a window, a door has been inserted into the corridor to give independent access and all windows have been renewed in uPVC, although broadly echoing the appearance of the original timber sashes. Other than this, the motor house is unchanged externally

from Dr Barrett's day and is in good condition. It has not proved possible to trace building plans so the exact date of construction is unknown but a large shrub, visible to the right of the garage opening in the 1899 photograph, may offer some clues. Its maturity suggests that Dr Barrett may have constructed his motor house some time before he obtained his first car in May 1898 and certainly no later.

The description of this purpose-built motor house, published in 1899, is the earliest that has been found and thus the Southport building may be the earliest surviving example in England of that very common building type, the domestic garage. Even though its interior has most likely been altered beyond recognition, it is a building of some considerable significance.

The discovery was made in the course of fieldwork for the Car Project, the English Heritage project that examines the impact of the motor car on the built environment and landscapes of England. Undertaken by John Minnis and Kathryn Morrison, it will result in the publication of a substantial book in 2011. A Research Department report on another early group of motor houses, those of Sir David Salomons, at Broomhill, Southborough, Kent, has been published recently. For more on the Car Project, see www.english-heritage.org.uk/server/show/nav.19388.

John Minnis



NEW DISCOVERIES AND INTERPRETATIONS

Miner-Farmer landscapes of the North Pennines Area of Outstanding Natural Beauty (AONB)

A new research project into extensive lead-mining landscapes, and the threats they face from erosion and climate change.

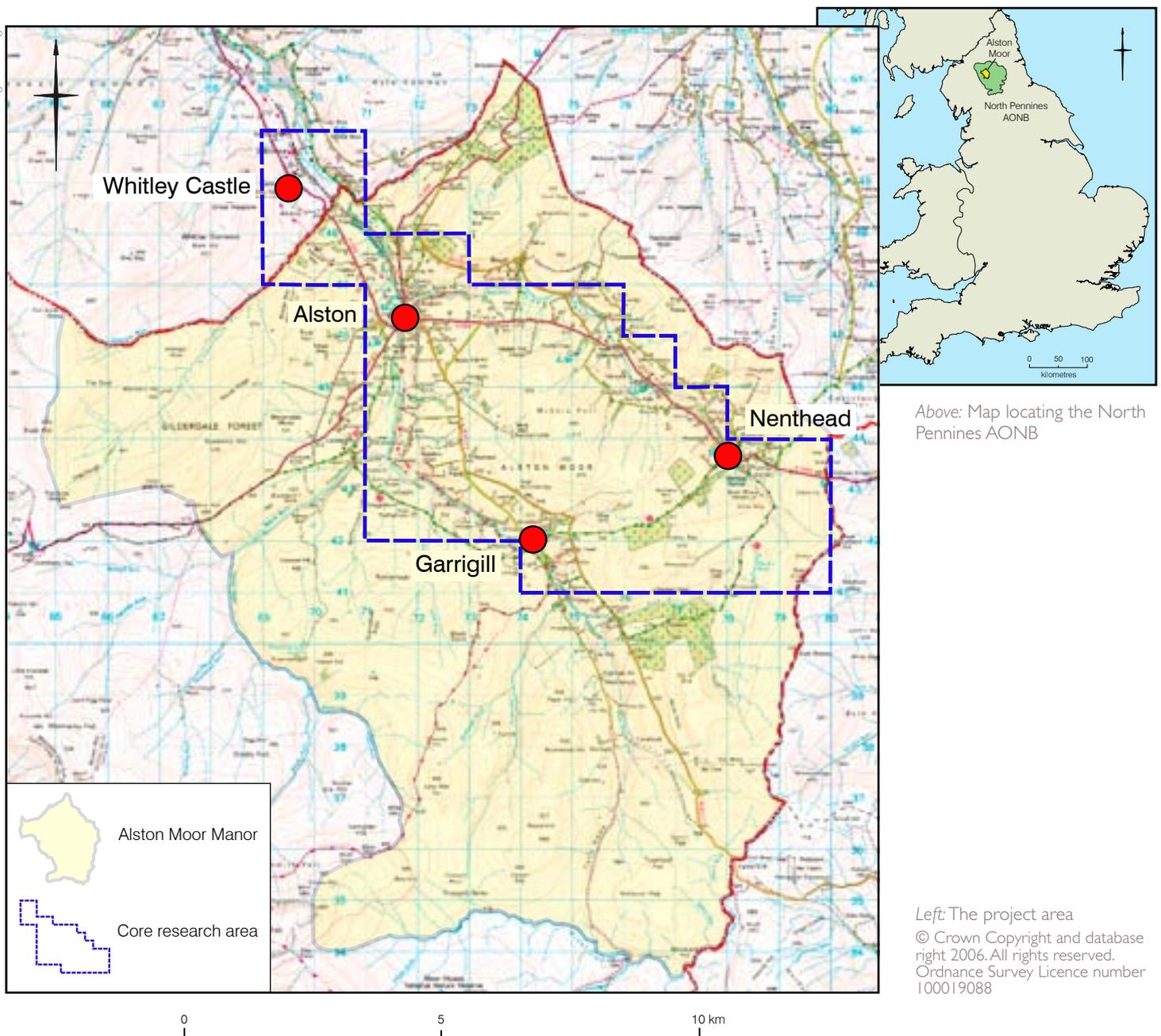
In late 2008, English Heritage began an innovative, multi-disciplinary 5-year landscape survey project investigating the miner-farmer landscapes of the North Pennines AONB. This contributes to the aims of the joint accord between EH and the National Association of AONBs to further the understanding, conservation and public enjoyment of the historic environment of these protected landscapes. The project, focused on the upland landscape of Alston Moor, Cumbria, is led by the English Heritage Archaeological Survey and Investigation team, and has been designed in partnership with the AONB Staff Unit. It will integrate archaeological research into multi-period lead-mining landscapes with the identification of landscape-specific threat and erosion issues, and the development and testing of new recording and analysis methodologies.

The North Pennines AONB, the second largest in the country, is nationally important for its ecological diversity, scenic qualities and world-class geological heritage, becoming the first UNESCO European Geopark in Britain in June 2003. It contains large areas of remote heather moors and blanket peat bogs, and a sense of wildness and remoteness characterises the area's uplands. Deep dales interrupt the high ground where enclosed pasture fields, dispersed farmsteads and a small number of settlements fringe the limited valley-floor arable land. Although prehistoric, Roman and medieval settlement has been recorded, distribution is very sparse and this has had very little perceptible influence on the character of the landscape, the quality of which has been almost entirely

shaped by twin industries: exploitation of the rich natural geological and mineral resources (principally lead) and farming. Historically, most of the region's people and settlements were connected to one, or often both according to the season. These were the so-called miner-farmers.

The twin industries have filled the landscape with a wealth of evidence: mines, waste heaps, reservoirs, roads and railways, smallholdings, fields and settlements. Mining and farming developed in parallel, with subsistence agriculture initially supporting uncertain income from mining, or mining supplementing the meagre income from farming. From at least the medieval period to the introduction of industrial-scale exploitation in the 19th century, lead mining was a small-scale rural activity. As the industry expanded, new farms and settlements evolved as small homesteads gave way to new mining and agricultural regimes. As pressure on land intensified to support growing populations and industrial activity, earlier settlements were abandoned to make way for agricultural expansion. Mining sites were also often re-worked, further confusing the understanding of earlier landscapes.

Despite the fact that the evidence for miner-farmer practices is extremely well preserved in some areas, particularly around Alston, where altitude and remoteness has prevented modern agricultural destruction, the physical remains of these complex changes remain relatively unrecognised and little studied. The area offers an ideal opportunity to develop understanding of lead-mining beyond the documented and technological aspects



Above: Map locating the North Pennines AONB

Left: The project area

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of the industry (which tend to dominate existing literature) and to investigate its landscape, social and cultural dimensions archaeologically.

Understanding the relationships and tensions between the 'artificial' fabric of large, lead-mining landscapes and the natural environment within which they reside is fundamental to the appreciation of the historic environment within the AONB. The archaeological remains in these landscapes often extend seamlessly over many square kilometres of upland and dales, with varying degrees of density and survival, frequently linked over long distances by geological and topographical trends. The scale and complexity of the archaeological landscapes makes them vulnerable to a complex and wide range

of threats. Natural threats, particularly the impact of the catchment and dispersal of water from precipitation, are crucially important. From the earliest periods, the locations of ore-bearing veins and of rivers and streams dictated the location, form and extent of lead-mining landscapes. Natural water systems were often modified over very large areas to supply power to waterwheels, for washing ores, and so on. With the cessation of active maintenance, the impact of unmanaged semi-artificial water systems has become one of the most significant threats. Coupled with this, there is little understanding of the relationship between industrial water-management and areas of peat moorlands. Today, such moorlands are usually regarded primarily as an ecological resource, and managed through programmes of 'grip-blocking' (blocking of old drains



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Fletcheras Mine, 3km south-east of Alston. Earthwork remains of multi-period lead and coal mining, field patterns and drainage. Here, the natural drainage has been augmented with artificial ponds and leats for primitive hushing, the washing of ores, and drainage of shafts since at least the medieval period. Now, unmanaged run-off is creating channels and seepage lines causing erosion and loss to the archaeological and environmental resource. As well as the mining remains, earthworks of small-holdings, enclosures and structures are also evident within, and pre-dating the pattern of later enclosed fields

to restore blanket bog and improve carbon storage capacity), amongst other measures. Historically, however, these moorlands were managed to provide water for lead-mining and to supply peat as a fuel for smelting and domestic use. All of this needs to be included in assessments of the threats faced by the historic and natural environments, particularly in the context of the current debate on the potential impacts of climate change. Similar gaps in understanding occur where former lead-mining landscapes are now openly accessible as a result of the Countryside and Rights of Way Act (2000), bringing increased visitor impact on flora and wildlife habitats specifically associated with lead-mining remains. Many of the factors at play in the North Pennines apply equally in other areas of the country. Therefore, as well as improving the understanding of the project area, the results will inform a wider range of environmental, conservation and management agendas for industrial landscapes elsewhere. By examining this relationship between the historic and natural environments, this project will make a significant contribution to English Heritage's *Heritage at Risk* strategy.

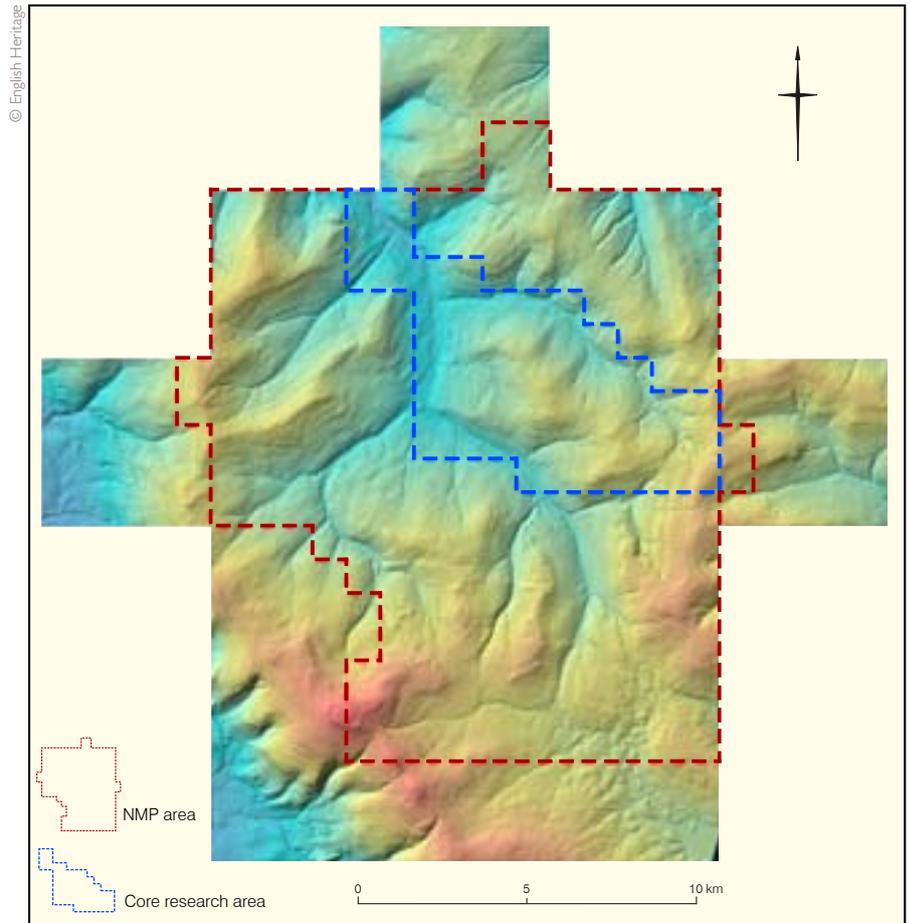
The Miner-Farmer project will integrate with two projects led by the North Pennines AONB which focus on the natural environment and modern cultural uses of landscape. The Peatscapes project, which enjoys multi-agency support, is aimed at influencing and delivering sustainable land management practices within the AONB, which contains 27% of England's blanket bog. The Living North Pennines project is a landscape, communities, historic environment, and wildlife initiative supported by the Heritage Lottery Fund. As well as meshing with these projects, the Miner-Farmer project is also building relationships with several academic establishments, including opportunities for information and skills exchange.

The historic manor of Alston (c 300 square kilometres), selected for the Miner-Farmer project, provides a representative sample of the evolution of a miner-farmer landscape. The project comprises a number of tiered survey approaches. A core research area (c 50 square kilometres of Alston Moor) will be the subject of intensive fieldwork. The boundaries of this sample have been defined to include peat moorlands, extensive lead-mining remains, enclosed pasture recovered from former peat moorlands, mining smallholdings, the principal town of the area, Alston, and two other major mining settlements, Nenthead and Garrigill, as well as fourteen scheduled monuments. Of these, twelve are lead mines, of which some have management and conservation problems related to peat loss and fluvial erosion, and one, the Whitesike and Bentyfield Mines complex, is currently on the Heritage at Risk Register. Despite the fact that the sample area represents one of the most intensively mined areas within the AONB, the paucity of information related to lead mining and other extractive industries (including stone, coal and peat) within the existing historic environment databases for this area contrasts with their obvious landscape presence.

The core research area will be systematically surveyed on the ground by the Archaeological Survey and Investigation team using both traditional skills and modern technology. While the investigation will rely heavily on tried and tested techniques of observation and analysis, it will also apply new recording approaches in the field. This will combine OS digital mapping, mapping-grade GPS, a

GIS database, specially commissioned aerial imagery, including digital orthophotography, LiDAR, hyperspectral bandwidth photography, and satellite imagery. The topology and spatial extent of information on the historic environment will be digitally recorded onto these image sets in the field, and land-use, land-use change, buildings, and threat information will be similarly recorded to produce a comprehensive GIS for the core research area. The ground survey will also be used as a control sample for assessing the desk-based analysis of the remotely captured datasets. Although it is often the 19th-century, industrial lead-mining remains that dominate the landscape, the sites of small-scale dressing floors and tiny shelters associated with earlier periods of mining can still be identified. Their locations are often betrayed by flowering of specific metal-tolerant plants and scatters of fine debris. Finding efficient ways to identify these types of remains across large tracts of landscape will be explored through the examination of the diverse remote datasets and comparison of results with the detailed ground survey. In this way the project will aim to identify the most effective methods for recording and analysis of similar landscapes elsewhere, allowing standards and guidelines for future research and recording to be produced. It is also anticipated that the work will help build predictive models for the identification of types of threats and rates of loss appropriate to these environments. The project will also incorporate the results of a survey undertaken by the AS&I team of another threatened lead-mining landscape in the North Pennines at Scordale in Cumbria (conducted in partnership with the MoD), which acted as a pilot for some of the methodologies adopted for the Miner-Farmer project.

To manage the wide range of data this project will generate, a geo-referenced multivariate GIS database has been developed. The GIS platform adopted (ESRI ArcView) is common to the two principal partners, as well as other stakeholders, such as Natural England and the MoD, making data integration and exchange more streamlined. The GIS integrates recording of the historic and natural environments alongside threat, conservation and management, allowing sophisticated analysis of the relationship between the variables. Other specialist teams within English Heritage's Research Department

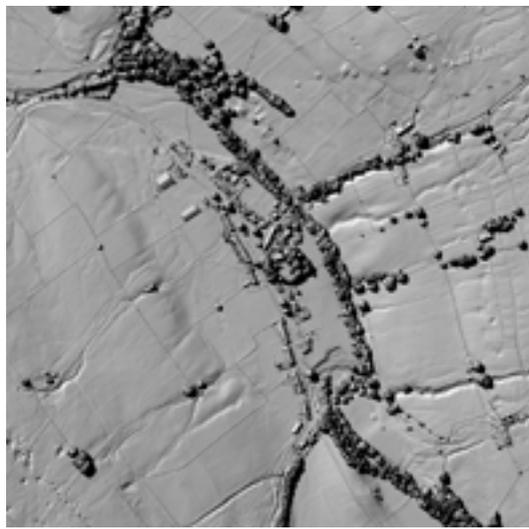


will be contributing to the project. The Aerial Survey and Investigation team will record archaeological sites visible on aerial photography within the larger area of c 300 square km of Alston Manor as part of the National Mapping Programme (NMP), and will also contribute to the assessment of the other remotely-captured datasets. Research into the built environments of the lead-mining settlements, particularly the development of farmstead types and secular architecture, will be undertaken by the Historic Landscape Characterisation and York Architectural Investigation teams respectively. Scientific support will be provided by the Geophysical Survey and Environmental Studies teams, and technical support will be provided by the Imaging, Graphics and Survey, and GIS teams. The project will also aim to provide capacity-building opportunities for archaeological contractors and voluntary groups to develop skills in landscape survey.

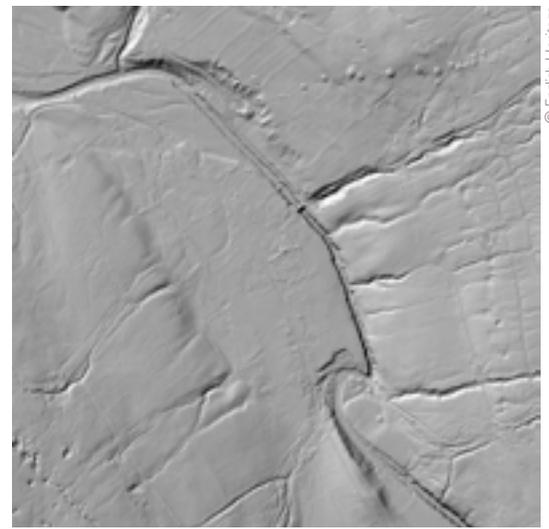
A number of the field survey components within the core project area have already commenced. These include a rapid survey of farmstead types, area assessments of

Digital terrain data will be utilised to model the relationship between landform, fluvial drainage patterns and impact on lead-mining landscapes. Licensed to English Heritage for PGA, through Next Perspectives™

Left: Sample LiDAR (first pulse return) of the area around Garrigill (km square NY7441)



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Right: Sample LiDAR of the area around Garrigill. Same area with tree canopy and built fabric filtered out (last-pulse return). Examination of this data along with other remotely captured imagery will aid the interpretation and modelling of the landscape features, which would otherwise be difficult with traditional, vertical aerial photographic imagery

Alston, Garrigill and Nenthead, and a detailed earthwork and geophysical survey of an exceptionally well-preserved Roman fort at Whitley Castle. The fort survey was undertaken in advance of the overall landscape project to inform management of the monument under a Higher Level Stewardship Agreement with Natural England for the farmland on which it lies. The agreement not only provides funding for work which will help the preservation of the fort and surrounding archaeology, but also allows public access to the monument. The positioning of this magnificent fort 18km south of the Hadrian's Wall, close to the lead- and silver-bearing veins, has attracted speculation that part of its main function may have been to control the mineral resource. The survey has already revealed the extent of a possible *vicus* associated with the fort, as well as evidence for the continuity of intra- and extra-mural settlement activity, as well as the development of multi-period field systems in its penumbra. Thus, we may have an identifiable starting point for the association of mining and settlement in this region. This survey also provides tantalising

hints about the degree to which even earlier landscape features might survive, which will hopefully become clearer as the wider survey progresses. The full results of this survey at Whitley Castle will be published in the English Heritage Research Department Report Series in 2009.

Full aerial imagery acquisition (including LiDAR) for the core research area should be completed by spring 2009 with both fieldwork and desk-top analysis following on from this. The aerial imagery which will underpin the survey of the core area has been jointly funded by HEEP and the Peatscapes project. Further modules of the project, including environmental survey and analysis, remote-sensing analysis, and methods of erosion detection and monitoring will be undertaken during the three-year programme of survey, which will be followed by a two-year period of assessment, including detailed analysis of the results, further targeted survey to test and validate findings, and final publication.

Stewart Ainsworth

The incredibly well-preserved earthworks of the Roman fort known as Whitley Castle



© English Heritage, NMR 20677049

Chiswick House, London: excavation on the site of the Jacobean House

Investigations in the grounds of the Palladian Villa at Chiswick have uncovered a wealth of archaeological information that has added greatly to our understanding of the history and development of the site and will be of the utmost importance for the site's future management.

Chiswick House is in the London Borough of Hounslow overlooking the River Thames. The spectacular Grade I listed house lies in extensive landscaped grounds, with well-preserved and important garden and landscape features of several 18th- and 19th-century phases; the gardens are Grade I listed on the Historic Gardens Register. The present house was built in the late 1720s in the Palladian style by Richard Boyle, 3rd Earl of Burlington, and was constructed adjacent to and to the north west of an earlier 'H' plan building of Jacobean style.

As part of the Chiswick House and Gardens Regeneration Project, a new cafe is being constructed a short distance to the east of Chiswick House, with an area of permanent hard-standing for a marquee between the cafe and the house. Excavations in advance of the construction of the marquee footings have given an unrivalled opportunity to investigate the surviving remains of the Jacobean building, the first Chiswick House, and to see how the building developed. Targeted excavation of the building was undertaken in November and December 2008. Although constrained by existing planting, structures, and services, a trench covering much of the building's southern range, and part of the eastern and western ranges was excavated.

From the historical record, and particularly the pictorial evidence of the Kip and Kniff view (page 18, top right) it was known that the entrance front of the Jacobean House had been modified in the later 17th century, although how extensive the modifications were soon became apparent.

Prior to the excavation, the understanding and interpretation of the building's chronological development from the historic documentation and earlier limited excavations was:

Phase 1 - H-plan structure of early 17th-century date (pre-1610).

Phase 2 - Addition of the northern range enclosing the small open courtyard.

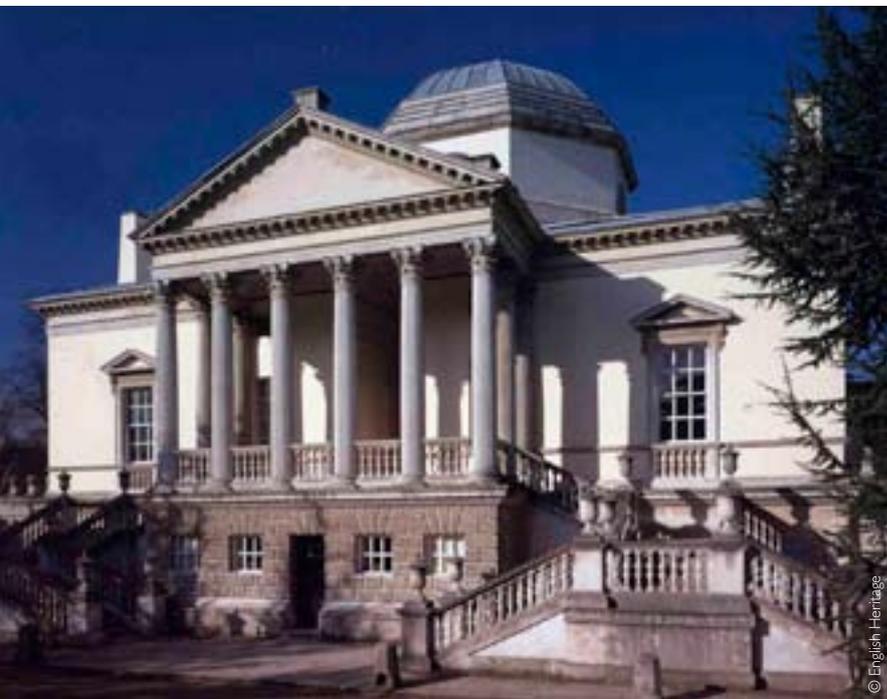
Phase 3 - Later 17th-century alterations to entrance front.

Phase 4 - Lord Burlington's 18th-century entrance front re-design c. 1721.

Plan of Chiswick House and grounds

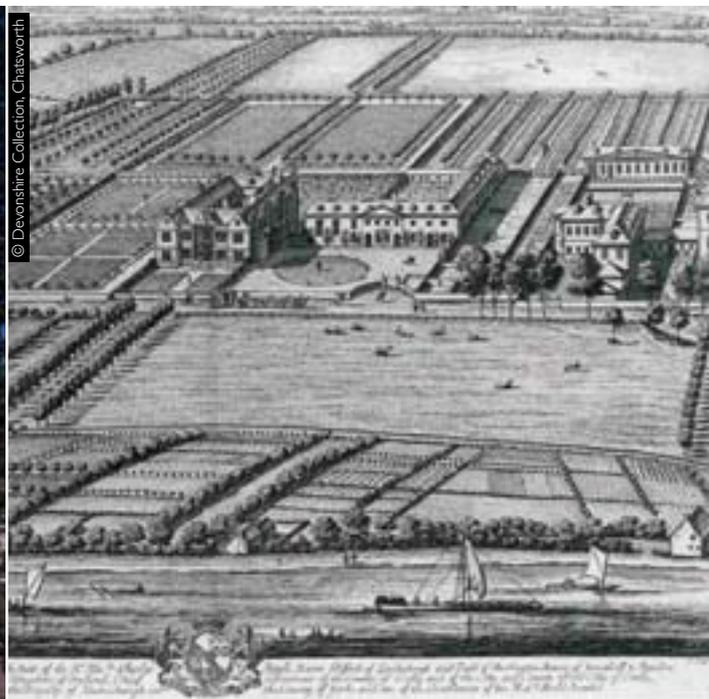
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Above left: The Palladian Chiswick House

Above right: Kip and Knyff view of Chiswick House



© Devonshire Collection, Chatsworth

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Phase 5 - Remodelling of the building's western range following a fire c.1725.

Phase 6 - Demolition in 1788.

The excavations were able to confirm this relative chronological site sequence and added much detail to understanding of the individual phases.

As the excavation progressed it became clear that there had been extensive remodelling of the building in the 17th century. The Kip and Knyff view shows the front of the building had a central entranceway with projecting flanking bays. The main east and west ranges projected further still, and in the excavation trench in front of these ranges the brick footings of canted bay windows were revealed. The flanking bays to either side of

the main entrance were secondary additions as can be seen from the butt-joints in the brickwork.

Prior to the late 17th century, the whole of the southern front had been completely remodelled, with new windows inserted and flanking bays added to either side of the door. Originally the building would have looked similar to the contemporary Ham House in Richmond, London. Although larger, Ham House retains the bay window frontage and would presumably have had similar shaped gables to those at Chiswick. The projecting bays at the angles of the front and side ranges were mini loggias at Ham House, whereas those at Chiswick were shown to be 'marble recesses' in a drawing produced by Lord Burlington.

Below left: Bay window of eastern range

Below right: Brickwork of flanking entranceway



© English Heritage



Internally the Jacobean house was cellared, with basements in each of the three main ranges partially excavated during these works. In the southern end of the eastern range a door opening leading to the north was excavated.

We now know that the northern range, was later than the western range. The western range was cellared with windows taking light from the courtyard to the basement. The northern range was not cellared and butted against the earlier western range wall.

When the building was demolished in 1788 the cellars were backfilled with demolition debris. Where excavated a large amount of decorated plaster was retrieved. This plaster was of two main periods – the simpler plaster was of mid 17th-century date, with the more-deeply incised material from the early 18th century. It seems likely that the extensive remodelling and re-fenestration of the building that took place in the mid 17th century was accompanied by internal redecoration. The later plasterwork (a block of carved stone with bay-leaf moulding, of which design there are examples in the Palladian Villa at Chiswick, was also retrieved), are presumably from Lord Burlington's remodelling of the entrance front in 1721. The design for this remodelling survives, and gives a tantalising glimpse of the room use in the building. The portico opened up to a grand hall, known as the Great Room, with the dining room in the eastern range and bedchambers above. The western range contained the Gallery. The excavation revealed that the Great

Room would have been 11m square in plan. Presumably there would have been a double-piled hall range, although no evidence was seen during the excavation for stairs or other partitions.

Although the archaeological work on this part of the site is nearing completion, there is a great deal of work to be done to complete the assessment and analysis of the excavations that have taken place. The results of this piece of work have added greatly to our understanding of the sequence of development of the site, and equally importantly of the form, decoration and function of the buildings, and of the use of the land in the immediate vicinity of the building.

Dave Fellows

Left: Ham House, Richmond

Right: Decorated plaster from demolition material in the cellars

General view of completed excavation



NEW DISCOVERIES AND INTERPRETATIONS

Long barrows on the South Dorset Ridgeway

Analytical earthwork survey and geophysical survey of the long barrows on the South Dorset Ridgeway got the local community involved in answering questions about the original form of the monuments.

The South Dorset Ridgeway is an area of high ground in the south of the county, bordered to the south by the English Channel, to the north by the River Frome, to the west by the River Brit and to the east by Wareham Heath and the Isle of Purbeck. The area contains an extraordinary density and range of Neolithic and Bronze Age funerary and ceremonial monuments, including the Poor Lot round barrow cemetery and the causewayed enclosure and bank barrow at Maiden Castle. The long barrows, however, remain little studied and poorly understood. In the run up to an HLF funding bid for a project celebrating the prehistoric ceremonial landscape of the Ridgeway, the Dorset AONB Service identified a huge amount of local expertise about, and enthusiasm for, the heritage of the area. The long barrow survey was designed to harness some of this resource. The Ridgeway Survey Group volunteers assisted with the survey and record of the long barrows and undertook

original archive research. Their work forms the basis of this article, and their written accounts are held with the EH survey report in the NMRC archive.

The Ridgeway long barrows range from extant chambered long barrows to sites which now only survive as cropmarks in ploughed fields, and fall into four groups: Long Bredy and Poor Lot; the chambered long barrows; Maiden Castle, and Broadmayne and Bincombe Hill. Questions raised after an initial assessment included the form of the possible long barrows in the Poor Lot round barrow cemetery; the survival of features associated with the chambered long barrows, and the survival of buried features associated with heavily ploughed sites. The first two questions were addressed by field investigation and analytical earthwork survey, the third by geophysical survey. The sites were recorded as appropriate for their condition: detailed earthwork surveys located

Part of the Poor Lot barrow cemetery. The Long Bredy bank barrow marks the western end of the South Dorset Ridgeway (left)





to the National Grid at 1: 200, 1: 500 and 1: 1000 scales using EDM and differential GPS, and DTMs using data from differential GPS surveys to record the slight remains of ploughed sites.

The Poor Lot round barrows include excellent examples of bell barrows and disc barrows. They are laid out in a linear barrow cemetery orientated NW-SE, running along the edge of the South Winterbourne valley, at the western end of the Ridgeway, with a second linear group running NE-SW up the northern side of the valley. There are three probable long barrows. One lies at the top of the second group, where a long mound is deliberately sited between two swallow holes. Nearby is the well known Poor Lot 'triple barrow': a long mound with three circular mounds on its top and a slight ditch on its northeast side. Interpretation of the complex is made difficult by its later incorporation into a field system and recent ploughing has obscured details of the ditch, but the monument could well have originated as a long barrow, with three round barrows built on top of it in the Early Bronze Age. A third example, at the heart of the group, has also been interpreted as a triple barrow, but probably originated as a long barrow. Other round barrow groups on the Ridgeway have long barrows as their focus, such as those at Longlands, Bincombe Hill and Came Wood. At Came Wood a round barrow was built over the end of the long barrow mound: a very deliberate act of closure.

Five Ridgeway long barrows have a megalithic component. They range from the extant chambered long barrows known as the 'Grey Mare and Her Colts' and the 'Hell Stone', to the ploughed over site at Hampton Barn. The chambered long



Left: Members of the Ridgeway Survey Group surveying the Poor Lot triple barrow

Right: Member of the Ridgeway Survey Group undertaking geophysical survey of the Maiden Castle long barrow

barrows form a compact group with its centre at the Valley of Stones, the source of the sarsen stones used for the monuments' megalithic components. The dry valley which gives access up onto the Ridgeway from the South Winterbourne provides the focus for these monuments. At Combe Farm only two massive sarsens remain of a chambered long barrow. At Sheep Down the mound survives as an earthwork and geophysical survey has suggested a megalithic component. The site at Hampton Barn has been ploughed and its sarsen stones are now only known from a 1908 photograph taken on a visit of the Dorset Natural History and Antiquarian Field Club. The 'Grey Mare and Her Colts' lies at the head of a dry valley which runs down to Gorwell in the valley of the River Bride. The long mound terminates in a row of sarsen stones and several stones set into the edge of the mound are probably the remains of a retaining kerb. This is the only long barrow on the Ridgeway with

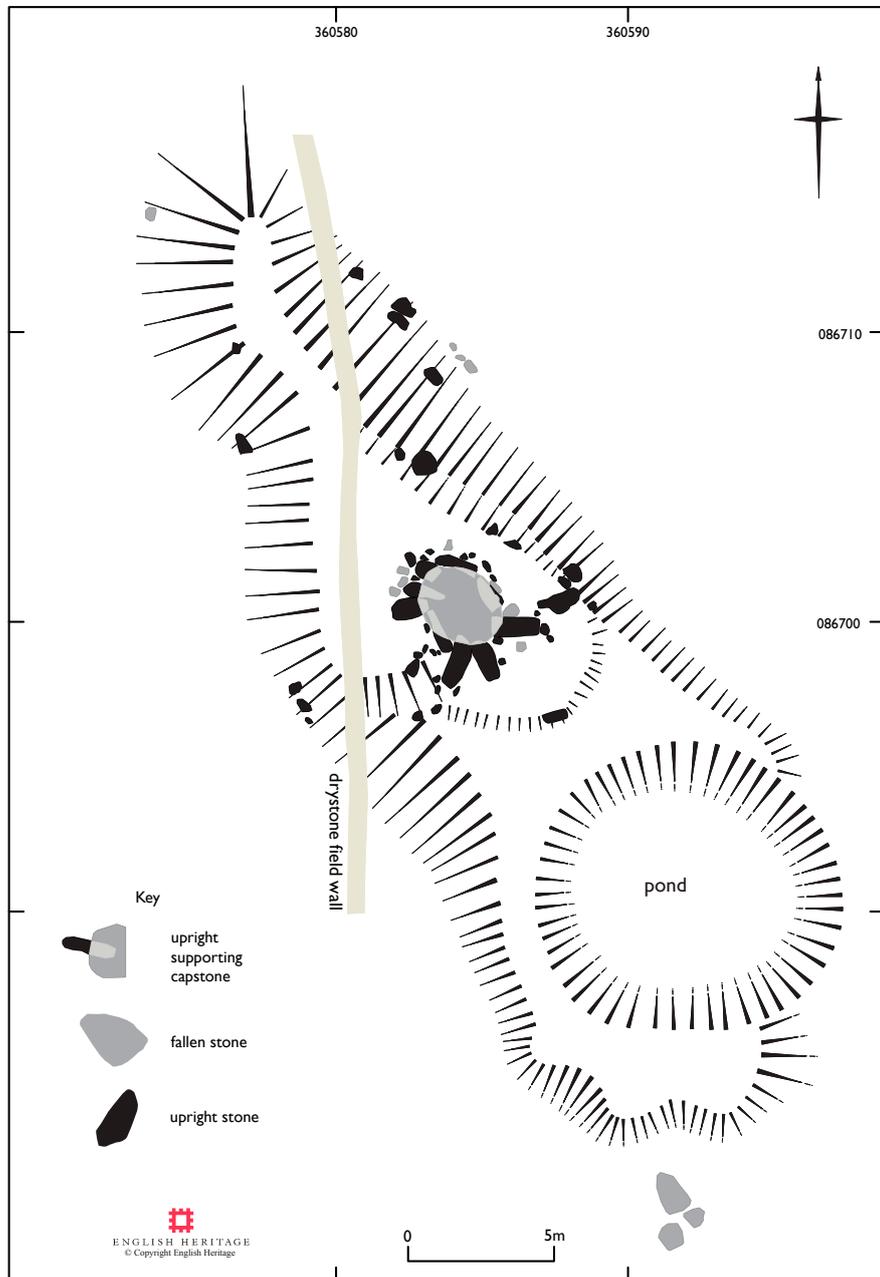
The Grey Mare and Her Colts: a chambered long barrow on the South Dorset Ridgeway





Above: The Hell Stone: the sarsen stones were 'restored' in 1866; and below, plan showing the long mound

any recorded excavations. The antiquarian Charles Warne wrote in *Ancient Dorset* (1872), 'I have been credibly informed by a former tenant of the land, that he made

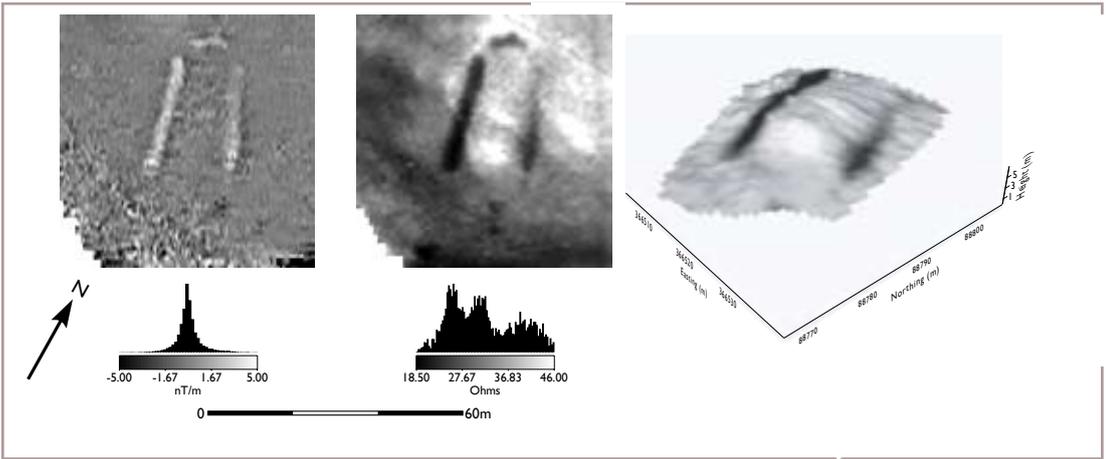


an exploration some years since, amongst the stones, which resulted in the discovery of many human bones, and a quantity of ancient British pottery in a fragmental state'.

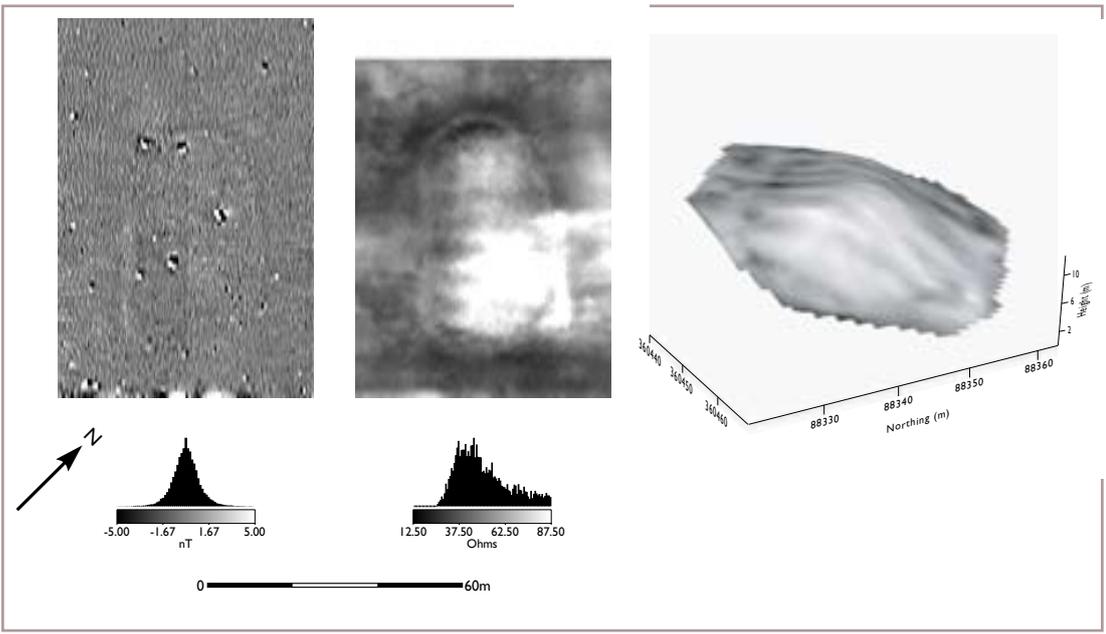
The Hell Stone lies in a similar location to the 'Grey Mare and Her Colts', at the head of a dry valley system which runs south and southwest via Hell Bottom to the southern edge of the Ridgeway at Corton Hill, but at first glance appears to be very different. An arrangement of upright sarsen stones with a massive capstone catches the eye. Field investigation and a detailed survey revealed that the stones are sitting on top of a large, long mound. The stones were moved and erected in a form more akin to a portal dolmen than the façade of a chambered long barrow. Warne was not impressed by the restoration and wrote, 'Incredible as it may appear, the parties concerned seem to have thought it a meritorious act; for we find their names recorded in a note attached to a photograph of their great achievement'.

Two of the long barrow sites were selected for geophysical survey in a week-long training exercise designed to equip the Ridgeway Survey Group volunteers with the skills necessary to undertake further survey on their own initiative and thus extend the number of sites receiving geophysical investigation. These techniques are particularly useful on the heavily plough degraded sites in the South Dorset Ridgeway area. Geophysical survey was therefore initially targeted on the now barely appreciable ploughed-over site of a long barrow near Maiden Castle. This barrow is clearly marked on aerial photographs dating back to the time of Mortimer Wheeler's excavations on the adjacent Iron Age hillfort in the 1930s, but it now only survives as a slight low mound in an area of arable land. By contrast, the second barrow surveyed, at Sheep Down, still survives as a prominent earthwork mound in a set-aside field. Fluxgate magnetometer and earth resistance surveys were carried out at both sites as experience of previous surveys has shown that the two techniques when applied together generally produce complementary information enhancing the overall level of detail recovered from long barrow sites.

There is a striking correspondence between the resistance and magnetic data-sets from the Maiden Castle barrow. The resistance



Greyscale plots of earth resistance and magnetometer data recorded over the Maiden Castle long barrow and image of the earth resistance data draped over the digital terrain model of the land surface



Greyscale plots of earth resistance and magnetometer data recorded over the Sheep Down barrow and image of the earth resistance data draped over the digital terrain model of the land surface

survey reveals the vestiges of the mound clearly bracketed by a segmented U-shaped arrangement of adjacent side ditches also confirmed by the magnetic data. When the earth resistance data is draped over a digital terrain model of the surviving mound topography with the vertical scale exaggerated the original form the monument can be appreciated. Scoring of the surface of the barrow mound by modern ploughing can clearly be seen in the topographical model.

The geophysical survey of the more prominent earthwork mound at Sheep Down suggests a more unusual form of barrow apparently lacking side ditches but perhaps bounded by a retaining kerb (defined as a weak high resistance anomaly) as at the nearby ‘Grey Mare and Her Colts’. Strong internal high resistance anomalies suggest a megalithic component. The site also lacks any significant magnetic response.

The rounded shape of the enclosing feature at Sheep Down defined in the geophysical results may indicate that the site was reconstructed as a pair of conjoined round barrows. Such later augmentation and alteration of earlier long barrows is known at other sites in the Dorset Ridgeway area surveyed by the project most notably at Came Wood.

The results demonstrate geophysical methods can continue to contribute to the study of the Ridgeway long barrows by helping to recover information on the location and form of the more damaged monuments such as the lost Hampton Barn site where few surface traces now remain. It is hoped that the training undertaken will facilitate such further studies in the future.

Hazel Riley and Andy Payne

NEW DISCOVERIES AND INTERPRETATIONS

12th-century buildings discovered at Carisbrooke Castle

Further work in preparation for the new Princess Beatrice garden leads to spectacular new discoveries.

As reported in *Research News 9*, the Privy Garden at Carisbrooke Castle, Isle of Wight, is about to be transformed into the new Princess Beatrice garden. Designed by well-known garden broadcaster and writer Chris Beardshaw, the new garden will incorporate aspects of what is now known about the Victorian and Edwardian use of the space. A key feature is the re-instatement of the (now blocked) original 19th-century gateway, which is situated mid-way along a north-south wall separating the bailey from the Privy Garden, as the main garden entrance. This gave an opportunity to answer research questions; in particular, the age of the enclosure wall and why the archaeological deposits excavated in the Privy Garden were so different from those recorded by Dr Christopher Young in the bailey? Last October, three small

contiguous trenches were excavated from the bailey through the re-opened gateway and into the Privy Garden. The discovery of a 12th-century building led to the excavation of two further trenches this February, one to establish its length and the other to investigate the possibility of a further building added to its southern end.

A small exposure of the outer ditch of the Conquest-period ringwork allows its course to be traced northwards to the known section under the east end of St. Nicholas' Chapel, indicating that it occupies most of the north-eastern side of the Privy Garden, and southwards to an apparent terminal revealed in Young's Trench Y5 in the bailey. Its upper fill was cut by the foundation trench of a 12th-century cellared building, 13.2m x 6.35m, of which the complete width of the south gable end and north-west exterior corner were recovered. Its west wall lay below the garden wall north of the gateway and its north-east corner was clipped by the west edge of Trench Y5. Constructed of coursed stone rubble, occasional Roman tile and *opus signinum*, and finely tooled stressed ashlar quoins, its 0.8m thick walls incorporated several courses of crude Romanesque 'herringbone' work. The interior of the cellar was rendered. The building, with first floor accommodation and cellar below, is small for a hall but might be a chamber block or camera. Given its proximity to St. Nicholas' Chapel, it may be 'the house of the Vicar of the Castle' mentioned in the Accounts of 1292.

In the 13th-century or a little earlier, a building or range of similar width to the cellared building was added to its south end. The west wall of the structure is represented by the garden wall to the south of the



© English Heritage

The south gable end of the 12th-century building, with 15th-century buttress in the foreground, looking west

gateway. Its foundations butted the south-west corner of the 12th-century building, and a straight joint in its east face, previously thought to be a reveal of the 19th-century gateway, is clearly the point of abutment with the earlier structure indicating that it stood to at least first floor level. The remains of the corresponding east wall abutted the south-east corner of the 12th-century building. Both walls were 0.76m thick, constructed of stone rubble brought to course in places and bonded with lime mortar. The southern extent of this building is not known though wall fragments found by Rigold in a series of box trenches excavated prior to the construction of the public lavatory might continue the line of the east wall.

A substantial buttress was added to the east face of the south-east corner of the 12th-century structure presumably as a result of settlement into the ditch fills below. Its foundation trench cut deposits of degraded greensand which are probably the equivalent of the extensive 15th-century dumps recorded in Trench Y5.

Both buildings were probably demolished in the 17th-century with some suggestion that the south range went first retaining its west wall as a boundary. The walls of the 12th-century building were taken down to ground level and the cellar backfilled, its west wall providing the foundation for a garden wall which must have been constructed before 1723 since it is shown on a detailed plan of that date.

The discovery of these buildings is an important addition to our understanding of the arrangement of the domestic accommodation of the 12th-century motte-and-bailey castle. The Privy Garden, far from being an enclosure created relatively late in the castle's history, is an integral part of the early development of the motte-and-bailey. These buildings are closely associated with several coeval structures found by Young, and the medieval predecessor of St. Nicholas' Chapel, which form a group to the south of the bailey. All have a common orientation which differs from the 13th-century range along the north side of the castle. Unlike Young's buildings, which were demolished by the early 15th century, these continued to function probably until the 17th century when they, too, were cleared away. The reason why the 12th-century cellared building was completely demolished rather



Three surviving quoins of the south-west corner of the 12th-century building with a late 12th- or 13th-century wall abutting it (to the right), looking east

than retaining its west wall as a boundary, as in the south range, is possibly related to instability caused by subsidence into the underlying Conquest-period ditch. Clear evidence of this was observed in its west wall close to the north-west corner where the wall slumped to the south and is implied by the addition of a buttress to its south-east corner.

Following detailed assessment of the evidence, and the creation of a site GIS which will bring together all known information on the medieval castle, the results will be incorporated into a new guidebook and published in a variety of journals. Updates on the project will appear on the English Heritage website.

Michael Russell

East wall of the south range, looking west. Its southern end is cut by a large pit possibly dug to plant a shrub



Whose blue? The true story behind the sky-blue roof of St Pancras International Station

Next time you pass through St Pancras on your way to the Continent, admire the bold decoration of this wonderful building with a more knowledgeable eye.

One of the most admired features of the newly reincarnated St Pancras International is the striking sky blue colour of the massive cast iron ribs which soar over the platforms. The story behind the decisions made about the original decoration of the roof trusses in the nineteenth-century and its renovation in the final years of the twentieth provide interesting insights into the tastes of both periods.

The station is listed Grade I and therefore all alterations were subject to approval by Camden Council and English Heritage. The site was also the focus of a major redevelopment of the Channel Tunnel Link, alterations to a busy London Underground intersection and the redevelopment of a blighted area of central London. However the result of this massive project eloquently demonstrates that conservation and modern development can work in harmony to achieve impressive results.

View of the blue-ribbed roof looking up from the concourse



© English Heritage

In 1998 Zoe Croad, Historic Buildings Inspector for the project, requested my assistance to help correlate the mass of documentary and archaeological evidence for the decorative history of the interior of the station and to establish a coherent decorative scheme for the future. Even then, some nine years before the planned opening, the project was working to tight deadlines dictated by submissions, consent, approvals processes and lead-in times for massive construction orders. The roof of the train shed had suffered bomb damage during the war and the project aimed to reinstate areas of glazing which had been lost during the course of subsequent repair campaigns. English Heritage had suggested that the original nineteenth-century colour scheme of the station roof, thought to be a blue, could be reinstated and, if appropriate, incorporated into the modern extension. The early decorative schemes needed to be established and evaluated so that the agreed modern aluminium glazing units could be powder coated in the selected colour as part of their manufacturing process.

The cast iron framework of the roof, 689ft long, 100ft high at its apex and at the time spanning the largest covered area in the world with almost half of its surface glazed, was a stunning engineering achievement. A perfunctory perusal of the historic descriptions seemed to confirm that the designer, William Henry Barlow, painted the ribs blue so that the roof would melt into the sky. However examination of paint samples removed from the iron trusses revealed that they had originally been painted in an iron-oxide brown paint and the blue paint was

applied at a later date. The original specification for the iron framework of the train shed, begun in 1866, was that it would be painted with three coats of 'iron minium' after erection to prevent the metal rusting. This protection proved necessary as the framework was exposed to severe wind and rain due to delays in erecting the brick side walls and end screens. By 1868 the station was open for use by passengers but the hotel and the taxi rank on the Euston Road side of the site were not completed until 1876. The iron oxide brown paint was logically thought to be a temporary builders' finish rather than a finished decorative scheme, but the documentation suggested that Barlow always intended the trusses to be painted brown 'a colour which would least show the dirt from smoke of the engines'

As early as 1870, long before the hotel was completed, James Allport, the Midlands General Manager who supervised the work, voiced his concerns about the colour of the station roof. He had already provided a significant contribution to the station design by suggesting that the basement area offered valuable storage space when Barlow had intended to fill the space with spoil from tunnelling. This undercroft area has now been opened up to provide vital functional space for the new development. Allport reported: 'With reference to the colouring of the roof of the St Pancras Station, he had done all he could to prevent the dark brown colour being used, which made it look exceedingly dull and heavy...and had discussed this matter with Mr Barlow and Mr Gilbert Scott on several occasions.' He thought that nature should be imitated and the roof should be painted 'a beautiful blue'. Allport's suggestion was eventually taken up between 1870 and 1877 when the roof is described as being recently repainted and having 'a blue, sky-like appearance'.

After collating the archival evidence and existing paint research, I embarked on an on-site investigation to produce an outline of the decorative history of the interior of the station. In early 1999 my findings were presented at the first of a series of meetings with Rail Link Engineering (RLE) headed by the principal architect Alastair Lansley. I explained our new understanding of the early brown paint layers and that the first 'Allport' sky-blue colour was composed of a mixture of French ultramarine and white lead. French ultramarine was a costly pigment favoured

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Close-up view of the colour scheme of sky-blue iron trusses and red 'boots'

by Victorian landscape painters to depict skies. The base or 'boot' of the iron trusses had been painted vermilion at this time, and some of the high level moulded detail of the trusses had been picked out using vermilion. The original scheme was repeated once, before being overpainted in a blue tinted with the cheaper Prussian blue, which produced a blue with a slightly greenish cast. The 'boot' was painted brown. This scheme was used for subsequent decorations applied until the early part of the twentieth century. From the 1920s until the 1990s a cream and brown scheme was employed.

The historic schemes gave a series of options for the redecoration of the renovated roof. The different approaches held by the various agents involved with the St Pancras project ranged from 'objective interpretive archaeology' to a more 'inspired by the past' use of research findings. Understandably, as the colour of the metal ribs spanning the station would have a great impact on the final scheme, RLE were not happy with the idea of having an historic scheme imposed. Despite English Heritage's suggestion that the original scheme should be recreated, little support was given to the first scheme - 'Barlow's Brown'. The RLE team liked the first 'sky-blue' colour but were not happy with the vermilion boot and detailing. Colour trials were conducted within the station by sourcing the original



The statue of Sir John Betjemen admiring the blue roof

pigments, French ultramarine, Prussian blue, vermilion and iron oxide browns. These were then ground in linseed oil and mixed with lead white to produce a match to areas of historic paint revealed on site and examined in cross-section under high magnification. I then matched these to modern paint systems. To speed up the process I painted out the trial areas on site using sample pots of emulsion paint bought from John Lewis.

It was agreed that the ultramarine blue was a more attractive colour than the Prussian blue and that the bright vermilion on the 'boot' did not sit well against the building's red sandstone and red/brown brick. Various decoration options were then considered. It was even suggested that the Prussian blue and brown scheme should be recreated on the grounds that although this was not the original blue and was obviously a cheaper, less attractive colour, it had actually had a longer period of use than the ultramarine blue. There was even a suggestion of abandoning any colour differentiation of the boot and carrying the blue down to the ground level.

The discussion was opened out for wider consultation. Camden Council and the Victorian Society expressed their preference for the ultramarine scheme but in general favoured 'a less rigid application of the historical evidence'. Further trials on the 'boot' eventually provided a colour match for the boot which was a closer match to the colour of the surrounding stone and brick, and a compromise was reached by which archaeological rigour and late twentieth-century taste were reconciled.

The colour scheme agreed, my final task was to provide a colour specification for the sky blue and the 'boot' red so that the paint

and powder-coat systems could be ordered. An RLE architect came to the English Heritage Conservation Studio to pick up the information. I produced the final matched colour using authentic materials, although the actual paint systems would be made from modern stains and resins. Starting with 100% lead white and adding increasing amounts of French ultramarine I produced a painted sheet of vibrant light blue which corresponded to the paint viewed in cross-section - and certainly did not match the exposed sections of the original paint which had faded, discoloured and darkened in the course of time. The architect thought my sample was a little bright and asked if I could add some black to make it slightly greyer. I refused to do this and together we examined the cross-section to confirm that the paint did not contain any pigment other than French ultramarine and white lead. I did offer the observation that with the levels of pollution in central London, the light blue may soon look grey. The paint swatch was taken away for matching to a modern paint system (with health warnings that the sample contained lead white). In the process of painting, great care was taken to retain the historic paint wherever possible for analysis by future generations. A system was developed for stripping dirt and loose paint with low and high pressure water jets, while leaving well adhered paint intact.

In the summer of 2006 cycling from Camden with St Pancras in the distance I noticed a small patch of a strangely familiar blue behind the scaffolding and cranes hunched over the exposed train shed roof. The iron trusses were finally being painted blue. During the following weeks, I watched the project proceed and, like everyone else, was stunned when I saw the completed scheme from the inside. The old station had been transformed into a vibrant international link celebrating both the old and the new.

AFTERWORD

The blue paint applied to the trusses of St Pancras International is officially called *English Heritage Barlow Blue*. This is clearly incorrect and I believe it should be called Allport's blue - or perhaps if we are being really accurate, Helen's blue.

Helen Hughes

Helen Hughes seen against a background of blue



NOTES & NEWS

A round-up of activities and developments showing some of the scope and variety of projects that are ongoing in the Research Department.

INTER-TIDAL SURVEY IN THE SEVERN ESTUARY

Gloucestershire County Council Archaeology Service have been recently commissioned by English Heritage to undertake the pilot fieldwork of the Severn Estuary RCZAS (Rapid Coastal Zone Assessment Survey), having completed the Phase 1 desk-based assessment and the NMP mapping of the project area.

The Severn Estuary RCZAS survey team are using a Trimble GeoXT handheld GPS with a GeoBeacon receiver, linked to digital cameras with built-in GPS units, to allow the survey results to be rapidly incorporated into the project GIS. The English Heritage Archaeological Survey and Investigation team, based at Exeter, organised a training day for the Severn Estuary RCZAS team at Lilstock Harbour, an abandoned 19th-century harbour on the West Somerset coast, to enable the team to get to grips with the survey equipment before submitting it to the rigours of the inter-tidal environment.

Hazel Riley

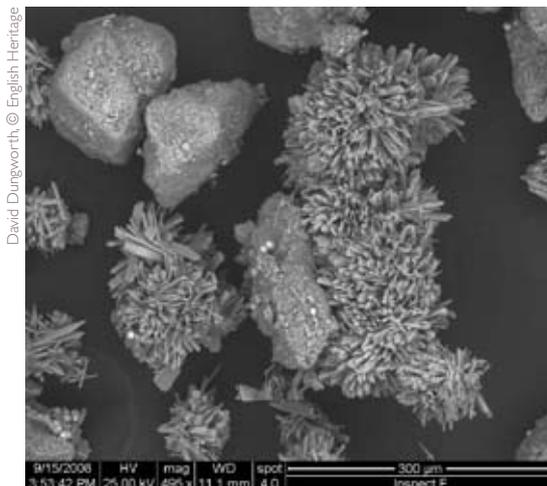
ELECTRON MICROSCOPE

In July 2008 English Heritage purchased a new scanning electron microscope (SEM) for the Laboratories at Fort Cumberland. The SEM is now in high demand for imaging historic materials at magnifications up to 100,000 times! The SEM is managed by the Technology Team at Fort Cumberland who are using it to investigate metals, glasses, slags and other materials. We also make the SEM available to other teams within English Heritage and it has been used to support research into historic paint and investigate materials associated with poorly-understood industries such as copperas (a hydrated iron sulphate used as an ink and a dye).



Hazel Riley, © English Heritage

Surveying at Lilstock Harbour with the GeoXT GPS



David Dungworth, © English Heritage

SEM image of naturally-occurring natrojarosite found on Brownsea Island, Poole Harbour

The HEEP-funded research into the alum and copperas industries of the Poole Harbour area have been supported by the scientific investigation of possible raw materials. The image shows small rounded fragments of iron pyrites and feathery crystals of natrojarosite.

David Dungworth



Justine Bayley teaches at a training day on industrial residues

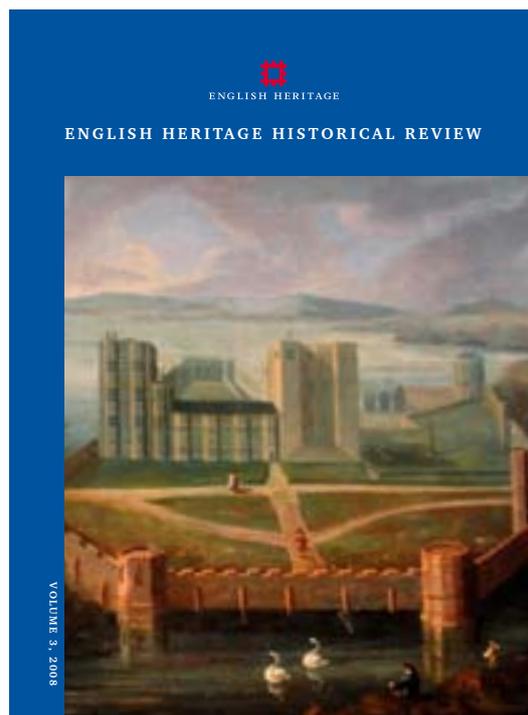
TECHNOLOGY TRAINING ROADSHOW 🗺️

The Technology team, part of the Archaeological Sciences department based at Fort Cumberland, have been providing 'Industrial residue training days' at various venues around England. The training aims to give participants a practical, hands-on introduction to the finds and features that provide evidence of metalworking at all periods, from prehistoric to post-medieval. Participants often bring samples of their own finds with them so they can learn how to identify the processes they represent.

The day is made up of short presentations backed up by handling sessions to develop familiarity with the relevant material. The sessions include an introduction to metalworking, on-site archaeometallurgy (including sampling), iron smelting, iron smithing, non-ferrous smelting, refining and working non-ferrous metals (copper alloys, lead, silver and gold), and finally materials often confused with metalworking debris.

So far training has been provided in London, Cambridge, York, Newcastle, Manchester and Ironbridge, with more dates to follow including Bristol and Exeter. The sessions are being co-ordinated by the English Heritage Regional Science Advisors.

Sarah Paynter



Cover of English Heritage Historical Review Volume 3

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RESEARCH NEWS 10

The Silbury Hill articles in *Research News 10* did not mention the very considerable contribution to the project made by Fachtna McAvoy of Archaeological Projects, who managed the archaeological input and recording on the project from its outset in May 2000 until June 2007 (see *CJA News 2*, 2-4).

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93. Arnold, A J and Howard, R E, 'Turton Tower, Chapelton Road, Turton, Blackburn with Darwen, Lancashire: Tree-Ring Analysis of Timbers'
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7. Minnis, J, 'Sir David Salomons' Motor Stables, Broomhill, Southborough, Tunbridge Wells, Kent'
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2. Arnold, A J, Howard, R E and Hurford, M, 'Church of St Andrew, Feniton Court, Feniton, Devon: Tree-Ring Analysis of Timbers'
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