ARCHAEOPRESS ROMAN ARCHAEOLOGY 92

Roman Frontier Archaeology – in Britain and beyond

Papers in honour of Paul Bidwell presented on the occasion of the 30th annual conference of the Arbeia Society

Edited by

Nick Hodgson and Bill Griffiths

Paul Bidwell

Roman Frontier Archaeology – in Britain and beyond

Papers in honour of Paul Bidwell presented on the occasion of the 30th annual conference of the Arbeia Society

Edited by

Nick Hodgson and Bill Griffiths

Archaeopress Roman Archaeology 92

Archaeopress Publishing Ltd
Summertown Pavilion
18-24 Middle Way
Summertown
Oxford OX2 7LG

www.archaeopress.com

ISBN 978-1-80327-344-0
ISBN 978-1-80327-345-7 (e-Pdf)

Front cover: The Roman fort at South Shields, looking east with the mouth of river Tyne in the background
Back cover: Inscription of AD 222 recording the introduction of an aqueduct to South Shields Roman fort (RIB 1060). Background image: Hadrian's Wall under excavation on urban Tyneside, at Shields Road, Byker, 2001. Images copyright Tyne and Wear Archives and Museums

This book is available direct from Archaeopress or from our website www.archaeopress.com

Contents

Southern Britain

Antiquarian matters

The Roman military north

Other frontiers

List of contributors

Lindsay Allason-Jones
Formerly Director of Archaeological Museums, Museum of Antiquities, Newcastle University; independent researcher

David J. Breeze
Formerly Chief Inspector of Ancient Monuments, Historic Environment Scotland; independent researcher

Richard Brickstock
Formerly Curator of Durham Castle, Durham University; Lecturer, Leeds University; independent researcher

Rob Collins
Senior Lecturer, School of History, Classics and Archaeology, Newcastle University

Alex Croom
Keeper of Archaeology, Tyne and Wear Archives and Museums

† Geoffrey Dannell
Independent researcher

Michael Fulford
Professor of Archaeology, University of Reading

Stephen Greep
Formerly Verulamium Museum; Tyne and Wear Archives and Museums; Chairman, Roman Finds Group; independent researcher

Frances M. Griffith
Formerly Devon County Archaeologist; independent researcher

Bill Griffiths
Senior Manager, Tyne and Wear Archives and Museums

David H. Heslop
Formerly Tyne and Wear County Archaeologist; independent researcher

Richard Hingley
Professor of Roman Archaeology, Durham University

Nick Hodgson
Formerly Principal Keeper of Archaeology, Tyne and Wear Archives and Museums; independent researcher

Neil Holbrook
Chief Executive, Cotswold Archaeological Trust

Fraser Hunter
Principal Curator, Iron Age and Roman Collections, National Museum of Scotland

Stephen J. Kaye
Retired earth scientist

Alistair McCluskey
Colonel (retired) British Army; formerly Assistant Head of the British Army's Centre for Historical Analysis and Conflict Research

Jonathan McKelvey
Director, AD Archaeology Ltd; formerly Keeper of Field Archaeology, Tyne and Wear Archives and Museums

Allard W. Mees
Head of the Department of Scientific IT, Römisch-Germanisches Zentralmuseum Mainz

Roger Miket
Formerly Senior Keeper of Archaeology, Tyne and Wear Museums Service; Manager of Culture and Leisure with Highland Council and Northern Board Member Scottish Natural Heritage; independent researcher

Eduard Nemeth
Professor of Ancient History, Babeș-Bolyai University Cluj-Napoca, Romania

John Poulter
Independent researcher

John Pamment Salvatore
Formerly Publications Officer, Exeter Archaeology; independent researcher

Isabella Welsby Sjöström
Independent researcher

Margaret Snape
Formerly Keeper of Field Archaeology, Tyne and Wear Archives and Museums; independent researcher

Matthew Symonds
Editor, *Current World Archaeology*; independent researcher

Marijke van der Veen
Emeritus Professor of Archaeology,
University of Leicester

Derek A. Welsby
Formerly Assistant Keeper, Department of Ancient Egypt and Sudan, The British Museum

Everett L. Wheeler
Scholar in Residence, Duke University

Tony Wilmott
Senior Archaeologist, Historic England

Pete Wilson
Formerly Head of Research Policy (Roman Archaeology) at English Heritage; independent researcher

Abbreviations

AE
L'année épigraphique (1888-). Paris.

CIL
Mommsen, T. *et al.* (eds) 1863-. *Corpus Inscriptionum Latinarum*. Berlin.

PAS
Portable Antiquities Scheme

RIB
(1-2400) Collingwood, R.G. and R.P. Wright 1965. *The Roman Inscriptions of Britain*, *I*, *Inscriptions on Stone*, Oxford: Clarendon Press.
(2401-2505) Frere S.S. and R.S.O. Tomlin (eds) 1990-1995. *The Roman Inscriptions of Britain, II, Instrumentum Domesticum*. Gloucester: Sutton.
(3001-3550) Tomlin, R.S.O., R.P. Wright and M.W.C. Hassall 2009 *The Roman Inscriptions of Britain*, *III*: *Inscriptions on Stone found or notified between 1 January 1955 and 31 December 2006*, Oxford: Oxbow.

All dates are AD unless otherwise stated.

Acknowledgements

The editors wish to express their warmest thanks to Alex Croom and Judith Schachtmann for assisting in the preparation of this volume.

The editors gratefully acknowledge a generous grant from the Roman Research Trust towards the production of this volume.

The editors were deeply saddened to hear of the death of one of the contributors, Geoff Dannell, as the book was going to press. They are grateful to his co-author, Allard Mees, for taking on sole responsibility for final corrections to their paper.

Introduction

Paul Bidwell – archaeologist

Arriving in the north in 1980 to excavate inside the fort at Vindolanda, Paul Bidwell was regarded by some as an *enfant terrible*. Here was someone from outside 'The Wall Game', an unknown southerner, undertaking an ambitious Hadrian's Wall excavation. The report on that excavation – *The Roman Fort of Vindolanda* – appeared in 1985 and was striking in a number of ways. It was the first book-length report of a single excavation on the Wall ever to be published, displaying a new level of structural and artefactual analysis. But how many of us have explored all the highways and byways of that book? The interpretation was characterised by a tendency to challenge generally held beliefs. Paul had also written the coarse pottery report, producing what is still one of the most useful catalogues of 3rd and 4th century pottery types on the Wall, and showing at once that here was an archaeologist with an expert grasp of excavated material – the finds – as well as structural and historical data.

Brought up on the south coast, Paul had read law at Exeter University, but shortly after graduation went to work (1971) as a site assistant for the Exeter Museums Archaeological Field Unit at the beginning of a six-year campaign which uncovered the baths of the legionary fortress at Exeter and the forum and basilica that had succeeded them (Figure 1). Paul's abilities were such that by 1974 he had become assistant director of the unit, and in 1979, still only 29, he published the monograph report on the excavations, *The Legionary Bath-house and Basilica and Forum at Exeter*. A year later, Hadrian's Wall beckoned.

In 1980 it meant that Paul brought to the northern frontier some unfamiliar methods (such as pottery quantification), expertise and ideas. After Vindolanda he turned his already capacious knowledge of Roman building techniques to the bridges of Hadrian's Wall, where there were opportunities for survey and excavation in 1982-5. The report, *Hadrian's Wall Bridges*, published in 1989, demonstrated that the bridge at Chesters had been of stone arched construction, not the timber platform previously imagined.

Paul started his association with the Roman site at South Shields in 1983, beginning really extensive excavations

Figure 1. Paul Bidwell at Exeter, 1972.

in that year. He remained based there, working for Tyne and Wear Museums Service, now Tyne and Wear Archives and Museums, until his retirement 30 years later. Paul was quick to realise that the Roman forts on Tyneside held huge archaeological potential, but that unless something was done to unlock this, the lack of upstanding remains and unlikely settings destined these sites to be neglected and ignored and to play little part in the lives of the people living around them.

One obvious way of giving poorly preserved urban sites meaning for a non-specialist public was to reconstruct some of the Roman buildings. Seeing that this was the only means by which long-term interest in visiting and excavating sites like South Shields was likely to be sustained, he threw himself behind the campaign to obtain consent to build the west gate at South Shields *in situ* (opened 1988), while the working Roman baths (opened 2000) and section of Hadrian's Wall at Wallsend (1994) – arguably still the only full scale reconstruction of the Wall there is – and the *in situ* barrack and commanding officer's house (2001) at South Shields, sprang very much from his personal vision and have transformed the cityscapes in which these sites lie. He was successful in doing this and won widespread – though far from universal – support because the sites themselves were carefully excavated and the reconstructions designed with academic rigour only after the exhaustive research of all evidence available from the sites on Tyneside and elsewhere in the Roman world.

From the very beginning Paul Bidwell was anxious to ensure that as wide a cross-section of people as possible should have an opportunity to participate in the work of research and reconstruction at South Shields and Wallsend; these included students and local people from diverse backgrounds, gradually developed into a team of paid professionals and an ever-growing army of volunteers, drawn from many countries as well as the local community. In the 1980s and 1990s, like Corbridge before it, South Shields became a kind of training ground for archaeologists, many of whom have since become leading practitioners or academics. At the same time, for many in the local community the inclusive volunteer and training schemes at South Shields and Wallsend have been a life-changing introduction to archaeology and the beginning of sense of place and appreciation of the Roman heritage of the region. It could be said that Paul's pioneering of socially inclusive excavations and research programmes on Tyneside formed the template for what would now be called community archaeology, an achievement recognised in his award of an OBE in 2013. One of Paul's last tasks at Tyne and Wear Archives and Museums was the development of the WallQuest community archaeology project that went on in 2013-16 to great success, discovering and excavating the lost Roman baths at Wallsend.

This was the culmination of many years of advocacy by Paul of the archaeological potential of the works of Hadrian's Wall as they run through urban Tyneside, which he had found undervalued when he arrived in the region. Distressed by the inadequacy of the archaeological mitigation, Paul nevertheless seized the opportunity offered by the destruction of 200 m of the Wall by the A1 bypass at Denton in the late 1980s to squeeze out as much information as possible, excavating in difficult conditions. Since then, he has consistently championed the Wall on urban Tyneside, urging that it should be excavated and displayed wherever the opportunity arises, as at Shields Road, Byker, where thanks to his persistence the Wall – its actual location previously unknown – has been excavated (with truly remarkable results) and partly displayed.

Given his wide-ranging contribution to the field of archaeology it would be easy, but an error, to overlook Paul's contribution to museology in his three decades at Tyne and Wear Museums. In addition to running the archaeology team Paul was also sometime curator of the museum at Arbeia Roman Fort, South Shields. In the days before the ready availability of computers he maintained a hand-drawn chart in his office showing visitor figures to the site and developed a deep awareness and understanding of who visited and why, something many museums still struggle to achieve today.

In the 1990s Paul led on the development of the new museum at Wallsend, having laid the seed for it with the excavation and reconstruction of a section of Hadrian's Wall to the west of the site. When the then new Heritage Lottery Fund emerged, North Tyneside Council asked him to develop a feasibility study, which led to the opening of Segedunum Roman Fort, Baths and Museum in 2000, now an established visitor attraction in the heart of an urban community. The new millennium saw Paul become Senior Manager of all the museums of both North and South Tyneside (the Roman forts of South Shields and Wallsend, South Shields Museum and Art Gallery and the Stephenson Steam Railway), assume responsibility for a wider portfolio of responsibilities across Tyne and Wear Museums, and support colleagues with other refurbishments, notably at South Shields Museum and Art Gallery. It was of course in his leadership of the programme of reconstructions across both fort sites that his archaeological and museological skills most effectively intersected.

With the team that he gathered around him in the 1980s and 90s Paul embarked on a programme of archaeological research that extended far beyond Hadrian's Wall on Tyneside to embrace not only the northern frontier zone but the province as a whole. He has remained active in his old stamping ground in the south-west, and published (often in collaboration with colleagues) a series of monograph archaeological reports whose number, scale and quality can be rivalled by few archaeologists of his generation, including, in addition to those already mentioned, *Roman Finds from Exeter* (1991); *Excavations at South Shields Roman Fort, volume 1* (1994); *Hardknott Roman fort, Cumbria* (1999); *Roman Pottery from Excavations in Colchester* 1971–86 (edited, 1999); *The Roman Fort at Newcastle upon Tyne* (2002) and *Hadrian's Wall at Wallsend* (2018).

He has also published for a wider audience a series of popular (or at least more generally accessible) accounts such as: *Roman Exeter: Fortress and Town* (1980); *Roman Forts in Britain* (1997, revised ed. 2007); *The Roman Army in Northern England* (2009) and has edited one of the most significant collections of Wall studies in recent times, *Understanding Hadrian's Wall* (2008). He was the first guest editor of Current Archaeology in 1999 with a Hadrian's Wall special issue. Nor have Paul's interests been confined to the Roman period, as we see from his publication of the pottery from a 5th-6th century trading station at Bantham Sands in Devon (2011), his study of the Anglo-Saxon crypt at Hexham (2010) and report on an early Anglo-Saxon settlement at Shotton, Northumberland (2014).

Paul's business acumen was quick to seize on the opportunity offered by the new developer funded archaeology of the 1990s to expand the museum's department of archaeology into a full-scale commercial contracting unit (TWM Archaeology) whose activities supplemented the capital development projects and research carried out at South Shields and Wallsend. In the following piece Jonathan McKelvey has provided an overview of the highlights of the unit's work under Paul's leadership. The excavation results from Roman Tyneside attracted attention abroad and there was indeed an international dimension to the work of TWM Archaeology – reflected in some of the contributions to this volume – with the South Shields excavations carried out in partnership with the US environmental charity Earthwatch and its hundreds of volunteers, and commercial and Euro-funded research projects taking Paul's staff to countries such as Germany, Austria, Spain, Portugal and Sudan. In 2009 TWM Archaeology hosted the XXIst International Congress of Roman Frontier Studies in Newcastle.

Those involved in developer funded digs throughout northern England, or present during the long years when vast areas of Wallsend and South Shields Roman forts were meticulously excavated down to natural subsoil (Figure 2), will remember Paul's incisive interventions and guidance, at times gentle, stern, or seemingly unorthodox. It is in Paul's nature that he assumes that everyone should want to get involved in every aspect and constantly seek to interpret and to question. He ran the finest of training grounds. Excavators, he would say, should be able (at least in a rudimentary way) to date pottery as it comes out of the ground, rather than setting it aside for the specialist to add the chronological dimension when the site was written up. Indeed, when it comes to specialists, he maintained, they should be engaged with and interrogated if what they said was at odds with the structural interpretation (we have all read reports where the structural and specialist reports contradict each other). He has a particular dislike of the belief (no longer as prevalent as it was in the 1980s) that an objective archaeological record could be made via a single context recording system and written up by someone else with complete understanding at a later date. He set out his philosophy in 1994:

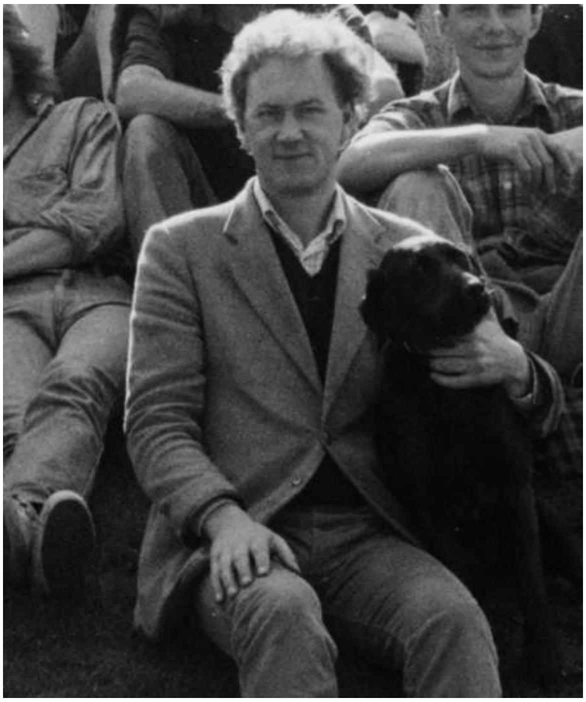


Figure 2. Paul Bidwell at South Shields, 1987.

> We reject the belief that it is possible to obtain adequate results by recording a site without understanding at the time of excavation the likely form of structures, the dating evidence and the general stratigraphical history of the site. No matter how comprehensive the observations made on site, the really significant details will often be overlooked unless there is constant testing of wide-ranging hypotheses during the excavations...at South Shields an interpretative approach is adopted: every effort is made to establish the significance of the contexts at the time of their excavation...in the overall interpretation of the site.

What has characterised Paul's approach and what he has passed on to so many who have worked with him over the years, is essentially *independence of mind* – a questioning approach and a refusal to defer automatically to the judgement of others simply because they had a particular finds, scientific or period speciality, or, especially, status. Most emphatically of all, he has never deferred to fashion in archaeological interpretation. Equally, Paul has never had any preconceptions based a person's background or whether they were the 'right sort' to be doing the empirical, hands-on-to-every-aspect sort of archaeology he has championed, as is clear from the diversity of origins in the people he has brought on or encouraged over the years – some of that variety can be glimpsed in the tributes from beneficiaries of his support that are included in some of the essays that follow.

The financial crash of 2008 and the increasing difficulty of working competitively within a local authority pay structure led to the closure of TWM Archaeology at the time of Paul's retirement in 2013, but the legacy of a quarter of a century of archaeological exploration, both research and development driven, is obvious from the publication record. Since then Paul has continued to publish prolifically and been involved in numerous archaeological projects and since 2015 he has edited the *Britannia* monograph series. In his 60s Paul taught himself to use Autocad and prepared all the illustrations for his *Hadrian's Wall at Wallsend* monograph himself – an example at once of his immense industry and belief that an archaeological director should be able to lay a hand on every aspect of the work. We look forward to reading what Paul has to say in print – we hope for years to come – on Hadrian's Wall and other aspects of Roman Britain and the Roman frontiers, while his former colleagues at South Shields are working with him to bring the elements of that great excavation that are still formally unpublished to final publication.

The editors of this volume, through the distractions of other commitments, or perhaps mere indolence, were not able to organise it in time to coincide with one of the usual pretexts – a retirement say, or a 65th or 70th birthday. However, we are presenting it to Paul on the occasion of the 30th annual conference of the Arbeia Society, which he helped to found in 1991 and which supports research and community archaeology in the north-east, and whose conference has become known as one of the most exciting and accessible forums for debate on the Roman northern frontier. The Arbeia Society and its conference exemplify Paul's inclusivity and long-term determination to demystify and make open to all the archaeology of the region. Paul's grounding in the military and urban Roman archaeology of southern Britain and his expertise in finds means that a collection of essays by friends and colleagues who have worked with him over the years was bound not to be limited to the Roman north but to embrace aspects of the archaeology and material culture of the whole province of *Britannia* and the Roman world beyond. We salute a master of the archaeologist's craft, and hope that he will find enjoyment in these essays in his honour.

The work of TWM Archaeology in the developer-funded field from the perspective of a practising contracting archaeologist

Jonathan McKelvey

Discoveries made during developer-funded projects undertaken by TWM Archaeology (the name given to the commercial contracting arm of the Archaeology Department of Tyne and Wear Museums in the 1990s) have made several critically important contributions to the understanding of the archaeology of the north-east of England. These form one element of several contributions made by TWM Archaeology (under the leadership of Paul Bidwell) to the cultural heritage of the north-east.

Paul Bidwell would be the first to emphasise that archaeology is a team enterprise requiring a group of individuals with a diverse range of skills and capabilities working together toward a common goal. Notwithstanding this, there is no doubt that TWM Archaeology would not have achieved the breakthrough discoveries detailed below without the leadership, direction and enthusiasm of Paul. As both the key architect and main driving force behind this organisation it is only right that his contribution is fully recognised, recorded and celebrated.

Paul's leadership of TWM Archaeology coincided with the onset of developer-funded archaeology which stemmed from changes in government planning policy in the early 1990s, obliging developers to fund the excavation of sites threatened with destruction by their projects. He recruited and developed a team that were positioned to meet the opportunities and challenges of this brave new developer-funded era. Paul took every opportunity to excavate away from the South Shields base, and the team evolved from a series of excavations – some research, some development-driven – undertaken in the late 1980s and early 1990s.

These included several Hadrian's Wall excavations, such as the initial uncovering of the Wall to the west of Wallsend Roman fort at Buddle Street, work on the Wall and Vallum at Denton, and two seasons of excavations on the west abutment of the Roman bridge at Chesters (a supplement to Paul's early-1980s work at the site), undertaken as part of a programme to mitigate riverine erosion. Several projects took place in the early 1990s ahead of large-scale urban renewal programmes, such as at the Riverside in South Shields – which revealed traces of the salt panning industry – or at Wylam Wharf in Sunderland, exploring the post-medieval development of the riverbank in the area.

Indeed, throughout the 1990s and into the current century the team remained flexible, operating across commercial archaeology, but also undertaking research-based projects. Away from the two Tyneside forts, other major works included the Roman bridge at Corbridge (again to mitigate erosion) and a major survey of the crypt at Hexham Abbey. There is no doubt that working across research and commercial excavations gave the team a variety of skills and experiences which enhanced the quality of the work delivered. In many ways, however, it was the purely development-driven projects which produced the most surprising and dramatic results. In what follows I have selected a small number of significant sites to illustrate key advances made in the understanding of the prehistoric, Roman, Anglo-Saxon and medieval periods.

Prehistoric

A combination of factors has led to significant discoveries that have revolutionised the understanding of the late prehistoric period in the north-east. Advances in geophysical survey techniques, aerial photography and the opportunities provided by developer-funded archaeology have combined to provide the impetus for the discovery of numerous sites and enabled a new and clearer understanding of the archaeology of the region. At an early date Paul recognised the potential of utilising geophysical survey as a rapid method for locating and identifying sites. After initially working in conjunction with Alan Biggins of Timescape Surveys he worked towards the establishment of an in-house geophysical survey team at TWM Archaeology. This was a bold and consequential directorial decision which at the time involved a considerable investment both financially and in terms of training required.

There has been increased aerial photographic coverage of the north-east, with for instance Tim Gates identifying hitherto unknown prehistoric settlements at East and West Brunton, now part of Newcastle Great Park. From the early 2000s the Northumberland coastal plain to the north of Newcastle saw a rapid expansion of open-cast mining and housing developments that formed the background conditions for a revision in the understanding of the late prehistoric period. The fact that much larger areas were being stripped and systematically examined by geophysical survey and higher trench samples required by County Council archaeologists has led to both the discovery of a greater number of sites and a more comprehensive understanding of their setting in the landscape. Crucially the financial resources made available through developer-funding also meant that it became possible to date sites that are poor in artefacts by means of extensive programmes of radiocarbon dating.

Between 2002 and 2008 TWM Archaeology excavated Iron Age earthwork enclosure complexes in a housing development 6 km north of the wall at East Brunton and West Brunton and in advance of surface mining at Blagdon Park, 12 km to the north. As well as these three settlements several lesser unenclosed sites and pit alignments were also investigated, giving the most complete sample so far of an Iron Age landscape immediately north of Hadrian's Wall. Subsequently work on other prehistoric sites at Shotton Surface Mine and Brenkley Surface Mine and at a number of housing developments in south-east Northumberland have made possible a revised and more comprehensive understanding of the late prehistoric period.

The most striking feature to have come to light relating to the prehistoric period is a regular system of landscape division consisting of a series of pit alignments or pit boundaries. These took the form of long lines of elongated pits snaking across the landscape. Scientific dating derived from their earliest fills cluster in the early centuries of the first millennium BC (late Bronze Age) but it seems likely that they remained open features partitioning the landscape into and through the Iron Age. One explanation of the pit alignments is that they may have demarcated parcels of landscape resources, including pastureland, woodland and access to rivers, that were the preserves of particular communities or groups of settlements. To date these pit alignments have been found at Fox Covert, Shotton, Blagdon Park, Ulgham and at Wallsend adjacent to Rising Sun Country Park. They testify to the widespread settlement and organisation of the landscape by the time of the late Bronze Age or early Iron Age (around 700 BC).

The detailed large-scale excavations of prehistoric settlements at East Brunton, West Brunton and, Blagdon Park has allowed the formulation of a new model for understanding the settlement pattern for the Northumberland coastal plain. Palisade enclosures and unenclosed settlements represent the earliest settlement types, some of which may have their origins in the Bronze Age with the latter predominating by the mid-Iron Age period. By the late Iron Age, large earthwork enclosed settlements with banks and ditches constructed on a monumental scale began to dominate the landscape. These substantial banks and ditches can only have been constructed with communal effort, with their striking visual effect being designed to reinforce the wealth, power and status of the occupants. Evidence from radiocarbon analysis shows that the earthwork enclosures were built *c.* 200 BC often on sites that had been continuously occupied since the late Bronze Age.

Subsequent work has shown that the density of settlement revealed at East and West Brunton and in the Blagdon Park area is typical and that on the most level and fertile part of the coastal plain for at least 25 km north of the Tyne the late Iron Age landscape was covered with these high-status enclosures at 1 km intervals, interspersed with smaller scale unenclosed settlements in a stratified society with complex links. It seems likely that the substantial earthwork enclosures represent a widespread social elite, while contemporary small unenclosed roundhouse settlements, and agglomerated small-ditched enclosures may have been dependent on the more substantial enclosures. The archaeological work has shown that by the late Iron Age the area of the Northumberland coastal plain was densely occupied by a complex society with much variation in wealth and status, a very different model to the former understanding of the area as being occupied by isolated subsistence farming communities.

Radiocarbon evidence suggests that these large rectilinear enclosures at Brunton and Blagdon Park, just to the north of Hadrian's Wall, came to an abrupt end in the second century. It has been previously argued that Hadrian's Wall had relatively little impact on the native population, acting primarily as a customs border. However, the archaeological evidence that has come to light in the last 20 years show the creation of a supply network and rudimentary Roman provincial society to the south of Hadrian's Wall and an abandonment of settlements immediately to its north. The idea that the Wall had a destructive effect on traditional Iron Age society to the north is a new insight. It is possible that native settlements immediately north of the Wall were cleared to form a demilitarised zone or that the densely occupied society could not be sustained as the building of the Wall had undermined the agricultural wealth and stability of a complex society.

Further information:

Hodgson, N., J. McKelvey and W. Muncaster 2012. *The Iron Age on the Northumberland Coastal Plain.* Newcastle upon Tyne: Tyne and Wear Archives and Museums.

Roman

TWM Archaeology was well placed to take advantage of commercial work along the line of Hadrian's Wall. By the mid-1990s Paul had created a team of specialists with expertise in both the excavation and recording of complex Roman stratigraphy and the analysis of finds and the production of post-excavation reports. An integrated approach meant that it was possible to bring together the results from numerous small interventions to provide a clearer picture of the whole.

A wholly unexpected discovery in 2001 was a system of emplacements for obstacles on the berm between the Wall and its frontal ditch. These were found initially at Shields Road, Byker (Wall Mile 2) and later in the same year over a one kilometre length between Throckley and Heddon (Wall Miles 10-11).

The system of obstacles found at Shields Road, Byker consisted of three rows of elongated pits, the inner and outer row running along the line of the berm with the middle row aligned at right angles. These rectangular and vertical sided pits were most probably emplacements for an impenetrable entanglement of forked branches, close in appearance and function to *cippi* entanglements as described by Caesar. Each pit would have held two forked- branches at either end, the entanglement forming a substantial above-ground structure hindering access to the Wall by a potential attacker. In places the obstacles seem to have been accompanied by a mound raised on the south lip of the Wall ditch.

The discovery of the new element of Hadrian's Wall adds significantly to the understanding of the Wall and marks a significant contribution to understanding its function. The frontier work can now be reconstructed as what would have been a daunting and impressive linear barrier with a substantial wall, fronted by an entanglement and large ditch. The entanglement would have been part of a primary design, that, whether or not implemented everywhere, bound together the functions of the Wall, berm, ditches and turrets in a unitary whole. It is clear that they are a Hadrianic provision and were probably envisaged along the length of the Wall, the width of the berm at 6 m being unnecessarily wide otherwise. These obstacles represent the first discovery of a new element in the repertoire of regular Wall works to be made in modern times. It is remarkable that these features had not been recognised before given the level of resources previously allocated to establishing the nature of the components of the defensive frontier. It shows the importance of being open to new discoveries and highlights the potential of future investigative work along the line of the Wall.

The rows of pits have since been found at several other points in the eastern 18 km (11 miles) of the Wall. At a number of sites where the pits have been located there is evidence for the refurbishment or renewal of the defensive entanglement.

The discovery of this additional defensive structure taken in conjunction with advances in knowledge about native settlement either side of Hadrian's Wall throw doubt on the interpretation of the Wall as primarily a facility for the control of movement of civilians. With settlement immediately to the north largely abandoned it is difficult to see the Wall as a system whose main purpose was to regulate contacts between separated populations. Conversely the development of villa estates and a supply network to the south of the Wall compels reconsideration of the Wall as a practical defensible barrier against raiders from the north. The discovery of this unknown system of obstacles between Wall and Wall ditch suggests that Hadrian's Wall was indeed designed with the function of being able to act as a defensive barrier. These discoveries have the potential to inform a paradigm shift in the understanding of Hadrian's Wall in relation to its function and impact on the native populations to the north and south of the frontier.

Further information:

Bidwell, P. 2005. The systems of obstacles on Hadrian's Wall; their extent, date and purpose. *Arbeia Journal* 8: 53-76.

Frain, T., J. McKelvey and P. Bidwell 2005. Excavation and watching briefs along the berm of Hadrian's Wall at Throckley, Newcastle upon Tyne, in 2001-2002. *Arbeia Journal* 8: 29-52.

McKelvey, J. and P. Bidwell 2005. The excavation of prehistoric features and Hadrian's Wall at Nos. 224-228 Shields Road, Byker, Newcastle upon Tyne. *Arbeia Journal* 8: 5-28.

Anglo-Saxon

An Anglo-Saxon settlement was discovered in advance of surface mining at Shotton, near Stannington, 10 km north of Newcastle, representing a significant contribution to the understanding of the archaeology of this period. The settlement, excavated between 2009 and 2010, consisted of six rectangular post-built halls, two sunken-feature buildings, and a system of enclosures, fences and trackways. The site is one of a small number of Anglo-Saxon settlements to have been excavated on a scale and under conditions which allows for a detailed analysis of its layout and development over time.

The earliest period consisted of an unenclosed settlement established *de novo* in the early Anglo-Saxon period, with the radiocarbon dates indicating foundation during the mid to later 6th century. The settlement consisted of a cluster of three halls and another structure of uncertain type. These buildings were replaced by a more extensive enclosed settlement, with halls, sunken-featured and other buildings, pens and fenced areas, all located within a row of seven ditched enclosures. This settlement appears to have been established no earlier than the mid-seventh century and to have gone out of use in the ninth or tenth century. The layout of the enclosed settlement says something about its social organisation. The row of enclosures defined by multi-phased ditches suggests longevity and probably continuity of tenure, perhaps by individual households, with each enclosure representing a farmstead. Artefactual evidence recovered consisted of Anglo-Saxon pottery, loom weights and metalworking residues.

The excavation has provided a significant boost to the study of Anglo-Saxon settlement in the north-east of England. In the early medieval period Northumbria was at the forefront of political, cultural and intellectual developments. At its greatest extent in the 7th century the Kingdom of Bernicia, with its capital at Bamburgh, extended from Edinburgh to the Humber. Despite the importance of the early medieval period in the region little is known about settlement archaeology outside a restricted region in north Northumberland (Bamburgh, Yeavering and Thirlings) and the ecclesiastical sites to the south at Hexham, Jarrow, Monkwearmouth and Hartlepool. The discovery of this Anglo-Saxon settlement at Shotton represents an important finding with significant implications for archaeology in Northumberland and the wider north-east Region. Taken in conjunction with recent discoveries of other Anglo-Saxon sites (Felton, Cheviot Quarry, Lanton Quarry) it demonstrates that the rural settlement pattern was of greater density than once thought, with many other similar sites awaiting discovery. The site at Shotton, like several other recently located Anglo-Saxon settlements lies at some distance from the original focus of the nearest medieval village. It is clear from the place-name evidence that Anglo-Saxon settlement in Northumberland was extensive. Some of the sites are likely to lie undetected in fields on the periphery of other medieval towns and villages throughout the region more of which will come to light through careful archaeological investigation prior to future development. The location, recognition and detailed excavation of further Anglo-Saxon settlements has the potential to gather the data required to answer many of the unresolved questions about the nature and extent of the Anglo-Saxon settlement.

Further information:

Muncaster, W., J. McKelvey and P. Bidwell 2014. Excavation of an Anglo-Saxon settlement and of prehistoric features at Shotton, Northumberland. *Archaeologia Aeliana* 5th series 43: 77-140.

Medieval

At Fox Covert Surface Mine 1.20 km north-west of the Dinnington, to the north-west of Newcastle, a medieval monastic grange farm was excavated in 2004-2005 representing, at 3 ha in area, the largest open area excavation undertaken in Tyne and Wear at that time.

The complex represented a monastic grange or specialist farm belonging to Newminster Abbey which acquired the *vill* of Horton, within which the complex lay, in 1157. The complex was probably a satellite farm linked to Horton Grange specialising in hemp production and cloth preparation. It was in use between 1250 and 1350 but had a sudden ending with evidence of burning and destruction of buildings.

The grange was focused on elevated ground overlooking Prestwick Carr to the south, being laid out as a series of enclosures arranged in a tight grid system with a main enclosure at its core. The complex lay by the side of a road flanked by ditches that ran south towards Prestwick Carr which would have been a marsh in the medieval period and used for the extraction of peat. It was clear that the road and enclosures had been laid out at the same time as the eastern roadside ditch also defined the western side of four of the enclosures.

Each of the enclosures was defined by ditches, with the main complex measuring 55 m by 40 m in area. In the interior the remains of two buildings were identified. One of the buildings may have had a stone foundation or dwarf wall but the remains had been heavily disturbed by ploughing and the other building was constructed on a frame of timber posts. A further enclosure to the south contained a large rectangular timber building that was possibly a barn. The interior of the main enclosure also contained a stone-lined well of exceptional quality and this was completely excavated to its full depth of 7.30 m. A sunken cobbled area was inserted against the interior of the southern ditch and this was probably a purpose-built retting pond for soaking bundles of hemp stalks to extract their fibres for use in manufacturing coarse fabrics, ropes and sails. The grange was reached via a substantial metalled road, with wide flanking drainage ditches, that ran into the site from the north and then continued south down the west side of the two grange enclosures toward the Carr.

A search of the documentary sources suggested that the site was probably associated with Newminster Abbey, a Cistercian house on the outskirts of Morpeth. The Newminster Cartulary states that a grange at Horton and its turbary (the award of the right to extract peat) were provided with a stone road. It is possible therefore that the complex revealed by the excavation was the original Horton Grange or at least an outlying element associated with it, perhaps as part of the turbary. Its end in the second quarter of the 14th century was abrupt and maybe violent given the presence of destruction deposits. Possibly the site was a victim of the plague or one of the frequent Scottish raids; one such in 1327 wasted the township and turbary of Mason, located only 1.5 km to the south-east. Following the abandonment of the site a ridge and furrow field system was created over it, and the grange possibly being substantially re-established on higher ground at 'Old Horton Grange' 1 km to the north. The addition of the Fox Covert site to this distribution plot of known sites associated with Newminster shows a concentration of holdings in the Stannington and Horton areas. It is also notable that nine of the granges, including Horton Grange and the Fox Covert site, were situated within 15 km of the Abbey in a productive landscape which was populated by nucleated townships. The monasteries were at the forefront of innovation in agriculture and were responsible for the diffusion of new technology. The processing of hemp and cloth preparation on an industrial scale at the Fox Covert site provides an example of this both in terms of methods used and the scale of production. The sunken yard and evidence of water management at the Fox Covert site demonstrate a degree of engineering skill and adaptation that are the result of a concentration of specialist knowledge developed over time.

The Cistercian order based at Newminster Abbey had a considerable impact on the cultural and physical landscape of Northumberland between the 12th and 16th centuries and played an important role in the development of agriculture in the region. The systematic excavation of the Fox Covert complex has made it possible to go beyond the fragmentarily preserved written record documentation to see how a monastic grange actually functioned and was physically organized in its landscape setting.

The Fox Covert complex was a wholly unexpected discovery. Its finding shows the benefit of the extensive geophysical and trenching evaluation strategies now being implemented by County Archaeology Officers even where no heritage asset is previously known. Documentary evidence suggests that there were many such agricultural and industrial complexes under monastic control in the north-east. The discovery of the Fox Covert site shows the rich archaeological potential that exists and potential contribution to the understanding of the medieval period in the region.

Further information:

Muncaster, W. 2006. Archive report on Fox Covert Excavation. TWM Archaeology: Unpublished client report in Tyne and Wear Historic Environment Record.

An assessment of the legacy and achievements of Paul and his colleagues during the years that TWM Archaeology functioned both as a museum department and a commercial contracting organization would certainly give pride of place to the significant advances in knowledge made by the detailed long-term research excavations at South Shields and Wallsend Roman forts and to the detailed analysis and reconstruction of Roman structures at these Tyneside forts. However, Paul was not wedded to the Roman period, and was one of the first in the region to see the opportunity that the new developer-funded archaeology offered to enable archaeology to take place on a larger scale and make transformative discoveries in many other areas. This contribution has not been able to do more than select the most dramatic highlights from the hundreds of developer-funded archaeological projects carried out by TWM Archaeology under his leadership. But it says something about Paul as an archaeologist that he was interested and closely involved in them all – he was no narrow period specialist but turned his hand enthusiastically to the problems of the prehistoric, Anglo-Saxon, medieval and industrial periods. He was an inspiring leader and as a result our archaeological knowledge of the region is so much richer.

Bibliography of the published works of Paul Bidwell

Complied by the editors with the help of Alex Croom. This is as complete a list as could be created without consulting Paul himself.

1973

(with M. Griffiths). *Cathedral Close: Excavations of the Exeter City Archaeological Field Unit Report.* Exeter: Exeter City Council.

1975

Report on Roman coarse wares, in K. Jarvis and V.A. Maxfield, The excavation of a first-century Roman farmstead and a late Neolithic settlement, Topsham, Devon. *Devon Archaeological Society Proceedings* 33: 235-44.

1976

(with G.C. Boon). An antefix type of the Second Augustan Legion from Exeter. *Britannia* 7: 278-80.

1977

Early black-burnished ware from Exeter, in J. Dore and K. Greene (eds) *Roman Pottery Studies in Britain and Beyond* (British Archaeological Reports International series 10): 184-98. Oxford: British Archaeological Reports.

1979

The Legionary Bath House and Basilica and Forum at Exeter (Exeter Archaeological Reports, Vol.1). Exeter: Exeter City Council and the University of Exeter.

(with R. Bridgewater and R.J. Silvester). The Roman Fort at Okehampton, Devon. *Britannia* 10: 255-8.

1980

Roman Exeter: Fortress and Town. Exeter: Exeter City Council.

Devon and Exeter under the Romans, in S. Timms (ed.) *Archaeology of the Devon Landscape.* Exeter: Devon County Council.

1982

Review of J. N. Dore and J.P. Gillam 1979. *The Roman Fort at South Shields. Britannia* 13: 429-30.

The Durotrigian and Roman Pottery, in R. Silvester, Excavations at Honeyditches Roman villa, Seaton, in 1978. *Devon Archaeological Society Proceedings* 39: 63-74.

(with C.G. Henderson). The Saxon minster at Exeter, in S.M. Pearce (ed.) *The Early Church in Western Britain and Ireland. Studies Presented to C A Ralegh Radford* (British Archaeological Reports British Series 102): 145-175 Oxford: British Archaeological Reports.

Roman Occupation?, in R.A. Higham, J.P. Allen and S.R. Blaylock, Excavations at Okehampton Castle, Devon. Part 2 – the Bailey. *Devon Archaeological Society Proceedings* 40: 25-7.

1984

(with R.J. Silvester). A Roman site at Woodbury, Axminster. *Devon Archaeological Society Proceedings* 42: 33-57.

The Roman Pottery from Cullompton, in F.M. Griffith, Aerial Reconnaissance in Devon in 1984: a preliminary report and the discovery of a hillfort. *Devon Archaeological Society Proceedings* 42: 30.

1985

The Roman Fort of Vindolanda at Chesterholm, Northumberland (Historic Buildings and Monuments Commission for England Archaeological Report no. 1). London: Historic Buildings and Monuments Commission for England.

1986

The Pottery, in F.M. Griffith, Salvage observations at the Dark Age site at Bantham Ham, Thurlestone, in 1982. *Devon Archaeological Society Proceedings* 44: 50-1.

Roman Pottery and Tiles, in C. Gaskell Brown (ed.) *Plymouth Excavations; the Medieval waterfront, Woolster Street and Castle Street:* 13. Plymouth: Plymouth City Museum.

1987

The non-Cornish coarse wares, in P.M. Carlyon, Finds from the earthwork at Carvossa, Probus. *Cornish Archaeology* 26: 110-13.

1988

(ed. With R. Miket and W. Ford). *Portae cum Turribus: Studies of Roman Fort Gates* (British Archaeological Reports British Series 206). Oxford: British Archaeological Reports (Re-issued 2009).

(with R. Miket and W. Ford). The reconstruction of a gate at the Roman fort of South Shields, in P. Bidwell, R. Miket and W. Ford (eds) *Portae cum Turribus: Studies of Roman Fort Gates* (British Archaeological Reports 206): 155-231. Oxford: British Archaeological Reports.

Review of J.D. Zienkiewicz 1986. *The Legionary Fortress Baths at Caerleon: 1. The Buildings, 2. The Finds. Britannia* 19: 535-6.

(with R.J. Silvester). The Roman pottery and a note on South Devon wares, in B. Cunliffe, *Mount Batten, Plymouth: A Prehistoric and Roman Port:* 42-9. Oxford: Oxford University School of Archaeology.

1989

(with N. Holbrook). *Hadrian's Wall Bridges* (English Heritage Archaeological Report no. 9). London: Historic Buildings and Monuments Commission for England.

(with M. Watson, M.). A trial excavation on Hadrian's Wall at Buddle Street, Wallsend. *Archaeologia Aeliana* 5th series 17: 21-8.

Contributions to C.M. Daniels (ed.) *The Eleventh Pilgrimage of Hadrian's Wall.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne and Cumberland and Westmorland Antiquarian and Archaeological Society:
Chesterholm-Vindolanda: 46-9
Chesters Bridge Abutment: 63-6
Hadrian's Wall at Denton Burn: 73
Hadrian's Wall, Wallsend: 77
South Shields: 83-9

1991

(with N. Holbrook). *Roman Finds from Exeter* (Exeter Archaeological Reports, vol. 4). Exeter City Council and the University of Exeter.

Later Roman barracks in Britain, in V.A. Maxfield, and M.J. Dobson (eds) *Roman Frontier Studies 1989: Proceedings of the 15th International Congress of Roman Frontier Studies:* 9-15. Exeter: Exeter University Press.

1992

(with N. Holbrook). Roman pottery from Exeter 1980-1990. *Journal of Roman Pottery Studies* 5: 35-80.

1993

Review of P.S. Austen 1991. *Bewcastle and Old Penrith: A Roman Outpost Fort and a Frontier* Vicus. *Britannia* 24: 327.

1994

(with S.C. Speak). *Excavations at South Shields Roman Fort, vol.1* (Society of Antiquaries of Newcastle upon Tyne Monograph Series 4). Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne with Tyne and Wear Museums.

(with M. Snape). The *vicus* of the Roman fort at Wallsend, Tyne and Wear. *Arbeia Journal* 3: 13-32.

Review of P.J. Casey and J.L. Davies 1993. *Excavations at Segontium (Caernarfon) Roman Fort*. *Britannia* 25: 322-4.

Review of C. O'Connor 1993. *Roman Bridges. Landscape History* 16: 70-80.

1995

Review of J.D. Anderson 1992. *Roman Military Supply in North-East England: An Analysis of, and Alternative to, the Piercebridge Formula*. *Britannia* 26: 395-6.

1996

The exterior decoration of Roman buildings in Britain, in P. Johnson (ed.) *Architecture in Roman Britain* (Council for British Archaeology Research Report 94): 19-29. York: Council for British Archaeology.

(with M. Watson). Excavations on Hadrian's Wall at Denton, Newcastle upon Tyne, 1986-89. *Archaeologia Aeliana* 5th series 24: 1-56.

Some aspects of the development of later Roman fort plans. *Arbeia Journal* 5: 1-18.

1997

A water-colour of a culvert through Hadrian's Wall at West Denton, Newcastle upon Tyne. *Archaeologia Aeliana* 5th series 25: 151-2.

(with A. Croom). The coarse wares, in L.P. Wenham and B. Heywood, *The 1968 to 1970 Excavations in the* vicus *at Malton, North Yorkshire* (Yorkshire Archaeology. Report 3): 61-103.

Roman roads and bridges in Tynedale, in T. Corfe (ed.) *Before Wilfrid: Britons, Romans and Anglo-Saxons in Tynedale* (Hexham Historian 7): 18-28.

1998

Roman Forts in Britain. London: Batsford/English Heritage.

Some aspects of the development of later Roman fort plans, in M. Zahariade and I. I. C. Opris (eds) *The Roman Frontier at the Lower Danube, 4th-6th Centuries* (Studia Danubiana, Pars Romaniae, Series Symposia I), Bucharest: 59-75.

A decorated samian bowl from the Plaza site at Tynemouth. *Archaeologia Aeliana* 5th series 26: 161-3.

(with V.G. Swan). Camelon and Flavian troop-movements in southern Britain: some ceramic evidence, in J. Bird (ed.) *Form and Fabric: Studies in Rome's Material Past in Honour of B. R. Hartley* (Oxbow Monograph 80): 21-30. Oxford: Oxbow.

(with A.T. Croom). The pottery, in P.J. Casey and B. Hoffmann, Rescue excavations in the *vicus* of the fort at Greta Bridge, Co. Durham, 1972-4. *Britannia* 29: 61-80.

Review of R.A. Hall 1997. *Excavations in the* Praetentura*: 9 Blake Street* (The Archaeology of York 3.4). *Yorkshire Archaeological Journal* 70: 161-2.

1999

(with M. Snape and A. Croom). *Hardknott Roman Fort, Cumbria* (Cumberland and Westmorland Antiquarian and Archaeological Society Research series No. 9).

Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society.

(ed. with A. Croom) R. P. Symonds and S. Wade, *Roman Pottery from Excavations in Colchester, 1971-86* (Colchester Archaeology Report 10). Colchester: Colchester Archaeological Trust Ltd.

A survey of pottery production and supply at Colchester. *Roman Pottery from Excavations in Colchester, 1971-86* (Colchester Archaeology Report 10): 488-99.

(with A. Croom). The *Camulodunum*/Colchester type series. *Roman Pottery from Excavations in Colchester, 1971-86* (Colchester Archaeology Report 10): 468-87.

(ed.) *Hadrian's Wall 1989-1999: A Summary of Recent Excavation and Research.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society/Society of Antiquaries of Newcastle upon Tyne.
Contributions:
The Pilgrimages of Hadrian's Wall: 1-6
A summary of recent research on Hadrian's Wall: 7-35
(with W.B.Griffiths) The Wall at Buddle Street: 95-97
Chesters – the fort and vicus: 114-117
Chesters – the bridge: 119-120.
Willowford bridge abutment: 141-145
Bibliography: 203-224.

Hadrian's Wall 1989-1997, in N. Gudea (ed.) *Roman Frontier Studies: Proceedings of the XVIIth International Congress of Roman Frontier Studies*: 55-56. Zalau, Romania: Zalau County Council.

(with A. Croom). The pottery, in P. Davenport, *Archaeology in Bath: Excavations 1984-1989* (British Archaeological Reports 284): 67-79. Oxford: British Archaeological Reports.

Review of P. Ottaway 1996. *Excavations and Observations on the Defences and Adjacent Sites, 1971-90* (The Archaeology of York, Vol. 3. The Legionary Fortress, Fasc. 3). *Britannia* 30: 414-5.

2000

(with A. Croom). Roman Pottery, in P. Weddell, The excavation of a post-Roman cemetery near Kenn. *Devon Archaeological Society Proceedings* 58: 93-126.

Review of R. Woodside and J. Crow 1999. *Hadrian's Wall. An Historic Landscape*. *Landscape History* 22: 112-13.

2001

A probable Roman shipwreck on the Herd Sand at South Shields. *Arbeia Journal* 6-7: 1-23.

(with S. Macpherson). Excavations at Westgate Road, Newcastle upon Tyne, and the position of Hadrian's Wall and the Vallum. *Arbeia Journal* 6-7: 49-54.

Review of E.A.M. Shirley 2001. *Building a Legionary Fortress. Antiquaries Journal* 81: 430-1.

2002

(with M. Snape). *The Roman Fort at Newcastle upon Tyne. Archaeologia Aeliana* 5th series 31 (extra volume for 2002).

(ed. with L. Green) *Heritage of the North Sea Region.* Shaftsbury: Donhead.

Timber baths in Augustan and Tiberian fortresses, in P. Freeman, J. Bennett, Z.T. Fiema and B. Hoffmann (eds) *Limes XVIII: Proceedings of the XVIIIth International Congress of Roman Frontier Studies Held in Amman, Jordan (September 2000)* (British Archaeological Reports International. Series 1084 (I)): 467-81. Oxford: Archaeopress.

Review of M. McCarthy 2002. *Roman Carlisle and the Lands of the Solway. Archaeological Journal* 159 323-4.

Great Sites: Exeter Roman baths. *British Archaeology* 65: 12-15.

(with M. Snape and A. Croom). Aldborough Roman Town: Excavations by Miss D. Charlesworth, 1961-73, and by RCHME, 1959-60. *Yorkshire Archaeological Journal* 74: 29-111.

2003

The original eastern terminus of Hadrian's Wall. *Archaeologia Aeliana* 5th series 32: 17-24.

Review of N. Higham (ed.) 2001. *Archaeology of the Roman Empire: a Tribute to the Life and Work of Professor Barri Jones* (British Archaeological Reports International Series 940). *Archaeologia Aeliana* 5th series 32: 197-8.

(with N. Hodgson and W.B. Griffiths). The settlements at the Eastern end of Hadrian's Wall, in *Los Banos Publicos: Como Simbolo de la Romanidad (Roman baths as a Roman symbol)*: 103-112, Gijon: Gijon Municipality and Tyne and Wear Museums.

2004

Appendix 3. The pit group from Spindleberry, Retreat Drive, in A. Sage and J. Allan, The early Roman military defences, late Roman burials and late features at the Topsham School, Topsham. *Devon Archaeological Society Proceedings* 62: 1-39

(with N. Hodgson). Auxiliary barracks in a new light: recent discoveries on Hadrian's Wall. *Britannia* 35: 121-57.

Review of N. Merriman (ed.) 2004. *Public Archaeology. Archaeological Journal* 161: 270-1.

2005

(with J. McKelvey). The excavation of prehistoric features and Hadrian's Wall at nos. 224-228, Shields Road, Byker, Newcastle upon Tyne. *Arbeia Journal* 8: 4-28.

(with T. Frain and J. McKelvey). Excavations and watching briefs along the berm of Hadrian's Wall at Throckley, Newcastle upon Tyne, in 2001-2002. *Arbeia Journal* 8: 29- 52.

The systems of obstacles on Hadrian's Wall: their extent, date and purpose. *Arbeia Journal* 8: 53-75.

Additional notes on a probable Roman shipwreck on the Herd Sand at South Shields. *Arbeia Journal* 8: 132-3.

Connections between the military units of Spanish origin in *Britannia* and their homelands, in C.F. Ochoa and P.G. Diaz (eds) *Unidad y Diversidad en el Arco Atlantico en Epoca Romana* (British Archaeological Reports International Series 1371): 35-8. Oxford: Archaeopress.

The dating of Crambeck Parchment Ware. *Journal of Roman Pottery Studies* 12: 15-21.

Review of J.J. Wilkes (ed.) 2003. *Documenting the Roman Army. Essays in Honour of Margaret Roxan. Journal of Roman Archaeology* 18: 660-2.

The Roman bridge at Corbridge. *Current Archaeology* 199: 352-6.

Arbeia and Segedunum. *Current Archaeology* 200: 408-11.

2006

Constantius and Constantine at York, in E. Hartley, J. Hawkes, M. Henig and F. Mee (eds) *Constantine the Great – York's Roman Emperor*: 31-40. York: York Museum Trust and Lund Hunphries.

The possible origin of the reused Roman building stone at Jarrow, and, Roman pottery, in R. Cramp, *Wearmouth and Jarrow Monastic Sites* (2 vols): 1-2: 325-6. London: English Heritage.

2007

Roman Forts in Britain (revised edn.). Stroud: Tempus.

Post-Roman imported wares, in J. Gossip and A. Jones, *Archaeological Investigations of a Later prehistoric and a Romano-British Landscape at Tremough, Penryn, Cornwall* (British Archaeological Reports British Series 443): 78. Oxford: Archaeopress.

Review of M. Reddé, M. *et al.* 2006. *L'Architecture de la Gaule Romaine. Les Fortifications Militaires* (Documents d'Archéologie française). *Journal of Roman Archaeology* 20: 556-8.

Review of D.J.P. Mason 2005. *Excavations at Chester: The Roman Fortress Baths. Britannia* 38: 396-7.

Review of D.J. Breeze 2006. *J. Collingwood Bruce's Handbook to the Roman Wall* (14th edn). *Archaeologia Aeliana* 5th series 36: 369-70.

2008

(ed.) *Understanding Hadrian's Wall.* South Shields: The Arbeia Society.

Did Hadrian's Wall have a Wall-walk?, in P. Bidwell (ed.) *Understanding Hadrian's Wall:* 129-43. South Shields: The Arbeia Society.

(with A.T. Croom and R.M. McBride). The coarse wares, in H.E.M. Cool and D.J.P. Mason (eds) *Roman Piercebridge. Excavations by D.W. Harding and Peter Scott 1969-1981* (Architectural and Archaeological Society Durham and Northumberland Research Report 7): 208-30. Durham: Architectural and Archaeological Society Durham and Northumberland.

2009

Contributions to N. Hodgson (ed.) *Hadrian's Wall 1999-2009: A Summary of Excavation and Research*, Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne:
South Shields – Arbeia (with N. Hodgson): 61-72
The eastern terminus of the Wall and the Branch Wall from Wallsend fort: 72-3
The Wall at Buddle Street, immediately west of Wallsend fort: 77-9
Newcastle upon Tyne – Pons Aelius: 83-5
The reused Roman stonework in the Anglo-Saxon crypt at Hexham Abbey: 105-7
Chesters Bridge: 107-8

(with N. Hodgson). *The Roman Army in Northern England.* Newcastle upon Tyne: The Arbeia Society.

(with E. Hartley and S. Corcoran). Constantine at York, in M. Rakocija (ed.), *Niš and Byzantium. Seventh Symposium Niš, 3-5 June 2008. The Collection of Scientific Works VII:* 45-53. Niš, Serbia: NKC.

The earliest occurrences of baths at auxiliary forts, in W.S. Hanson (ed.) *The army and frontiers of Rome. Papers offered to David J. Breeze* (Journal of Roman Archaeology Supplementary Series 74): 55-62. Portsmouth RI: Journal of Roman Archaeology.

Contributions to M.F.A. Symonds and D.J.P. Mason (eds) *Frontiers of Knowledge: A research framework for Hadrian's Wall Volume1: Resource assessment.* Durham: Durham University, English Heritage and Durham County Council:
The Brampton Kilns: 22
Introductory Overview: 34-5
The Stone Curtain (with P.R. Hill): 36-41
Building records for the curtain wall and vallum: 43-4
System of obstacles on the berm of Hadrian's Wall: 44
The Wall ditch and upcast: 44-5
Military Way and other Minor Routes: 53
Bridges and Culverts: 53-4
Newcastle: 71-3
Benwell: 73
Roman pottery with a brief reference to barrels: 121-5.

(with R. McBride). The other Roman coarse pottery, in S.S. Frere and R.L. Fitts, *Excavations at Bowes and Lease Rigg Roman Forts* (Yorkshire Archaeological Report 6): 139-55. Leeds: Yorkshire Archaeological Society.

2010

A survey of the Anglo-Saxon crypt at Hexham and its reused Roman stonework. *Archaeologia Aeliana* 5th series 39: 53-145.

Post-Roman imported wares, in J. Gossip and A. Jones, Archaeological excavations at Tremough, Penyrn, 2000-6. *Cornish Archaeology* 48-9: 59-60

(with M. Snape and G. Stobbs). Excavations in the military *vicus* south-west of the Roman fort at South Shields in 1973, 1988 and 2002. *Arbeia Journal* 9: 42-132.

(with A. Croom). The supply and use of pottery on Hadrian's Wall in the 4th century AD, in R. Collins and L. Allason-Jones (eds) *Finds from the Frontier. Material Culture in the 4th and 5th Centuries* (Council for British Archaeology Research Report 162): 20-36. York: Council for British Archaeology.

2011

Review of T. Wilmott (ed). 2009. *Hadrian's Wall. Archaeological Research by English Heritage 1976-2000. Britannia* 42: 492-493.

(with S.J. Reed and J. Allan). Excavation at Bantham, South Devon and post-Roman trade in south-west England. *Medieval Archaeology* 55: 82-138.

(with A. Croom). Roman pottery, in J. Proctor, Investigations on the eastern margin of the extra-mural area at Benwell Roman fort. *Archaeologia Aeliana* 5th series 40: 147-8.

2012

The Roman Fort at Bainbridge, Wensleydale: excavations by B.R. Hartley on the *principia* and a summary account of other excavations and surveys. *Britannia* 43**:** 45-113.

Review of B.C. Burnham and J.L. Davies (eds) 2010. *Roman Frontiers in Wales and the Marches. Britannia* 44: 437-438.

Review of D.J. Breeze 2011.*The Frontiers of Imperial Rome. Archaeologia Aeliana* 5th series 41: 293-294.

(with A. Croom). The Roman pottery, in M. Stephens and P. Ware, *A Roman Pottery Kiln from the Community Primary School, Norton-on-Derwent, North Yorkshire* (MAP Archaeological Practice Ltd Publication 1). Malton: MAP Archaeological Practice Ltd.

2013

The elevations of Roman fort-gates, in Flügel, C. and Obmann, J. (eds) *Römische Wehrbauten: Befund und Rekonstruktion* (Schriftenreihe des Bayerischen Landesamtes für Denkmalpflege 7): 82-7. Munich: Bayerisches Landesamt für Denkmalpflege.

2014

The Roman names of the fort at South Shields and an altar to the *Di Conservatores*, in R. Collins and F. McIntosh (eds) *Life in the Limes: Studies of the People and Objects of the Roman Frontier presented to Lindsay Allason-Jones:* 49-58.Oxford, Oxbow.

(with N. Hodgson). South Shields as a late-Roman naval base, in *Honesta Missione: Festschrift für Barbara Pferdehirt*. Monographien des Römish-Germanischen Zentralmuseums Band 100: 99-106. Mainz: RGZM.

(with W. Muncaster and J. McKelvey). Excavation of an Anglo-Saxon settlement and of prehistoric features at Shotton, Northumberland. *Archaeologia Aeliana*. 5th series 43: 77-140.

Review of R. Cuttler, D.J.P. Mason and J. Mckpeake 2012. *Excavations at Chester: the western and Southern Roman Extramural Settlements: a Roman Community on the Edge of the World: Excavations 1964-1989 and Other Investigations. Britannia* 45: 496-498.

The Coarse Pottery, in C. Smart, *A Roman military complex and medieval settlement on Church Hill, Calstock, Cornwall: Survey and Excavation 2007-2010* (British Archaeological Reports British Series 603): 49-55. Oxford: British Archaeological Reports Publishing.

2015

The Branch Wall at Wallsend and Location of a Monument Associated with the building of Hadrian's Wall. *Arbeia Journal* 10: 1-34.

(with T. Morgan). Rivers and Streams Crossed by Hadrian's Wall and their Possible Surveillance at Bridges and Culverts. *Arbeia Journal* 10: 43-51.

(With A. Croom). A Lead Sealing of the *Ala Augusta Vocontiorum* from Chester-le-Street. *Arbeia Journal* 10: 149-51.

The towns of the Midlands and the North, in M. Fulford and N. Holbrook (eds) *The Towns of Roman Britain: the contribution of commercial archaeology since 1990* (Britannia Monograph series 27): 117-37. London: Society for the Promotion of Roman Studies.

2016

(with A. Croom). The coarse wares, and, Discussion of pottery, in D.J. Breeze, *Bearsden: a Roman Fort on the Antonine Wall*: 108-29: 176-81. Edinburgh: Society of Antiquaries of Scotland.

Discussion: Roman, in Garner-Lahire, J. *Excavations at the Minster Library, York 1997* (British Archaeological Reports British Series 622): 132-3. Oxford: British Archaeological Reports Publishing.

Fifth Century Pottery in Devon and North East Cornwall. *Internet Archaeology* 41. <https://intarch.ac.uk/journal/issue41/1/toc.html> accessed 15 February 2022.

2017

(ed. with N. Hodgson and J. Schachtmann). *Roman Frontier Studies 2009: Proceedings of the XXI International Congress of Roman Frontier Studies (Limes Congress) held at Newcastle upon Tyne in August 2009* (Archaeopress Roman Archaeology 25). Oxford: Archaeopress.

Rural Settlement and the Roman Army in the North: external supply and regional self-sufficiency, in

M. Allen, L. Lodwick, T. Brindle, M. Fulford, and A. Smith, *The Rural Economy of Roman Britain: New Visions of the Countryside of Roman Britain*, Vol 2 (Britannia Monograph Series 309): 290-305. London: Society for the Promotion of Roman Studies.

Review of R. Collins, M. Symonds and M. Weber (eds) 2015. *Roman Military Architecture on the Frontiers: Armies and their architecture in Late Antiquity. Britannia* 48: 496-497.

(with A. Croom). The Roman ceramics, in M. Cook, J. Lawson and D. McLarne, Excavations and Interventions in and around Cramond Roman Fort and Annexe, 1976 to 1990. *Scottish Archaeological Internet Reports* 74: 19-37. <https://doi.org/10.9750/issn.2056-7421.2017.74> accessed 15 February 2022.

2018

Hadrian's Wall at Wallsend (Arbeia Society Roman Archaeological Studies 1). South Shields: The Arbeia Society and Tyne and Wear Archives and Museums.

The Roman Pottery, in D.J. Breeze (ed.) *The Crosby Garrett Helmet* (Cumberland and Westmorland Archaeological and Antiquarian Society extra series 48): 66-68.

(with Croom, A. and Hodgson, N.). The Annexe of the Roman Fort at Slack, West Yorkshire: Excavations by B.R. Hartley in 1968-9. *Britannia* 49: 1-51. Carlisle: Armatura Press.

Review of L. Dunwoodie, C. Haward and K. Pitt 2015. *An Early Roman Fort and Urban Development on Londinium's Eastern Hill: Excavations at Plantation Place, City of London, 1997-2003. Britannia* 49: 466-467.

2019

Contributions to R. Collins and M. Symonds (eds) *Hadrian's Wall 2009-2019: a summary of excavation and research*. Kendal: Society of Antiquaries of Newcastle upon Tyne and Cumberland and Westmorland Antiquarian and Archaeological Society:
The Branch Wall – The eastern end of the Wall at Wallsend: 114-115
Wall mile 0 (Buddle Street): 122-127
Wall Mile 11 (Heddon-on-the-Wall): 140-141
Hexham Abbey: 152
Wall miles 48 and 49 (magnetometer surveys): 186

(with A. Croom). Roman pottery from the excavations in 2012-13 (Area J), in S.J. Sherlock, *A Neolithic to Late Roman Landscape on the North-East Yorkshire Coast. Excavations at Street House, Loftus, 2004-17* (Tees Archaeology Monograph 7): 132-4. Hartlepool: Tees Archaeology.

2020

The external supply of pottery and cereals to Antonine Scotland, in D.J. Breeze and W.S. Hanson (eds) *The Antonine Wall: Papers in honour of Professor Lawrence Keppie* (Archaeopress Roman Archaeology 64): 263-285. Oxford: Archaeopress.

(with A. Croom). The Roman pottery, in M. Kirby, Excavations at Musselburgh Primary Health Care Centre: Iron Age and Roman discoveries to the north of Inveresk Roman Fort, East Lothian. *Scottish Archaeological Internet Reports* 89: 53-83 < https://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-310-1/dissemination/pdf/Magnus_Kirby.pdf> accessed 15 February 2022.

2021

Contributions to S. Rippon and N. Holbrook (eds) *Roman and Medieval Exeter and their Hinterlands: From Isca to Excester* (Exeter: a Place in Time 1), Oxford: Oxbow:
The Legionary Fortress and its landscape context: 127-166
Contribution to N. Holbrook, The Civitas Capital 167-220
(with S. Rippon, J. Allen, D. Gould, and N. Holbrook) Conclusions : Exeter – A Changing Place in Time: 323-341

Contributions to S. Rippon and N. Holbrook (eds) *Studies in the Roman and Medieval Archaeology of Exeter* (Exeter: a Place in Time 2), Oxford: Oxbow:
(with D. Gould). Roman Exeter: The Fortress Plan and Gazetteers of Evidence for the Street Plans and Stone Buildings: 51-92
Pottery Supply in Roman Exeter and the South West: 309-337

The pre-Roman Iron Age

Late Bronze Age and Iron Age settlement in lowland North-East England

D.H. Heslop

Introduction

This paper celebrates Paul's contribution to the Iron Age in the region through his role as archaeological director at Tyne and Wear Archives and Museums and of its onetime commercial contracting unit, TWM Archaeology. The sequence of excavations in south Northumberland undertaken and rapidly published by the museum service transformed our understanding of the character and density of settlement in the centuries leading up to the Roman conquest, and provided intriguing hints of the impact of the occupation on the lives of the local population. This paper grows out the relevant resource assessment of the recently revised North-East England Regional Research Framework, convened by the present writer. See Figures 1 and 2 for location of sites mentioned.

The acceleration of excavation in advance of house building and mineral extraction in the last 20 years has had as much impact on the study as the increased use of aerial reconnaissance from the 1970s, which transformed our knowledge of a poorly understood area (e.g. Harding 1979). If the tremendous rise in the number of archaeological sites followed what might be termed the *aerial photography revolution* of the seventies and eighties, starting in the late 90s, a second wave of site recognition and recording might be termed *the geophysical revolution*, resulting from the routine geophysical survey of green-field sites in advance of proposed development. With the general release of Environment Agency LIDAR data in 2016, we are perhaps on the verge of a third revolution in site recognition and discrimination. It will have greatest impact in marginal and upland areas, where the LIDAR data can show sites covered in woodland, but even on heavily ploughed agricultural land, it is proving surprisingly useful. At Morley Hill Farm, north of Newcastle, geophysics in advance of house building revealed a second enclosure next to the previously known earthwork enclosure. There is no trace on the ground in the ploughed field but it can be seen on the LIDAR coverage, as a very faint earthwork.

Climate and landscape

Carefully considered sampling can be successful in defining the ecological environs of the site, for example at East and West Brunton, where macro-fossils from the water-logged enclosure ditch primary fills show an open landscape, with herb to tree ratios consistently around the 50-70% in favour of the former. Pollen was poorly preserved, hinting at periodic drying of the ditch (Hodgson *et al.* 2012: 181 and fig. 98). Climate data can be inferred from wider archaeological interpretation. Steve Willis suggests that one possible reason for the apparent abandonment of salt-making on the north-east coast may be climatic variations in coastal evaporation rates (Willis 2016: 261). The onset of wetter conditions in this period is argued at Street House, Loftus, where the presence of wetland taxa like sedges and spike rush reflect both the increase of wetland and the need to expand cultivation into those less-favourable margins (Sherlock 2007: 41). At East Wideopen South, Newcastle, the contemporary environment was characterized as a lowland heathland, a habitat usually associated with bogs, scrub woodland, scattered trees and acid grassland (Archaeological Services Durham University 2014a: 38).

There is a high degree of regional variation in the survival of later prehistoric field systems in the north-east. In lowland areas they are highly degraded, with survival limited to the most resistant, subsoil penetrating sections of field-boundary, but such features are becoming increasingly familiar through large scale excavation, in addition to those known from aerial photographs. This contrasts with the better-preserved upland networks, where both boundaries and the textured surfaces resulting from agricultural activity can survive in exceptional circumstances.

On the lowlands, further systematic plotting of existing aerial photographs would undoubtedly reveal more systems. Geophysical work around some sites, such as Dinnington, Newcastle (Biggins *et al.* 1997), already shows evidence for the presence of linear pit alignments which follow the general alignments of the excavated examples at Fox Covert and Shotton, mentioned below. Short lengths of field boundaries are frequently found in geophysical surveys in advance of green-field development, although it is often difficult to discriminate between field boundaries and smaller enclosures.

For a number of sites where landscape plans are available, either from geophysics, excavation or a combination of both, the patterns of linear boundaries

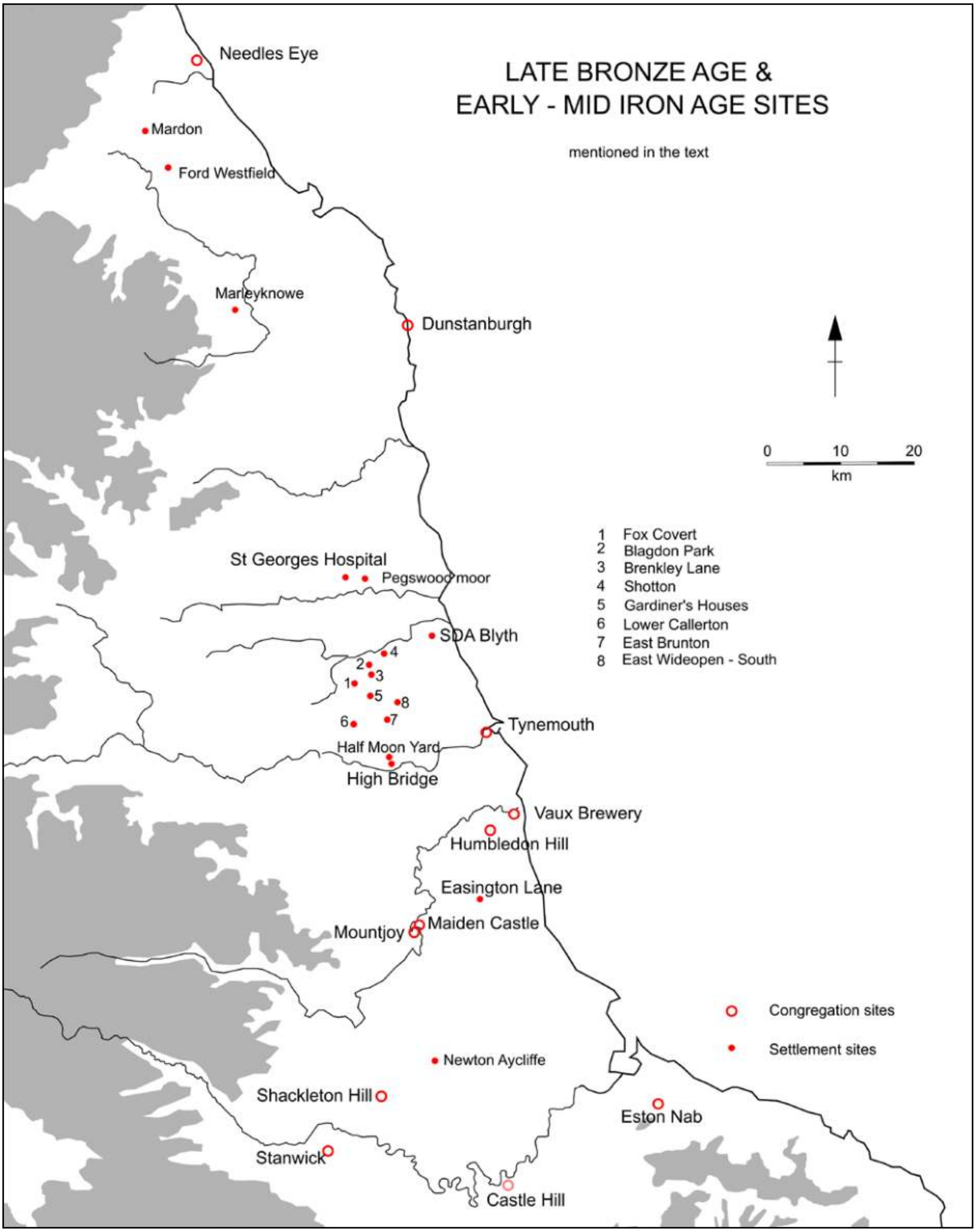


Figure 1. Late Bronze Age and early-mid Iron Age sites mentioned in the text.

are often linked to one long arterial boundary, which is often utilized to form one side of a ?later enclosure. These may be the primary landscape divisions, and might be equivalent to the pit alignments, which, in certain instances, could be replaced with substantial ditched boundaries, as at Ferrybridge, West Yorkshire (Roberts 2005: fig. 60) or linked into continuous ditches, as happens adjacent to the enclosure which appears to be appended to the pit alignment at Shotton North-East (Hodgson *et al.* 2012: 107; figs 54-5). Further south, the

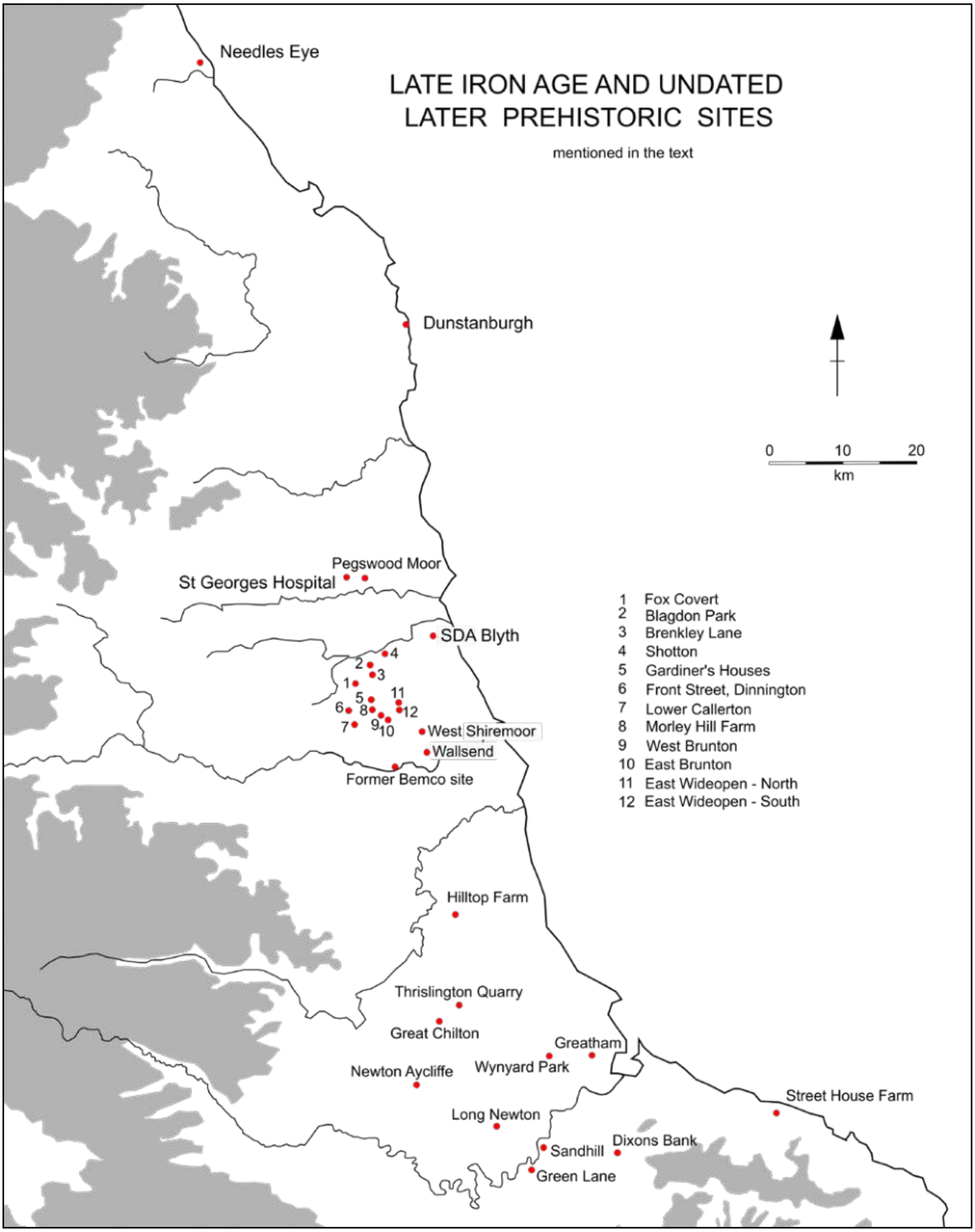


Figure 2. Late Iron Age and undated later prehistoric sites mentioned in the text.

Scots Dyke runs for almost 10 km between Stanwick and the Swale, and it might have continued north for an unknown distance, although not associated with known enclosures (Haselgrove 2016: 23). Like the group of four pit alignments north of Newcastle (Hodgson *et al.* 2012: 107), it is on the same general alignment to the Great North Road. Arterial boundaries are seen in the far north of the region at Ford Westfield, near Berwick; Marleyknowe, Wooler (Passmore and Waddington 2012: fig. 3.13) and Mardon SE1, Cornhill-on-Tweed (Gates

2012: 92, fig. 3.19; 105), at Pegswood Moor (Proctor 2009: 5), at Shotton North-East (Hodgson *et al.* 2012: 99, fig. 54) and possibly at East Wideopen South (ASDU 2014a: fig. 3, where the west side of the curvilinear ditched enclosure appears to be laid-off a N-S ditch which runs beyond the excavation area). Further south, the Tees Valley sites often display this arrangement; e.g. Dixon's Bank, Middlesbrough (Ditch A; Sherlock 2012: 116, fig. 7.6; Annis 1996), Street House, Loftus (Sherlock 2007: fig. 16), Manfield, Crabby Plantation and possibly Rock Castle, near Stanwick (Fitts *et al.* 1994). In several instances, the arterial boundary is double-ditched, to form a droveway (Ford Westfield, Berwick: Gates 2012: 92) or connects with a droveway (Marleyknowe, Street House). A selection of ditched enclosures with adjacent landscape features are illustrated here, showing the variety of form that these landscape features display across the region (Figure 3).

The smaller ditched boundaries spread out from the focus of settlement, branching off the arterial boundaries when present. There is less evidence of settlements being embedded into existing field systems. In many instances, field boundaries do not appear to extend into the landscape between settlements, as is seen with, for example, the pre-Roman Iron Age rectilinear 'brickwork-like' field systems at Low Common, Whitwood and Ferrybridge, West Yorkshire (Burgess and Roberts 2004; Roberts 2005) or the coaxial fields at Wattle Syke (Martin *et al.* 2013: 17). The palaeo-environmental evidence shows that the landscape is largely de-forested by the turn of the end of the pre-Roman Iron Age (Tipping 1997: 245) but the open areas are not partitioned into field blocks but may be a shifting pattern of open ploughlands and stock runs, divided by belts of shrub and forest, which would have provided their own suite of resources for foraging and fuel collection. Labour was only expended on digging ditched boundaries to manage the arable/livestock interface in proximity to the settlement. The social importance of this activity is postulated by Adrian Chadwick (1999: 163) where the ditched boundary is important in affirming communal relations and identity.

Settlement

The observation in the first North-East Regional Research Framework that later prehistoric settlement archaeology is heavily biased towards the later Iron Age remains largely true (Petts and Gerrard 2006: 35), but the frequent recognition of late Bronze Age and early Iron Age antecedents on many later settlements, particularly in the north of the study area, has shown that this may well be a factor of archaeological observation rather than a reflection of the density of occupation of the landscape. Earlier settlements lack easily identifiable deep enclosure ditches and substantial house ring ditches that are such diagnostic features of post 4th century BC sites. This is not a local problem; Knight observes the same situation in the Trent Valley (Knight 2007: 193). A further factor which has not been discussed may be the extent to which late Iron Age and Roman period activity, particularly ploughing around settlements, may have edited the archaeological record by removing the faint traces of the ring-groove houses and shallow ditched boundaries of early first millennium occupation, giving enhanced survival to the space covered by later, unploughed enclosures, long before the damage done by modern deep ploughing has further obliterated evidence.

As the pace of excavation has increased, there has been a concomitant move away from the dominance of air-photography inspired morphological studies. Although still the only landscape-wide source of evidence, the dangers of defining cultural identity by the distribution of deep ditches is well appreciated (Haselgrove 2016: 371). It is possible that ditched enclosures, rather than representing the typical architecture of the average agricultural settlement, were structures specially created for social events within the life of the community, and that their size, form, relationship to the surrounding landscape and life-span were determined by complex social and ideological dynamics, rather than the necessities of agricultural production.

Cleveland and east Durham

Almost all of the new excavations between Durham and Yarm are located in a band running north-south through the Magnesian limestone of South-East Durham, Hartlepool and Sedgefield, with a small group in the Tees Valley on Permian sandstone. Only Street House, Loftus, which is a research project, is above the 125 m contour (Sherlock 2018); the vast majority of the rest were investigated as part of developments for housing, transport or mineral extraction.

The evidence of social stratification and a hierarchy of settlement types can be found at an increasing number of larger focal points across the lowlands and around the upland periphery. Eston Nab remains the only site of the later Bronze Age and early Iron Age to combine absolute dating with pottery, macro-plant fossils and a comprehensible structural sequence. (Vyner 1988). The earliest defences at the hillfort were late Bronze Age in date; there was also an early Iron Age boulder wall and an early 5th century BC ditch and bank. Evidence from sites like these suggests that, throughout most of later prehistory, the region was weakly centralised and may have been based on household groups, interconnected by the loose ties of kinship and personal affiliation. A small number of other possible 'lowland

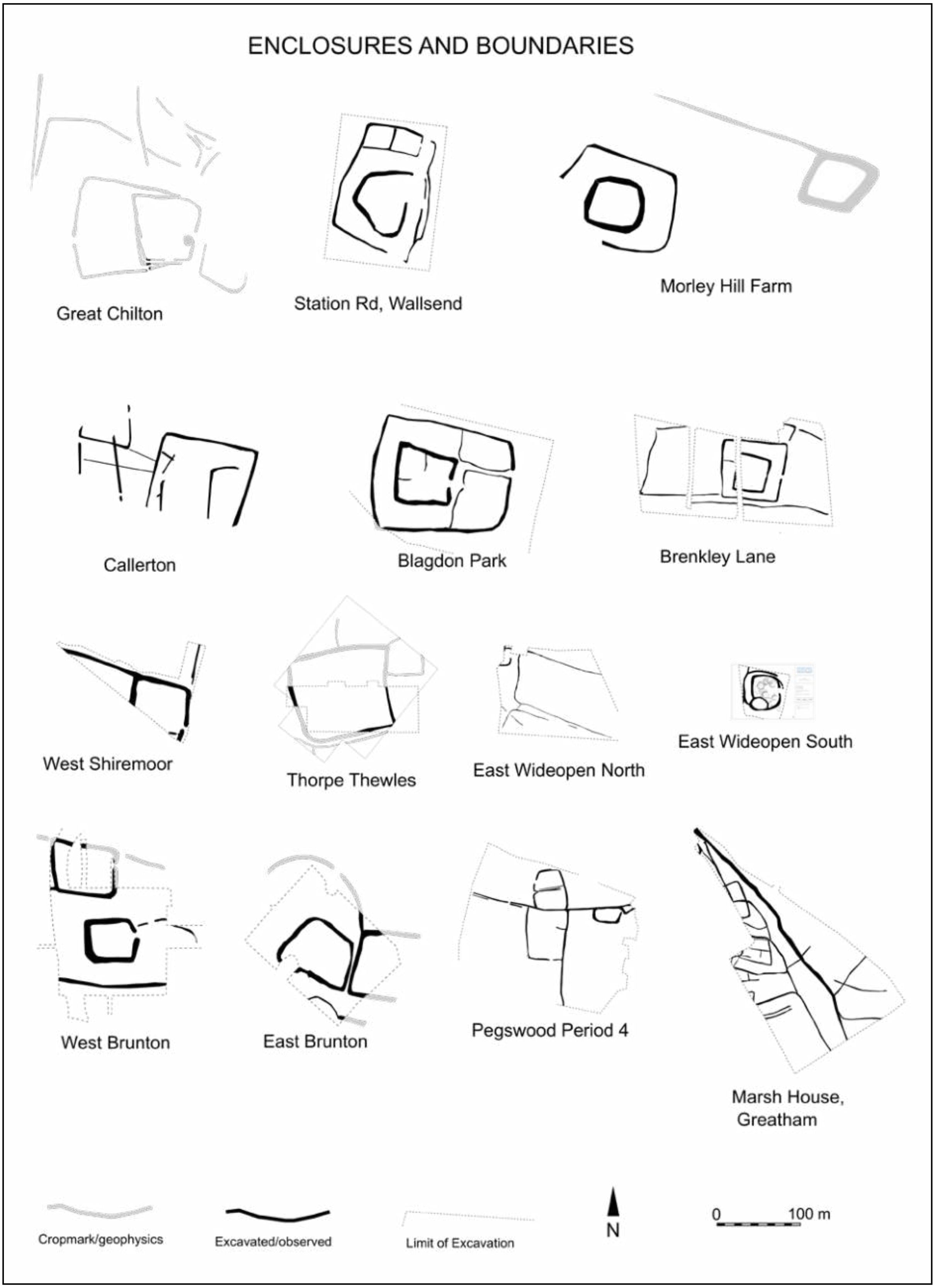


Figure 3. A selection of ditched enclosures with adjacent landscape features.

forts' or 'central places' are known, such as Maiden Castle, Durham; possibly nearby Mountjoy, Durham (although evaluation to date has produced only mid Bronze Age material (Brogan and Hodgson 2011), and Shackleton Hill, Heighington, but these sites remain poorly understood. At Castle Hill, Kirklevington, a possible high-status site has been evaluated during infrastructure works and yielded eight radiocarbon dates from the early to mid Iron Age, but this is not yet published (information in Green Lane Report: Northern Archaeological Associates 2014: 39).

When sites do become visible in the later Iron Age, the pattern of settlement in the Tees Valley has much in common with the lowland regions to the south and north, but Steve Sherlock's synthesis has shown that significant differences observed in the archaeological record identify this area as a sub-region that displays a separate identity to central Yorkshire, Durham and Tyneside. Differences are seen in the construction, use and after-use treatment of roundhouses, in the range of artefacts in use and in the way these objects are used, fragmented and deposited (Sherlock 2012: 118).

For the last two centuries before the Roman conquest, the character of settlement and social organisation in this area must have been dominated by the rise of the royal site at Stanwick, although this is outside the geographical boundary of this study. For this period, along with the northern fringes of Tyneside, the Tees Valley has the greatest density of known and excavated sites in the north-east. 148 sites are listed in the Stanwick environs survey (roughly between the Wear and the Cleveland Hills), at a predicted density of one or two sites per square km (Haselgrove 2016: 372) which compares closely with Nick Hodgson's estimation for enclosure density for the later Iron Age on the Northumberland coastal plain (Hodgson *et al.* 2012: 188). In some places, like around Manfield, it has been suggested that enclosures occur with the frequency of 18th- and 19th-century farms (Still and Vyner 1986).

The Tees Valley distribution is predictably dominated by rectilinear enclosures (96) with only 7 curvilinear and 12 D-shaped. 26 are classed as 'open' but with only 20% of the known sites having been excavated, clearly this is a major under-representation, as it often transpires that open phases both precede and follow episodes of enclosure (Haselgrove 2016: 365-8). What, if anything, these differences signify, is not immediately apparent – but there are more D-shaped types south of the river, although all await excavation (B. Vyner, *pers. comm.*). Less than 10% are curvilinear and none have been excavated in the Tees Valley or Durham. Further afield, the curved enclosure at Pallet Hill, Catterick was found to predate a rectilinear type, but this sequence was reversed at Fawdon Dean, Northumberland (Haselgrove 2016: 368). Anderson (2012: 302) has shown that curvilinear enclosure tends to be at higher altitudes to other forms. Derek Hamilton's Bayesian modelling has shown that the curvilinear forms are both earlier and later than the rectangular sites, which form a believable horizon around 200 BC (Hamilton 2016: 238). What has been demonstrated is that landscape was both structured and fully occupied, with subsistence technologies that were as advanced as anywhere in the country.

Many of these sites were established, and were flourishing for several generations before the construction of the royal capital of Stanwick, *c.* 80 BC. It is a proof of the productive capacity of the population to generate huge, disposable surpluses that the regional elites were able to build the largest oppidum in northern Europe, the outer perimeter being 7.28 km long and perhaps taking three or four million person hours to erect (Haselgrove 2016: 458). The extent of the territory that supported such a focus is a topic of intense interest. The Gallo-Belgic imports from Thorpe Thewles and Catcote may well have been re-distributed through Stanwick (Haselgrove 2016: 245-55), but a lack of comparable excavations further north defeats any attempt to map the area of allegiance beyond Teesside. Lindsay Allason-Jones has suggested that the Wear formed a major boundary between polities, arguably more significant than the more usually referenced River Tyne (Allason-Jones 2009).

Recent excavations in Stockton, Hartlepool and South Durham have been filling in gaps in the distribution maps, extending the database of settlement plans and house types, and contributing to the on-going debate about the impact of the Roman occupation on the local population, without challenging current paradigms. Iron Age enclosures have been recorded at Low Newton and Wynyard Business Park, Stockton, Hilltop Farm (Proctor 2013), Durham and Thrislington Quarry, Sedgefield (MAP 2007).

At Great Chilton, an enclosure and external features discovered by aerial photography were subject to geophysical survey and archaeological investigation as part of a community archaeology project. In advance of the radiocarbon dating for the site, the earliest possible date is provided by a Phase 1 pit which produced an iron single-jointed snaffle-bit of a type assigned to the 5th century BC at the chariot burial at Newbridge, Edinburgh, excavated in 2001 (Carter *et al.* 2010). The earliest roundhouse was contained within a concentric palisaded enclosure. It was replaced by a ring-ditch 18 m in diameter defining a platform 14 m across (Archaeological Services Durham University 2014b: 12), which is very comparable to the much better preserved ring ditch at Thorpe Thewles (the best-preserved

Central House III), which was around 20 m in diameter, with a central platform 13 m across (Heslop 1987: 22).

More complex landscapes running into the Roman period, were recorded at Sandhill, Ingleby Barwick, six phases of Iron Age and Romano-British activity were recorded, in the vicinity of the more fully explored villa excavated in 2003-4 (Willis and Carne 2013; Archaeological Services Durham University 2014c). At Green Lane, Yarm, a complex of structures, including two roundhouses and 12 penannular gullies, was described by the excavator as a 'succession of irregularly enclosed and partially enclosed areas was neither completely 'open' nor formally enclosed' (Northern Archaeological Associates 2014: 37). A single radiocarbon measurement would suggest a 1st century BC/AD date. At nearby Mount Leven, Middlesbrough, field boundaries, ditched boundaries and overlapping enclosures were excavated in advance of housing development (Archaeological Services Durham University 2012).

The evolution of a settlement from the 5th century BC to 1st century AD can be followed at Amazon Business Park, Newton Aycliffe. On land originally occupied by a mid-Bronze Age flat cremation cemetery and clay quarries, two separate but almost certainly contemporary foci of mid-Iron Age date were recorded, the northern, open and with three roundhouses aligned along a linear boundary. The southern, with two circular structures, may have been enclosed, but if so, by ditches sufficiently insubstantial to have been ploughed-out around much of the circuit. By the late Iron Age, the later iterations of these two groups seem to be interlinked in a complex landscape of adjoining enclosures, one a D-shaped more substantial enclosure, connected by linear boundaries (Wardell Armstrong 2015).

Another highly significant site, showing how settlements could respond to local environmental conditions, was excavated in 2013 at Greatham, Hartlepool, in advance of engineering works on the edge of Cowpen Salt Marsh. Like Newton Aycliffe, proximity to a Bronze Age settlement and activity zone may be significant, presumably exploiting the broad spectrum of resources from the nearby carr-lands. Rising sea-levels in the late Bronze Age may have made these littoral zones more attractive, although the only radiocarbon dates from this period are from less-reliable tooth enamel. In the late Iron Age, on the higher ground to the north-east, a series of enclosures were laid out on a significant linear boundary, which was re-cut several times, enduring well into the Romano-British period. The horizontal stratigraphy showed the sequence, interpreted as a pair of small enclosures being re-fashioned and then incorporated into two-phase field system, which gave Roman period C14 dates and which were filled with industrial waste, Roman pottery and midden material. The excavators concluded that the main focus of habitation was nearby, but outside the area excavated. Given the close proximity to the salt marsh, salt-production could well have formed part of the economy of the settlement, but no briquetage or kiln furniture was recovered. Of interest was the discovery of a small ring-ditch with a second circle appended, separate from the enclosure group and interpreted, on East Yorkshire parallels, as a funerary structure ('barrowlet'), although no burials survived (Fell and Robinson 2018).

It is now clear that a range of sites made up a mosaic of complex land-uses in our region on the eve of the Roman conquest. Sites composed of the same basic range of components (roundhouses, penannular and rectangular gullies, and a wide range of bounding and enclosing linear features of differing scale and function) could be assembled in a variety of different configurations, reflecting differing social functions and status, with some flourishing, while others appear to be abandoned or subject to landscape re-organisation, or possibly being absorbed into larger agglomerations.

Coastal and south-east Northumberland

Development-led fieldwork over the last 25 years has provided the first evidence of landscape organisation and settlement in the lowlands in the late Bronze Age, north of Newcastle, providing a range of absolute dates for pit alignments, a class of monument more widely known as cropmarks in North Northumberland and South Scotland (Gates and Deegan 2009: 135). Four examples have been excavated, at Fox Covert, Blagdon, Shotton village and Shotton North-East (Hodgson *et al.* 2012: 107). Another nearby is suspected from a geophysical survey at Gardiner's Houses, Dinnington (Biggins *et al.* 1997). In addition to acting as landscape boundaries, these enigmatic monuments may have been useful as markers, in this instance being associated with the movement of people and stock along the major North-South route that became the Great North Road (Vyner 2007; Graves and Heslop 2013: 24). To the south, this route crosses the River Tyne at the ancient fording point at Newcastle, where dredging in the late 19th century produced the largest assemblage of late Bronze Age votive weaponry from any river in the country, with the exceptions of the Thames and the Witham.

Andrew Poyer's PhD has catalogued the metal finds from the Tyne, noting the river's pre-eminence in the north-east as a provenance for metal votives, but also emphasising that most were dredging finds and the other rivers in the regions have not been subject to river improvement to anything like the same degree (Poyer 2015: 138). A comparison of the number of objects recovered from the Tyne and the Wear is illuminating. Nineteen objects were recovered from the Tyne and five from the Wear. 1886 was the year of maximum dredging activity in the Tyne, when 5,273,585 tons were dredged, whereas in 1885, the peak year for the Wear, less than a tenth of that (428,590 tons) was dredged (Graves and Heslop 2013: 25). Excavations in advance of the construction of the Sage Music Centre revealed the presence of a large undated ditch, with a terminal suggesting an opening. This may be a high status enclosure commanding the river crossing and used during ceremonies associated with this significant place in the sacred landscape, but it could equally be a causewayed enclosure, or, as suggested by the excavator, the *vallum* for the lost monastery of Saxon Gateshead (Nolan and Vaughan 2007: 160).

The theme of periodic congregation is significant in describing a class of site becoming increasingly important in the region, the lowland equivalent of the hillfort. With significant earthworks but typically univallate, these enclosures are defined by their scale, being greater than a hectare in size, often using topographical features to supplement the constructed boundary, but not with an eye to maximize the defensive potential of the site. When excavated, they display little evidence of substantial permanent occupation. Needles Eye enclosure, Berwickshire, excavated in 2004-5 and published in 2012, is the most securely dated and fully understood, although less than 15% of the interior has been examined. Evidence of occupation was present – carbonised grain, pottery and quernstones - but no roundhouses or other possible dwellings in the area examined, leading the excavator to interpret the site as 'a gathering place for the wider community where salt and other commodities were traded and exchanged' to a catchment of densely-settled agricultural and pastoral land encompassing, perhaps the Tweed, Till and Breamish valleys (Proctor 2012: 113).

The roundhouses discovered at Tynemouth may be an indication of a coastal promontory fort, though they could be of Romano-British date (Jobey 1967). A site at the Vaux Brewery, Sunderland has revealed a late Bronze Age enclosure overlooking the River Wear (Pre-construct Archaeology North 2004). Also in Sunderland district, the site of Humbledon Hill, the subject of geophysical survey in 2003 and evaluation in 2006 and 2007, has an inner palisade with late Bronze Age pottery and an outer ditch, 9 m distant, with rampart, dated by Iron Age pottery. The interior had early Bronze Age pits and but most of the eastern half has been destroyed by the construction of a Victorian reservoir.

There may also have been some form of larger fort or enclosure at Dunstanburgh, which has in the past produced late Iron Age metalwork (Bosanquet and Charlton 1936), including a recently recognised sword fragment. An important group of ten beehive querns, currently in the English Heritage store at Helmsley, were recorded by John Cruse in 2005. Survey work has recognised earthworks outside the south curtain wall at variance to the medieval defences and overlain with ridge and furrow (Northumberland HER 23479; Oswald *et al.* 2006: 30).

As noted above, there is little structural evidence that these larger sites were permanent settlements, and still less that a socially separate elite controlled the agricultural production of the population. It may be that the 'specialness' of these sites is displayed in their capacity to accommodate large numbers, if only for short periods, and, by implication, in the type of activities taking place within them. These sites were vital in the replication of social structures, being religiously and ideologically significant, but not necessarily the residences of high-ranking individuals. They gave physical expression to the way apparently dispersed and socially unstratified communities were interlinked and capable, as at Stanwick or Yeavering Bell, of colossal feats of co-ordination.

To a large degree, the focus of modern investigation has continued to concentrate on the south-east of the region (Figure 1), following the spatial pattern of development, unlike earlier research excavation, primarily by George Jobey, which could be spread across the geological and topographical range of the county, for example, at Burradon, Hartburn, Huckhoe and Marden (Jobey 1959; 1970; 1973). Most of these sites were small enclosures, probably sufficient for only one household. The site at Burradon was larger in size, and contained several roundhouses, though it is not clear whether more than one was occupied at any one time (Jobey 1970). The database of settlements of this period has expanded, notable through the systematic analysis of LIDAR data and Google Earth satellite imagery. These discoveries, which include numerous rectilinear enclosures, increase the overall distribution and density of this site type in the region. In some cases, the analysis has added further detail to already known sites, including the identification of possible associated boundaries and trackways (David Astbury, *pers. comm.*).

Two publications merit special mention in taking forward the research agenda in the region: the excavation of Pegswood Moor, Morpeth (Proctor 2009) and the group of sites on either side of the A1 excavated by Tyne and Wear Museums between 2002 and 2008, and collectively published with the Arbeia Society in the monograph *The Iron Age on the Northumberland Coastal Plain* (Hodgson *et al.* 2012). At Delhi Surface Mine, Blagdon Park, Northumberland, extensive field boundaries and roundhouses (Blagdon Park 1) were located just to the south of an unenclosed/palisaded/

ditched enclosure sequence (Blagdon Park 2) (Figure 4). Six kilometres to the south, West Brunton, Newcastle followed a broadly similar trajectory to Blagdon Park 2: whereas at nearby East Brunton, a palisaded/unenclosed/ditched enclosure sequence was recorded. Much of the evidence cited for the period in this review is derived from these two sources.

As the rate of house-building and open-cast mining on the fringes of the conurbation has accelerated, several new sites have been evaluated and excavated in the past decade. In Northumberland, SDA Blyth (Northumberland HER Event No. 13805) and St George's Hospital, Morpeth (Archaeological Research Services 2016); in Newcastle, Brenkley Lane Open Mine (van Wessel and Wilson 2020), Lower Callerton (Archaeological Services Durham University 2015), Morley Hill Farm (AD Archaeology 2015), Front Street, Dinnington (Wardell Armstrong 2017a); in North Tyneside, two sites in East Wideopen (South; Archaeological Services Durham University 2014a: North; Northern Archaeological Associates 2017), West Shiremoor (Archaeological Services Durham University 2017), Station Road, Wallsend (Wardell Armstrong 2017b); in Sunderland, Murton Lane, Easington (TWM Archaeology 2011) and several sites in Gateshead are at different stages of investigation.

The scope of these excavations, the pioneering application of Bayesian modelling for radiocarbon dates by Derek Hamilton (2010), the quality of the research, combined with the promptness of publication has meant that the results from these sites have formed the framework for a new model of settlement development, that attempts to describe the trajectory of lowland settlement from the mid first millennium BC to the mid-2nd century AD, in landscapes unhindered by topographical or geological constraints.

The pit alignments of the late Bronze Age to early Iron Age date noted earlier are evidence that 'landscape clearance, settlement and division were taking place on the Northumberland coastal plain at the same time and in the same way as in regions much further south' (Hodgson *et al.* 2012: 186). A site at Murton Lane, Easington, Sunderland, has a rectangular uneven-sided enclosure (longest side 70 m, shortest 45 m) with a further ditch parallel to the long axis, forming a possible droveway 5 m wide, although neither of the two entrance gaps is on that side of the circuit. No other structures survived in the 1.29 hectares stripped. The ditch was around generally around 1.50 m wide and 0.60 m deep, with sloping sides and edge-derived fills. A range of C14 dates, from wood charcoal or hazel nutshell, focused on the mid to late Bronze Age, if

Figure 4. Excavation at the enclosed site at Blagdon Park 2 in advance of surface coal mining, showing the hurried and difficult conditions in which such excavations often have to be carried out.

the earlier Neolithic dates were excluded as residual. There were no ceramic finds and no diagnostic flint in stratified contexts (TWM Archaeology 2011).

The contemporary population lived in roundhouses in open clusters, sometimes in association with palisades of uncertain function. At Blagdon Park 1, isolated roundhouses were either single or possibly grouped in pairs. One, close to a pit alignment, was burnt down in the early Iron Age (Hodgson *et al*. 2012: 13). 200 m to the north, a much denser group of possibly 25 circular structures predated a later massive enclosure, but between those two events, a palisaded phase could conceivably have encircled some of the roundhouses. A gully in the roundhouse sequence was dated to the early or mid-Iron Age (Hodgson *et al*. 2012: 17).

Surface mining around Shotton led to the strip-and-record operations across a wide swath of landscape, over 1 km sq., where it might be expected that all surviving sites in the landscape would be recorded. Four foci of occupation were observed. To the south of Shotton village, among Anglo-Saxon rectangular buildings, a solitary large roundhouse was adjacent to a pit alignment, and to the east of the village, a fragmentary field system of late Bronze Age date was in close proximity to the overlapping arcs of two circular structures. NE of the village, a cluster of roundhouses were associated with the small possibly palisaded rectangular enclosure attached to another length of pit alignment (Hodgson *et al*. 2012: 97), which in plan and form is very similar to the slightly larger Murton Lane enclosure mentioned above.

Undated open settlements of possibly similar character, with at least five curvilinear ditches were recorded at East Wideopen North, adjacent to but clearly outside a possible contemporary large enclosure or paddock (Northern Archaeological Associates 2017: 15) and at the SDA site at Blyth, where excavation revealed a single roundhouse along with pits and a number of short gullies of unknown function (Northumberland HER Event No. 13805).

A group of sites at Newcastle have produced evidence of both late Bronze Age settlement (High Bridge: Brogan 2010) and Iron Age settlement (Half Moon Yard: Swann 2018; Clavering Place: ASDU in press), and it has been suggested that a large, multi-phase site awaits discovery under the medieval town (Swann 2018: 149). The absence of later prehistoric evidence from other excavations in the City (over 100 trenches and watching briefs) makes it unlikely that a major settlement will be discovered (Graves and Heslop 2013). Given the known density of sites in south-east Northumberland, what has been found probably reflects the expected level of finds from the dispersed settlement pattern of the region, in a locus that has been so intensively sampled. Outside urban areas, the routine use of strip-and-record excavation will undoubtedly throw up more small, unenclosed sites, but the dating of plough-truncated features is often frustrated by the lack of dateable artefacts associated with these early settlements, and the high rate of failure of C14 samples. They formed an important part of a complex settlement pattern, either as outliers to larger groupings or as single-unit habitations in their own right.

An unenclosed phase at West Brunton had over 40 individual circular ditches, ranging in diameter from 5 m to 12 m, the largest within a small palisade or fence-line (Hodgson *et. al*. 2012: 69; fig. 39). This phase gave dates in the mid Iron Age and later, when the number of known sites greatly increases. Clearance of woodland and an intensification of agriculture has been noted, associated with an increase in population (Tipping 1997: 244).

Almost all of the early first millennium sites have some sort of linear feature within the overall plan. Where enclosure is found, it usually takes the form of timber palisades or fence-lines. These take a wide range of structural forms, and plan sizes. East Brunton, Phase 1 has three or four concentric palisade lines, the socket of one of which gave a radiocarbon date of 770-400 BC (Hodgson *et al.* 2012: 49). The purpose of the palisaded boundary is rarely questioned but many do not appear to have easily identifiable practical functions. It is not uncommon for the line of posts to stop abruptly, as is the case at the East Brunton group, none of which makes a complete circuit (Hodgson *et al.* 2012: fig. 28): if it is argued that the individual feature has been ploughed-out, the palisade cannot have been substantial or robust. At St George's Hospital, Morpeth, the rectangular middle Iron Age palisades are on the south and west sides (25 m and 30 m respectively) of the internal roundhouse, but only part of the western side and not at all on the northern. The ring grooves of the adjacent roundhouses haven't been ploughed out (Archaeological Research Services 2016: fig. 55). At East Wideopen South, an irregular feature interpreted as a palisade (Archaeological Services Durham University 2014a: F311; section 120, fig. 8) cuts less than 30 cm into the subsoil. From the presence of cobbling within one of the roundhouses (8a) and the fact that the edges of the enclosure ditches grade gently to the horizontal (e.g. Archaeological Services Durham University 2014a: S213, fig. 35), no great depth of stratigraphy has been lost to plough erosion.

There are no excavated examples of a palisade completely enclosing a roundhouse in the dozen or so sites subject to area excavation, but examples of both curvilinear and rectilinear forms are known on aerial photographs, where accurately plotted (e.g. Gates 2012: figs 3.4 and 3.5).

The earliest ditched enclosure from the South East Northumberland sites dates to the early Iron Age (Phase 2? at Blagdon Park 2; Hodgson *et al.* 2012: 19). It is relatively small (less than 1.50 m across) and only known on one side, the eastern, with entrance gap, in the same position as the entrance into later massive late Iron Age enclosure, the assumption being that the other three sides were removed by the later ditch in the same position.

Around 200 BC, many of the sites were given very substantial ditched enclosures, with rectilinear plans becoming the predominant form (Figure 3). The sub-region now has excavated plans for ten massive ditched enclosures surrounding one or more circular structures. The five to be first fully published (Blagdon Park 2, and two at both East and West Brunton) form the basis of a thorough re-appraisal by Nick Hodgson of an archaeology that had changed little from the 1970s. This covers a series of crucial issues: the form and monumentality of the enclosure, the interior spaces and their structures, the contemporary environment and subsistence economy and the social structure and material culture of the local population, and these will not be repeated here (Hodgson *et al.* 2012). Since the publication of that monograph, five new enclosed sites have been excavated which test the basic models of settlement development outlined at Blagdon Park and the Bruntons, that at Brenkley Lane now fully published.

A massive double–ditched enclosure at Brenkley Lane Open Mine was excavated by Headland Archaeology in 2013. It had an internal arrangement which directly matches that at Blagdon Park 2, less than 3 km to the north (van Wessel and Wilson 2020). The outer ditch at Brenkley is smaller than that at Blagdon Park 2 but it is in turn enclosed by a further ditch and droveway system. The Brenkley Lane landscape developed just downslope from a small Bronze Age cremation cemetery on a locally prominent hillock. There are three separate loci of roundhouses but the value of the sequence is lessened by the failure of many of the samples to produce C14 dates. The inner enclosure has a fence-like structure which mirrors the eastern side of the enclosure, with entrance gap in the same position, like a ditch in an equivalent position at Blagdon Park 2 – the Phase 2? ditch mentioned above (Hodgson *et al.* 2012: 19).

At West Shiremoor, the corner and half of one side of large enclosure ditch divided into internal cells was excavated in 2016 and 2017, but the majority of the site was under the adjacent A19. The eastern zone, with east facing gateway, contained a sequence of overlapping circular structures but the observable portion of the western area was empty. A possible palisade was observed in the same position on the eastern ditch as postulated above at Blagdon Park 2: Phase 2? and Brenkley Lane. Two phases of occupation were recognised in the interior, the latest running into the 2nd century AD.

At Station Road, Wallsend and East Wideopen – South, the interior ditches are very reminiscent of the smaller ditched Enclosure 1 at East Brunton, being of irregular trapezoidal shape and in having the interior seemingly full of circular structures. Station Road, Wallsend, (Wardell Armstrong 2017b) developed from a small open settlement of three or four circular structures of mid-late Iron age date, into a double enclosure, the outer being later than the inner. In having internal partitions near the entrance, it resembles Blagdon Park 2. The upper features of the latest features contained a small quantity of last first and early 2nd century AD Roman pottery, but there is no later activity on the site (Wardell Armstrong 2017b).

The East Wideopen – South enclosure develops from a double palisaded site dated by radiocarbon to 756-444 cal BC (95.4% probability). This was dismantled, and subsequent development saw thirteen stratigraphically discrete roundhouses located in the small area that was subsequently enclosed. This enclosure is unusual in having a sequence of ditch re-cuts, with one phase engaged to a substantial landscape feature or part of an embracing massive enclosure like East Brunton, Enclosure 3 (Hodgson *et al.* 2012: 51, fig. 28). The south-western corner of the circuit has a sub-circular adjunct, roughly 25 m in diameter, encircling four short, straight gullies, which may drain the platform or be earlier), but no other surviving structures. Further houses are thought to post-date the enclosure, being the last structures in the settlement sequence, with an associated radiocarbon date of 92 BC – AD 62 (at 95.4% probability). The site produced a small assemblage of Iron Age pottery but nothing Roman (Archaeological Services Durham University 2014a).

When sites develop substantial enclosures, the principal roundhouse often has a massive eaves-drip ring-ditch, often with internal posts hinting at the possibility of a second storey, as postulated at East and West Brunton (Hodgson *et al.* 2012: 199) while smaller buildings and structural remains suggest a variety of different structural designs, presumably for other functions. The data available from these new excavations offers great potential for research into the functioning of enclosure interiors and building traditions.

Not all late Iron Age sites developed massive enclosures. At Front Street, Dinnington, a small group of late Iron Age/early Roman period circular structures but with only one or two in use at one time show no evidence of being associated with a substantial enclosure. It may be significant that there was no prehistoric pottery recovered from the five circular structures and other linear features on the site, which provided five radiocarbon dates within a bracket of 147 BC to AD 145 at 95% probability (Wardell Armstrong 2017a).

At Pegswood Moor, Morpeth, it was possible to chart the evolution of a small community over a period of more than five centuries, starting in the 4th century BC, with a group of four larger roundhouses. In the late Iron Age, a landscape of complex enclosures spread across the site and beyond in all directions, with two lines of circular structures representing settlement over a couple of centuries. In the late 1st century AD, a further occupied enclosure was aligned to earlier boundaries but a more substantial boundary cut across earlier enclosures that were no longer in use. The reorganisation of the landscape around the need to manage stock suggests a change in the emphasis towards animal husbandry in the early Roman period. The requirements of the military garrison on the northern imperial frontier are one possible interpretation for that change (Proctor 2009).

The nearby St George's Hospital site, Morpeth, echoes the sequence at Pegswood. As seen at Brenkley Lane and sites further south, like Greatham Hartlepool, the earliest phase is a Bronze Age cemetery. In the middle Iron Age there is a multi-phase palisade with internal roundhouses and a large circular structure outside, which has two, opposed, entrances, and was interpreted as having a different, possibly agricultural function. In use for perhaps 175 years, it was interpreted as a single household unit, with one or two structures with each iteration of the palisade. There is a gap in the sequence before the creation of a substantial enclosure of 0.63 hectares with four entrance gaps around the sinuous circuit. An element of continuation is seen with the construction of a substantial roundhouse adjacent to the mid Iron Age cluster. Other houses were spread around the site, inside and outside the enclosure. A series of smaller enclosures or paddocks and droveways to the north and south, reinforce the pastoral emphasis of the complex. This later phase ran from the 1st century AD, or slightly later, into the late Roman period (Archaeological Research Services 2016).

From the range of different sites coming into view we can see that there is a consistent pattern of development through which settlements progress, but that this model does not cover all sites. Crucially, it is not scalable, with smaller and larger settlements diverging from the model.

I suggest that it is the status of the individual family or kinship group that is the single most important factor in determining the course of development of each individual site. The power of the ancestral link is emphasized by Hodgson in his discussion of the Northumberland Coastal plain sites (2012: 208).

I suspect that the phenomenon of enclosure construction is linked to social practice and their construction is used to mark significant events in the life of the community – for example for burial ceremonies which involved the congregation of the lineage group from across the region. These would involve feasting and the repayment of social obligations accrued during the life of the lineage head, and during which the range of social transactions needed to sustain life – finding partners, acquiring querns, salt etc., and gift exchange to forge and cement relationships – would take place to honour the dead person and start the inheritors on a path to creating new relationships of their own. The purpose of the structures was to manage a large influx of livestock which would need coralling and watering before slaughter for feasting. It would take such a congregation to construct the enclosure in the first place – the type of congregation in earlier periods that would gather to witness the votive deposition of objects into places like the Tyne Crossing, or in earlier millennia to construct causewayed enclosures and henges.

It should not be assumed that the head of the social group was male. The possibility that in north central Britain, there was some element of matriarchy and female inheritance – as suggested by the geneticist Professor Brian Sykes in his studies of mitochondrial DNA – would explain the prominence of Cartimandua, and the fact that artefacts found on settlements (as opposed to votive locations) that are suggestive of the display of wealth often have a decorative and not a martial aspect (cf. the gold earring from Thorpe Thewles and the many glass bangles found on late Iron Age sites in the region). Iron Age Northumbria may have marched in step with the matriarchal ancestors of the Picts from north of the border (Sykes 2007: 262).

Many of the new sites discussed above are moving into final publication. When the full reports are available, it will be possible to re-appraise the current model of site development (palisaded>open>ditched) that Paul's team has done so much to establish.

Acknowledgements

The author would like to thank the following for contributing to the data and ideas of this paper: Ed Caswell, Colin Haselgrove, Tom Moore, Don O'Meara, Ben Roberts, Steve Sherlock, Peter Topping and Rob Young. Jennifer Morrison was very helpful in providing copies of report in the public domain but in advance of full publication.

Bibliography

(Abbreviation: TWHER = Tyne and Wear Historic Environment Record)

AD Archaeology 2015. Land at Morley Hill Farm, Hazlerigg, Newcastle upon Tyne. Unpublished client report TWHER.

Allason-Jones, L. 2009. Some problems of the Roman Iron Age in northern England, in W.S. Hanson (ed.) *The Army and Frontiers of Rome*: 218-224. Portsmouth, RI: Journal of Roman Archaeology Supplementary Series 74.

Anderson, A.W. 2012. Traditions and Transitions: Later and Roman Iron Age Communities in the North-East of England. Unpublished PhD dissertation, Durham University.

Annis, R. 1996. Bonny Grove Farm and Dixon's Bank: two Romano-British settlement sites in Cleveland. *Durham Archaeological Journal* 12: 41-60.

Archaeological Research Services Ltd 2016. An Archaeological Excavation at St. George's Hospital, Morpeth. Unpublished client report no. 2016/70.

Archaeological Services Durham University 2012. Mount Leven, Yarm, Stockton-on-Tees. Archaeological Evaluation. Unpublished client report.

Archaeological Services Durham University 2014a. East Wideopen, North Tyneside, Tyne and Wear post-excavation full analysis. Unpublished client report TWHER 2014/15.

Archaeological Services Durham University 2014b. Great Chilton, County Durham: archaeological excavation and geophysical survey. Unpublished client report no. 3078.

Archaeological Services Durham University 2014c. Sandhill, Ingleby Barwick, Stockton on Tees. Archaeological Evaluation. Unpublished client report no. 3353.

Archaeological Services Durham University 2015. Lower Callerton: archaeological evaluation. Unpublished client report no. 3700.

Archaeological Services Durham University 2017. West Shiremoor (North), Shiremoor, North Tyneside: archaeological excavation. Unpublished client report TWHER 2017/73.

ASDU in press. Clavering Place Report.

Biggins, J.A., J. Biggins, R. Coxon and M. Watson 1997. Survey of the prehistoric settlement at Gardener's Houses Farm, Dinnington. *Durham Archaeological Journal* 13: 43-53.

Bosanquet, R.C. and J. Charlton 1936. Excavations at Dunstanburgh Castle in 1931. *Archaeologia Aeliana* 4th series 13: 279-292.

Brogan, G. 2010. Excavations and building recording at 44 to 48 High Bridge, Newcastle upon Tyne. *Archaeologia Aeliana* 5th series 36: 329-74.

Brogan, G. and N. Hodgson 2011. A Bronze Age site at Mountjoy, Durham City: archaeological evaluation in 2003-7. *Archaeologia Aeliana* 4th series 40: 41–84.

Burgess, A. and I. Roberts 2004. *Two Late Iron Age/Romano-British Settlement Sites Near Whitwood, West Yorkshire.* Wakefield: West Yorkshire Archaeological Services Publication 6.

Carter, S., F. Hunter, A. Smith, M. Hastie, S. Lancaster, M. Dalland, R. Hurford, E. Bailey, G. McDonnell and T. Swiss 2010. A 5th century bc Iron Age Chariot Burial from Newbridge, Edinburgh. *Proceedings of the Prehistoric Society* 76: 31-74.

Chadwick, A. 1999. Digging ditches and missing riches? Ways into the Iron Age and Romano-British cropmark landscapes of the north midlands, in B. Bevan (ed.) *Northern Exposure: Interpretative Devolution and the Iron Ages in Britain*: 149-172. Leicester: Leicester Archaeology Monographs 4.

Fell, D. and G. Robinson 2018. *Life of Brine? Bronze Age and Later Discoveries at Marsh House Farm, Greatham, Hartlepool*. Barnard Castle: NAA Monograph Series 2.

Fitts, R.L., C. Haselgrove, P. Lowther and P. Turnbull 1994. An Iron Age farmstead at Rock Castle, Gilling West, North Yorkshire. *Durham Archaeological Journal* 10: 13-42

Gates, T. 2012. Monuments from the air, in D. Passmore and C. Waddington (eds) *Archaeology and Environment in Northumberland (Till-Tweed Studies vol. 2)*: 58-110. Oxford: Oxbow.

Gates, T. and A. Deegan 2009. Monuments in the landscape, in D. Passmore and C. Waddington (eds) *Managing Archaeological Landscapes in Northumberland (Till-Tweed Studies vol. 1)*: 125-171. Oxford: Oxbow.

Graves, C.P and D.H. Heslop 2013. *The Eye of the North: an Archaeological Assessment of Newcastle upon Tyne before AD 1600.* Oxford: Oxbow.

Hamilton, W.D. 2010. The use of Radiocarbon and Bayesian modelling to (re)write later Iron Age settlement histories in east-central Britain. Unpublished PhD dissertation, University of Leicester.

Hamilton, W.D. 2016. Later prehistoric settlement from the Tees to the Forth: the timing of transformation and the tempo of renewal, in R. Crellin, C. Fowler and R. Tipping (eds) *Prehistory without Borders: the Prehistoric Archaeology of Northeast England and Southeast Scotland: 224-243.* Oxford: Oxbow.

Harding, D.W. 1979 Air survey in the Tyne-Tees region 1969-79, in N.J. Higham (ed.) *The Changing Past*: 21-30. Manchester: University of Manchester.

Haselgrove, C. (ed.) 2016 *Cartimanduas's Capital? The Late Iron Age Royal Site at Stanwick, North Yorkshire, Fieldwork and Analysis 1981-2011* (Council for British Archaeology Research Report 175). York: Council for British Archaeology.

Heslop, D.H. 1987. *The Excavation of an Iron Age Settlement at Thorpe Thewles, Cleveland 1980-2* (Council for British Archaeology Research Report 65). London: Council for British Archaeology.

Hodgson, N., J. McKelvey and W. Muncaster 2012. *The Iron Age on the Northumberland Coastal Plain: Excavations in Advance of Development 2002-2010* (Tyne and Wear

Archives and Museums Archaeological Monograph 3). Newcastle upon Tyne: Tyne and Wear Archives and Museums.

Jobey, G. 1959. Excavations at the native settlement at Huckhoe, Northumberland, 1955-7. *Archaeologia Aeliana* 4th series 37: 217-278.

Jobey, G. 1967. Excavation at Tynemouth Priory and castle. *Archaeologia Aeliana* 4th series 45: 33-104.

Jobey, G. 1970. An Iron Age settlement and homestead at Burradon, Northumberland. *Archaeologia Aeliana* 4th series 48: 51-96.

Jobey, G. 1973. A native settlement at Hartburn and the Devil's Causeway, Northumberland, 1971. *Archaeologia Aeliana* 5th series 1: 11-53.

Knight, D. 2007. From open to enclosed: Iron Age landscapes of the Trent Valley, in C. Haselgrove and T. Moore (eds) *The Later Iron Age in Britain and Beyond*: 190-218. Oxford: Oxbow.

MAP Ltd 2007. Thrislington Quarry Extension. Unpublished client report.

Martin, L., J. Richardson and I. Roberts 2013. *Iron Age and Roman Settlements at Wattle Syke*. Leeds: West Yorkshire Archaeological Services.

Nolan, J. and J. Vaughan 2007. Excavations at Oakwellgate, Gateshead, 1999. *Archaeologia Aeliana* 5th series 36: 125-249.

Northern Archaeological Associates 2014. Green Lane, Yarm. Unpublished client report.

Northern Archaeological Associates 2017. East Wideopen, Tyne and Wear: Post-Excavation Assessment Report. Unpublished client report TWHER 2017/26.

Oswald A., J. Ashbee, K. Porteous and J. Huntley 2006. *Dunstanburgh Castle, Northumberland: Archaeological, Architectural and Historical Investigations* (English Heritage Research Department Report 26). London: English Heritage.

Passmore, D. and C. Waddington (eds) 2012. *Archaeology and Environment in Northumberland (Till-Tweed Studies vol. 2)*. Oxford: Oxbow.

Petts, D. and C. Gerrard 2006. *Shared Visions: the North-East Regional Research Framework for the Historic Environment*. Durham: Durham County Council.

Poyer, A.J. 2015. The Topographic Setting of Bronze Age Metalwork Deposits in North East England. Unpublished PhD dissertation, University of Sheffield.

Pre-Construct Archaeology North 2004. An Archaeological Evaluation at the former Vaux Brewery, St Mary's Way, Sunderland, Tyne and Wear. Unpublished client report TWHER 2004/114.

Proctor, J. 2009. *Pegswood Moor, Morpeth: a Later Iron Age and Romano-British Farmstead Settlement.* London: Pre-Construct Archaeology Monograph 11.

Proctor, J. 2012. The Needles Eye enclosure, Berwick-upon-Tweed. *Archaeologia Aeliana* 5th series 41: 19-122.

Proctor, J. 2013. Late Iron Age enclosures and Postmedieval cattle burials at Hilltop Farm, Pittington (Pre-contruct Acrchaeology unpub. client report).

Roberts, I. (ed.) 2005. *Ferrybridge Henge; The Ritual Landscape*. Leeds: West Yorkshire Archaeological Services.

Sherlock, S.J. 2007. *The Excavation of an Iron Age Settlement at Street House, Loftus, North East Yorkshire 2004-2006.* Middlesbrough: Teeside Archaeological Society.

Sherlock, S.J. 2012. *Late Prehistoric Settlement in the Tees Valley and North-East England*. Hartlepool: Tees Archaeology Monograph Series 5.

Sherlock, S.J. 2018. *A Neolithic to Late Roman Landscape on the North-East Coast: Excavations at Street House, Loftus, 2004-17*. Hartlepool: Tees Archaeology Monograph Series 7.

Still, L. and B.E. Vyner 1986. Air photographic evidence for later prehistoric settlement in the Tees Valley. *Durham Archaeological Journal* 2: 11-24.

Swann, N. 2018. Excavations at Half Moon Yard, Bigg Market, Newcastle upon Tyne. *Archaeologia Aeliana* 5th series 47: 117-154.

Sykes, B. 2007. *The Seven Daughters of Eve.* London: Norton.

Tipping, R. 1997. Pollen analysis and the impact of Rome on native agriculture around Hadrian's Wall, in A. Gwilt and C. Haselgrove (eds) *Reconstructing Iron Age Societies: New Approaches to the British Iron Age*: 248-53. Oxford, Oxbow.

TWM Archaeology 2011. Excavations at Murton Lane, Easington. Unpublished client report TWHER 2011/98.

van Wessel, J. and D. Wilson 2020. Iron Age settlement activity on the North-East coastal plain: excavations at Brenkley Lane surface mine, Tyne and Wear. *Archaeologia Aeliana* 5th series 49: 25-63.

Vyner, B.E. 1988. The hill-fort at Eston Nab, Eston, Cleveland. *Archaeological Journal* 145: 60-98.

Vyner, B.E. 2007. A great north route in Neolithic and Bronze Age Yorkshire: the evidence of landscape and monuments. *Landscapes* 1: 69–84.

Wardell Armstrong 2015. Hitachi Intercity Express Manufacturing Plant, Newton Aycliffe, County Durham, Archive Report. Unpublished client report.

Wardell Armstrong 2017a. Front Street, Dinnington, Newcastle upon Tyne, Archive Report. Unpublished client report TWHER 2017/3.

Wardell Armstrong 2017b. Station Road, Wallsend, Tyne and Wear, Archive Report. Unpublished client report.

Willis, S. 2016. The briquetage containers and salt networks in north-east England, in C. Haselgrove (ed.) *Cartimanduas's Capital? The Late Iron Age Royal Site at Stanwick, North Yorkshire, Fieldwork and Analysis 1981-2011* (Council for British Archaeology Research Report 175): 256-61. York: Council for British Archaeology.

Willis, S. and P. Carne (eds) 2013 *A Roman Villa at the Edge of Empire: Excavations at Ingleby Barwick, Stockton-on-Tees, 2003-04* (Council for British Archaeology Research Report 170). York: Council for British Archaeology.

Studies in material and scientific evidence

A small forest of pines: pinecone motifs in Romano-British sculpture

Lindsay Allason-Jones

Whilst working on the last volume for Britain of the *Corpus Signorum Imperii Romani,* I became aware that depictions of stone pinecones had a curious distribution in Roman Britain. As examples have been found at South Shields, Chesters, Corbridge and Vindolanda, all sites with which Paul Bidwell has been associated in a long and distinguished career, it seemed an appropriate topic to offer him and I hope he will find it of interest.

Figure 1. Tombstone of the daughter of Crescens from Kirkby Thore. Photographed by kind permission of the Trustees of the British Museum.

Stone pinecones in Britain most commonly appear as three-dimensional representations but some can be seen, usually in relief, on tombstones. In Greek and Roman religious practice pinecones were associated with Attis (Atys), a deity who, according to Ovid, transformed himself into a pine-tree.[1] His resurrection from self-inflicted death led to him representing that part of nature which dies in winter but re-emerges in the spring; his associated pinecones thus came to be seen as symbols of life after death.[2] The story of Attis and the pictorial evidence of the tombstones has led to the generally accepted understanding that pinecones were used in Roman sculpture solely in funerary contexts.[3]

Table 1 provides a list of the pinecones which appear on tombstones from Roman sites in Britain.[4] It can be seen immediately that the findspots are all military forts, with a preponderance along Hadrian's Wall or in its hinterland. It is less clear whether the deceased in all cases were military men but the two outliers, from Lincoln and Wroxeter (Nos. 10 and 11), specifically state a soldier's legion, whilst No. 4, from Kirkby Thore, identifies the deceased as the daughter of an *imaginifer* (Figure 1). The provenance of the others implies that the people involved, whether men, women or children, all had links with the military.

As well as the inscribed tombstones, the upper part of a decorated pediment of a funerary monument, is known from Old Penrith, Cumbria.[5] This consists of an angular pedimented niche with a central pinecone in relief. A second pinecone survives to one side and there would have been a third flanking the central cone. The seed scales of both pinecones have been realistically carved. Between the pinecones there are birds in relief: one, a swan, looks to the right; the other, of which only part survives, appears to be a dove looking backwards. The top of the surviving pillar has incised decoration over a motif in relief, possibly a lotus flower.

When pinecones appear on an inscribed tombstone their symbolism could be considered obvious, even if there may be subtle nuances which escape us. It is also possible that, rather than simply following a symbolic tradition, the pinecones are indicating that the deceased was a worshipper of Attis, but evidence for the worship of Attis and Cybele is rare in Roman Britain. There are

1 *Metamorphoses* 10.86.
2 Strong 1911: 17, fn. 2.
3 See Darblade-Audoin 2006: 103-8, nos. 289-324; Cumont 1966: 219, fn. 4; see also the Neumagen free-standing funerary monuments: Espérandieu 1907-66: no. 5145.
4 Throughout this paper references are given to the entries in the published volumes of *Corpus Signorum Imperii Romani*, where detailed bibliographies are given for each stone. Where no *CSIR* reference is given, these examples will be published in the forthcoming *CSIR* volume: *Roman Sculpture from the Hinterland of Hadrian's Wall* I.11.

5 British Museum, Acc. No. 1870,1013.41.

Roman Frontier Archaeology (Archaeopress 2022): 37–44

Table 1. Pinecones on tombstones in Britain

	Provenance	Description	Military or civilian	Reference
1	Risingham, Northumberland	Pinecone in deep relief with roughly cross-hatched lines above a crescent in the pediment	Unknown	*CSIR* I.1: no. 268
2	Halton Chesters, Northumberland	Pinecone in relief with cross-hatched lines in the centre of the pediment	Family of Vitalis and Virilis	*CSIR* I.1: no. 258
3	Carlisle, Cumbria	Pinecones in 3D with cross-hatched lines as finials on a portrait tombstone	Aurelia Aureliana	*CSIR* I.6: no. 493
4	Kirkby Thore, Cumbria	Pinecone in very deep relief with cross-hatched lines	The daughter of Crescens, an *imaginifer*	*RIB* 769
5	Brougham, Cumbria	Pinecone incised within the pediment with cross-hatched lines	Crescentius, set up by his father Vidaris	*RIB* 785
6	Overborough, Lancs.	Pinecone in relief in the apex of the pediment with cross-hatched lines	Aurelius Pussinna and his wife Aurelia Eubia	*RIB* 612
7	Overborough, Lancs.[6]	Pinecone in relief in the apex of the pediment with cross-hatched lines	No data	*RIB* 614
8	York, Yorks.	Pinecones in deep relief with incised cross-hatching in both top corners of the tombstone	Julia Velva	*CSIR* I.3: no. 42
9	York?, Yorks.	Fragment, presumed to be from the pediment of a tombstone: a flat pinecone with incised cross-hatched lines.	Unknown	*CSIR* I.3: no. 93
10	Lincoln, Lincs.	Incised oval with slanting lines in the pediment	Soldier of the 9th Legion	*CSIR* I.8: no. 52
11	Wroxeter, Shropshire	Pinecone in very deep relief at the apex of the pediment with incised cross-hatched lines	Soldier of the 20th Legion	*CSIR* I. 9: no. 148

three heads of Attis known: from Corbridge,[7] Caerleon,[8] and Papcastle,[9] the latter site also producing a head of Cybele.[10] Other sculptures suggesting a cult of Cybele in Britain include an altar from Corbridge dedicated to Dea Panthea, one of Cybele's aliases, which has the bust of Attis depicted on its right side.[11] There is a relief from Chesters which shows a scene from the legend of Cybele and Attis,[12] whilst an inscribed poem from Carvoran on Hadrian's Wall is also interpreted as referring to Cybele.[13] The skeleton of a man identified as a priest of Cybele was found in Grave 951 at Catterick[14] and there is some artefactual evidence of a cult of Attis/Cybele in London.[15]

In the case of the more numerous three-dimensional stone pinecones, most have been found with no inscription or other evidence to confirm if they adorned funerary monuments or were simply architectural decoration with no symbolic connotations. As can be seen from the list in Table 2, such sculptures divide into three groups: those where the surface has been incised to suggest the scales of a pinecone, those which are plain and those which are unusual. The first group sub-divides into those where the scales have been depicted realistically and with some care, for example Nos. 1, 4, 14 and 30, and those where the scales are indicated by incised cross-hatched lines. Examples in this latter sub-group, although rougher in execution than the first sub-group, still give a reasonable appearance of a pinecone.

One example from Carlisle has the additional motif of a snake coiling around the pinecone (No. 13), whilst an example from Kirkby Thore in Cumbria (No. 17:

[6] Despite the similarity of *RIB* 612 and 614, they are separate tombstones. They appear separately in a sketch by Machell (Machell, T., ms *The Antiquities of Cumberland,* 3 vols. Carlisle Archives Centre: DCHA II/4/1-6). Furthermore, on *RIB* 612 the letter D sits above the M and S whilst on *RIB* 614 the three letters are arranged in a line. The two flowers on *RIB* 614 are also not present on *RIB* 612.
[7] *CSIR* I.1: no. 48.
[8] *CSIR* 1.5: no. 16.
[9] Excavated on the site of the Roman bridge in 2014: SF 113; context 264.
[10] Excavated on the site of the Roman bridge in 2014: SF 104; context 264.
[11] *CSIR* I.1: no. 58.
[12] *CSIR* 1. 6: no. 115.
[13] *RIB* 1791; Henig 1984: 110.
[14] Wilson 2002, II: 41.

[15] See Henig 1984.

Table 2. Three-dimensional pinecones from sites in Britain.

	Provenance	Base	Surface treatment	Additional decoration	Reference
	Antonine Wall				
1	Midfield Mains, Midlothian	Square base	Individually incised, realistic scales	None	*CSIR* I.4: no. 59
	Hadrian's Wall				
2	South Shields, Tyne and Wear	Tapered shaft	Cross-hatched lines	None	*CSIR* I.1: no. 251
3	Benwell?, Tyne and Wear	Broken base	Swirled lines	None	*CSIR* I.1: no. 254
4	Benwell?, Tyne and Wear	Broken base	Cross-hatched lines but some attempt has been made to develop the shapes to show realistic scales	None	*CSIR* I.1: no. 255
5	Chesters, Northumberland	Mounted on a rectangular 'capital' which sits on an undercut rectangular base	No incised lines but the surface has been left with the chisel marks showing, suggesting it may have been plastered and painted.	The base has two bolster ends with a vestigial pediment incised on the front	*CSIR* I.6: no. 410
6	Chesters?, Northumberland	Broken	No data	No data	*CSIR* I.6: no. 467
7	Housesteads, Northumberland	Broken base	Deeply incised random lines	None	*CSIR* I.6: no. 437
8	Housesteads, Northumberland	No base	No decoration	None	*CSIR* I.6: no. 438
9	Housesteads, Northumberland[16]	No base	Some trace of vertical lines running from the base to the tip	None	*CSIR* I.6: no. 439
10	Birdoswald, Cumbria	Sits on a column with a torus moulding	Onion-shaped with no incised decoration	None	*CSIR* I.6: no. 463
	Stanegate				
11	Vindolanda, Northumberland	No base	Swirled lines	None	*CSIR* I.6: no. 454
12	Vindolanda, Northumberland	Had a rectangular base and a very narrow neck	Incised cross-hatched lines	None	*CSIR* I.6: no. 455
13	Carlisle, Cumbria	No base	Roughly cross-hatched lines	A snake curls up from the base to the tip	*CSIR* I.6: no. 504
14	Carlisle	No base	Diagonal lines cut deeply into the surface give a series of raised, cushioned squares	None	*CSIR* I.6: no. 505
	Hinterland of Hadrian's Wall				
15	Chester-le-Street, Co. Durham	Plain flared base	Cross-hatched lines arranged in a random spiral.	None	Evans *et al.* 1991: fig. 37.
16	Brougham, Cumbria	Broken at the base	Swirling grooves radiating down from the tip	None	*CSIR* I.11: forthcoming

[16] Blagg 2002, states there were originally nine from Housesteads but that only one (No. 7 above) had any indication of scales.

17	Kirkby Thore, Cumbria	Plain rectangular base	The scales are indicated by cross-hatched lines	A plain strap, possibly a snake, curls up in a spiral	*LS* no. 757
18	Old Carlisle, Cumbria	Square base	Incised curving lines indicating seed scales	None	*LS* no. 910
19	Old Carlisle, Cumbria	Square, chamfered base	Incised cross-hatched lines	None	Smith 1748: 179, fig. V
20	Papcastle, Cumbria	Square base?	Incised curving lines	None	*LS* p.457 (there compared with *LS* no. 910)
21	Maryport, Cumbria	No base	None	None	Coulston 1997: 122
22	York, Yorks.	Square base	A few large, incised diamonds, described as a 'net-like motif'	None	*CSIR* I.3: no. 88
23	York, Yorks.	The base is missing	Tightly packed, incised cross-hatched lines, decreasing in size towards the tip	None	*CSIR* I.3: no. 89
24	York, Yorks.	Square base	Incised swirling lines	None	*CSIR* I.3: no. 90
25	York, Yorks.	The base is missing	Incised cross-hatched lines	None	*CSIR* I.3: no. 91
26	York, Yorks.[17]	No base	Very faint cross-hatched lines	None	*CSIR* I.3: no. 92
27	Handbridge, Chester	Integral square base	None	None	*CSIR* I.9: no. 114
	Wales				
28	Caerleon, Gwent	Disc base	No indication of scales	None	*CSIR* I.5: no. 26
29	Caerwent, Gwent	The 'pinecone' is the base from which a flared shoulder emerges to support a domed finial, giving the appearance of a pineapple	Incised cross-hatching on the base	None	*CSIR* I.5: no. 89d
	The South				
30	Southwark, London	Broken at the base	Diagonal lines cut deeply into the surface give a series of raised, cushioned, squares	None	*CSIR* I.10: no. 124
31	Southwark, London	Broken at the base but may have come from a *cornucopia*	Random lines giving graduated irregular, cushioned scales	None	*CSIR* I.10: no. 125
32	Holcombe, Devon	No base	Roughly incised cross-hatched lines		*CSIR* I.7, part II: no. 11

Figure 2) has a plain strap similarly wound around the scales, which may also represent a snake. A reference to the worship of Attis involving snakes can be found in the story of Aeschines assisting his mother in her religious rites.[18] This is somewhat inconclusive evidence but may support the notion of a link between Attis and pinecones. On the other hand, Toynbee, in her discussion of snakes in Roman religious art, gives instances of snakes being linked to such diverse deities as Isis, Mithras, Mercury, Juno, and Apollo as well as the healing deities Aesculapius and Salus, although none of these seem to have any particular association with pinecones.[19] Such a link, however, can be seen on the staff of Bacchus, which ends in a pinecone hung with ribbons, and which Henig states was carried as symbol of fertility.[20]

[17] Blagg 2002 records that six are published in *RCAHM* 1962 but only five are included in CSIR I. 3.

[18] Demosthenes *De Corona* 18: 260: 'you squeezed the fat-cheeked snakes or brandished them above your head'.

[19] Toynbee 1973: 223-36.

[20] Henig 1984: 117; see also a marble Bacchic scene from London

Figure 2. Pinecone from Kirkby Thore with a plain strap or snake. Photographed by kind permission of the Trustees of the British Museum.

An unusual relief, which was found in the late levels of the main east-west street close to Site XI at Corbridge, shows a *genius* wearing a mural crown and holding a *cornucopia* in his left hand. This *cornucopia* has stylized vine leaves around its rim and contains fruit topped off with a pinecone. There are also two fragmentary pieces from the same site which each show a pinecone emerging from the rim of a similar *cornucopia*.[21] As these depictions only appear at Corbridge it might be presumed that this was a local sculptor's personal method of showing abundance, although a pinecone may not seem the most obvious symbol to include. Are these three accurately identified as pinecones or should another type of fruit be considered?

Despite various efforts on the Internet to prove that the Roman world was in contact with the New World many centuries before Christopher Columbus, and was thus familiar with the pineapple, this is implausible. The suggestion initially came from an interpretation of what appears to be a pineapple in a basket of fruit on a mosaic from the Grotto Celoni on the Via Casilina in Rome.[22] Whilst the elaborate finial from Caerwent (No. 29) may add fuel to this theory, the inclusion of a pinecone in a basket of fruit could be due to the extensive use of pine-kernels in Roman cooking. Recipes given by Apicius include the use of pine-kernels for many savoury and sweet recipes, as well as being used to make the herb *silphium* go farther.[23] In a scene depicting fruitful abundance, a pinecone, whose seeds are a source of life as well as a common culinary ingredient, would be appropriate and it is, therefore, concluded that this is what the Corbridge sculptor had in mind.

If the decorated stones can be identified as pinecones, is this so with those which have no surface decoration? In the case of one of the stones from Chesters (No. 5), the surface has been left with the chisel marks showing, suggesting it may have been plastered and painted and that is also possible for the other plain examples, although most of them have well-finished surfaces with no keying for plaster. The sculpture from Chesters is also unusual in that it appears to sit on a separate altar capital,[24] complete with bolsters, which is less convincing as a funerary monument. If this is an altar, is the object on top a pinecone - hinting at its use in the veneration of Attis/Cybele – or is it to be interpreted as an egg, another symbol of life.[25] Of interest in this discussion are some wall-paintings from Pompeii in Italy: in a niche in the House of the Vettii a wall-painting depicts a group of dancing *lars* and a *genius paterfamilias* over a snake which slithers towards an altar on which rests a large egg; Toynbee suggests the snake represents the dead founder of the family.[26] In similar scenes on other wall-paintings in Naples Museum snakes open their jaws to ingest eggs on altars.[27] In this context, as snakes shed and renew their skins regularly, they may have been simply regarded as symbols of continual rebirth without a link to a specific deity. Alternatively, the sculpture from Chesters could be intended to represent a flame, as claimed for the stone with swirled lines from tip to base found at Vindolanda (No. 11). The stones from Benwell (No. 3), Housesteads (No. 9) and York (No. 24) also look more convincing as flames than pinecones, whilst an unpublished sculpture from Brougham, currently residing in a rock garden near Penrith (No. 16), has swirled lines on one part of its surface but cross-hatched lines on the other half and could, conceivably, be interpreted as flaming pinecone (Figure 3). Charcoal made from imported pinecones was

Mithraeum: pl. 49. Bacchus is occasionally equated with Sabazios whose bronze cult arms are decorated with images of snakes, but there is little or no evidence that the cult of Sabazios was ever followed in Roman Britain: Henig 1984: 200.

21 *CSIR* I.1: nos. 155 and 156.

22 Palazzo Massimo alle Terme, Rome, cat. no. 325.

23 *Silphium* is probably to be identified as asafoetida. See Flower and Rosenbaum 1958, for recipes using pine-kernels and p. 28 for identification of *silphium.*

24 Altars with separate capitals and shafts are rare in Roman Britain but are known; see, for example, an example from Melandra, Derbys.: Hamnett 1908: 322, photo opp. p. 321.

25 See *CSIR* I.6: no. 26, fn. 5.

26 Toynbee 1973: 233.

27 Toynbee 1973: 233.

Figure 3. Pinecone with both swirling lines and cross-hatching from Brougham. Photographed by kind permission of the property owner.

found in the excavations of Carrawburgh Mithraeum, indicating that they were considered appropriate fuel for altar fires.[28]

An undecorated 'pinecone' from Birdsowald (No. 10) can be described as onion-shaped and sits on a torus moulding, so may be best seen as an architectural embellishment. A stone from Maryport (No. 21) is both plain and elongated and does not convince as anything more than an architectural finial, which could come from a funerary monument but could equally come from any other building.

A distribution of the stones whose surface treatment leads to a reasonably convincing identification of a pinecone[29] is as firmly military as the distribution of the tombstones in Table 1. Two outliers come from Southwark in London (Nos. 30 and 31) and may well be military. The only example from a purely civilian context is the pinecone from Holcombe Villa in Devon (No. 32); as there are no others from villa sites, nor any from town sites, the uniqueness of the Holcombe example may lead to the speculation that the villa was a veteran's retirement home. Otherwise, the distribution indicates that the pinecone as a symbolic motif was brought to Britain by the army and does not seem to have leached into civilian belief. Blagg, while noting the military distribution, comments on 'the abysmally low standard of execution' which he concluded, 'suggests they cost relatively little'; the implication being that the military bias was not due to cost constraints.[30]

With the others, we must be cautious of identifying them all as coming from a funerary context. The size and form of the stone from Caerwent (No. 29), as well as its findspot in front of House XII.20S, where it is presumed to have fallen from the gable end, confirms that it is a roof finial but it may have been recycled from another building, so its links to a funerary monument are possible, if conjectural. The plain ovoids, particularly those from Maryport (No. 21) and Birdoswald (No. 10) may also have nothing to do with tombs of any type but simply be architectural details.

The date range of both the tombstones and the three-dimensional sculptures is very varied. In the case of the tombstones, there is evidence that the pinecone motif was introduced into Britain in the 1st century. No. 10, from Lincoln, has been dated to before 71, largely because the deceased was a soldier of the 9th Legion which moved from Lincoln to York around 71, whilst No. 11, from Wroxeter, has been dated to before 66 and identified by Holder as being the earliest record of a

[28] Richmond and Gillam 1951: 69-92.
[29] Nos. 1, 3, 4, 7, 12, 13, 14, 15, 17, 18, 19, 20, 22, 23, 25, 26, 30, 31 and 32.
[30] Blagg 2002: 154.

beneficiarius from Roman Britain.[31] The other examples cannot be dated more tightly than 1st to 4th century, although the example from Halton Chesters (No. 2) must date to after the 120s when the fort was built. A mid-late 3rd-century date has been suggested for Aurelia Aureliana's tombstone from Carlisle (No. 3) on the evidence of the shape of the 'O's.[32] The other three-dimensional pinecones from Hadrian's Wall with insecure contexts may be dated between the early 2nd century when Hadrian's Wall was built, and the late 3rd century, when stone sculpture becomes increasingly rare in the area. The example from Midfield Mains (No. 1) is thought to be Antonine in date, given its findspot near the fort of Inveresk. The possible flame stone from Vindolanda has been dated to the 3rd century on the evidence of the altars found in association.[33]

Those examples found on southern sites seem, at first sight, to be much later until it is realized that they tend to come from secondary deposits. No. 28 from Caerleon was found inside the fortress and is presumed to have been brought in to be re-used as building material[34] whilst the example from the villa at Holcombe, Devon (No. 32) came from the debris of a late 4th century phase, in part of the villa dated to the late 3rd or early 4th century.[35] The roof finial from Caerwent is considered to be late 3rd or 4th century but may have been repurposed from another building,[36] and one of the Southwark stones (No. 31) came from a 4th-century pit; its original site is unknown.

A statistician might not consider 11 tombstones and 32 three-dimensional stones as being a viable group on which to base any analysis, but the examples discussed above make it clear that all stone ovoids should not be immediately identified as either pinecones or funerary motifs, whilst some may be more comfortably seen as flames. It is also clear that those stones which can be identified as pinecones, particularly those with additional snake motifs, should be borne in mind when discussing the cult of Attis in Roman Britain – although other deities are available.

Acknowledgements

I am grateful to Jeremy Paterson, Ian Haynes and Barbara Birley for their input into this paper.

[31] Holder 1982: 49; 75; pl. 10.
[32] *CSIR* I.6: no. 493.
[33] *CSIR* I.6: no. 454.
[34] *CSIR* I.6: no. 26.
[35] *CSIR* I.7, part II: no. 11.
[36] *CSIR* I.5: no. 89d.

Bibliography

Ancient sources

Ovid *Metamorphoses,* translation by Brooke More 1922.

Demosthenes *De Corona,* translation by C.A. Vince and J. H. Vince.

Modern sources

Blagg, T.F.C. 2002. *Roman Architectural Ornament in Britain* (British Archaeological Reports British Series 329). Oxford: Archaeopress.

Coulston, J.C. 1997. The stone sculptures, in R.J.A. Wilson (ed.) *Roman Maryport and its Setting*: 112-131. Maryport: Trustees of the Senhouse Roman Museum and Cumberland Westmorland Antiquarian and Archaeological Society.

CSIR I.1 = Phillips, E.J. 1977. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain 1, 1. Corbridge. Hadrian's Wall East of the North Tyne*. Oxford: Oxford University Press.

CSIR I.3 = Rinaldi Tufi, S. 1983. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World.. Great Britain, 1, 3. Yorkshire*. Oxford: Oxford University Press.

CSIR I.4 = Keppie, L.J.F. and B.J. Arnold 1984. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 4. Scotland*. Oxford: Oxford University Press.

CSIR I.5 = Brewer, R.J. 1986. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World.. Great Britain, 1, 5. Wales*. Oxford: Oxford University Press.

CSIR I.6 = Coulston, J.C. and E.J. Phillips 1988. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 6. Hadrian's Wall west of the North Tyne, and Carlisle*. Oxford: Oxford University Press.

CSIR I.7 = Henig, M., G. Webster, and T. Blagg 1993. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 7. Roman Sculpture from the Cotswold Region with Devon and Cornwall*. Oxford: Oxford University Press.

CSIR I.8 = Huskinson, J. 1994. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 8. Roman Sculpture from Eastern England*. Oxford: Oxford University Press.

CSIR I.9 = Henig, M., G. Webster, and T. Blagg 2004. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 9. Roman Sculpture from the North West Midlands*. Oxford: Oxford University Press.

CSIR I.10 = Coombe, P., M. Henig, F. Grew and K. Haward 2015. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 10. Roman Sculpture from London and the South-East*. Oxford: Oxford University Press.

Cumont, F. 1942 (1966). *Recherches sur le Symbolisme Funéraire des Romains.* Paris: Librairie Orientaliste Paul Geutner.

Darblade-Audoin, M-P. 2006. *Nouvel Espérandieu: II – Lyon (Rhône).* Paris: Académie des Inscriptions et Belles-lettres.

Espérandieu, E. 1907-66. *Recueil Général des Bas-reliefs, Statues et Bustes de la Gaule Romaine.* Paris: Imprimerie Nationale.

Evans, J., R.F.J. Jones and P. Turnbull 1991. Excavations at Chester-le-Street. *Durham Archaeological Journal* 7: 5-48.

Flower, B. and E. Rosenbaum 1958. *The Roman Cookery Book. A Critical Translation of the Art of Cooking by Apicius.* London: Harrap.

Hamnett, R. 1908. Excavations at the Roman camp of Melandra, 1906-7. *Derbyshire Archaeological Journal* 30: 319–23.

Henig, M. 1984. *Religion in Roman Britain.* London: B.T. Batsford.

Holder, P.A. 1982. *The Roman Army in Britain.* London: B.T. Batsford.

LS: Bruce, J.C. 1870-5. *Lapidarium Septentrionale*. Newcastle upon Tyne: William Dodd.

RCAHM 1962: *An Inventory of the Historical Monuments in the City of York. Volume 1, Eburacum, Roman York*. London: Royal Commission on Historical Monuments England/ Her Majesty's Stationery Office.

Richmond, I.A. and J.P. Gillam 1951. The temple of Mithras at Carrawburgh. *Archaeologia Aeliana* 4th series 29: 1–92.

Smith, G. 1748. Old Carlisle. *The Gentleman's Magazine* 18: 179.

Strong, E. 1911. The exhibition illustrative of the provinces of the Roman Empire in the Baths of Diocletian at Rome. *Journal of Roman Studies* 1: 1–49.

Toynbee, J.M.C. 1973. *Animals in Roman Life and Art.* Baltimore and London: The John Hopkins University Press.

Wilson, P.R. 2002. *Cataractonium: Roman Catterick and its Hinterland. Excavations and Research, 1958-1997, Part 2.* (Council for British Archaeology Research Report 128). York: English Heritage.

Paying the army: thoughts on the *Annona Militaris* and the supply of goods to the northern frontier in Britain

Richard Brickstock

This paper offers some thoughts from a numismatic perspective on the date of the introduction of the *annona militaris* and also on the date at which deductions ceased to be made from soldiers' salaries for food and equipment. It suggests that it was only with the collapse of the Augustan currency system in the later 3rd century that the Roman state resorted to equipping its provincial armies through a process of taxation in kind, without the necessity for monetary transactions. Diocletian, it will be argued, formalised rather than introduced the system, refining an already-existing situation; and thereafter the army was paid largely through a dual system of cash donatives and the operation of the *annona militaris*.

I have made a number of forays into this territory over several decades, most particularly my contribution to the Roman Archaeology Conference in Durham 1999 (Brickstock 2000); a paper for the *Coloquio International de Arqueologia en Gijon* in 2002 (a conference which I attended at the invitation of Paul Bidwell and his colleagues at Tyne and Wear Museums; Brickstock 2005); and a contribution to the Finds from the Frontier conference held in Newcastle upon Tyne in 2008 (Brickstock 2010). Throughout this period (and indeed both before and since) I have essentially adhered to the 'party line' espoused by the late John Casey, my mentor and later colleague at Durham University, namely that the action of the *annona militaris* (the collection and distribution to the army of taxation in kind rather than cash) had a depressing effect on the volume of coinage in circulation in the 4th century and hence also on the patterns of coin recovery observable on the northern frontier of *Britannia* and in military-dominated zones more widely. This idea was set out by John in his more general works such as *Roman Coinage in Britain* (1980; 1984) and *Understanding Ancient Coins* (1986); and followed by us in a number of coin reports (for example, Housesteads, a report originally penned in the 1980s and finally published in revised form in 2009; Brickstock and Casey 2009; 364).

Since then, however, my ideas on various aspects of the subject have continued to evolve, to the degree that it is perhaps time to question a fair proportion of what I have previously written, and which, at the time, I believed to be true – and it is in this light that the following thoughts are offered.

The area where most uncertainty lies is the situation that pertained in the 3rd century, from the time of Septimius Severus through to the reign of Diocletian. In the third of the papers mentioned above, I produced what I thought at the time was quite a clever piece of work, demonstrating (I thought) that there had been a 16-fold rise in prices from the time of the invasion of the north in the 70s AD through to the early 3rd century. This was based on the supposition that the dominant denomination in everyday transactions was, in the Flavian period, the *as* (worth 1/16th of a *denarius*), but that, by the time of Severus, fractions of the *denarius* had all but disappeared, leaving the *denarius* as the coin in day-to-day usage.

Richard Reece (1999: 129) had previously argued for 'very gentle inflation' over the 200 years between 7 BC and AD 193, at a rate of about 1% per annum (equivalent to a seven-fold hike in prices over that period), based on the disappearance of the smallest Augustan denominations (the *semis* and *quadrans*). Certainly, production of the smaller fractions had all but ceased by the time of Severus (only the *sestertius* was still produced in any quantity).

My own conclusion, however, seemed to me quite reasonable - a 16-fold price rise over 150 years was, after all, the equivalent of an annual rate of inflation of roughly 2%, and we had, in modern times, been used to seeing rates 10 times that on a regular basis. On reflection, however, this observation was coloured to an unreasonable degree by a modern perspective - and my conclusions, as a result, were just plain wrong.

Nobody really understands the root causes of modern-day inflation (though many might claim that they do), though it is relatively easy to identify some of the drivers that perpetuate it. But some of these – annual wage increments, annual pay claims, and the like – simply did not exist in the ancient world. One of the principal differences between then and now is that we use a token coinage rather than one based on the bullion value of the coins concerned. In the former, there is no direct link between value and metal content, but in the latter there is a direct and, in the Roman empire, an established relationship between gold, silver and copper (and indeed with other commodities) that is only disrupted by a definite change of circumstance –

for instance a shortage of silver bullion such as occurred in the later 3rd century.

For much of the 1st and 2nd centuries there were no massively significant events to disrupt the Augustan coinage system, nor any obvious reasons for fixed rates of pay to be altered either upwards or downwards (normally something driven by a surplus or shortage of labour) – with the very significant exception of the periodic pay rises accorded to the military in the reigns of Domitian, Septimius Severus and Caracalla. It is perhaps more sensible, therefore, to envisage rising prices spurred by these particular events, rather than the sort of gradual and inexorable inflation that we 'enjoy' today. Domitian raised pay by a third; Severus perhaps doubled pay (the size of the increase, between 50 and 100%, is not conclusively established); and Caracalla raised pay by a further 50%. This amounts to a (three- or) four-fold rise in military pay between the time of Augustus and that of Caracalla, a period of a little over two centuries.

How much did prices actually rise over the same period? The answer may well lie not in the quantities of particular denominations being issued at any given time (which was what informed my earlier thoughts) but rather the percentage of the various denominations present in archaeological assemblages at various dates.

David Shotter (2001) has drawn a distinction between early and later Flavian sites on the grounds (echoed by my own research) that *asses* are less common in later assemblages than earlier. If this is correct, the copper *as* was already starting to be replaced in day-to-day currency by the larger fractions of the *denarius*, namely the brass *dupondius* (1/8th *denarius*) and *sestertius* (1/4 *denarius*). Comparison between the histogram bars for 81-96 and 193-22 in Figure 1, a graph of the early coins from Corbridge (i.e. those minted before 260), certainly demonstrates the radical change in denominations *minted* over time: the 114 coins of 81-96 comprise some 58 *asses* (just over 50% of the total); 38 *dupondii* and *sestertii*; and only 18 *denarii* (less than 16% of the total). By contrast, all but three of the coins of 193-222 are *denarii*.

This change in the relative production of the various denominations does not, however, necessarily equate with the numbers actually in circulation. My research into the significance of circulation wear visible on the coinage of northern assemblages, much of that work undertaken in the last decade (i.e. since the production of the three papers referenced above), strongly suggests that, although production of base-metal coin was without doubt greatly reduced, large amounts of it remained in circulation well into the 3rd century.

A second graph of the well over 1000 coins minted before 260 recovered from Corbridge, this time graded according to suggested deposition dates based on circulation wear (Figure 2; following the methodology outlined in a paper presented to the Limescongress in Newcastle in 2009: Brickstock 2017), provides, to my mind, a clear illustration of this: the *denarius* made

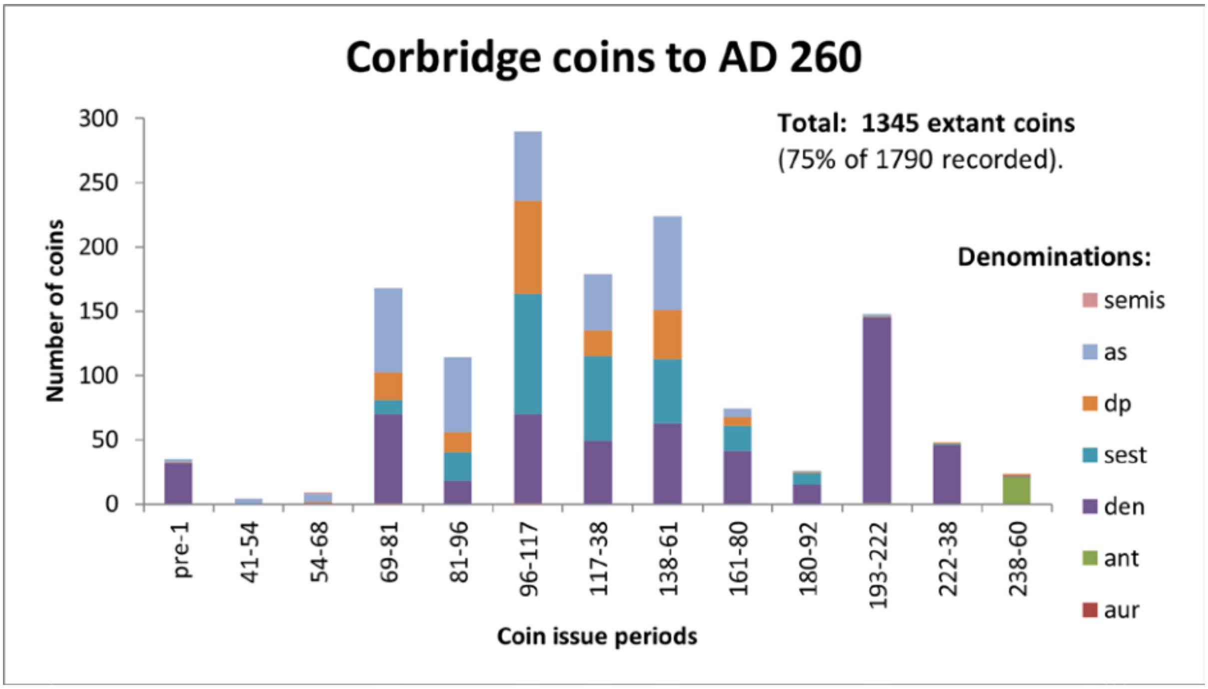


Figure 1. Corbridge coins minted before 260.

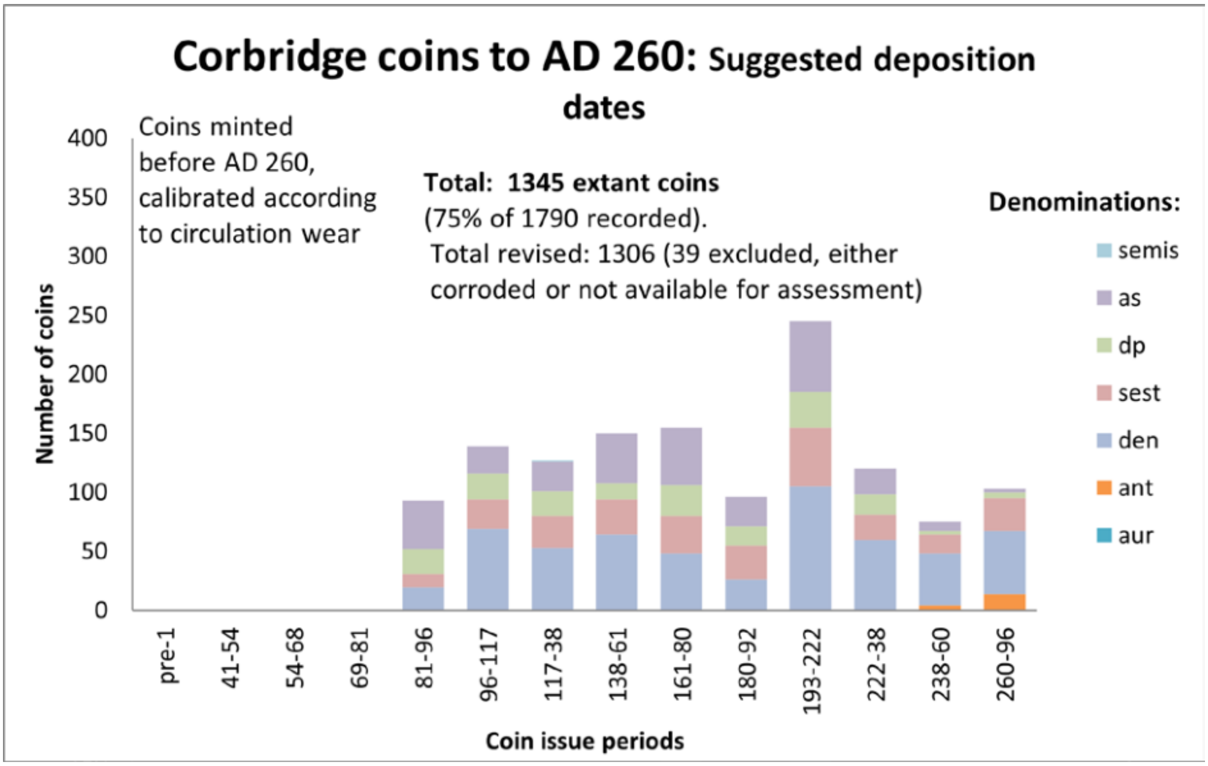


Figure 2. Corbridge coins calibrated according to circulation wear.

up a much larger proportion of finds in circulation in the 220s than it did in the 70s, but the *sestertius* and even smaller denominations still formed an important element of the currency in circulation.

Figure 2 presents a picture for 81-96 not markedly dissimilar to Figure 1: 93 coins are assigned by my methodology to 81-96 and of them 19 (roughly 20%) are *denarii*; 41 (44%) are *asses;* and the remainder *dupondii* and *sestertii*. When we come to 193-222, however, the situation is changed dramatically: 245 coins assigned to 193-222 include some 105 *denarii* (43% of the total); but more than half are of smaller denominations, including 60 *asses* (nearly 25% of the total). These percentages are illustrated in Figure 3, which indicates that the *as* made up a significant proportion of the currency pool well into the second quarter of the 3rd century; and that likewise the *denarius* did not outnumber the base-metal denominations until the same time (by which time the state was ceasing production of the *denarius* in favour of the '*antoninianus*').

These figures provide us with what I think should be a much more accurate measure of the rise in prices between the time of Domitian and that of Septimius Severus, namely the opportuntity to make direct comparison between the value of coinage in circulation at each period (always providing we accept that the volume of coinage deposited and recovered bears a direct relationship to the quantity in circulation). The coinage assigned to the period 81-96 by my methodology was worth just over 27 *denarii,* which, dividing by 15 years, gives us *c.* 1.8 *denarii* per annum – though given that Corstopitum is thought to have been founded in *c.* 85/86, that figure of 27 *denarii* should perhaps be divided by only *c.* 11 years, giving *c.* 2.5 *denarii*/annum. The equivilent figures for 193-22 are *c.* 123 *denarii*, divided by 29 years, which gives *c.* 4.25 *denarii* per annum.

If we divide the later value by the former, these adjusted figures suggest that the rise in prices over that period might have been no more than twofold, actually no more than might be expected if markets had simply adjusted upwards (without any such thing as annual inflation) to take account of the military pay rises over the same period. Domitian's pay rise (of 1/3rd, in 84) was already in place when Corbridge was founded; Severus' was of between 50 and 100%, so military pay had at most doubled; arguably, Caracalla's rise of a further 50%, following so swiftly on that of his father, may actually have taken military salaries significantly ahead of prices.

If this is true, it shines an entirely new light on the value of the rates of pay enjoyed by the military in the 3rd century: they may well have been little or no worse off than their 1st- and 2nd-century counterparts, even if, at that stage, a significant percentage of their salaries was still being deducted at source. This brings us back

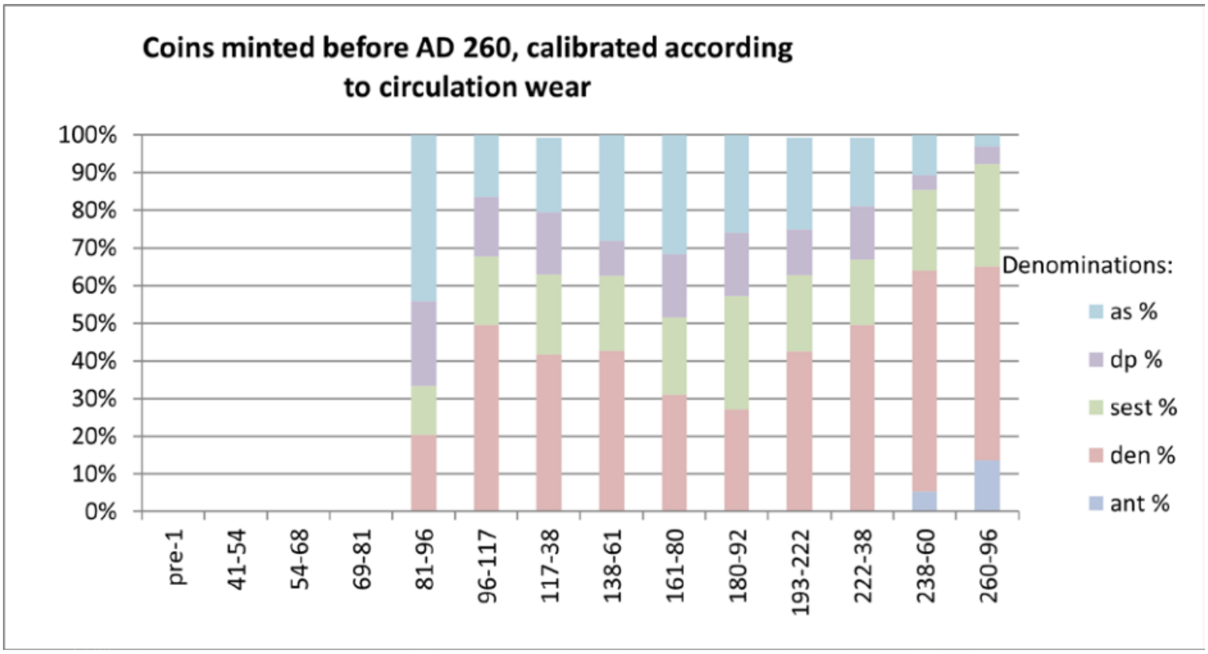


Figure 3. Corbridge coins calibrated according to circulation wear, expressed as percentages.

to the two great uncertainties in this discussion, namely the date at which deductions from pay for rations and equipment ceased; and the date of the introduction of the *annona militaris*, payment of the troops in kind (with or without deductions from their monetary salaries).

It is frequently observed that early- to mid-3rd century coinage is recovered from sites in only small quantities relative to periods both earlier and later. This is normally blamed on the process of debasement of the silver currency underway at the time (due to an increasing shortage of bullion empire-wide that had its roots in the geographical stagnation of the empire from the time of Trajan onwards), which resulted in the removal of much of the available currency pool through the hoarding of earlier, more silver-rich issues. However, I have some problem with this widely accepted notion (even though there are certainly numbers of hoards of the period that select types differentially), since the whole notion of coinage in the ancient world, indeed one of the main definitions of coinage, is that the stamp of the issuing authority was its guarantee of value (and bullion content).

Until such time as the general population were no longer able to accept that assurance, life could continue as normal – and the evidence of coin histograms across the province and beyond is that that moment came quite late, namely sometime in the 260s, perhaps only late on the reign of the 'Gallic' emperor Postumus in *Britannia* (since his early coins are still noticeably silvery), a realisation that the silver coinage was no longer anything of the sort, but a copper coinage thinly masked as silver. At that point, the age-old interface between gold, silver and base metal coinage was shattered and a major monetary crisis ensured (visible in the coin record with the enormous peaks of coinage in the later 260s and 270s and the epidemic of copying in the 270s and 280s).

The shortage of early 3rd-century coin observable in the archaeological record does not of itself indicate a shortage of coin in circulation at that period; further study of the histogram of suggested deposition dates for Corbridge (see Figure 2) indicates a situation between 200 and 260 not markedly dissimilar to that pertaining throughout most of the second century, with the lack of 3rd-century issues being compensated for by the continued circulation of 2nd-century bronze and copper alongside both earlier and contemporary *denarii* and newly-minted '*antoniniani'*.

This in turn suggests that any crisis in military pay did not really manifest itself until the collapse of the Augustan currency system, which destroyed, virtually overnight, the value of the military *stipendium*. At that stage, action was necessary, and I suggest that the full-scale introduction of the process of the *annona*, not only the cessation of deductions at source, but also the provision of many commodities in kind, belongs to that period. Imperial donatives (increasingly common from the mid-2nd century, if not earlier) may well have provided a reasonable amount of disposable income (not least because of the sheer number of short-lived emperors, all honour-bound to provide accession donatives if they wished to survive) – but a system such as Diocletian either introduced or formalised was certainly required. In the intervening years attempts were made to rectify the situation: Aurelian's coin reforms appear to have had little impact in Britain, but the usurper Carausius coined extensively in good silver, and presumably paid his troops in such coin.

So we ask again, what was the date of introduction of the fully-fledged *annona*? I would suggest that the rapid expansion of the system of local taxation and payment of the troops in kind must be a factor of the 270s – it was not required in preceding decades but at that time total chaos would have ensued without it (and that therefore, as many suspect, Diocletian's later action was by way of formalising a system that already existed on the ground). In that context it sits neatly alongside the wholesale local production (probably by the military) of small change, something that would allow day-to-day transactions in the market place to continue but which was wholly inadequate for any major expenditure such as the feeding or equipping of an army unit.

How well, then, does this theory tie in with the evidence on the ground?

The structural record is both substantial and instructive. Individual forts, of standard design, were always provided with substantial granaries (usually in pairs), capable of accommodating the entire storage needs of the resident unit - and copious evidence of these structures survives. Many of the most obvious surviving structures are 2nd-century or later, but 1st-century predecessors undoubtedly existed.

It is possible that the entire complement of coin due to a particular garrison was delivered to its fort (and stored in its strong room) and that the 'deductions at source' were made by the quartermaster in order to pay for supplies and equipment locally (though it is also perfectly possible, and I think highly likely, that some transactions were made in kind from the start). Perhaps more likely in the early years of occupation, however, is that 'deductions at source' were made further away, at Corbridge or even York, where the redistribution service in the north began, and that thus the coinage actually received at the garrison forts was only the disposable element passed on to the soldiers themselves.

Warehouses, such as that excavated at Wellington Row, lined the river banks opposite the legionary fortress at York, and formed the initial embarkation place of incoming goods. These were operative from the later-1st century through to the 4th century – but some at least (including that at Wellington Row) were abandoned and derelict by the mid-4th century, suggesting that their original purpose was now redundant.

Navigable rivers were no doubt made use of as far as possible for moving produce of all kinds north and west: the Swale appears to have been accessible to Roman barges as far as Bainesse Farm, just south of Catterick, and this was perhaps the principal reason for the settlement there (Wilson 2002). Further onward distribution of goods relied on the Roman road network, principally Dere Street, running north to Corbridge, which appears to have been the major collection and redistribution point for the both the Stanegate and Hadrian's Wall (the route across the Stainmore to the western coast being slightly shorter but considerably more onerous).

At Corbridge, two enormous granaries, replacing earlier structures immediately below and/or elsewhere on the site, probably date to the period of reconsolidation in the 160s that followed the abandonment of the Antonine Wall. They appear overlarge for the size of town that existed in the mid-2nd century, and their primary function was surely as an integral part of the redistribution network, serving the military installations of the Stanegate and Hadrian's Wall; and the great unfinished storehouse complex adjacent to them likewise. The dating of these two sets of structures is perhaps instructive; the granaries were in active use until the late 4th century at least; the storehouses, or at least the southern portion of them abutting the E-W road, also appear also have been in active use throughout that period, though it is a moot point whether in a storage capacity or as a series of market stalls lining the road. Figure 4 (to be discussed further in another paper; Brickstock *in prep*.) graphs the coin finds from the granaries (Sites VII and X and the alleyway between them), again providing suggested dates of deposition based upon observed circulation wear. Significant peaks in the late Flavian and Trajanic period, in the 160s and 170s, and again in the Severan period, may reflect the foundation date of the site as a whole (rather than necessarily belonging to pre-Antonine buildings in that location, though the suggestion is attractive); the building of the granaries in the 160s; and re-building in the Severan period.

Although most items probably passed through Corbridge, the closest Wall fort, at Chesters, in all probability provided the forward distribution point for deliveries of coin: a fort provided far greater security for such valuable goods, and substantial wagon wheel-ruts on the threshold of the large strong-room at that site suggest that, from the Antonine period onwards at least, shipments of coin were delivered there (and this function would have been required for the distribution of imperial donatives even when the *annona* was in full swing). The second, more substantial, bridge across the Tyne, once thought to be Severan, has now been re-dated to the 160s (Paul Bidwell, *pers. comm*.): this bridge would have been capable of carrying much heavier loads than it's predecessor, allowing heavy wagons to pass directly across to the fort on its west bank in a way hitherto probably not possible.

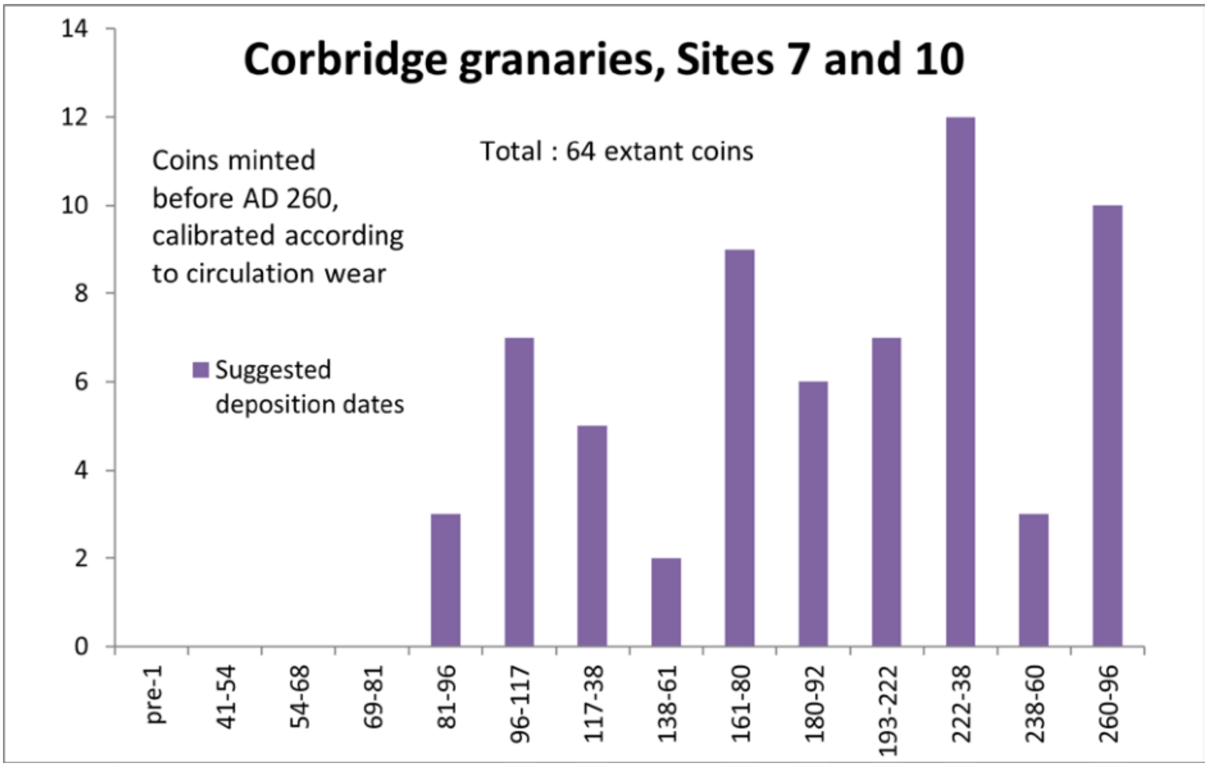


Figure 4. Coins from the Corbridge granaries.

Initially this supply network must have been essential, for, although much of the area is thought to have been intensively farmed prior to the Roman conquest, it is highly unlikely that the local population could have produced sufficient surplus to accommodate the needs of a garrison of thousands spread across the north. Individual forts on the standard model all had their own substantial granaries, sufficient in size to store both the grain and other commodities required by the unit, but the vast majority of that produce must have been brought in from afar for at least the first generation or two of occupation. Thereafter, with the gradual integration of the military establishments and their *vici* into the local landscape and population, a greater percentage of produce might have been supplied, bought and/or requisitioned locally (with or without the exchange of coinage) – and the surviving field systems (of Roman and later date) visible around Corbridge, Housesteads and elsewhere hint at that change.

The great supply centre at South Shields, established by Septimius Severus to secure the supply lines for his incursions into *Caledonia*, was presumably designed to do just that, rather than replace the already existing supply chain supporting the Wall and its hinterland. However, once that sea route to the Tyne had been successfully established, supply of goods to Corbridge by that route (certainly significantly less onerous, but perhaps hitherto viewed as insufficiently safe) would be a logical proposition once Severus' campaigns had come to an end. This situation cannot have lasted indefinitely, however, since a fire is thought to have destroyed most of the storage capacity of South Shields sometime late in the 3rd century (I would suggest perhaps sometime in the 270s, given the relative lack of small Radiate copies, product of the later 270s and early 280s); and it appears never to have been fully restored (since the rebuilding, probably early in the Tetrarchic period judging by the apparent over-representation of coinage of that period, saw the conversion of granaries into barracks). Whether this is because the earlier supply routes via Dere Street had been reactivated, or whether large-scale imports had become a thing of the past (or both) is a matter for debate: garrisons may well have been significantly smaller by this date (allowing, for example, the conversion of one of the pair of granaries at Vindolanda to alternative use); and the local hinterland may well have been capable of providing many of their basic needs (a local *annona*, in practice, with taxation in kind rather than in coin, complemented by markets adjacent to, and even inside, military establishments as well in Corbridge).

Much of this, and other detail besides, seems to me to sit very comfortably with a process of supply that continued to work as established without need of any major modification - until the crisis of the 270s, after which it was 'all change'.

Bibliography

Brickstock, R.J. 2000. Coin supply in the North in the late Roman period, in T. Wilmott and P. Wilson (eds) *The Late Roman Transition in the North*, papers from the Roman Archaeology Conference, Durham 1999 (British Archaeological Reports Series 299): 33–37. Oxford: Archaeopress.

Brickstock, R.J. 2005. Currency circulation in the north east of Britannia, in C.F. Ochoa and P.G. Diaz (eds), *Unidad y diversidad en el Arco Atlantico en Epoca Romana*, (British Archaeological Reports International Series 1371): 229–233. Oxford: Archaeopress.

Brickstock, R.J. 2010. Coins and the frontier troops in the fourth century, in R. Collins and L. Allason-Jones (eds), *Finds from the Frontier: Material Culture in the 4th-5th Centuries,* (Council for British Archaeology Research Report 162): 86–91. York: Council for British Archaeology.

Brickstock, R.J. 2017. Continuing the search for an 'Antonine Gap' on Hadrian's Wall, in N. Hodgson, P. Bidwell and J. Schachtmann (eds) *Roman Frontier Studies 2009, Proceedings of the XXI International Congress of Roman Frontier Studies (Limescongress) held at Newcastle upon Tyne in August 2009* (Roman Archaeology 25): 331–335. Oxford: Archaeopress.

Brickstock, R.J. in prep. *Coins from Vindolanda, Corbridge and the Stanegate*.

Brickstock, R.J. and P.J. Casey 2009. The coins, in A. Rushworth, *Housesteads Roman Fort – the Grandest Station*: 363-429. Swindon: English Heritage.

Casey, P.J. 1980. *Roman Coinage in Britain.* Aylesbury: Shire Publications.

Casey, P.J. 1984. *Roman Coinage in Britain*, 2nd edition. Aylesbury: Shire Publications.

Casey, P.J. 1986. *Understanding Ancient Coins*. London: Batsford.

Reece, R. 1999. *The Later Roman Empire, an Archaeology AD 150-600*. Stroud: Tempus.

Shotter, D. 2001. Petillius Cerialis in Carlisle: a numismatic contribution. *Cumberland and Westmorland Antiquarian and Archaeological Society* 3rd series 1: 21–29.

Wilson, P.R. 2002. *Cataractonium, Roman Catterick and its Hinterland* (Council for British Archaeology Research Report 129). York: Council for British Archaeology.

Pot mends and repaired pottery from South Shields Roman Fort

Alex Croom

'Pot mends' are metal fittings used to repair ceramic vessels, used from prehistory to the modern day. They, or the evidence for their use, are a feature of any sizeable assemblage of Roman pottery, although the proportion of mended vessels was always small. The three main types of pot mends were plugs for filling holes, and two forms of tenons and staples (here called cleats and rivets) for repairing cracks and breaks.[1] The assemblage at South Shields consists of 112 possible examples recovered from excavations carried out between 1875 and 2013, and come from the fort, *vicus* and cemetery.[2]

The types of repairs that used pot mends

To fill a hole

It was accepted practice in the Roman world to deliberately hole vessels, with the intended use varying according to the position of the opening; small holes can be made by carefully hammering a nail, knife-tip or other sharp implement held at an angle, which can then be enlarged, if required, by chipping away the edges.[3] Literary evidence suggests holes in vessels (made pre- or post-firing) were generally related to food preparation, such as a hole near the base to drain off the whey when making curds, a hole in the side used in the preparation of *garum*, and one near the neck when producing butter, although a hole in the base was also used for flowerpots.[4] As it is difficult to pierce a vessel accidentally without breaking the whole pot it is probable plugs were not used to mend non-deliberate holes but were used instead when the original use of the holed vessel was no longer possible, such as when liquids were absorbed into the fabric of the vessel, but the pot was still suitable for other purposes.[5]

To reinforce a crack

Some repairs reinforced hairline cracks to stop the vessel breaking apart. Such cracks could be the result of accidental damage but also manufacturing weaknesses from the drying or firing processes.[6]

To repair broken vessels

Vessels, especially bowls and dishes, might have a section of the rim or wall re-attached, or vessels that had broken into two or three large pieces were stitched back together; three or five pot mends per vessel are common, with two near the rim, two near the base of the wall and one in the base (cf. Figure 1, no. 20).[7]

Material used in repairing pottery

Lead

This is the most common (surviving) material. It was used for plugs, cleats and rivets and in many cases was clearly poured onto the pot in liquid form. The metal melts at a relatively low temperature so repairing a vessel would not need a specialist workshop, although it would require some level of skill with liquid metals and tools such as a vessel for the liquid lead, tongs and a ladle. A temporary wall made of some material such as clay was used to stop the liquid lead flowing away. The use of malleable lead strips used as staples or ties would require less work, but appears to be a much rarer practice; there are no examples from the site.

Copper alloy

The higher melting point of copper alloy would make molten pot mends unfeasible outside metalworking workshops, so pre-cut strips or (possibly) wire were used. Very few examples of Roman vessels repaired with copper alloy are known and the form the pot mend took is not always clear, although riveted strips were

[1] See below for descriptions of these different types of pot mends.

[2] Most of the complete lead examples come from the Victorian excavations. While many of these could have come from secure Roman layers they now have no context details and some uncertainty must remain over their dating. However, while lead pot mends (perhaps exclusively in the form of plugs) were used in the medieval period and possibly slightly beyond, very little medieval material has been recovered from the site and only a small amount of early post-medieval material, as the site was open fields until 1874.

[3] Spalling occurs on the opposite side. South Shields has at least two examples of untrimmed holes in the sides of closed vessels (Croom and Caffell 2010: figs 3-4) and six examples of pecked holes, usually sub-rectangular and up to 19 mm in length, in the bases of both bowl/dishes and cooking pots.

[4] Curds: Columella, *On Agriculture*, 12.8.1-2; *garum*: Fulford and Timby 2001: 295; butter: Pliny, *Natural Histories*, 28.35; flower-pots: Pliny, *Natural Histories,* 17.11.64. Other possible uses include funnels or sieves for domestic or industrial purposes such as butter and cheese-making, brewing, timing devices, money-boxes and holes for suspension (Perry 2012: 45-6; Seager Smith *et al.* 2011: 124; Fulford and Timby 2001: 295-6).

[5] Cf. Perry 2012: 49. Horace noted that 'unless the vessel is clean, whatever you pour in turns sour' (*Epistles,* I.2.54), and Persius mentioned wine that had been spoilt because the pitch lining the pot had gone bad (*Satires*, 5.146-7).

[6] Peña 2007: 229.

[7] The numbers used in the figures relate to the catalogue numbers.

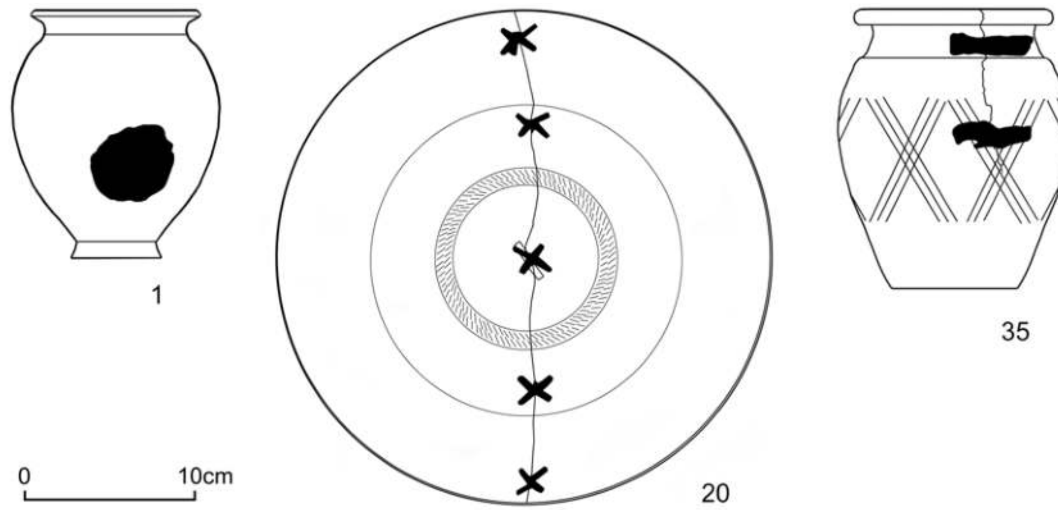


Figure 1. The types of pot mends used on the site. 1: beaker with plug; 20: samian bowl with cleats (restored); 35: cooking pot with rivets. Scale 1:4.

used in the very late Iron Age in southern England, and an example from Caernarfon is described as a 'staple'.[8] There are no examples from South Shields.

Iron

The use of iron is rare, but not unknown. J. Evans has noted examples of iron staples on both samian and coarse wares in Wales.[9] There are no examples from South Shields.

Glue

The number of vessels repaired using glues will be under-represented as purely organic glue does not often survive. There were various types available:

a) birch bark tar and other plant tars/resins.[10] Birch bark tar has been used in the past to waterproof ceramic vessels so joins were presumably waterproof, although unlikely to survive being reheated if the pot was used for cooking.

b) Cato refers to filling the cracks in the massive jars (*dolia*) used in wine production with a putty made of wax, resin, sulphur and gypsum in conjunction with either lead pot mends or a binding (or ties) of oak strips.[11] As he says the repaired vessels could be used for wine, the repairs must have been waterproof.

c) A lime and albumin mix has been used in more modern times for mending pottery.[12] This mixture was also known in the Roman period in connection with mending glass, so may have also been used on pottery.[13]

There is at least one possible example of plant tar from South Shields, but it has not yet been analysed.[14]

Leather/thread/sinew

Organic ties made from thread, leather or sinew have been used in the past to repair pots, and an example with surviving string criss-crossed between four holes comes from Mons Claudianus in Egypt; the presence of four close-set holes would help identify this technique.[15]

Pot repairers

Pots held together with organic cords could be easily repaired by any-one with access to a drill to create the holes, but the metal mends required more equipment and it is possible many were carried out by professionals. From the medieval period onwards street traders, and later shops selling pottery, repaired ceramic and glass vessels,[16] and a possible Roman workshop repairing and recycling samian vessels has been identified at Kempston

[8] Iron Age: imported Roman flagon at Verulamium: Stead and Rigby 1989: fig. 92, no. 24.2, grave dated *c.* 30-55; Caernarfon: King and Millett 1993: 240, no. 103 (not illustrated); it is unclear if this is a wire staple of the type used widely from the post-medieval period to the present (Garachon 2010: 36; fig. 4). See also Willis 2005, appendix 11.1 (samian vessels from Piercebridge and Baldock, not illustrated); McKinley 2005: 31 (grey ware bowl also mended with pitch or resin, not illustrated).

[9] Willis 2005: 11.4.

[10] At Springhead it was pure birch bark, but at other sites animal fat and beeswax were added: Seager Smith *et al.* 2011: 125.

[11] Cato, *On Agriculture*, 39. He recommended mending the vessels on bad weather days when outdoor work was impossible.

[12] Garachon 2010: 42; Eggert and Straub 2009: 5.

[13] Eggert and Straub 2009: 5. A 15th-century source said it was resistant to boiling water, although modern experiments found some samples failed after a number of weeks: Eggert and Straub 2009: 5-6.

[14] A samian bowl: SF no. P295.

[15] Peña 2007: 245.

[16] Garachon 2010: 41-6.

Figure 2. Examples of pot mends. 1: plug with shrinkage lines; 6: rectangular cleat; 10: 'W' cleat; 20: 'X' cleat, all © Arbeia South Shields Roman Fort; 35: exterior and interior views of a two-bar rivet, © Great North Museum: Hancock.

Church End, Bedfordshire, where both dove-tailed cleats and drilled holes were used.[17] At South Shields the lead could in theory have been melted over any open fire, although access to a vessel to act as a crucible and suitable tools would also be required. Since for many years lead was routinely melted to produce the sealings used on packaging, there were certainly people inside the fort who had experience of pouring molten lead into small moulds and onto different types of materials.

Types of pot mends and repairs

Plug (Figure 1, no. 1, Figure 2, no. 1)

These were used to fill a hole, usually quite large, in the wall or base of a vessel, which was generally an enclosed coarse ware pot. The plugs were made of lead, roughly circular or oval, with a large head on the exterior and a smaller foot on the interior, both of which projected above the surface of the vessel. They were made by pouring hot metal onto the pot.

This type of plug continued to be used in the medieval periods and, unless some of the pot survives with the plug, are difficult to date. There is one example from the Victorian excavations at the fort which seems likely to be medieval (Figure 3). Medieval plugs often have very irregular feet where the liquid lead was not properly confined, and can have cloth impressions from where rags were used to constrain the lead during casting.[18] The Shields example has what looks like a wood grain impression, but the surface of the lead is curved as well as looking too uneven to have rested on a piece of wood, and this could be the impression of corded cloth.[19]

There are only three examples of plugs from South Shields, excluding the possible medieval example, making them the least common type of repair. In contrast, at the town and religious complex at Springhead plugs were by far the most common type.[20] It is possible that holed vessels were less common at the fort because they were used in the preparation of something such as butter or beer that was supplied ready-made to the army and not manufactured on site, or was a foodstuff that was not part of the military rations.[21]

Figure 3. Cat. no. 4: lower surface of possible medieval pot mend with cloth impression. Scale 1:1.
© Arbeia South Shields Roman Fort.

Cleat (Figure 1, no. 20)

Cleats (or tenons) were small lead fittings, rectangular, dove-tailed or X-shaped, that sat in slots cut into the broken edges of the sherds. The slots were sawn or filed, some apparently to or from a drilled hole. As the cleats did not project above the surface of the vessel they were much less intrusive than plugs and rivets, but also not as strong.[22] They were only used on samian vessels and represent examples where the look of the finished bowl was considered important. Whilst it would be possible to use cleats on a cracked vessel it is likely they were generally used on broken vessels.

The cleats in the South Shields assemblage were divided into three categories: there were at least four oval/rectangular cleats, seven 'W' (with two usually short arms set at a slight angle) and five 'X' (longer arms set almost at right angles).[23] All types were used on both plain and decorated wares. The arms of the rectangular cleat are only 3 or 4 mm long,[24] and provide the weakest but most unobtrusive form of cleat. The arms of the W cleats range from 3-6 mm in length, while those of the X cleats were the longest, from 6-10 mm, although on at least two examples the arms are of unequal length.

Rivet (Figure 1, no. 35)

These are usually roughly rectangular on the exterior, with projecting shanks at either end set in holes drilled into the vessel wall on either side of the break. The majority of the examples from South Shields are

17 Wild 2013: 271-2, online figs 1-2.
18 Cf. Egan 1998: fig. 188, nos. 733, 739.
19 Egan 1998: fig. 188, no. 739. Cloth impressions are occasionally found on Roman examples: Biddulph *et al.* 2011: 247.
20 Biddulph *et al.* 2011: 247.
21 Curds as a foodstuff (rather than as ingredient for cheese) is one possibility. Although cheese-presses have been found on the site, their low numbers suggest only small-scale production of cheese, at least using this type of vessel.

22 Willis 2005: 11.1.
23 Most have four arms, but they can have more.
24 Measured from the broken edge of the sherd.

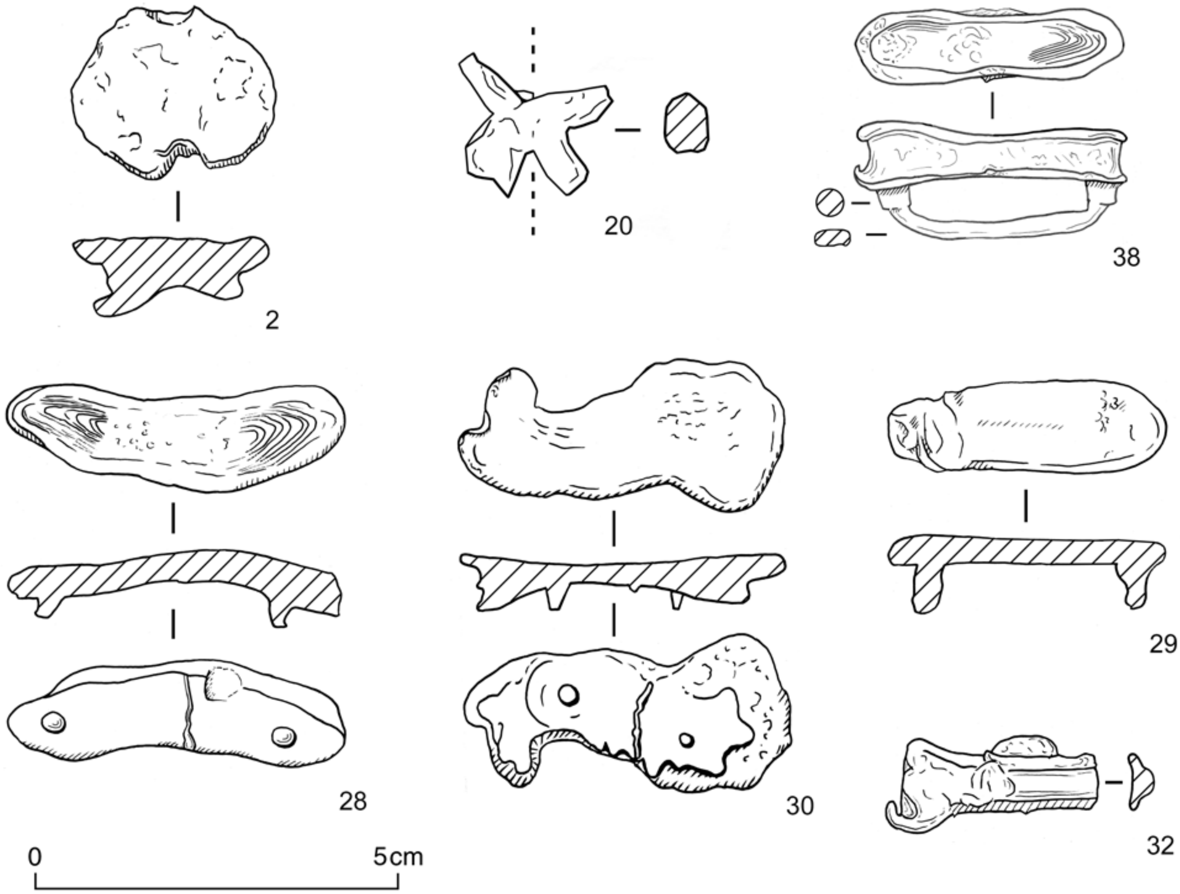


Figure 4. Examples of pot mends. 2: plug; 20: 'X' cleat; 38, 28, 30: curved cleats showing shrinkage lines on the upper surface and ridges from sherd joins on the underside; 29: flat rivet; 32: rivet with flanged D-sectioned bar, including part of the circle of lead filling the large rivet hole in the wall of the mortarium (on exterior of vessel). Scale 1:1.

unstratified, but this type of repair does not appear to have been used after the Roman period. They were used both on cracked and broken vessels, on both open forms such as bowls and enclosed forms such as cooking pots. They were frequently very obvious, and could be quite bulky, with the bars often projecting 5 mm above the surface of the vessel and occasionally up to 9 mm (Figure 4, no. 38; cf. Figure 2, no. 35, where a very similar rivet projects 7 mm).

Those at South Shields show two different production methods, both involving pouring molten lead onto the pot using temporary moulds of some type. The majority of examples have a 'flat' head, often slightly dished, with solidification shrinkage lines on the surface where the lead has cooled, with a back bar of a D-shaped cross-section, often with flanges on either side (Figure 4, nos. 28, 30, 38). Less common on the site are rivets with a flanged D-sectioned head as well as back bar, a type known from other sites (Cat. no. 36; cf. Figure 4, no. 32). In this assemblage the flat-headed type appears to be mainly late in date and the D-sectioned heads earlier, but the number of definite and dateable examples is low. There are no obvious examples of 'staples' made from wire.[25]

Two-bar rivet

The shanks projecting from the head on the exterior are joined by a narrow strip on the interior, forming a continuous cast loop. Some may have had a strip of lead wire threaded through the holes from the interior which was then held in place by the liquid lead used to make the head and shanks, although the difference between shank and back bar could just be the result of the shape of the mould made for the bar (Figure 2, no. 35; Figure 4, no. 38). The solid loop makes a very strong bond.

[25] In the post-medieval period this was a very common method of repair, often carried out by specialist workers. Usually the holes did not go all the way through the wall, and as far as possible the staples were attached to the underside of vessels so as not to be visible. The Romans always drilled the hole fully through.

The rivets are found in a number of forms:

One-bar rivet

Cast examples can have short, tapering shanks (Figure 4, no. 30).[26] It is unclear if this gave a strong enough repair in itself and these are complete staple-type rivets, or if they were originally part of two-bar rivets.

One-bar rivet with possible disc-headed shanks

The ends of the shanks expand at the end, but it is difficult to be certain these are not incomplete two-bar rivets.

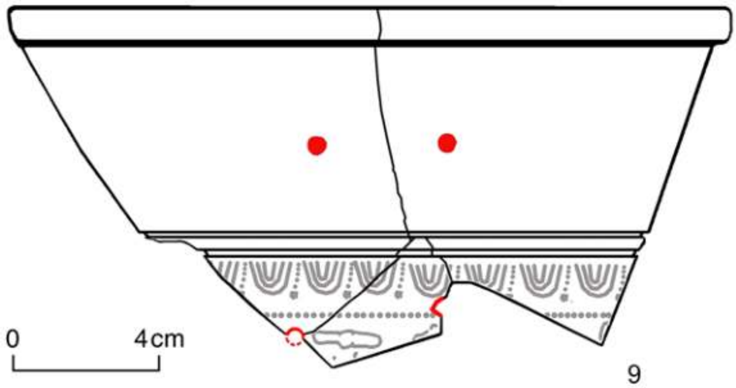


Figure 5. Cat. no. 9: bowl with remnants of lead in two rivet holes, part of a third hole and part of a possible cleat arm, shown in red. Scale 1:2.

There are 22 examples of rivets still *in situ* in the assemblage, although usually this is no more than the remnants of corroded lead within the holes, or traces of lead round the hole.[27] There are also ten examples of lead pot mends without any surviving pot, only one of which definitely comes from a stratified Roman layer.[28] Usually the rivets are curved on the lower surface, where the lead has solidified on the surface of the pot, sometimes showing the position of the crack between the two sherds (Figure 4, nos. 28, 30). One unstratified example is totally flat (Figure 4, no. 29). It may have been used as a pot mend placed vertically on the lower part of a large vessel where there was little curvature of the wall, but is not certainly a pot mend.[29]

The holes for the rivet shanks were drilled from anything between 7 mm to 15 mm away from the breakage edge, with one example possibly as much as 20 mm, but most examples are between 9 and 12 mm.[30] One of the complete lead rivets without any pot surviving shows that the distance was not always the same on either side of the break, with the shanks being 7 and 10 mm from the edge (Figure 4, no. 30). Two coarse ware cooking pots and one flanged bowl have holes drilled 17-20 mm from the nearest broken edge, so they either had unusually long rivets or these holes were not used as repairs.

Table 1. Types of repair, by fabric categories

Type	*samian*	*mort*	*CW*	*no pot*	*totals*
Plug	-	-	1	2	3
Cleat	23	-	-	-	23
Rivet	13	2	8	10	33
Totals	**36**	**2**	**9**	**12**	**59**

Key: CW = coarse wares; mort = mortaria;
no pot = no surviving pot

Generally only one type of repair was used on a pot. There is only a single example (Cat. no. 9) where both rivets and cleat appear to have been used (Figure 5), although as there seems to be no advantage in mixing the two this may represent two separate repairs, even though the more obtrusive rivets appear primary.

The assemblage

Currently there are records for 112 possible pot mends from the site, of which 103 were available for study. These are divided between those with clear evidence of repair (with surviving lead, or sawn slots in samian ware) and those with a single hole without any trace

Table 2. Breakdown of possible pot mends from South Shields (excluding possible medieval example)

Classification	*no of examples*
Lead pot mend without any surviving vessel	13
Ceramic vessel with clear evidence of repair	46
Ceramic vessel sherds with single drilled hole	44
Totals	**103**

[26] There are no examples with long shanks that could be bent inwards on the interior.
[27] There are also four examples where the position of the holes suggest it was a pot repair, although no lead survives. The blanket term 'lead' is used in this paper to include lead and its alloys. The surviving lead is often more corroded than most of the lead from the site and analysis would be useful to see if a particular alloy was preferred for pot mends, or whether it was just a case of whatever scrap lead was available.
[28] While lead plug pot mends were used in the medieval period and just occasionally up until the 17th century (see Portable Antiquities Scheme NMS-AA58EC; NMS-FFB905; SF-44B5D0), the rivet seems to have been used only in the Roman period.
[29] It is also possible this was a pre-cast pot mend that was bent to shape before being attached to the vessel by a molten bar on the interior of the vessel.
[30] The distance was measured from the centre of the hole or rivet, as the actual edge of the hole was not always clear if the mend was still in position.

Table 3. Categories of pottery represented, in vessels with clear evidence of repair and those with a drilled hole

Category	*Repaired*	*Drilled*
Amphorae	0	1
Samian	35	27
Mortaria	2	1
Fine wares	0	1
Coarse wares	9	14
Totals	**46**	**44**

of lead (Tables 1-2). Since the proportion of different fabric types of mended holes and those with only drilled holes are very similar (see Table 3), it is likely that most of the drilled vessels were used to mend pots but either the lead has left no trace or organic material was used. The number of coarse ware vessels with drilled holes is much larger than those with definite repairs, and it is possible organic material was more commonly used to repair this type of cheap vessel, a task easier to carry out than repairs requiring liquid lead.

The diameter of the holes used on definite repairs ranged from 2 mm to *c.* 9 mm, but were most commonly 3-4 mm. The diameter of holes on vessels without clear evidence of repair ranged from 2 to 6.5 mm, but again were most commonly 3-4 mm, so there is no distinction in hole size between the two. All the holes above 6mm were in vessels with thicker walls (mortaria and amphorae). Holes of about 3-4 mm could be used for other purposes, such as suspension of the vessels, but the distance of the holes below the rim (where present) was no different to the distance noted on definitely repaired vessels.[31]

It is therefore very difficult to identify a single drilled hole as being from either a repair or some other function. There are a few vessels in the collection with drilled holes that might not have been used for pot mends. A Crambeck reduced ware flanged bowl had one hole 7 mm below the rim with another hole just below it drilled through the flange, and two cooking pot body sherds had holes 17–20 mm away from any broken edge, which would have required unusually long metal rivets, although all three could conceivably have been used with organic ties, while a samian dish (form 18/31) with a hole drilled through almost the exact centre of the base, has the slip on the underside worn away in a *c.* 6 mm wide band round the hole and must have had some other use.[32]

Amphorae would only be repaired for a re-use other than transportation, and since the number of re-used vessels was presumably low, the number of such repurposed vessels needing repair lower still. Mortaria were occasionally repaired, but infrequently, and all three examples are likely to be late in date.[33] The low numbers of repaired fine wares (mainly drinking vessels) suggest drilled repairs were not considered waterproof and there were few alternative uses for this type of repaired vessel. It is, however, possible that glue was used when waterproof repairs were required.[34]

Percentage of vessels repaired

It is only possible to work out the percentage of vessels repaired by sherd count for the assemblage of pottery from the *vicus* outside the south-west gate.[35] The number of definitely repaired samian sherds from there makes up 1.7% of the total (641 sherds), rising to 2.5% if drilled vessels are also included. There were only two drilled vessels from the other categories of pottery (4844 sherds, excluding amphorae), plus a plug without surviving pottery.

Stratified examples

The earliest context to produce a repaired vessel (Cat. no. 36) was a road dating *c.* 163-205. While this is a coarse ware cooking pot most of the repaired vessels coming from stratified contexts are samian, with the majority of the coarse wares with definite repairs only coming from contexts dating to the very late Roman period or from unstratified contexts. It is therefore more useful to look at examples according to the date of the pottery itself (Table 4).

Early 2nd to early 3rd century

Samian

Most of the repaired pottery that can be dated to this period is samian; there were at least 38 examples. It is the most common type of pottery repaired on all sites, including here, either because it was more valued

31 Drilled holes ranged from 6-33 mm below the rim, cleats and rivets were 10-31 mm below the rim. Drilled holes closest to the rim include a very varied range of vessel types: a form 33 samian cup (6 mm), a poppyhead beaker (7 mm) and a samian form 18/31 or 31 bowl (8 mm).

32 Dickinson 1983: stamp no. 17. As the base is incomplete it is not clear if there was only a single hole. A body sherd from a calcite-gritted ware cooking pot also appears to have a faint circular groove worn into the surface round a hole (context 22781).

33 It is possible the complete rivet Cat. no. 41 also came from a mortarium, as it comes from a vessel with a wall thickness of *c.*8mm, the head has squared ends, and the shanks have a wide diameter at the top (12 mm), very similar to the two definite rivets used on mortaria (cf. Figure 4, no. 32).

34 Numerous cultures have used plant-based resins and tars to waterproof ceramic vessels, so repairs using such materials were presumably also waterproof: Regert *et al.* 2019: 1553, 1563. Albumen and lime cements are also said to be waterproof: Eggert and Straub 2009: 5.

35 The quantification by sherd count of the whole assemblage cannot be given, as sherd numbers were not recorded on pottery originally catalogued in the 1980s and early 1990s.

Table 4. Repaired and drilled vessels by fabric (the dating as listed has been refined or sub-divided in some fabric categories either by the dating of the vessel forms represented or the date of the context)

Fabric	*dating*	*repaired*	*drilled*
Amphora			
	Baetican C1 – late C3	-	1
Samian	C2 – mid C3	35	27
Mortarium			
	Catterick C3	1	-
	Catterick tradition *c.* 250+	1	-
	Crambeck white *c.* 270+	-	1
Fine wares			
	Poppyhead beaker late C1 – mid C3	-	1
Coarse wares			
	Unsourced reduced C2	1	-
	Unsourced flagons C2 – early C3	-	1
	BB2 and related late C2 – late C3	-	4
	BB1 *c.* 250+	-	1
	Crambeck reduced *c.* 270+	3	2
	Calcite-gritted *c.* 270+	1	2
	Crambeck reduced *c.* 370+	-	1
	Calcite-gritted *c.* 360+	1	-
	Fabric B18/G18 C4	2	-
	Unsourced oxidised	1	-
	Unsourced reduced	-	3
Totals		**46**	**44**

because of its appearance or cost, it was more expensive to replace, or because its open forms were easier to repair than closed forms.[36] Due to the nature of its slip and the fact that it was not made in forms intended for cooking, the vessels must have had a much longer use-life than other types of earthenware vessels, which may have made the idea of spending time or money on a repair more worthwhile. Generally the rivet method is more common than the cleat on samian,[37] but on this site cleats are more common (25 examples) than rivets (14), unless the drilled holes are all considered to be evidence of rivets (27). The dates of the vessels studied range from a sherd of a Trajanic bowl or dish of indeterminate form (drilled hole) to possible 3rd-century East Gaulish ware vessels, including a form 33 cup and a form 31R dish (both with cleat mends).

Table 5. The repaired and drilled samian of identifiable forms found at the fort, compared to the percentage of those vessel types by EVEs (estimated vessel equivalents) found on the site (from a sample from fort and vicus).

form	*no of repaired vessels (no)*	*no of repaired vessels as %*	*% of vessel type (by EVEs) found at the site*
Plain bowl and dish	25	52.1	51.2
Decorated bowl	19	39.6	16.2
Cup	4	8.3	30.8
Beaker	-		0.2
Mortarium	-		0.9
Inkwell	-		0.7
Unclassified	-		0.1
Totals	**48**		**2647%**

S. Willis has observed that decorated samian bowls were the most likely type to be repaired while cups were rarely repaired, and this is repeated here.[38] Table 5 shows that samian cups are under-represented in the number repaired, representing only 8% of the repaired samian vessels, whilst the form makes up almost a third of the samian assemblage from the site. There are more repaired plain bowls than decorated simply because they were the more common vessel, but a larger proportion of the decorated bowls found on the site were repaired than the plain vessels.

Late 2nd century to *c.* 270

Black burnished ware fabric 2 and South eastern reduced wares

These two related wares make up the majority of the coarse wares supplied to the fort during the 3rd century, providing mainly cooking pots, bowls and dishes.[39] In a sample of available catalogued pottery from the site (530kg) these wares make up 44% of all the pottery (excluding amphorae) from all periods by weight. Despite this there is not a single definite example of a repaired vessel in these wares, and only five examples with a drilled hole. For whatever reason, on the whole these vessels were not considered worth repairing; it may be that their short expected use-life of only a few years meant they were not worth the effort or expense of repairing them, or they were so cheap to buy, or there was such a constant supply of them, that it was easier to replace them than repair them, or that

[36] Willis 2005: 11.1-2, 11.4.
[37] Willis 2005: 11.3; table 72.
[38] Willis 2005: 11.6.
[39] Bidwell 2017: 293.

this form of repair was not suitable for the intended use of the pot (for example, holding liquids).[40]

It is also possible that a higher number of coarse ware vessels were repaired, but with glue rather than drilled holes. A study of 56 vessels with surviving evidence of glue from Springhead, Kent showed that 84% were fine and coarse wares, whilst the majority of vessels repaired with metal were samian.[41] Glued vessels could not be used on a fire, but could have a longer use-life by being re-used to store dry goods.

Late 3rd to early 5th century

Crambeck reduced ware and calcite-gritted ware

In the late 3rd century potteries in East Yorkshire began to supply the fort, and continued to do so until the end of the Roman period. Crambeck reduced ware was used mainly for bowls and dishes, with smaller quantities of beakers and lug-handled jars, while calcite-gritted ware was generally used for cooking pots, so together the range of vessels was broadly similar to that supplied earlier by BB2 and allied fabrics. There are five repaired vessels and five drilled vessels in Crambeck reduced ware and calcite-gritted ware, although in the sample of catalogued pottery (530kg) these and their associated wares make up only 4.1% of all pottery from the site. In other words, there were twice as many possible repaired vessels in late 3rd and 4th century wares than there were in late 2nd and 3rd century wares, despite the later wares making up only one-tenth of the amount of the earlier wares.

In the 3rd century the BB2 and allied wares seems to have been carried as incidental cargoes alongside military grain supplies brought up from south-east England by sea, with perhaps minimal transportation costs. In contrast the East Yorkshire wares were probably brought by overland routes with attendant additional costs.[42] It is possible the East Yorkshire wares were repaired more frequently than the BB2 and allied fabrics earlier in the century because the vessels were now comparatively more expensive to buy, or because there were longer periods between fresh consignments of stock. Another factor may have been that the pay of frontier soldiers in the 4th century was less in real terms than it had been in earlier times and they wanted maximum use out of their purchases.[43]

The practice of repairing pots continued until at least the late 4th century. There were two cooking pots in fabric B18/G18 (very similar to calcite-gritted ware but without the calcite inclusions)[44] and a calcite-gritted ware cooking pot with Huntcliff-type rim, all dating to after *c.* 360, and a Crambeck reduced ware flanged conical bowl with internal wavy line dating to after *c.* 370.

Vessel types repaired

Looking only at the 46 examples of definitely mended vessels, 78% were bowls or dishes, consisting of 72% in samian and 6% in coarse wares. These would certainly be the easiest types of vessel to repair, having good access to both exterior and interior, but the fact that few mortaria (4%) or samian cups (4%) were repaired shows that this was not the primary consideration for the choice of vessels to repair. Those vessels likely to have held liquids make up only 7% in total (two cups, a beaker and no flagons), and cooking pots, which could be used either for heating liquids or storage of dry goods, make up 10%.

The form of the vessel might also determine if it had a change of use on being repaired. Bowls and dishes that were used for dry foodstuffs, such as bread, fruit and cold meats, could continue to be used in the same way. A repaired mortarium, with projecting rivets within the gritted area could not be easily used for grinding, but could still be used as a form of bowl. Vessels intended for holding liquids were presumably used for some other function, such as containers, either of foodstuffs or other objects. Two repaired vessels, a cooking pot and a beaker (Figure 1, nos. 1 and 35), were re-used in graves, the latter as a probable cremation urn and the former as an accessory vessel, but it is impossible to say if they had been repaired in order to be included in the funeral rituals or if they had already been in use in a domestic or work context for some time beforehand: the Romans were quite happy to include previously used cooking pots in burials so were presumably not concerned about using repaired vessels.[45]

Table 6. Repaired and vessels with drilled holes, by vessel type

Form	*Repaired*	*Drilled*
Amphora		1
Flagon		1
Drinking vessel	3	3
Cooking pot	5	6
Samian bowl or dish	33	25
Coarse ware bowl or dish	3	7
Mortarium	2	1
Totals	**46**	**44**

[40] Modern ethnographic parallels suggest unglazed cooking pots might only last a year or two: Peña 2007: 57.
[41] Seager Smith *et al.* 2011: table 18.
[42] Bidwell 2017: 297; 302.
[43] Hodgson 2017: 146-7.
[44] Monaghan 1997: 911, 1032-3.
[45] As well as pots repaired with metal, glued pots have also been found in graves: Marter Brown and Seager Smith 2012: 8; fig. 3.

Conclusions

There is a range of reasons why particular vessels were repaired, including the original cost of the vessel, how new the vessel was and whether the owner thought they had got sufficient use-life from it, the lack of access to replacement vessels (either due to poverty or long gaps in supply), sentimental associations, or the suitability of the vessel that would otherwise be thrown out for a new function in place of a more valuable unbroken vessel (such in as burials and coin hoards). Some of these reasons can be suggested for vessels in this assemblage.

At South Shields up until the late 3rd century the vessels chosen for repair were those that were likely to have a long use-life as table ware rather than cooking wares. This includes a large number of samian vessels, which were more expensive than most coarse wares and had a longer expected use-life. After *c.* 270 coarse wares and mortaria were repaired in greater numbers, perhaps as a result of the increased cost of new vessels due to a major change in the supply of pottery to the site or a less regular supply - or both - or to soldiers being less willing to buy new vessels due to a reduction in the buying power of their pay.

The majority of vessels repaired were open forms such as bowls. At all periods the repair of drinking vessels and flagons using drilled holes or slots was minimal, either because it was easier to replace them or because these types of repairs were not considered sufficiently waterproof. Those vessels (of all types) that were singled out for repair might therefore have been used for holding dry goods or possessions, which for many may have been a change in function. Few holed vessels were repaired at South Shields, suggesting that whatever activity, probably principally food production, required such vessels, it was rarely carried out on the site.

Since one of Paul's long-standing interests has been the study of Roman pottery, this paper is offered in appreciation of all the knowledge, guidance and support he has given me over many years.

Catalogue

Cat. no.	type	Vessel	description	details
1	plug	Crambeck reduced ware beaker	plug in side of complete vessel, for hole *c.* 25 mm diameter (Figs 1, 2)	Victorian excavations in cemetery, acc. no. TWCMS T748
2	plug	no surviving pot	oval, for hole *c.* 17-13 mm (Figure 4)	*Vicus*, context 17023 (260/70+)
3	plug	no surviving pot	large oval, for hole *c.* 12x6 mm	Victorian excavations, Allason-Jones and Miket 1984: no. 8.86
4	plug	no surviving pot	long teardrop-shaped head, possibly with faint cloth impressions on dished surface, for hole *c.* 27-19 mm; irregular foot spreading out to one side with runnels, with cloth or wood-grain impression on underside (Figure 3)	Victorian excavations, Allason-Jones and Miket 1984: no. 8.87
5	cleat (oval)	samian, form 18/31	all narrow (2 mm) and short (3 mm); (1) just below rim; (2) 21 mm below; (3) 30 mm below (2), below carination	Fort, context 5607 (late 3rd/early 4th century)
6	cleat (rect)	samian, form 37 (*c.* 140-180)	(1) complete lead cleat between rim and ovolo; (2) second slot *c.* 75 mm below, near point where the bowl curves in towards the base (Figure 2)	Victorian excavations, Dore *et al.* 1979: fig. 30, no. 82
7	cleat (rect)	samian, form 38	remains of lead cleat in rectangular(?) slot immediately below rim	Fort, context 7362 (mid fourth – early post Roman); SF no. P275
8	cleat (rect?)	samian, form 37	(1) one side of one slot survives between rim and ovolo; (2) one slot 82 mm below first, near base. There is no evidence of a second arm at right angles to make an X cleat, so most likely rectangular, although narrow (3 mm)	*Vicus*, context 17200 (Hadrianic – early Antonine)

Cat. no.	type	Vessel	description	details
9	cleat (rect?) and rivet	samian, form 30	(1) remains of lead rivet within holes between rim and ovolo; (2) incomplete cleat slot (?), probably rectangular, just below ovolo; (3) incomplete hole within decoration (Figure 5)	Fort, context 3817 (*c.* 210-225); SF no. L52
10	cleat (W)	samian, form 37 (*c.* 140-180)	(1) surviving cleat, between rim and ovolo; (2) remains of slot (one side of one slot) 72 mm below, near base (Figure 2)	Victorian excavations, Dore *et al.* 1979: fig. 30, no. 84
11	cleat (W)	samian, form 33 (late 2nd or early 3rd century)	slot just under rim with narrow (2 mm) arm; sherds survives as far as carination but no other cleat slot present	*Vicus*, context 15068 (4th century)
12	cleat (W)	samian, form 18/31	small sherd, 47 mm across: (1) incomplete slot 8 mm immediately below bead rim, with traces of lead; (2) remains of slot 12 mm below rim on opposite side of sherd; (3) slot 20 mm below (2) with tips of slots; (4) non-joining body sherd with remains of another slot with remnants of lead	Fort, context 5813 (*c.* 21-213)
13	cleat (W)	samian, form 37 (Antonine)	Incomplete cleat slot 19 mm below rim, with one arm longer than the other (1.5 mm wide)	*Vicus*, context 16233
14	cleat (W)	samian, Curle 15	tips of incomplete slots with traces of lead 34 mm below rim.	Fort, context 20313 (4th century)
15	cleat (W?)	samian, indeterminate bowl/dish body sherd	incomplete cleat slot with narrow (2 mm) arm	Fort, context 627 (late 3rd century)
16	cleat (W?)	samian, form 37 (late 2nd – early 3rd century)	tips of thin (1 mm) slots only survive, with traces of lead, on lower part of wall near base, below the decoration	Victorian excavations, Dore *et al.* 1979: fig. 33, no. 135
17	cleat (W?)	samian, indeterminate bowl/dish body sherd	remains of a cleat slot, partially sawn but perhaps also drilled	Fort, context 24466 (*c.* 210-213)
18	cleat (W?)	samian, indeterminate bowl/dish body sherd	incomplete cleat slot, with one surviving arm, but with wide sawn area beside it	*Vicus*, context 17137 (*c.* 210-270)
19	cleat (W?)	samian, form 18/31R (Hadrianic-early Antonine)	incomplete cleat slot 16 mm below rim with narrow arm (1.5 mm)	*Vicus*, context 17179 (Hadrianic – early Antonine)
20	cleat (X)	samian, form 31R	(1) cleat slot just under rim with surviving lead cleat; (2) slot in wall just above footring with traces of lead; (3) slot in centre of base; (4) slot in wall just above footring; (5) slot just below opposite side of rim (Figures 1, 2, 4)	Fort, contexts 24150, 24120 (mid 3rd century); SF no. L250
21	cleat (x)	samian, form 31R (late 2nd – early 3rd century)	incomplete slot just under carination with narrow (2 mm) arm	*Vicus*, context 15086 (ploughsoil)
22	cleat (X)	samian, form 37	(1) slot 12 mm below rim; (2) second slot not directly in line, very near bottom of decorated zone. Arms of uneven length.	*Vicus*, context 30069

Cat. no.	type	Vessel	description	details
23	cleat (X)	samian, Curle 15	(1) remains of tips of two arms of X cleat with remnants of lead, 38 mm below rim and above carination; (2) remains of a slot 90 mm below (1) on the base within the footring. The base also has a central pecked hole.	Fort, context 20313 (4th century)
24	cleat (X?)	samian, form 30 or 37	only very tips of arm surviving, below rim	*Vicus*, context 30162
25	cleat	samian, form 18/31R or 31R	very fragmentary sawn arm	*Vicus*, context 16018 (medieval +)
26	cleat	samian, form 38	fragmentary slot just above flange (possibly a slot sawn up to a drilled hole)	Fort, context 20401 (early 3rd century)
27	cleat	samian, indeterminate body sherd	very small sherd, but with three or four sawn slots, with traces of lead	Fort, context 20452 (late second or very early 3rd century); SF no. L78
28	rivet (1 bar)	no surviving pot	complete (Figure 4)	Fort ditches, context 14500 (modern); SF no. L18
29	rivet (1 bar)	no surviving pot	complete (Figure 4)	*Vicus* (unstratified); SF no. L244
30	rivet (1 bar)	no surviving pot	complete (Figure 4)	Victorian excavations; Allason-Jones and Miket 1984: no. 8.85
31	rivet (disc?)	Catterick hammerhead mortarium (3rd century)	(1) hole 30 mm below rim, with remnants of lead; (2) 58 mm below, near base, with a broken bar on exterior and a disc-headed shank or broken bar on interior	Fort, context FB (1966, ploughsoil); SF no. L67
32	rivet (disc?)	Catterick tradition hammerhead mortarium (250+)	24 mm below rim an incomplete flanged D-section bar on exterior, shapeless lump on interior	Victorian excavations, no context details, acc. no. TWCMS : T628
33	rivet (disc?)	no surviving pot	cast flat head with two disc-headed shanks or incomplete bar (not seen)	Victorian excavations; Allason-Jones and Miket 1984: no. 8.89
34	rivet (disc?)	no surviving pot	cast flat head, unusually wide, with two disc-headed shanks or incomplete bar (not seen)	Victorian excavations; Allason-Jones and Miket 1984: no. 8.90
35	rivet (2 bar)	B18 cooking pot (4th century)	two rivets, both flat cast head on exterior and D-section bar on interior; (1) on neck below rim; (2) half way down body; has waisted body like Figure 4, no. 38 (see Figures 1, 2)	Victorian excavations; cemetery. Acc. no/ NEWMA : 1956.128.118.A
36	rivet (2 bar)	unknown reduced ware cooking pot	complete, but broken and highly corroded; flanged D-section bar on exterior and D-section bar on interior	Fort, context 51886 (late 2nd century); SF no. L139
37	rivet (2 bar)	calcite-gritted ware cooking pot	torn and incomplete flat head on exterior of body sherd with a D-section bar (flanged in part) on interior	Fort, context 6202 (modern); SF no. L29
38	rivet (2 bar)	no surviving pot	complete, unusually thick flat head with oval-sectioned back bar attached to circular section shanks (Figure 4)	Victorian excavations; Allason-Jones and Miket 1984: no. 8.58
39	rivet (2 bar)	no surviving pot	complete but distorted; flat head with a D-sectioned lower bar	Fort, context 5159 (4th century); SF no. L96
40	rivet (2 bar)	no surviving pot	the exterior bar is roughly circular but has a cut mark on one side and was presumably originally a long bar. Thin, incomplete bar on the interior of roughly D-section	Fort, context 26830, SF no. L210

Cat. no.	type	Vessel	description	details
41	rivet (2 bar)	no surviving pot	complete flat head with squared ends and flanged D-sectioned lower bar. Shanks D: 12 mm at top, from large drilled hole, tapering to 4 mm; possibly from a mortarium	Victorian excavations; Allason-Jones and Miket 1984: no. 8.74
42	rivet (2 bar)	no surviving pot	complete flat head with D-sectioned lower bar (not seen)	Victorian excavations; Allason-Jones and Miket 1984: no. 8.91
43	rivet (2 bar?)	samian, form 37	(1) hole below rim with incomplete flanged D-sectioned bar on exterior, no remains on interior; (2) hole 50 mm below first near base of wall, with remnants of lead	Fort, context AB (1981, unstratified); SF no. L65
44	rivet (2 bar?)	samian, form 37	hole in body towards lower part of the wall; remains of a detached D-sectioned bar in poor condition, unclear if from interior or exterior	Fort, context 3817 (*c.* 225); SF no. L53
45	rivet (2 bar?)	samian, form 31R (*c.* 160-90)	(1) on base, below wall carination with D-sectioned bar on interior and possible remains of a D-sectioned bar on exterior; (2) hole with no traces of lead 70 mm below near the centre of the base by the stamp	Fort, context (1977, unstratified); Dickinson 1983: stamp no. 21
46	rivet (2 bar?)	calcite-gritted ware cooking pot with Huntcliff-type rim	on neck, below rim; shapeless lumps of lead on both exterior and interior	Fort ditches (late fourth or early post-Roman); SF no. L36
47	rivet	samian, form 18/31R	non-joining sherds: (1) hole in lower wall; (2) hole in lower wall; (3) hole within footring with remnants of lead; (4) hole within footring	Fort, context 26198 (*c.* 205-212)
48	rivet	samian, form 18/31	(1) hole 22 mm below rim, with remnants of lead; (2) hole 22 mm below rim, level with (1) but on other side of sherd, with remnants of lead	Fort, context 24148 (mid 3rd century)
49	rivet	samian, indeterminate bowl/dish body sherd (Hadrianic - Antonine)	(1) hole with remnants of lead; (2) hole 18 mm below	*Vicus*, context 17190 (Hadrianic – early Antonine)
50	rivet	samian, form 18/31	hole 11 mm below rim with traces of lead	Fort, context 26053 (*c.* 210)
51	rivet	samian, indeterminate bowl/dish body sherd	hole with traces of lead	Fort, context 9072 (mid 3rd century)
52	rivet	samian, indeterminate bowl/dish body sherd	hole near base, with traces of lead	Fort, context 3113 (late 3rd century)
53	rivet	samian, indeterminate bowl/dish base sherd	hole on base near stamp, with traces of lead	*Vicus*, context 17164 (210-270), SF no. P720

Cat. no.	type	Vessel	description	details
54	rivet	Crambeck reduced ware hemispherical flanged bowl (late 3rd century+)	(1) hole immediately above flange; (2) hole immediately above flange at same height but 60 mm away from (1), with an unfinished hole beside it that would have cut into flange if finished; (3) hole below flange, 30 mm below (2) but to one side rather than directly below	Fort, context 14573 (late fourth or early post-Roman)
55	rivet	Crambeck reduced ware conical flanged bowl	(1) small (D:3 mm) hole 20 mm below rim; (2) larger hole (D:4 mm) 23 mm below rim on opposite side of sherd, 45 mm apart. No traces of lead, but position of holes suggests they were for rivets	Fort, context CX (1966, ploughsoil)
56	rivet	unclassified oxidised ware hemispherical bowl	(1) uncompleted hole just under bead rim; (2) completed hole immediately above (1); (3) hole 26 mm below (2) although not directly below. No traces of lead, but position of holes suggests they were for rivets	Fort, context L45 (1978, late 2nd century(?)), Dore 1983: cat. no. 389
57	rivet	samian, indeterminate bowl/dish body sherd	two holes on opposite edges of body sherd. No traces of lead, but position of holes suggests they were for rivets	Fort, context 8294 (late 3rd century)
58	rivet	samian, probably form 18/31R (early Antonine)	rim sherd with hole with remnants of lead	*Vicus*, context 17023 (260/70+)
59	rivet	B18 cooking pot (4th century)	a single hole (D:4 mm), but with traces of lead. Hole 36 mm below rim, below the shoulder	Fort, context DI (1980, unstratified)

Bibliography

Allason-Jones, L. and R. Miket 1984. *The Catalogue of Small Finds from South Shields Roman Fort.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne Monograph Series 2.

Biddulph, E., R. Seager Smith and J. Schuster 2011. *Settling the Ebbsfleet Valley, Volume 2: Late Iron Age to Roman Finds Reports.* Salisbury: Oxford Wessex Archaeology.

Bidwell, P. 2017. Rural settlement and the Roman army in the north: external supply and regional self-sufficiency, in M. Allen, L. Lodwick, T. Brindle, M. Fulford and A. Smith (eds) *The Rural Economy of Roman Britain: New Visions of the Countryside of Roman Britain Volume 2* (Britannia Monograph 30): 290-305. London: Society for the Promotion of Roman Studies.

Croom, A. and A. Caffell 2010. Further finds and human remains from the cemetery outside South Shields Roman Fort. *Arbeia Journal* 9: 139-150.

Dickinson, B. 1983. The potter's stamps, in R. Miket, *The Roman Fort at South Shields: Excavation of the Defences 1977-1981*: 53-55. Newcastle upon Tyne: Tyne and Wear County Council.

Dore, J. 1983. The coarse ware, in R. Miket *The Roman Fort at South Shields: Excavation of the Defences 1977-1981:* 61-107. Newcastle upon Tyne: Tyne and Wear County Council.

Dore, J., Greene, K. and C. Johns 1979. The decorated ware, in Dore, J. and J. Gillam, *The Roman Fort at South Shields:* , 107-27. Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne Monograph Series 1.

Egan, G. 1998. *The Medieval Household Daily Living, c. 1150-c. 1450* (Medieval Finds from Excavations in London 6). London: Boydell Press.

Eggert, G. and D. Straub 2009. Ancient glass gluing recipes, in J. Ambers, C. Higgitt and L. Harrison, *Holding It Together: Ancient and Modern Approaches to Joining, Repairing and Consolidation*: 3-7. London: Archetype Publications.

Fulford, M. and J. Timby, 2001. Timing devices, fermentation vessels, 'ritual' piercings? A consideration of deliberately 'holed' pots from Silchester and elsewhere. *Britannia* 32: 293-297.

Garachon, I. 2010. Old repairs of china and glass. *Rijksmuseum Bulletin* 58(1): 34-55.

Hodgson, N. 2017. *Hadrian's Wall: Archaeology and History at the limit of Rome's Empire*. Marlborough: Hale.

King, A. and M. Millett. 1993. Samian ware, in P.J. Casey and J.L. Davies, *Excavations at Segontium (Caernarfon) Roman Fort, 1975-1979* (Council for British Archaeology Research Report 90): 234-249. London: Council for British Archaeology.

McKinley, J. 2004. Welcome to Pontibus ... gateway to the west. *Surrey Archaeological Collections* 91: 1-69.

Marter Brown, K. and R. Seager Smith 2012. What do the Apocrypha know? Glued pottery vessels from Springhead and other Romano-British sites in south and eastern England, in Jervis, B. and A. Kyle (eds) *Make-do and Mend: Archaeologies of Compromise, Repair and Reuse* (British Archaeological Reports International Series 2408): 5-11. Oxford: British Archaeological Reports.

Monaghan, J. 1997. *Roman Pottery from York* (The Archaeology of York: the Pottery 16/8). York: Council for British Archaeology.

Peña, J.T. 2007. *Roman Pottery in the Archaeological Record.* New York: Cambridge University Press.

Perry, G. 2012. A hole for the soul? Possible functions of post-firing perforations and lead plugs in early Anglo-Saxon cremation urns, in Jervis, B. and A. Kyle (eds) *Make-do and Mend: Archaeologies of Compromise, Repair and Reuse* (British Archaeological Reports International Series 2408): 43-52. Oxford: British Archaeological Reports.

Regert, M., I. Rodet-Belarbi, A. Mazuy, G. Le Dantec, R. Dessì, S. Le Briz, A. Henry and M. Rageot 2019. Birch-bark tar in the Roman world: the persistence of an ancient tradition? *Antiquity* 93: 1553-1568.

Seager Smith, R., K. Marter Brown and J.M. Mills 2011. The pottery from Springhead, in Biddulph, E., R. Seager Smith and J. Schuster, *Settling the Ebbsfleet Valley, Volume 2: Late Iron Age to Roman Finds Reports:* 1-134. Salisbury: Oxford Wessex Archaeology.

Stead, I. and V. Rigby 1989. *Verulamium: the King Harry Lane Site.* London: English Heritage Archaeological Report 12.

Wild, F. 2013. A samian repair and recycling workshop at Kempston, Church End, Beds. *Britannia* 44: 271-272.

Willis, S. 2005. Samian pottery, a resource for the study of Roman Britain and beyond: the results of the English Heritage funded Samian Project. An e-monograph. *Internet Archaeology* 17. Viewed 22 Feb 2022, <https://intarch.ac.uk/journal/issue17/willis_index.html>

Interpreting the samian stamps from South Shields and the supply-chain to Hadrian's Wall and the hinterland forts

†Geoffrey B. Dannell and Allard W. Mees

Introduction

It is a great pleasure to offer this brief paper to Paul, whose interest in Roman ceramics has long been an exemplary demonstration of the value of the study of artefacts in unravelling history.

South Shields Roman fort is not strictly part of the Wall fortification itself, although it is the natural extension of the line, standing at the Tyne estuary, and it can fairly be considered as a 'Wall' installation.

When Brian Hartley wrote his seminal paper on the Roman occupation of Scotland, comparing the samian found on the Antonine Wall with that of Hadrian's Wall, he did not include South Shields since he thought it had been occupied throughout the Antonine period without a break, and thus not germane to his argument.[1] The data considered here relates mainly to stamps, since there has been no opportunity to study the decorated ware in detail during this recent extraordinary period of isolation.

There has been a limited addition to the corpus of samian stamps over the last 50 years, but the ability to exploit the available evidence has changed. Hartley was obliged to use his paper records, which he was working up in the project to update Felix Oswald's work on the stamps,[2] extracting comparative information by hand which can now be accessed electronically in various statistical formats, with accompanying visual displays.[3] The new technology does not invalidate Hartley's approach, indeed his map of 'representative potters', was the first systematic attempt to plot distributions, but it is now more easy to produce alternative solutions to problems than manual methodology then allowed.[4]

About the data from Hadrian's Wall and the 'Hinterland forts'

In certain respects the data from the Hadrian's Wall forts, the 'Hinterland forts' and their adjacent sites are problematic without close scrutiny. For instance, Newcastle appears to have a stamp population ≥ 40, but the forms of 15 out of a total 44 stamps are not known. Further, the question of the representation of decorated vessels and other unstamped forms is intrinsically difficult to calculate. The list for Housesteads can be taken as an example.[5] There, five stamps are recorded on decorated ware, four from Lezoux, and one from Rheinzabern. Dickinson differentiated between 29-33 separate decorated bowls from Lezoux alone. Attempts to attribute decorate vessels are also complicated by the fact that moulds were frequently used by potters in common, and there is no guarantee that a bowl 'made in a mould in the style of potter X', was actually made by that firm. For that reason stamps alone have been used.

[1] Hartley 1972: 25.
[2] Oswald 1931.
[3] The data used here comes from the updated online version of Hartley and Dickinson 2008-2012: https://www.rgzm.de/samian and at this time conserves Hartley's assessment of the potters' dates and their production sites. The method of calculation involves dividing the estimated working life into quinquennia, e.g. for Atticus ii: 85-90; 90-95; 95-100; 100-105; 105-110; 110-11, and plotting each 1/6 of the frequencies of these time intervals on the y-axis (cf. https://en.wiktionary.org/wiki/quinquennial).
[4] Hartley 1972: 24, fig. 1.
[5] Dickinson 2009, where a detailed examination of the fort samian extends to the decorated ware from Lezoux, and unstamped plain-wares from the East Gaulish and Upper-Germanic potteries.

The sites and their stamp numbers

Table 1. Quantities of samian stamps on Hadrian's Wall, the 'Hinterland forts' and potential trade hubs.

Hadrian's Wall	No.	Hinterland Forts	No.	Hubs	No.
South Shields	187	Bainbridge	59	Corbridge	1860
Wallsend	127	Catterick	235	Carlisle	592
Newcastle	44	Chester-le-Street	51	Chesterholm-Vindolanda	164
Benwell	69	Ebchester	11		
Rudchester	3	Greta Bridge	12		
Haltonchesters	59	Ilkley	43		
Chesters	69	Lancaster	122		
Carrawburgh	21	Malton	94		
Housesteads	47	Papcastle	32		
Great Chesters	10	Piercebridge	105		
Carvoran	2				
Birdoswald	60				
Castlesteads	0				
Stanwix	21				
Burgh-by-Sands	2				
Drumburgh	0				
Bowness-on-Solway	18				
General collections at Chesters	137				
Total	**876**		**764**		**2616**

Dates of samian stamps from sites on Hadrian's Wall, the Hinterland and potential distribution 'hubs' (Figures 1, 2, 3 and 4)

Interpretation of the data is subject to variability which complicate inter-site comparisons dependent upon:

1. The total period of occupation
2. The density of excavation
3. Whether a military site has civilian *canabae*, or a *vicus* attached

The first and most obvious similarity between South Shields and the Hadrian's Wall sites is the lack of samian supply until after *c.* 120, which suggests that either there was no involvement in the early campaigns, or, as Richmond suggested, any Flavian-Trajanic presence was away from the known site.[6] Only two potters (Atticus i of South Gaul, *c.* 85-110, and Balbinus of Les-Martres-de-Veyre, *c.* 100-125) are estimated to have worked entirely before the construction period of Hadrian's Wall and the latter only just. Elsewhere, the 'Hinterland Forts' do have activity *c.* 65-90 which is associated with the advances of Cerialis and Agricola; the same is true for Carlisle and Corbridge. However, some sites on the line of the Wall also have a few occurrences of earlier potters (Table 2).[7]

Following the installation of permanent garrisons after the building phase *c.* 125, samian stamp loss climbs sharply at South Shields and elsewhere. For the sites studied here there are three potters who worked exclusively at Les-Martres-de-Veyre, as opposed to those who worked both there and at Lezoux: Balbinus, Marcellus ii and Roppus ii. Their stamps only occur at South Shields and Wallsend.

The general shapes of the dating curves for the sites in the Antonine period are fairly similar. All show a rapid growth in annual loss up until around *c.* 155, when

[6] Cf. Bidwell and Speak 1994, Table 1.1 which summarises the chronology.

[7] Potters from South Gaul, known to have worked until *c.* 120 have not been noted, since their vessels may still have been current. Those in italics have questionable provenance records. For the rest, David Breeze (*pers. comm.*) observes that there is ample plough-furrow evidence to show that the line of the Wall was not barren before its construction, and there may have been native deposition, rather than survival.

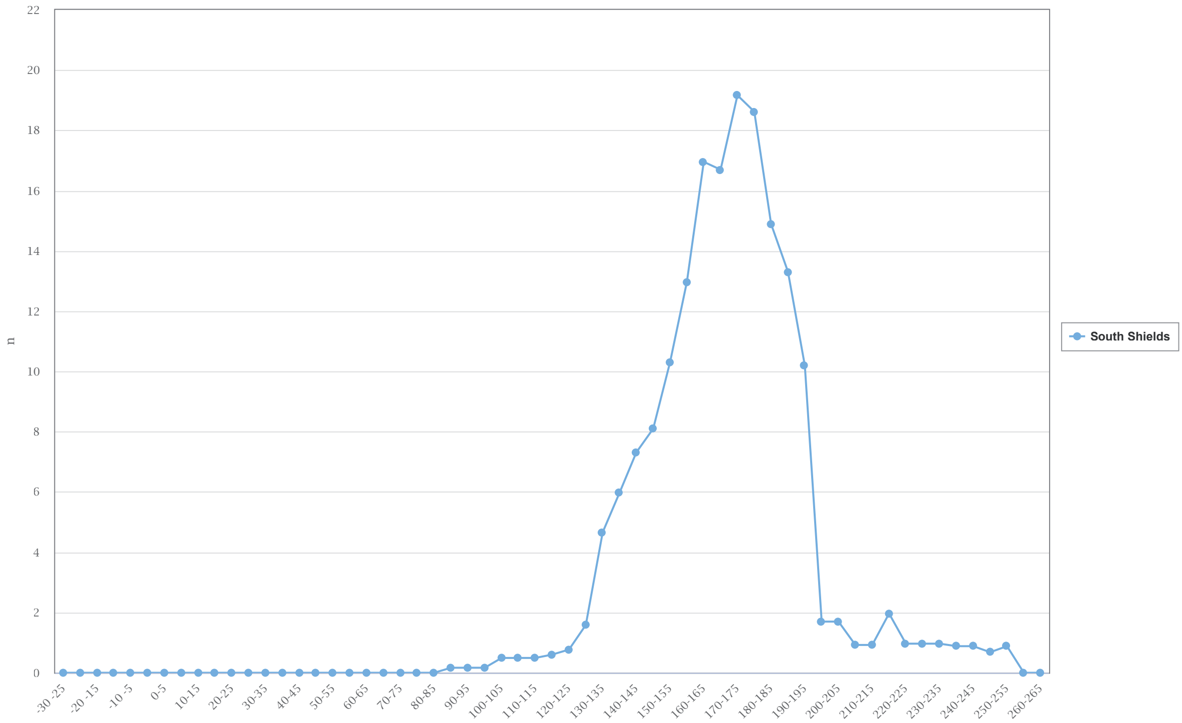


Figure 1. Quinquennial time chart of the samian stamps from Lezoux from South Shields. The ascending curve around 160-170 is discernible. Chart generated at Samian Research (http://www.rgzm.de/samian) [17.05.2021]

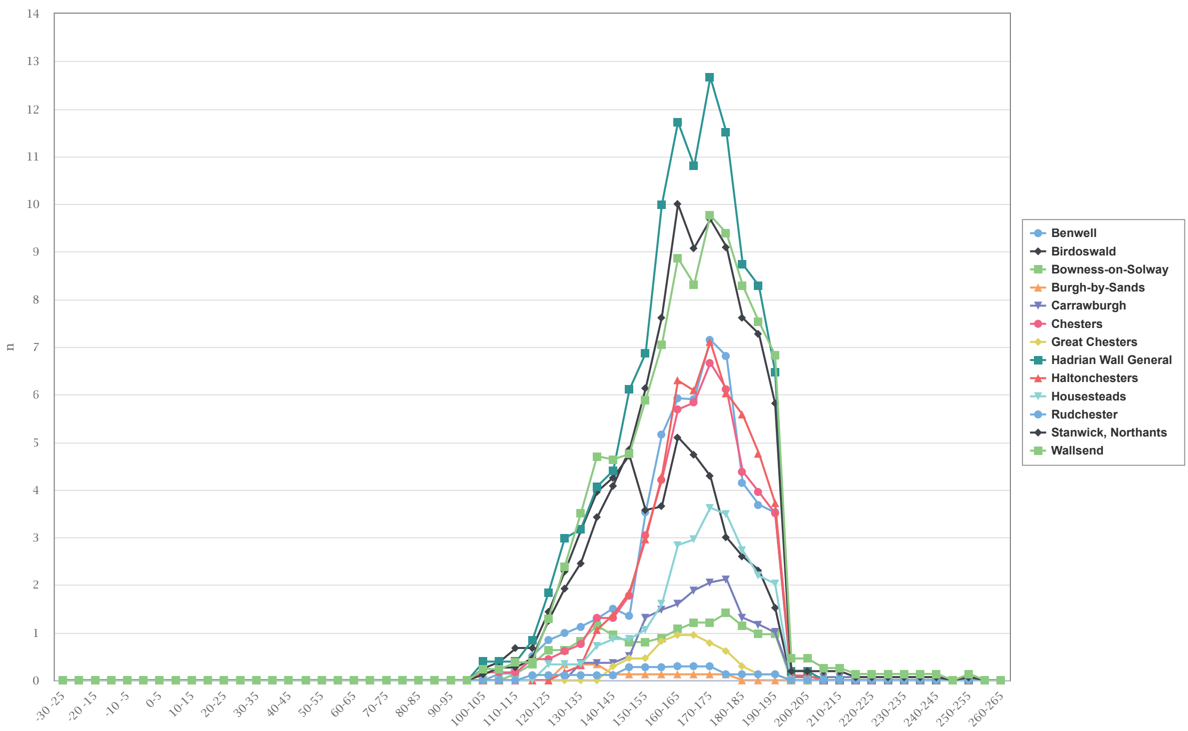


Figure 2. Quinquennial time chart of the samian stamps from Lezoux from Hadrian's Wall sites. On all sites, a consistent appearance of an interruption in the ascending curves around 160-170 is discernible. Chart generated at Samian Research (http://www.rgzm.de/samian) [17.05.2021]

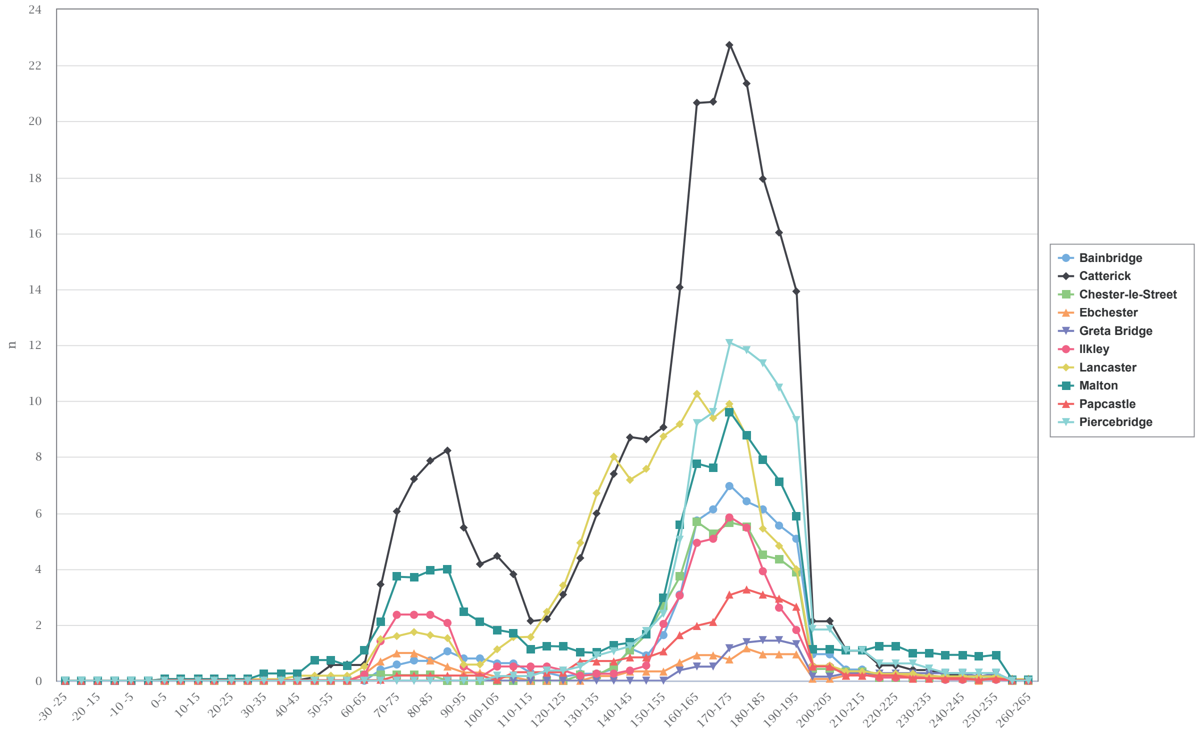


Figure 3. Quinquennial time chart of the samian stamps present at Hinterland fort sites. Chart generated at Samian Research (http://www.rgzm.de/samian) [17.05.2021]

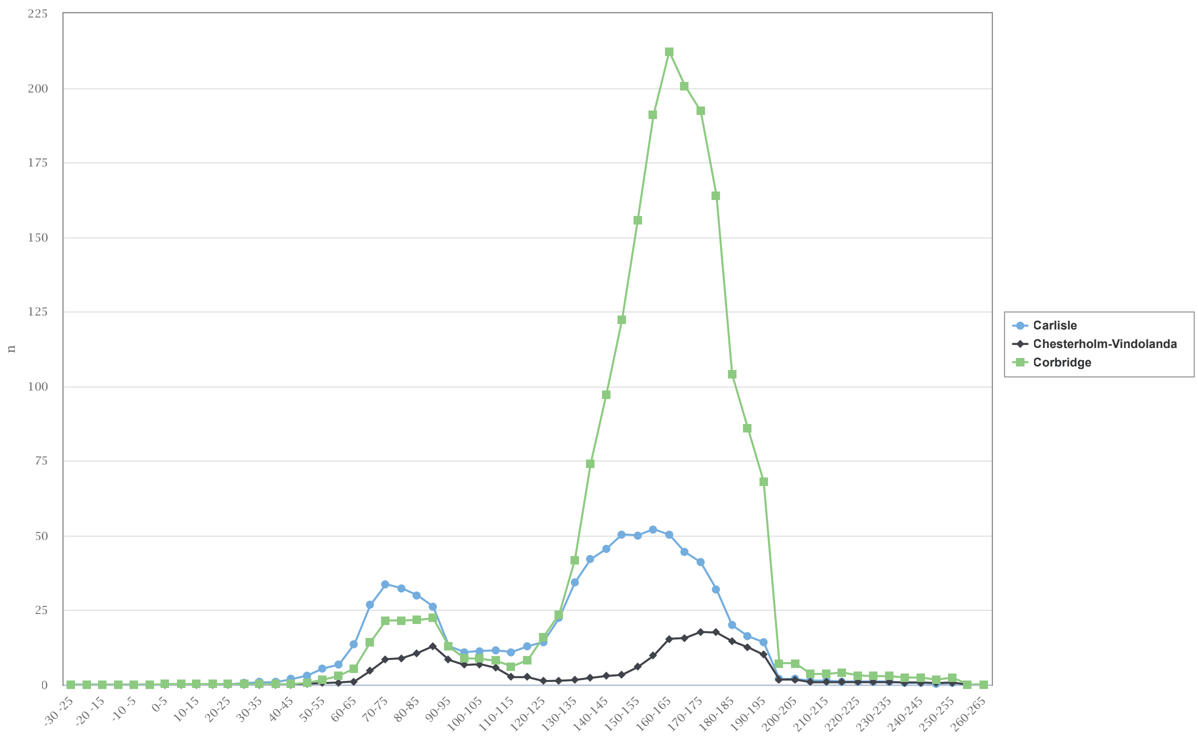


Figure 4. Quinquennial time chart of the samian stamps present at the major trade hubs on Hadrian's Wall (Carlisle, Chesterholm-Vindolanda and Corbridge). Chart generated at Samian Research (http://www.rgzm.de/samian) [17.05.2021]

Table 2. South Gaulish samian stamps from Hadrian's Wall which may pre-date the Wall construction.

Site	Potter	Date AD	Kiln-site
Benwell	Caicus	80-110	South Gaul
Newcastle	Calvus i	65-90?	South Gaul
Birdoswald	Coelus ii	65-85	South Gaul
Chesters	L. Cosius Virilis	75-110	South Gaul (see Table 5)
Chesters	Mercator i	70-110	South Gaul
Carrawburgh	Patricius i	65-90	South Gaul
Newcastle	Secundus ii	60-90	South Gaul
Newcastle	Severus iii	65-95	South Gaul
Wallsend	Tabius Virtus	80-100	South Gaul
Birdoswald	Tasgillus i	70-110	Montans
Housesteads	Verecundus ii	60-85	South Gaul

there is a relatively small dip, before a resumption in growth, with an apogee *c*. 170-175, after which there is a sharp decline. The temporary reduction is most likely associated with the withdrawal of units at the time of the occupation of the Antonine Wall. However, that the reduction appears so small suggests that the withdrawal of troops did not affect deliveries to the extent which might be expected (perhaps because the potters' dating is not sufficiently sensitive to pick it up).

It is possible that this has arisen from the methodology of samian dating which has hitherto been estimated by reference to presence/absence on 'dated' sites and groups. In reality the number of such sites has been exaggerated historically, and not yet replaced with sufficient data based upon dendrochronology.[8] The result is that both starting and terminal dates for many potters have been stretched *faute de mieux*, blurring the actuality. The terminal dates of the exports of the main group of potters working at Les Martres-de-Veyre and Lezoux have careers estimated as < 30 years (for the later Germanic potters many spans of activity range between 60-80 years!). It might also be argued that there is a circularity of argument, in that many careers have been calculated from deposition of stamps at Hadrian's Wall sites.

Alternatively, it may be that the growth of civilian settlements around the forts provided a continuing market regardless of troop numbers and the stamp records, particularly from older reports, do not distinguish sufficiently between material derived from purely military contexts and elsewhere.[9]

That said, differences of detail emerge. First, the evidence for loss of vessels of 1st-century manufacture at Newcastle, Birdoswald, Housesteads and Chesters in particular (see Table 2); next, the curious dip at Birdoswald sometime around 150; then, the apparently higher percentage of stamps of the late-2nd century or early-3rd century at Wallsend and South Shields, even although they form a small component of the totals on those sites.

Samian consumption patterns and their relation to the supply chain

Hartley founded his analysis of the potters' stamps on two assumptions; first that 'Central Gaulish samian ware was distributed more or less evenly in Britain in the Antonine period'; second, that 'it is known that sites within easy reach of ports on the east coast tended to receive a higher proportion of the products of Eastern Gaul and Germania Superior than inland or western ones'.[10]

The former assertion, while seemingly apparent from an overall distribution map, needs qualification. At first sight a distribution of 2nd-century Lezoux ware gives the impression that it was dispersed 'everywhere', but it is important to realise that such plots are two dimensional, and lack any effect of time. In fact samian supply came in pulses, dictated by discrete deliveries, the nature of which varied in volume, and regularity. The result of these influences means that comparisons of the quantities of individual potters' stamps between particular sites is not straightforward (see section on routing below) (Figure 5).

The underlying delivery mechanism can be traced back as far as the production centres, through to evidence from shipwrecks, warehouses and retail outlets, collectively described aptly by Meike Weber as 'pre-consumption deposits'.[11] The additional graphs for the Bavay Forum shop destruction and the Pudding Pan Rock wreck are added here (Figures 6 and 7).

The graphs show majorities of stamps by either a single dominant potter or a small number of larger firms, with a long 'tail' of smaller quantities, often single stamps, implying that from source to retail outlet samian loads retained a degree of integrity. The effect of such differences in the stamp records for the area surveyed by Hartley can be seen in the 'league tables' which shows the ranking of individual potters (Table 5).

[8] Cf. the redating of German *Limes* sections Kortüm 1998; Sommer 2011.

[9] Cf. Breeze 2006: 83-4.

[10] Hartley 1972: 22-3.

[11] Weber 2013.

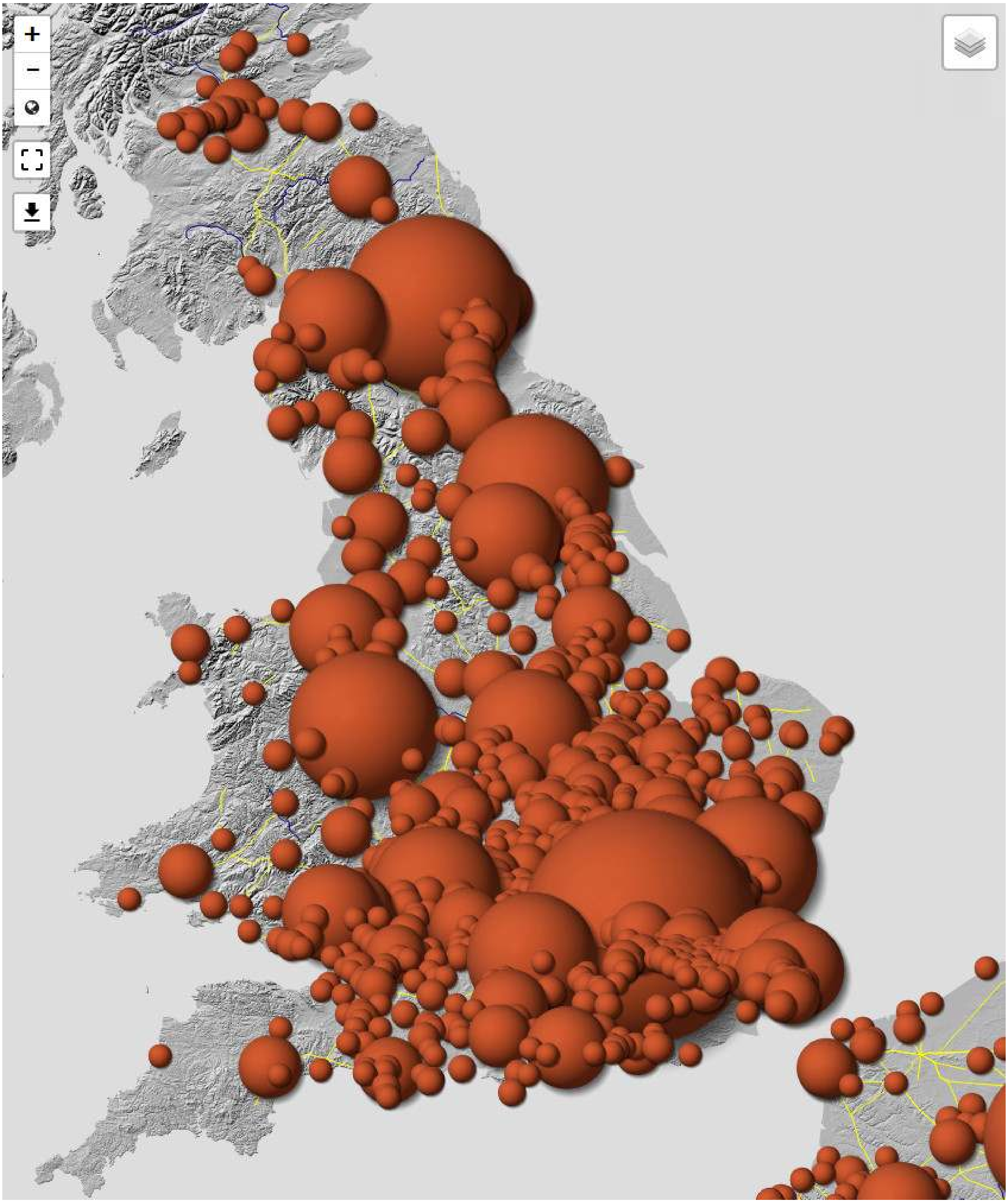


Figure 5. Distribution of samian stamps produced in Lezoux to Britannia. Dot sizes: square root values. Map generated at http://www.rgzm.de/Samian [10.05.2020].

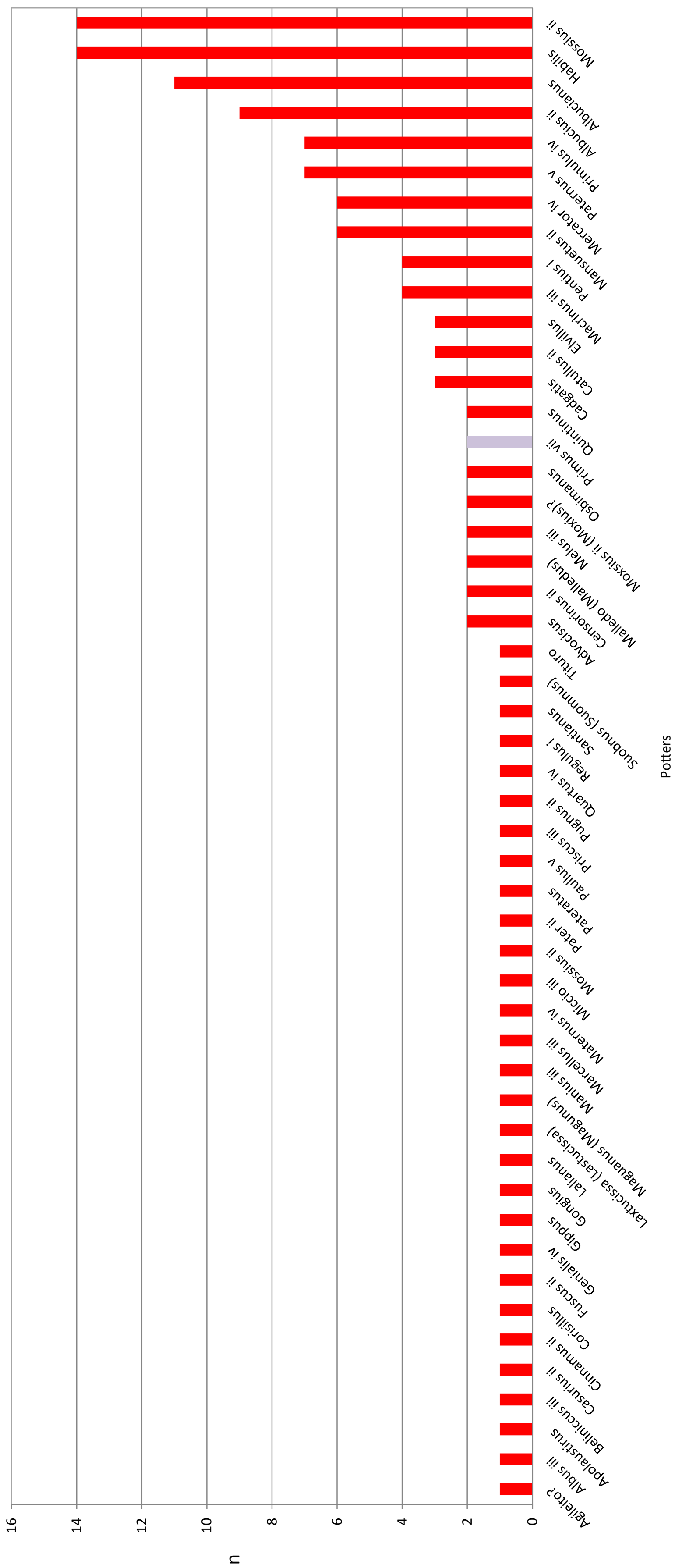


Figure 6. Number of samian stamps by potter from the Bavay 'forum boutique'. Red: Lezoux potters; grey: Rheinzabern potter. Data compiled from records in the Musée du Nord, Bavay.

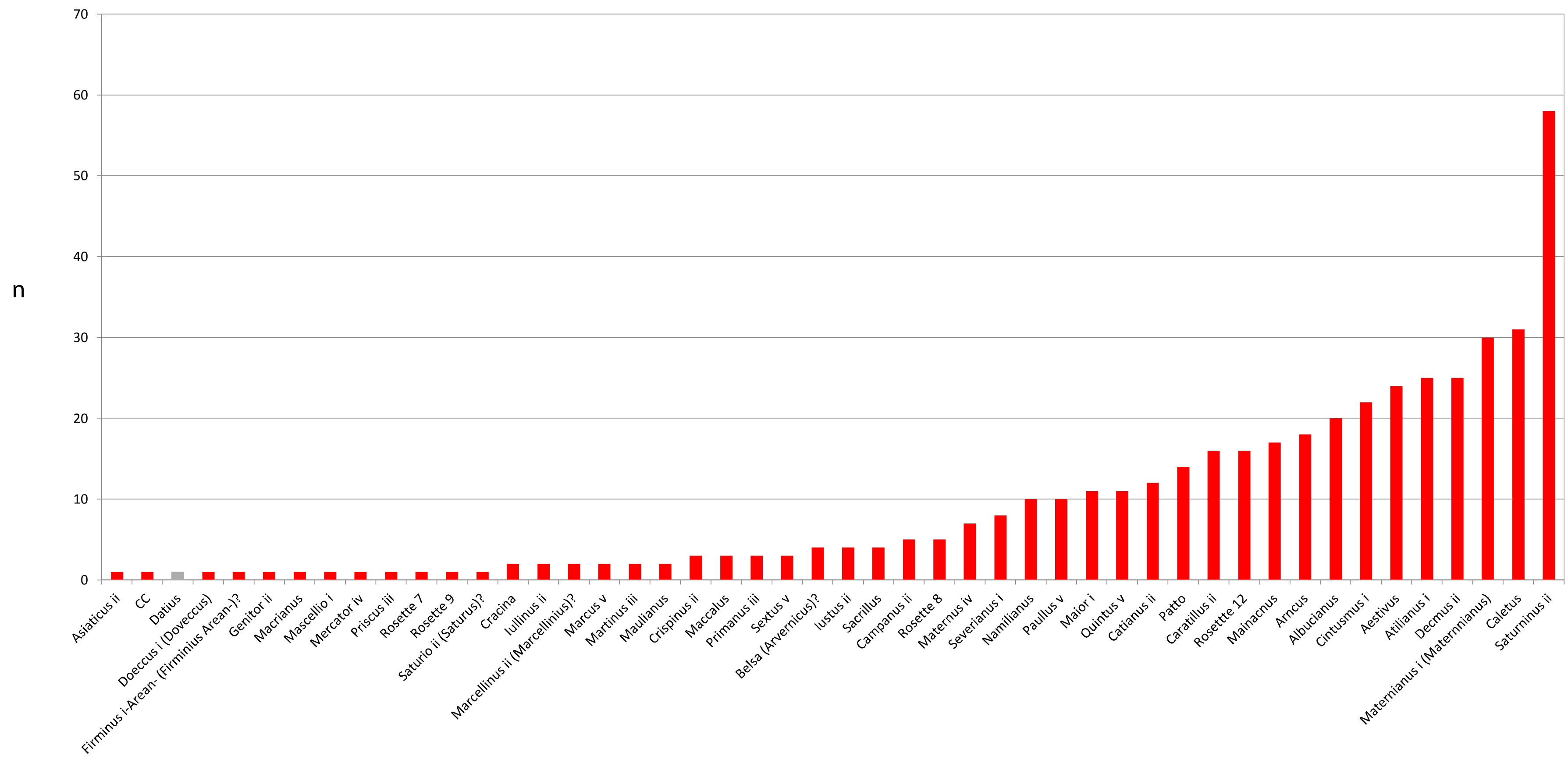


Figure 7. Number of samian stamps by potter from Pudding Pan Rock. Red: Lezoux potters; grey: Rheinzabern potter. Data after Walsh 2017.

Table 3: 'Pre-consumption groups' of samian stamps.

Group name	Kiln origin	Stamps	Site character	Reference
Fosse de Cirratus[12]	La Graufesenque	4326	Kiln failure	Dannell and Mees 2013: fig. 12.17
Cap de Creus (Cala Culip IV)[13]	La Graufesenque	1548	Shipwreck	Dannell and Mees 2013: fig. 12.18
Oberwinterthur Keramiklager[14]	La Graufesenque	274	Warehouse	Dannell and Mees 2013: fig. 12.21
Pudding Pan Rock[15]	Lezoux	444	Shipwreck	Cf. Figure 7
Bavay Forum[16]	Lezoux	136	Retail pottery	Cf. Figure 6
Castleford[17]	Lezoux	405	Retail pottery	Dannell and Mees 2013: fig. 12.22
Wroxeter Forum[18]	Lezoux	143	Retail pottery	Dannell and Mees 2013: fig. 12.23

Hadrian's Wall variable samian consumption and its relation to the total export volumes

The occurrences of individual potters is obviously a function of their availability in the market. A closer look at the presence of the potters from the main export centre at Lezoux demonstrates that as a proportion of the total export from the site, a quarter consists of the output of only 20 potters (Figure 9-10 and Table 3), which might be expected to be found on Hadrian's Wall in similar proportions.

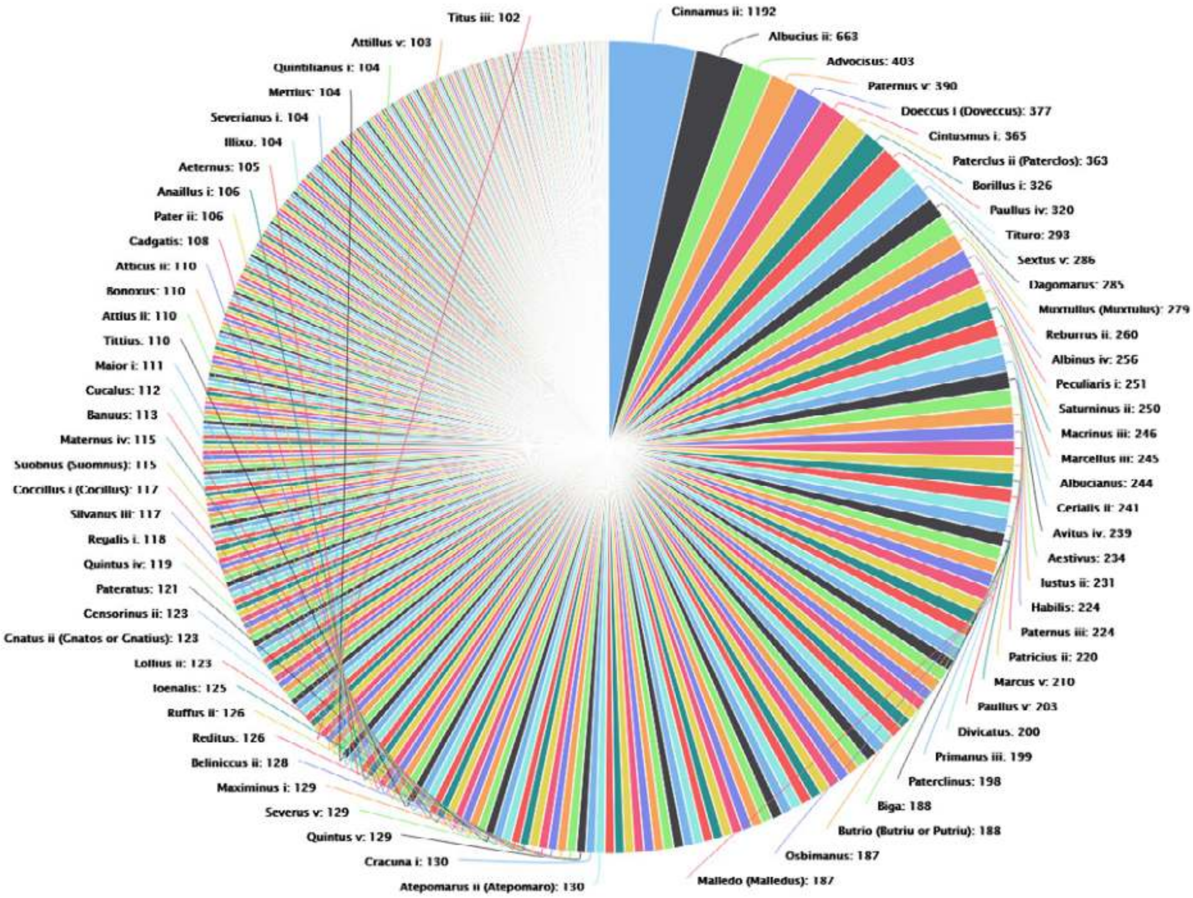


Figure 8. Pie chart of the total exports of individual Lezoux potters. Chart generated at Samian Research (http://www.rgzm.de/samian) [17.05.2021]

[12] Genin 2007: fig. 41.
[13] Hartley and Dickinson 2001.
[14] Ebnöther et *al.* 1994: 127.
[15] Walsh 2017.
[16] Cf. Carmelez 1994, and compiled from site records in the Musée du Nord, Bavay (with thanks to Laurent Bouthor).
[17] Dickinson 2009.
[18] Atkinson 1942.

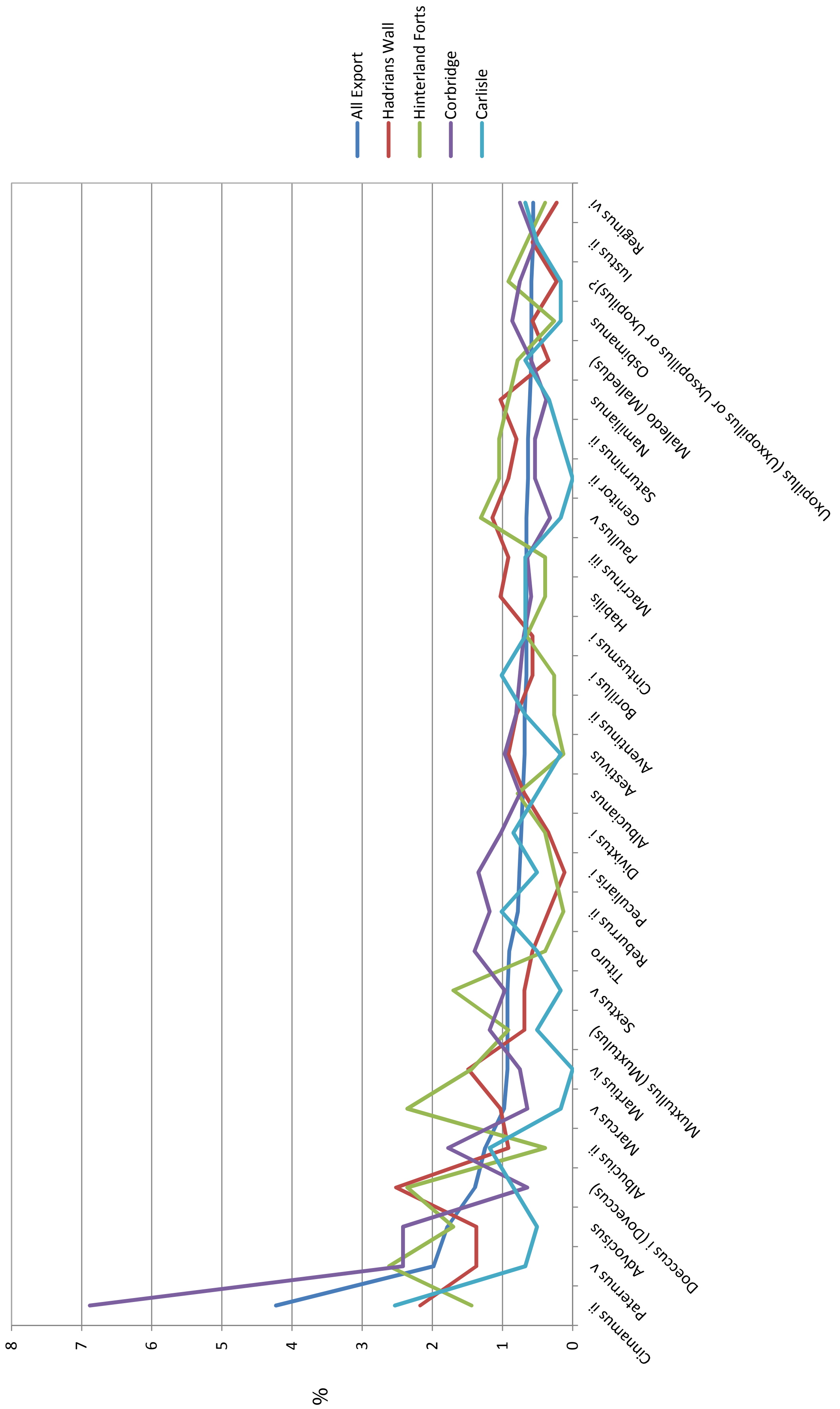


Figure 9. Differential percentages of potters' stamps from Lezoux between Hadrian's Wall related site groups. Ordered by the total export of Lezoux potters (cf. Table 4). Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021]

Table 4. Differential percentages of 'top 30' potters' stamps from Lezoux between Hadrian's Wall related site groups. Ordered by the total export of Lezoux potters (cf. Figures 9-10). Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021]

	All Export	**Hadrian's Wall**	**Hinterland Forts**	**Co Corbridge**	**Carlisle**	**South Shields**
Cinnamus ii	3.22	2.17	1.44	6.88	2.53	2.70
Albucius ii	1.79	0.92	0.39	1.77	1.18	
Paternus v	1.05	1.37	2.62	2.42	0.68	1.35
Paterclus ii (Paterclos)	0.98	0.23	0.79	0.11	1.01	
Advocisus	0.95	1.37	1.70	2.42	0.51	1.35
Doeccus i (Doveccus)	0.91	2.36	0.65	0.85	2.03	
Cintusmus i	0.87	0.57	0.65	0.70	0.68	1.35
Borillus i	0.86	0.57	0.26	0.75	1.01	
Reburrus ii	0.80	0.34	0.13	1.18	1.01	0.68
Paullus iv	0.79	0.23	0.26	0.11	0.85	
Dagomarus	0.74	0.69	0.26	0.05	0.85	0.68
Tituro	0.73	0.57	0.39	1.40	0.51	0.68
Muxtullus (Muxtulus)	0.71	0.69	0.92	1.18	0.51	0.68
Sextus v	0.69	0.69	1.70	0.97	0.17	0.68
Marcellus iii	0.69	0.34	0.39	0.27	0.51	1.35
Albucianus	0.66	0.69	0.79	0.75	0.51	0.68
Avitus iv	0.65	0.34	0.26	0.43	0.68	
Saturninus ii	0.65	0.80	1.05	0.54	0.17	1.35
Habilis	0.63	1.03	0.39	0.59	0.68	2.03
Peculiaris i	0.62	0.11	0.26	1.34	0.51	
Iustus ii	0.61	0.57	0.65	0.54	0.51	0.68
Albinus iv	0.60	0.23	0.13	0.11	0.34	
Macrinus iii	0.59	0.92	0.39	0.65	0.68	2.03
Aestivus	0.59	0.92	0.13	0.97	0.17	
Cerialis ii	0.58	0.34	0.13	0.43	0.85	
Paternus iii	0.58	0.46	0.13	0.16	0.17	1.35
Marcus v	0.56	1.03	2.36	0.65	0.17	1.35
Atilianus i	0.53	0.34	0.65	0.11	0.17	
Primanus iii	0.52	0.46	0.39	0.22	0.34	
Austrus	0.51	0.11	0.13	0.00	0.17	0.68

The descending order of the total export volumes of Lezoux potters (Figure 9) can be taken to compare the occurrences of these most frequently occurring potters in the different groups of sites related to Hadrian's Wall (Figure 10). As an example, the average export presence of Cinnamus ii stamps within the total export is 3.2%. At Corbridge it reaches 6.9% of the collection whereas at all the Hadrian's Wall forts in general, it is 2.2% and for the Hinterland forts only 1.4%. It is difficult to avoid the conclusion that although the overall quantity of a potter's stamps in the market is a strong indicator of the expected average presence on individual sites, there is a clear variance when it comes to the actual frequencies observed.

Another view of the data is to compare the relative ranking of the occurrence of individual potters.

Table 5. Table of relative frequencies of potters' stamps between Hadrian's Wall related site groups. Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021].

Hadrian's Wall	Hinterland Forts	Corbridge	Vindolanda	Carlisle	South Shields	Lezoux
Doeccus i	Paternus v	Cinnamus ii	Attilus v	Cinnamus ii	Sabellus	Cinnamus ii
Cinnamus ii	Doeccus i	Advocisus	**Flavius Germanus**	Albucius ii	Cinnamus ii	Albucius ii
Martius iv	Marcus v	Paternus v	Advocisus	Annius ii	Secundinus vi	Advocisus
Advocisus	Advocisus	Albucius ii	Scoplus	Borillus i	Doeccus i	Paternus v
Paternus v	Sextus v	Tituro	Paternus v	Paterclus ii	Habilis	Doeccus i
Clemens iii	Celsianus	Peculiaris i	Atlianus i	Reburrus ii	Macrianus	Cintusmus i
Paullus v	Cinnamus ii	Muxtullus	Iustus ii	Attianus ii	Macrinus iii	Paterclus ii
Habilis	Martius iv	Reburrus ii	Maximinus i	Biga	Martius iv	Borillus
Macrinus ii	Paullus v	Divixtus i	Pentius i	Cerialis ii	Maximinus i	Paullus iv
Marcus v	L. Cosius Virilis	Aestivus	Quadratus iii	Dagomarus	Namilianus	Tituro
Namilianus	Genitor ii	Sextus v	Vitalis vi	Divixtus i	Quintus v	Sextus v
Aestivus	Saturninus ii	Osbimanus	Paullus v	Doeccus i	Remicus	Dagomarus
Albucius ii	Severus vi	Aventinus ii	Banuus	Flavius Germanus		Muxtullus
Carussa i	Mammius	Albucianus	Intercillus i	Lollius ii		Reburrus ii
Genitor ii	Martinus iii	Borillus i	Mansuetus ii	Luppa ii		Albinus iv
Macrinus iii	Muxtullus	Martius iv	Marcus v	Nicephor i		Peculiari i
Mammius	Namilianus	Reginus vi	Avitus viii	Paullus iv		Saturninus ii
Mercator iv	Uxopillus	Uxopillus	Andegenus	Secundus v		Macrinus iii
Quintus v	Albillus i	Cintusmus i	Genialis iv	Severus v		Marcellus iii
Sabellus	Albucianus	Genialis iv	Mammius	Aventinus ii		Albucianus
Aventinus ii	Caletus	Maternus iv	Marcellinus ii	Avitus iv		Cerialis ii
Beliniccus ii	Iullinus ii	Cobnertus iv	Namilianus	Balbinus		Avitus iv
Mainacnus	Maior i	Doeccus i	Osbimanus	Bonoxus		Aestivus
Saturninus ii	Malledo	Macrinus iii	Paterclinus	Calava		Iustus ii
Scoplus	Mascellio i	Marcus v	Severus vi	Calendio		Paternus iii
Albucianus	Paterclus ii	Priscus iii		Cintusmus i		Habilis
Cambus i	Atilianus i	Attillus v		Cracuna i		Marcus v
Capellianus i	Beliniccus iii	Beliniccus iii		Cucillus i		Paullus v
Cobnertus iv	Carussa i	Capellianus i		Gongius		Divicatus

Here the measurement is not made just between Lezoux potters. In the Hinterland forts and Carlisle, as noted above, the effect of the earlier occupations can be seen (orange), and the Rheinzabern potter, Cobnertus iv (blue) has a place among the Wall sites and at Corbridge, while Avitus viii is in the list for Vindolanda. However, the effect of delivery(ies?) from La Madelaine to South Shields, not seen elsewhere as a proportion of total stamp loss emphasises the potential for skewness in distributions. A number of potters appear repeatedly among the top thirty or so but the variations are considerable and need to be compared to the ranking of the total known stamp output from Lezoux. For Rheinzabern, Avitus viii and Cobnertus iv, rank only 14th and 16th respectively, the most prolific producer Victorinus ii has only three stamps from all sites. The degree to which small vessel populations affect the result cannot be calculated, but it is clear from the rankings at Vindolanda that small numbers, when combined with a multiplicity of periodic rebuildings, complicate interpretation.[19]

In addition to information relating to date, it is also possible to look at the kiln sources for the stamps, which gives an insight to the general supply connections. The attribution of the potters' stamps to particular kiln-sites is not easy. Those found in manufacturing contexts on production sites are straightforward. On the other hand, there are many potters whose workplaces are more equivocal, often associated with those who either appear to have had 'branch workshops', or moved their workshops or employment from one site to another.[20] Hartley frequently ascribed a kiln source based upon his assessment of the overall geographical loss pattern, where there was no archaeological context at a manufacturing site. This approach can lead to complications, particularly for the potteries of *Gallia Belgica*. For instance, the work of a potter not attested at the Trier production centre may nevertheless appear in quantity at the city of Trier - and the question arises 'where did he work?'. Hartley's attributions have been left to stand, but as an interim measure sites have been grouped on the basis that potters who are known only to have exported from a single kiln-site are attributed to it but where they also worked at a larger production centre, they are attributed there.[21]

The group of kilns-sites connected with potters who worked at Lezoux is the dominant supplier with *c.* 80% market share. The most noteworthy variation is at South Shields, where contrary to Hartley, the percentage of samian supply from the Rheinzabern group is significantly lower than that from Hadrian's Wall or the Hinterland forts, and even less than Carlisle on the west coast. Against that, the deliveries from potters known only to have worked at Trier are significantly higher. That may be because samian consumption is the result of a defined demand for the product. If a vessel was bought from one source, it was at the expense of another from a competing supplier. South Shields has a much higher representation of samian from La Madelaine. This comes from four potters, and three stamps supplied by Remicus and the five by Sabellus may indicate a single delivery. On the other

Table 6. Aggregated sources of samian stamps (in percentages) from sites on Hadrian' Wall, the Hinterland and the Stanegate. Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021]. Cf. Table 7.

	Hadrian's Wall	Hinterland Forts	Corbridge	Carlisle	Vindolanda
Lezoux Group	80.71	82.2	86.67	80.07	**79.63**
Gueugnon		0.13			
Martres-de-Veyre	0.57	1.7	2.04	6.42	**2.47**
Rheinzabern Group	10.30	10.34	6.83	7.26	**10.49**
Heiligenberg Group	0.57	0.39	0.54	0.34	
Trier	0.92	0.65	0.54	0.17	**1.23**
Blickweiler Group			0.16	0.68	**0.62**
Argonne Group1	0.11	0.26	0.16		
Argonne Group2	1.60	0.52	0.38	1.01	
La Madeleine	1.72	0.26	0.81	0.68	
Colchester Group		0.13	0.38	0.17	**0.62**
Montans	0.23		0.05	0.17	
Banassac Group			0.16		
South Gaulish Group	2.17	2.36		1.01	**3.70**
Unknown	1.14	1.06	1.28	2.02	**1.24**
	100.00	**100**	**100**	**100**	**100**

19 Cinnamus ii was not recorded in the Mainz database at the date of this paper, but three stamps of die 5b on Drag. 37 have now been found from recent excavations (*pers. comm.* Gwladys Monteil, to whom many thanks).

20 Cf. Hartley 1977.

21 See Table 6 which gives the full list of sources, and Table 7, the derived groups.

Table 7. Coloured aggregations of kiln-sites according to the classifications given in Samian Research (http://www.rgzm.de/samian) [20.06.2021]. Cf. Table 6.

Hartley's Kiln Sites assigned to potters

Lezoux	Blickweiler
Lezoux+Blickweiler	Blickweiler+Chémery-Falquemont
Lezoux+Banassac	Blickweller+Bouchporn+Chémery-Falquemont+Mittelbron
Lezoux+Banassac+Vichy (Terre-Franche)	Blickweiler+Escherweilerhof
Lezoux+Gueugnon	Blickweiler+Escherweilerhof+Trier
Lezoux+Gueugnon+Lubié+Vichy (Terre-Franche)	Blickweiler+Hombourg-Budange
Lezoux+Les Martres-de-Veyre	Blickweiler+Trier
Leoux+Lubié	Bouchporn+Chémery-Falquemont+Mittelbron
Leoux+Lubié+Toulon-sur-Allier	Chémery-Falquemont+Mittelbron
Leoux+Lubié+Vichy (Terre-Franche)	Chémery-Falquemont+Haut-Yutz+Trier
Lezoux+Lubié+Vichy (Terre-Franche)+Toulon-sur-Allier	Argonne
Lezoux+Les Martres-de-Veyre+Toulon-sur-Allier	Argonne+Heiligenberg+Trier+Rheinzabern
Lezoux+ Toulon-sur-Allier	Argonne+Trier
Lezoux+Vichy (Terre-Franche)	Avocourt
Gueugnon	Avocourt+Lavoye
Les Matres-de-Veyre	Avocourt+Lavoye+Trier
Rheinzabern	Lavoye+Mittelbron+Sinzig+Trier
Rheinzabern+Heiligenberg	Lavoye+Rheinzabern+Westerndorf
Rheinzabern+Heiligenberg+Haut-Yutz	Lavoye+Trier
Rheinzabern+Heiligenberg+Ittenweiler+Kraherwald+Waiblingen	Les Alleux
Rheinzabern+Heiligenberg+Schwabian	Pont-de-Rèmes
Rheinzabern+Heiligenberg+Trier	La Madeleine
Rheinzabern+Haute Yutz+Pfaffenhoven+Trier	La Madeleine+Sinzig+Trier
Rheinzabern+Ittenweiler	Colchester+Sinzig
Rheinzabern+Ittenweiler+Schwäbisch+Trier	Colchester+Sinsig+Trier
Rheinzabern+Kräherwald	Colchester+Trier
Rheinzabern+Schwäbisch	Montans
Rheinzabern+Trier	Banassac+Lezoux+Vichy (Terre-Franche)
Rheinzabern+Trier+Waiblingen	Bannassac+Les-Martres-de-Veyre
Rheinzabern+Trier+Westendorf	Banassac
Rheinzabern+Westerndorf	La Graufesenque
Rheinzabern+Waiblingen	La Graufesenque+Banassac
Heiligenberg	La Graufesenque+Espalion
Heiligenberg+Ittenweiler	La Graufesenque+Le Rozier
Heiligenberg+Ittenweiler+Kräherwald	Unknown
Heiligenberg+Kräherwald	
Trier	
Trier+Sinzig	
Trier+Westerndorf	

hand there is only a single stamp from Les Martres-de-Veyre. This contrasts with the Stanegate sites, where there are significantly more.[22] The Colchester/Sinzig (?) deliveries are intriguing. Potters' stamps in Britain from Sinzig are only known from Colchester, Rainham and London, and retrieval of the stamps from Hadrian's Wall contexts for fabric analysis would be worthwhile to establish their origin.[23] The range of smaller kiln-sites

[22] Between them, Corbridge, Chesterholm-Vindolanda and Carlisle have the names of 14 other different Martres-de-Veyre potters.

[23] There are three stamped mortaria from Colchester at South Shields, and one at Wallsend (K. Hartley, *pers. comm.*, to whom many thanks).

poses questions about the organisation of the middlemen carrying on the trade. Given the small numbers involved it is hardly credible that they represent direct supplies. Rather, at some point in the routing they must have been aggregated, or evidence is missing for other products from the same regions which might have bulked up loads.

Correspondence analysis provides a further tool to measure the association of kiln sources with site deposition and particularly whether there are divergent spectra of potters' stamps from different production centres on the major sites of Hadrian's Wall (Figure 10). The analysis of statistically weighted consumption profiles per site can demonstrate consumption preferences, which might be the result of particular geographic situations. The correspondence analysis of the occurrences of samian from different kiln-sites on Hadrian's Wall sites demonstrates the statistically significant presence of products in South Shields from Trier, La Madeleine, and the Argonne group as well as Montans. At first sight the first three might be related to the geographical location of South Shields at the eastern end of Hadrian's Wall, since products from Trier and La Madeleine could have been imported via the Rhine estuary and South Shields would have been the first landing place. However, the higher percentage of products from Montans at South Shields, which one would have expected to arrive at the western end of Hadrian's Wall nearer to Carlisle,[24] is a strong warning that the total amount of the underlying data from Hadrian's Wall may be subject to a strong variability in the market supply.

Market routes to Hadrian's Wall

Apart from the small amount which may have been made at Colchester and the presumed short-lived site at Pulborough, all samian found in Britain came by sea.[25] For northern Britain the key question is whether there were direct deliveries to regional ports, and if so where were they situated? For Hadrian's Wall the

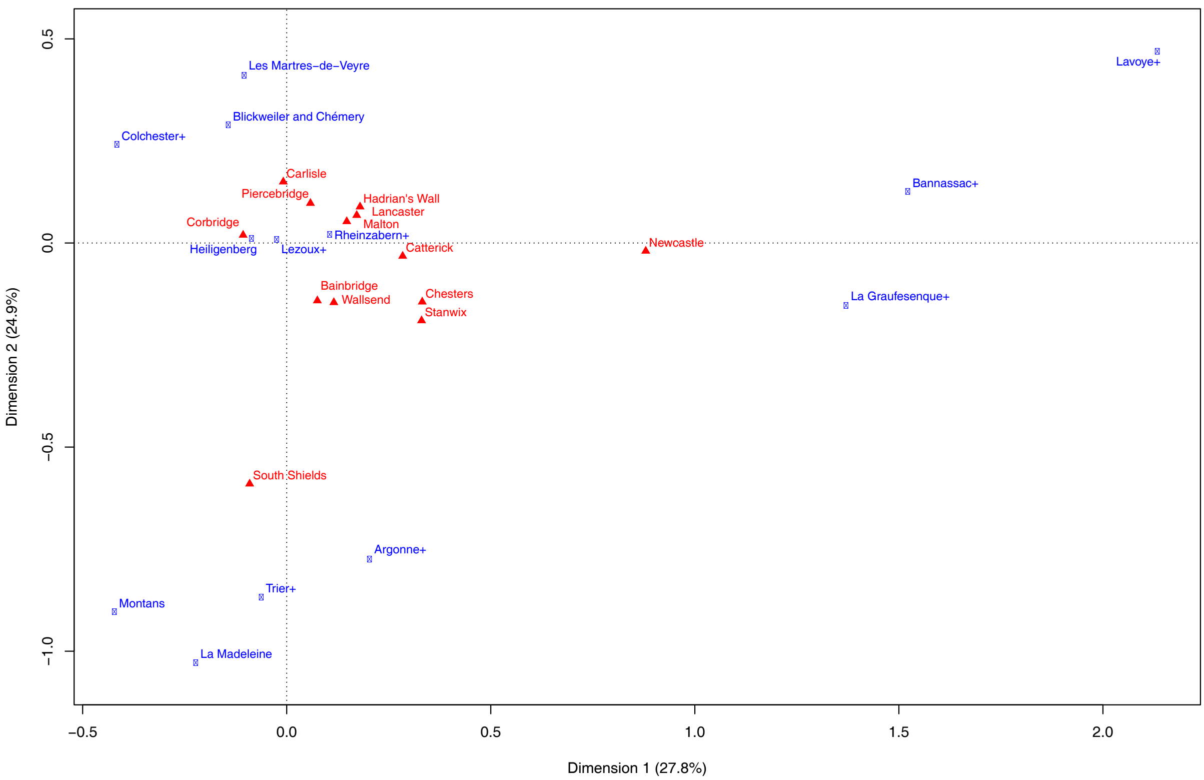


Figure 10. Correspondence analysis of the occurrences of samian produced at different production centres on Hadrian's Wall sites. In order to avoid statistical outliers, the analysis is based on sites having samian from at least 3 different kiln sites and which occur on at least 5 different sites (cf. Table 7). Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021]

[24] Cf. Wild 2015: fig. 3, where there is indication of importation up the west coast, but deposition right the way across the length of the Antonine Wall; additionally there are the two known inscriptions connecting Britain to Bordeaux (CIL.13.634, specifically mentioning a *negotiator* and that of Lunaris, which is 3rd-century, but connects with York (*Journal of Roman Studies* 11 (1921): 101). Wild's map shows that there was also an east-coast connection with Aquitania.

[25] Cf. Dannell and Mees 2013: 182-4.

Table 8. Occurrences of samian produced at different production centres at Hadrian's Wall sites (cf. the correspondence analysis of these data in Figure 11). Data from Samian Research (http://www.rgzm.de/samian) [17.05.2021]

	Argonne+	Bannassac+	Blick+Chém+	Colchester+	Geugnon	Heiligenberg	La Madeleine	Lavoye+	Lezoux+	La Graufesenque+	Les Martres-de-Veyre	Montans	Pont-de-Rème	Rheinzabern+	Trier+
South Shields	4	0	0	0	0	1	10	0	149	1	1	1	0	12	5
Wallsend	1	1	1	0	0	0	4	0	103	2	2	0	0	12	0
Newcastle	1	1	0	0	0	0	0	1	35	2	0	0	0	3	0
Benwell	0	0	0	0	0	1	0	0	57	1	0	0	0	9	0
Rudchester	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Haltonchesters	0	0	0	0	0	0	0	0	55	0	0	0	0	3	0
Chesters	0	0	0	0	0	1	0	0	54	3	0	0	0	9	2
Carrawburgh	0	0	0	0	0	1	0	1	17	2	0	0	0	0	0
Housesteads	0	0	0	0	0	0	0	0	28	1	0	0	1	16	1
Great Chesters	0	0	0	0	0	0	0	0	6	0	0	0	1	3	0
Carvoran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Birdoswald	0	0	0	0	0	0	0	0	52	2	0	1	0	4	0
Castlesteads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stanwix	0	0	0	0	0	0	1	0	14	1	1	0	0	3	0
Burgh-by-Sands	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Drumburgh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bowness-on-Solway	0	0	0	0	0	0	0	0	17	0	0	0	0	1	0
Hadrian's Wall	0	0	0	0	0	1	0	1	115	2	1	0	0	16	0
Bainbridge	1	0	0	0	0	0	0	0	53	1	0	0	0	3	1
Catterick	2	1	1	0	0	2	1	0	199	9	3	0	0	16	1
Chester-le-Street	0	0	1	0	0	0	0	0	44	0	0	0	0	5	1
Ebchester	0	0	0	0	0	0	0	0	8	0	0	0	0	3	0
Greta Bridge	0	0	0	0	0	0	0	0	8	0	0	0	0	3	0
Ilkley	0	0	0	0	0	0	0	1	32	0	1	0	0	9	0
Lancaster	0	1	0	0	0	0	1	0	105	3	4	0	0	5	0
Malton	0	0	0	1	0	0	0	0	67	2	4	0	0	17	2
Papcastle	0	0	0	0	1	0	0	0	28	0	0	0	0	2	0
Piercebridge	0	1	0	0	0	2	0	0	85	0	1	0	0	14	0
Corbridge	6	0	6	7	0	13	15	0	1614	0	38	1	0	126	10
Carlisle	3	1	4	1	0	2	4	1	476	5	38	1	1	41	1

most obvious entry point would be the Tyne, and the position and size of Corbridge would suggest it to be a potential inland port.[26] However, Corbridge is also on Dere Street, with a connection back through Catterick to York. Thus there are two alternative accesses, one by river, the other by road. From Corbridge, the Stanegate could then act as a distribution artery from which feeder roads through the Vallum would

[26] Current hydrography records the water level at between 0.13 m and 3.3 m, which would allow for rafts, although not throughout the year (https://riverlevels.uk/northumberland-corbridge#.YKYjFKhKj84). Breeze 2006: 120 notes that to date no harbour facilities have been found at South Shields, but since the site operated as a coastal supply base for grain, shipping facilities presumably existed.

serve the Wall forts. Its Flavian date and geographical situation nearer to the sources of samian ware make it more likely than Carlisle to have been a primary centre of importation.[27]

These distributions raise the issues of whether they demonstrate actual supply routes, population densities, delivery patterns, or a combination of these factors dependent upon the date of occupation of particular sites. The constant feature of Lezoux distribution for the Wall area is the predominant relative weighting of Corbridge. Beyond that, York appears as a prominent node supporting the argument above for a Dere Street connection which can be seen more clearly in some of the lesser suppliers, who nevertheless appear regularly among the potters in this study.[28]

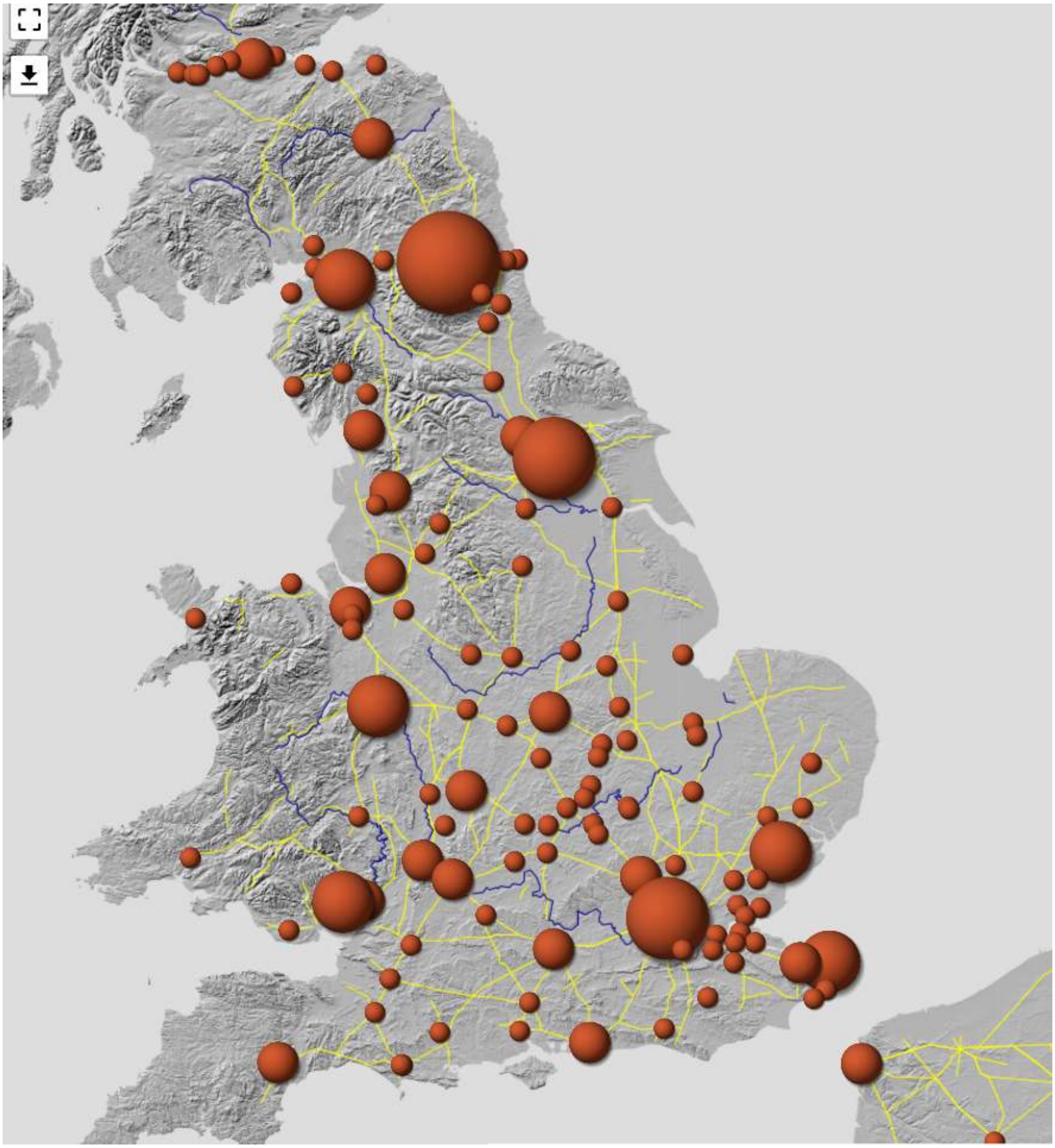


Figure 11. The distribution of Cinnamus ii stamps from Lezoux.

[27] Hanson *et. al.* 1979.

[28] Cf. Margary 1973, Roads 8 etc, and for Newcastle, South Shields and Wallsend (if supplied directly at all), Roads 80 etc.

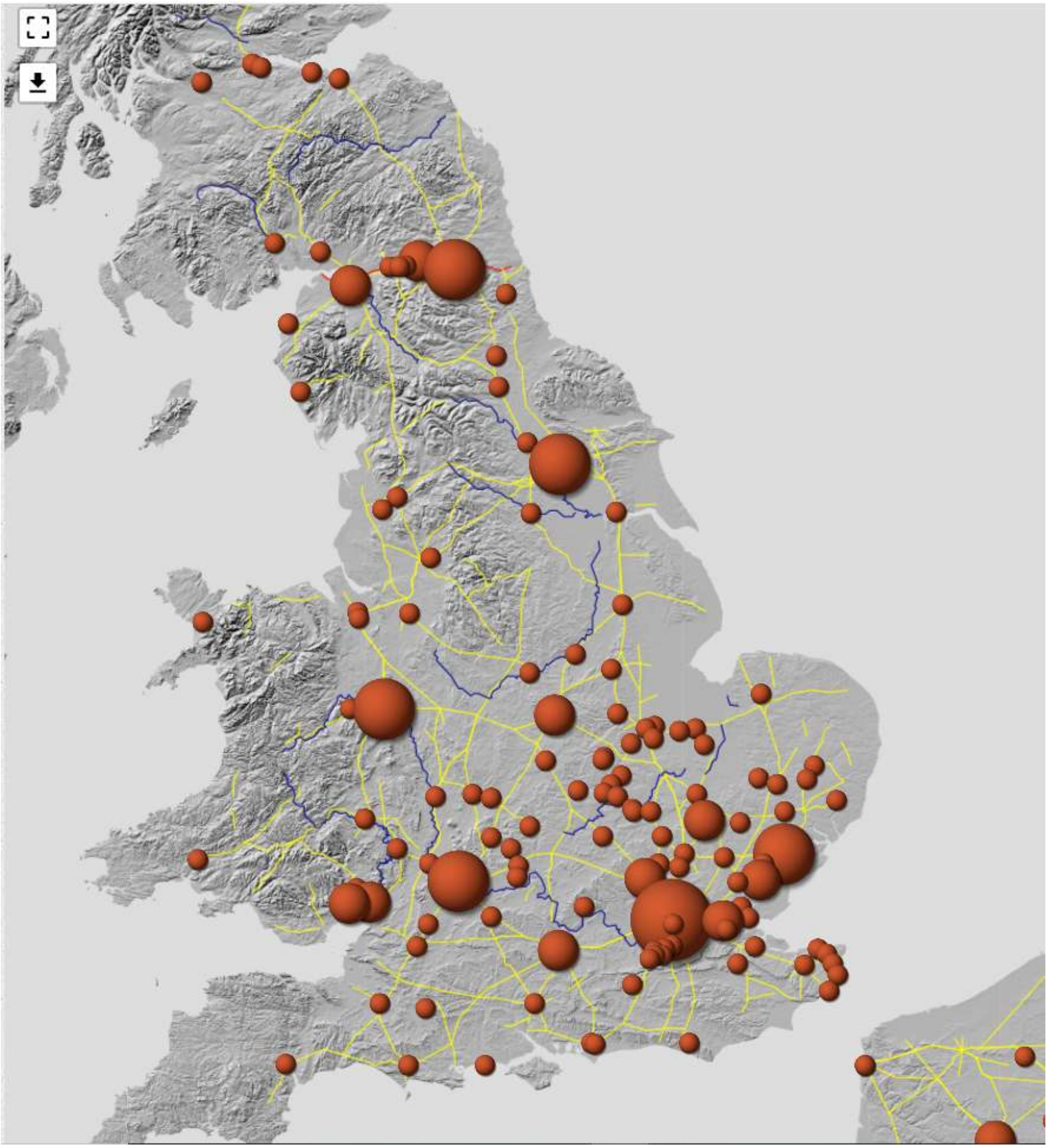


Figure 12. The distribution of Advocisus stamps from Lezoux.

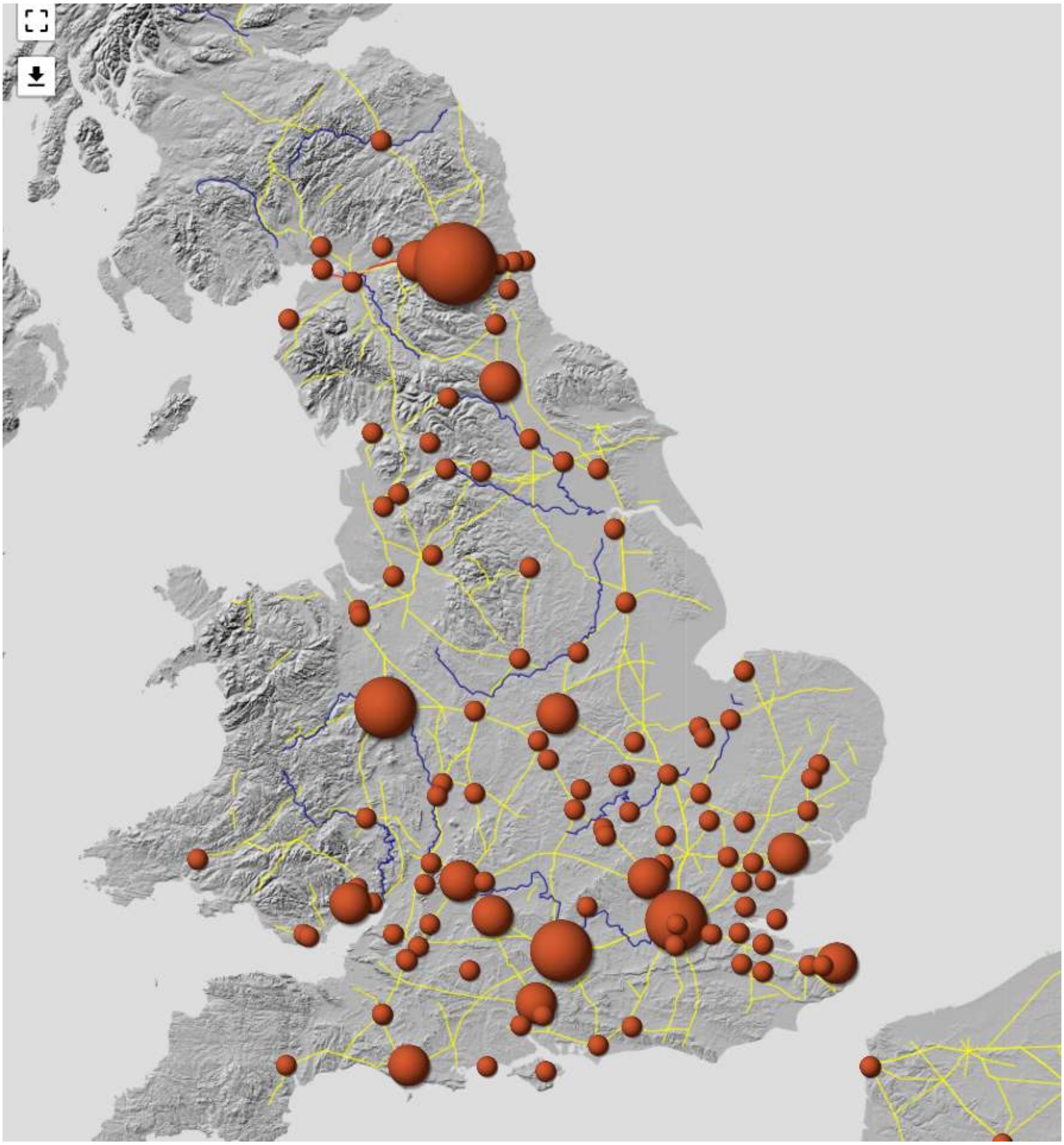


Figure 13. The distribution of Albucius ii stamps from Lezoux.

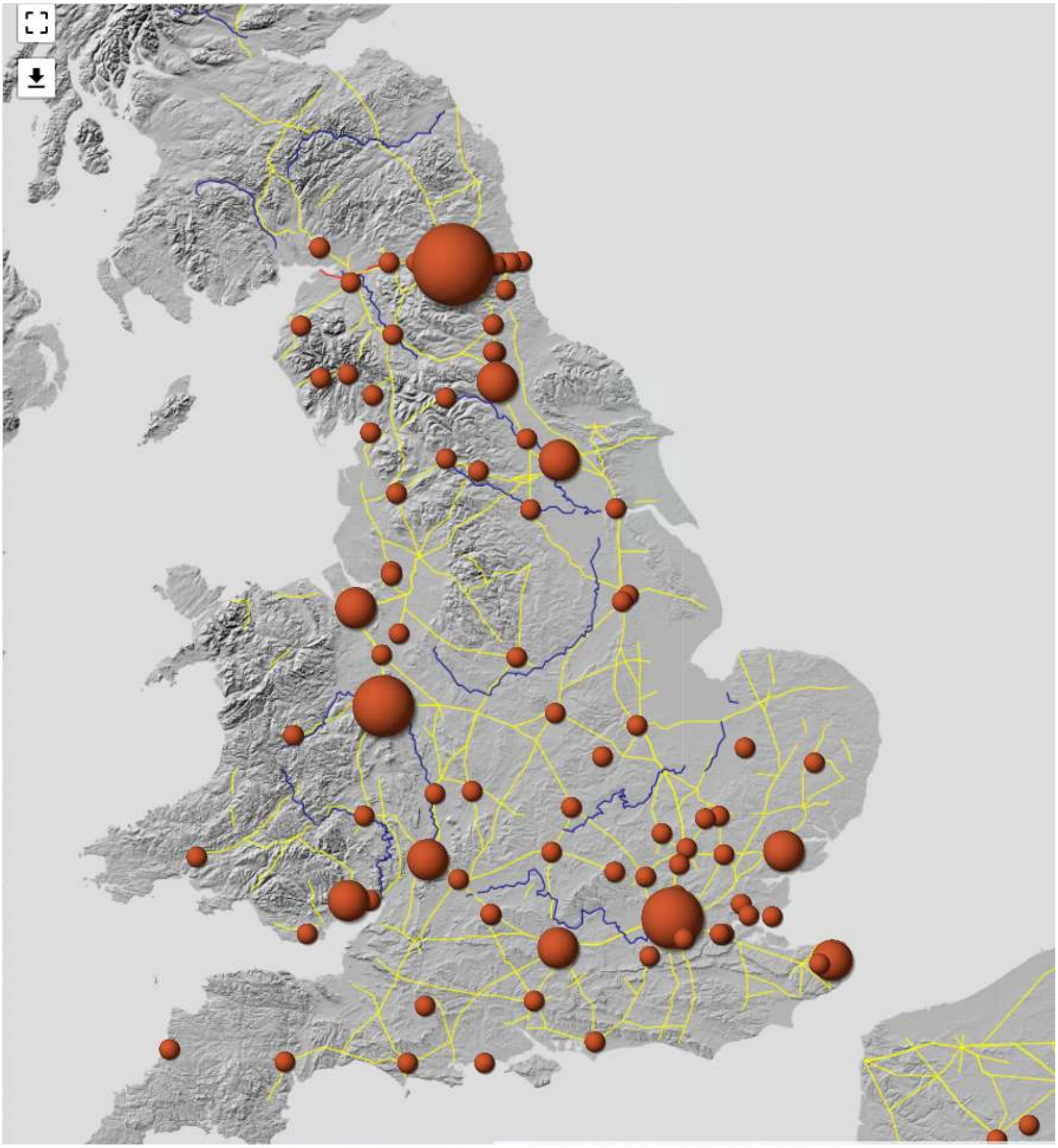


Figure 14. The distribution of Paternus v stamps from Lezoux.

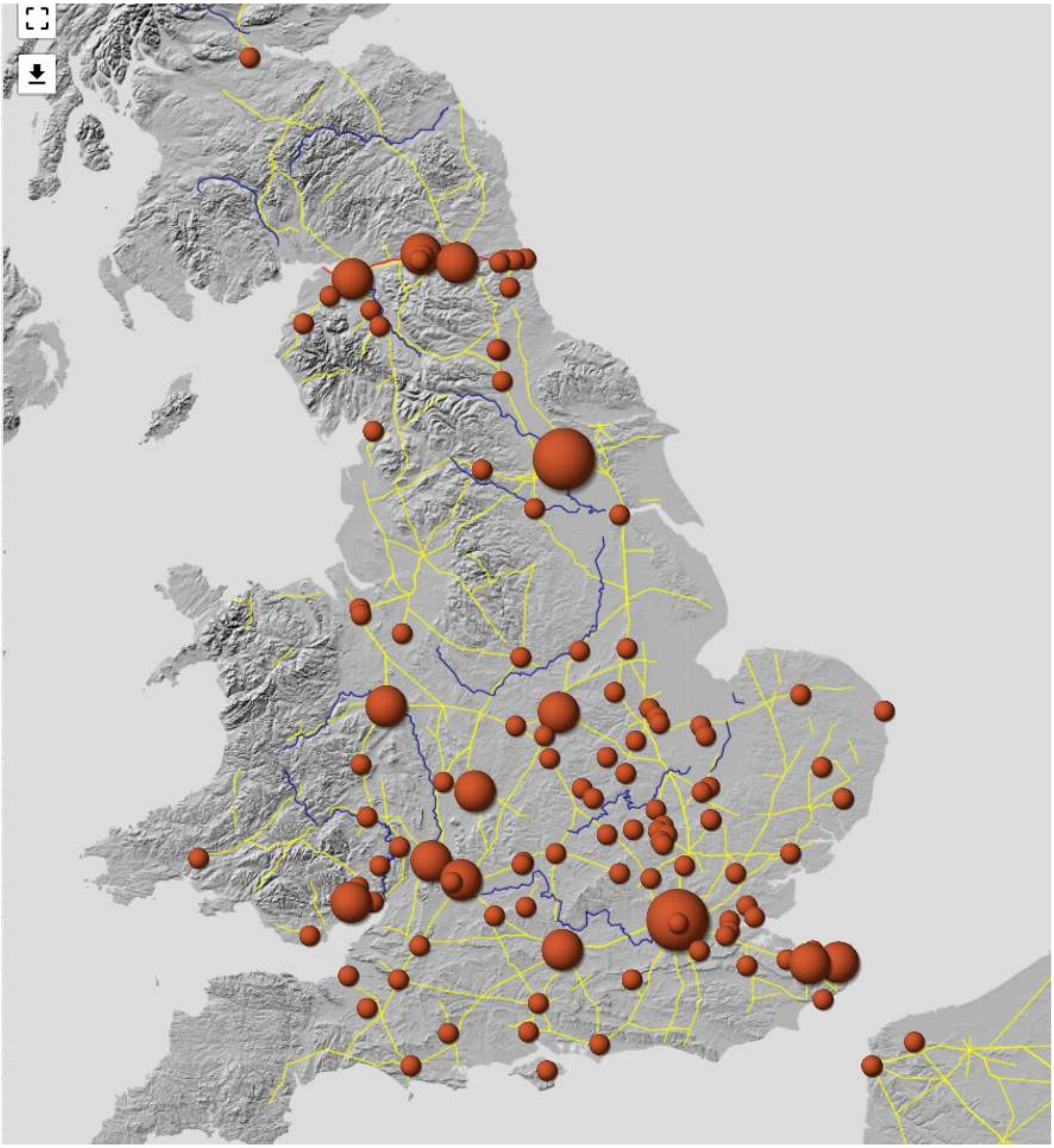


Figure 15. The distribution of Doeccus i stamps from Lezoux.

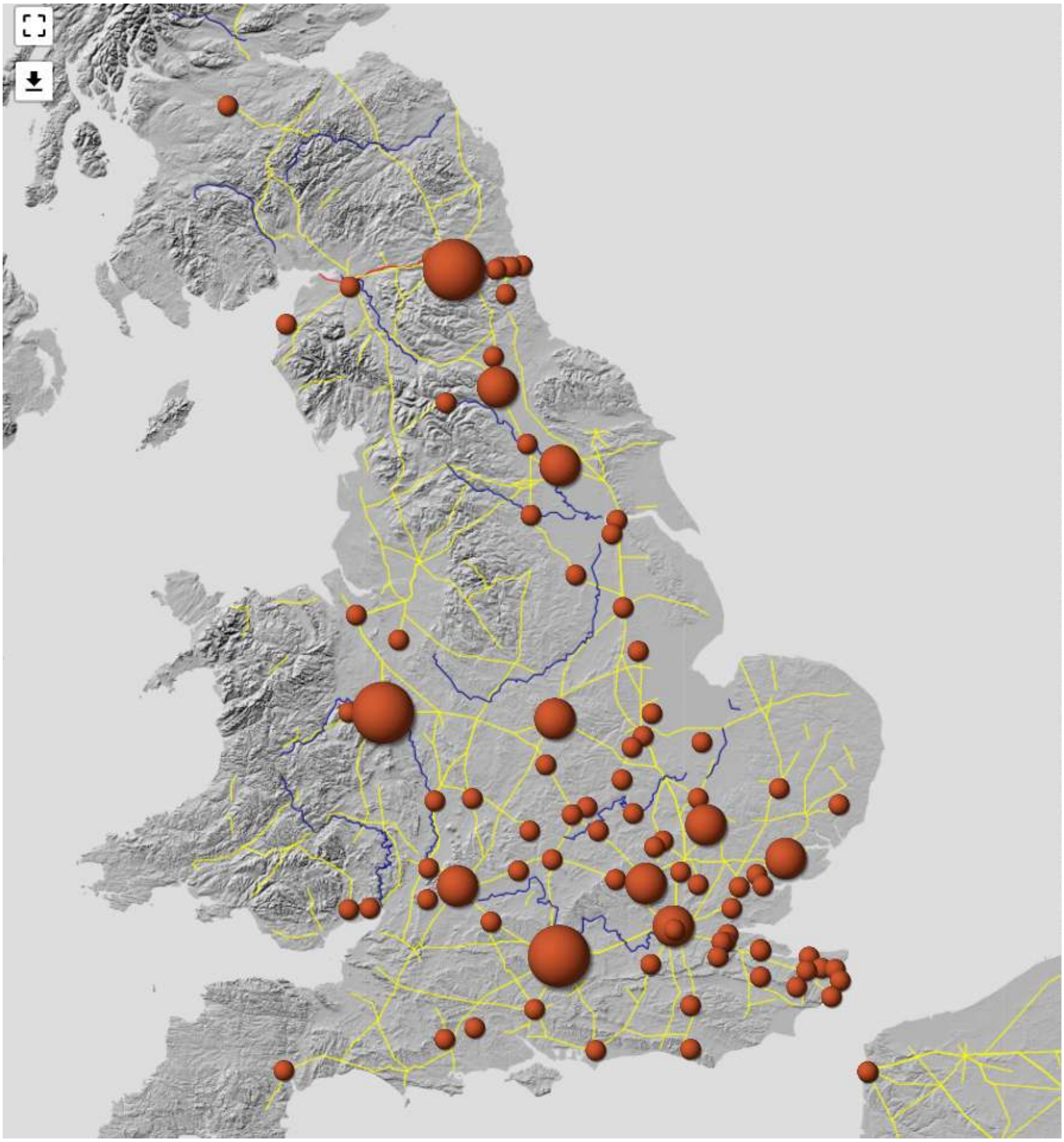


Figure 16. The distribution of Marcus v stamps from Lezoux.

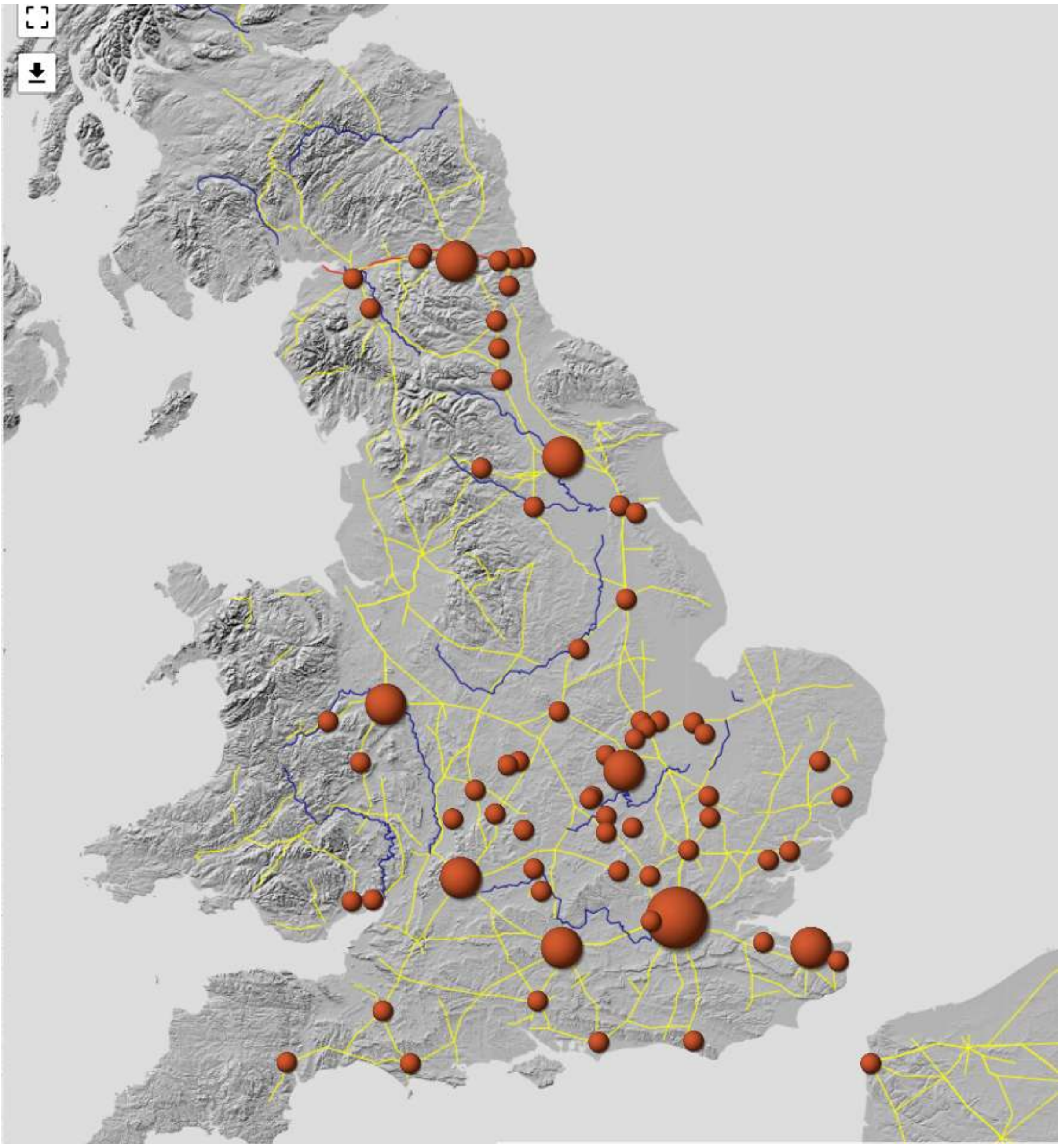


Figure 17. The distribution of Namillianus stamps from Lezoux.

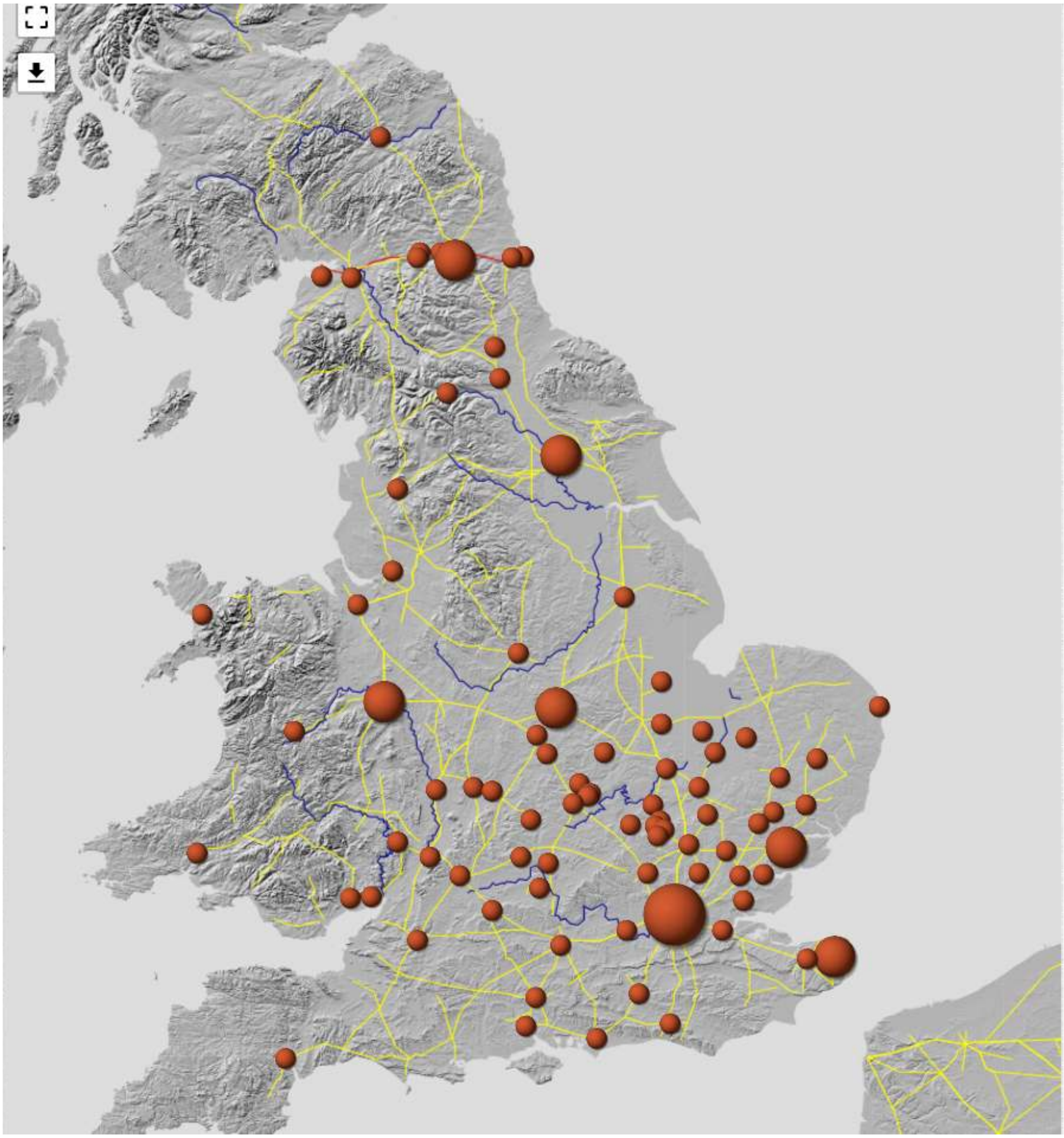


Figure 18. The distribution of Sextus v stamps from Lezoux.

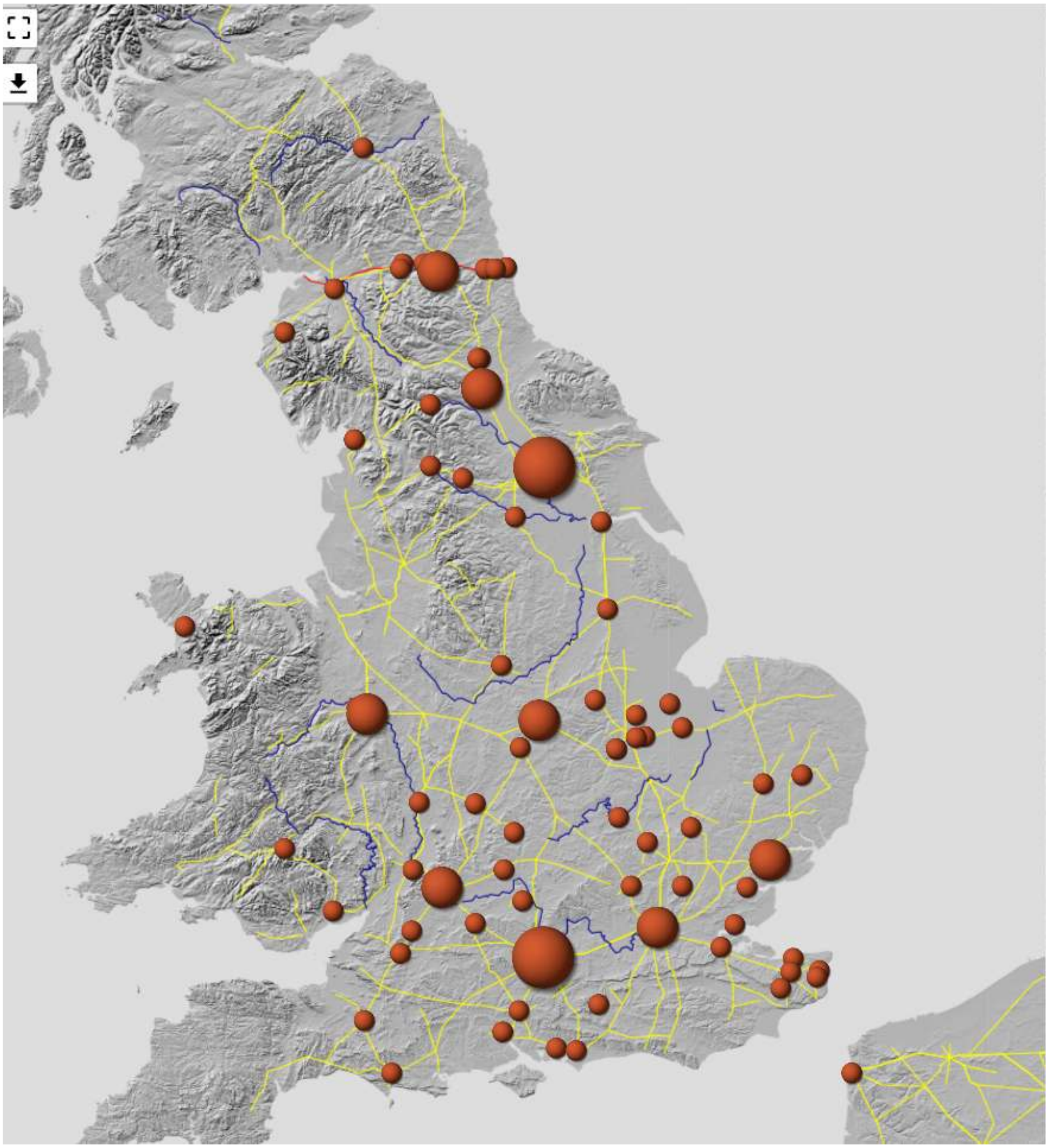


Figure 19. The distribution of Macrinus iii stamps from Lezoux.

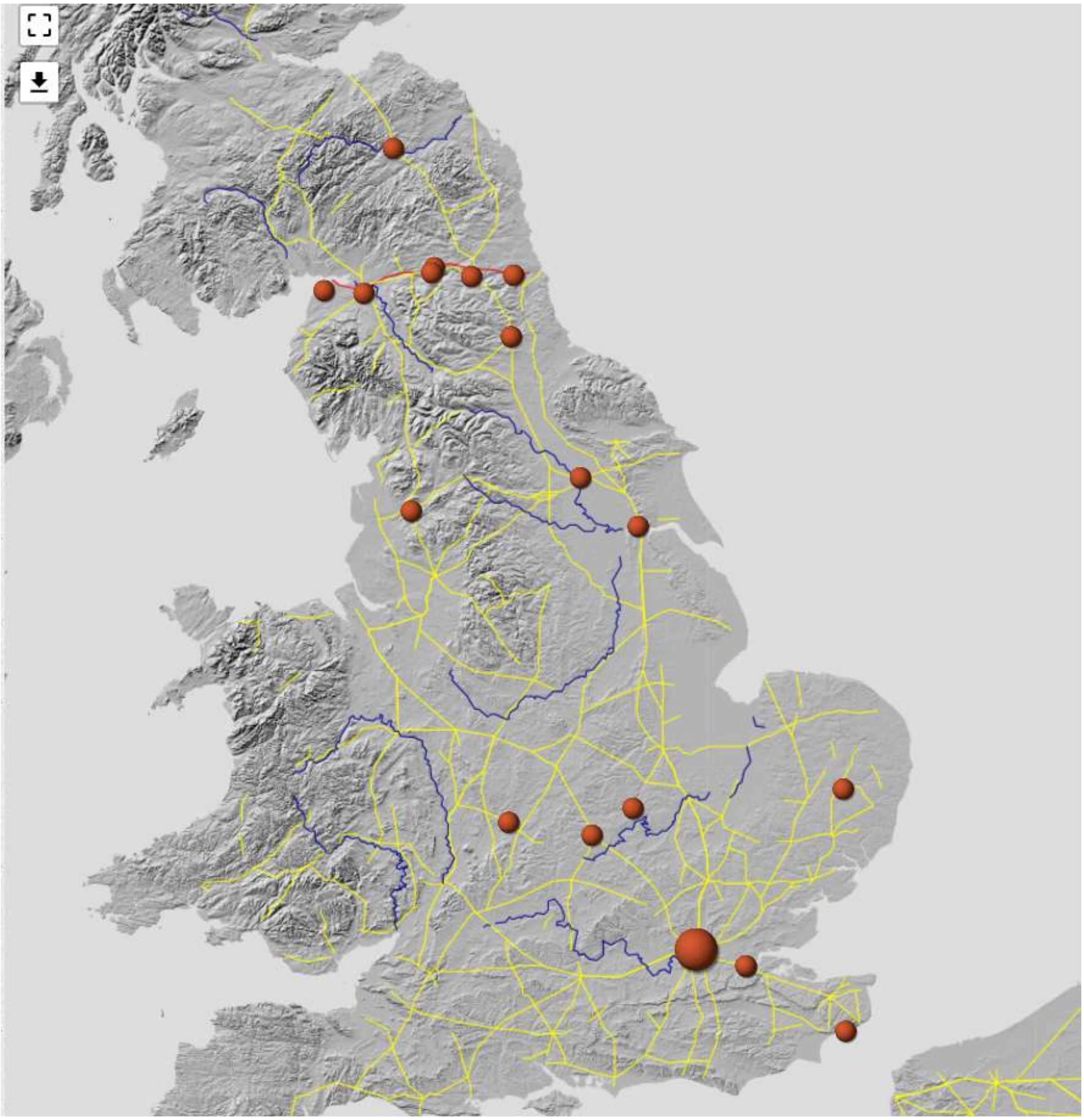


Figure 20. The distribution of Avitus viii stamps from Rheinzabern.

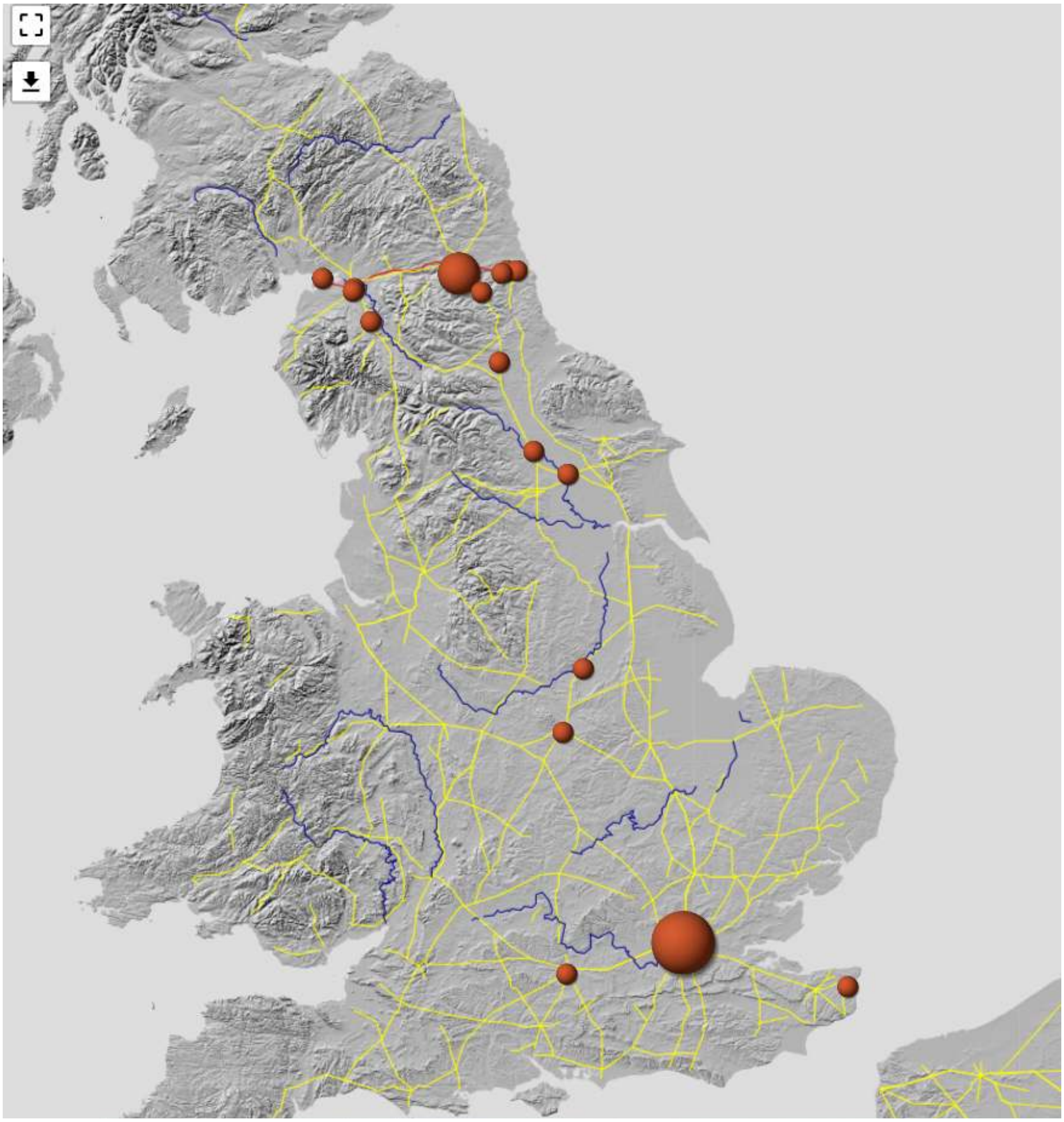


Figure 21. The distribution of Cobnertus stamps iv from Rheinzabern.

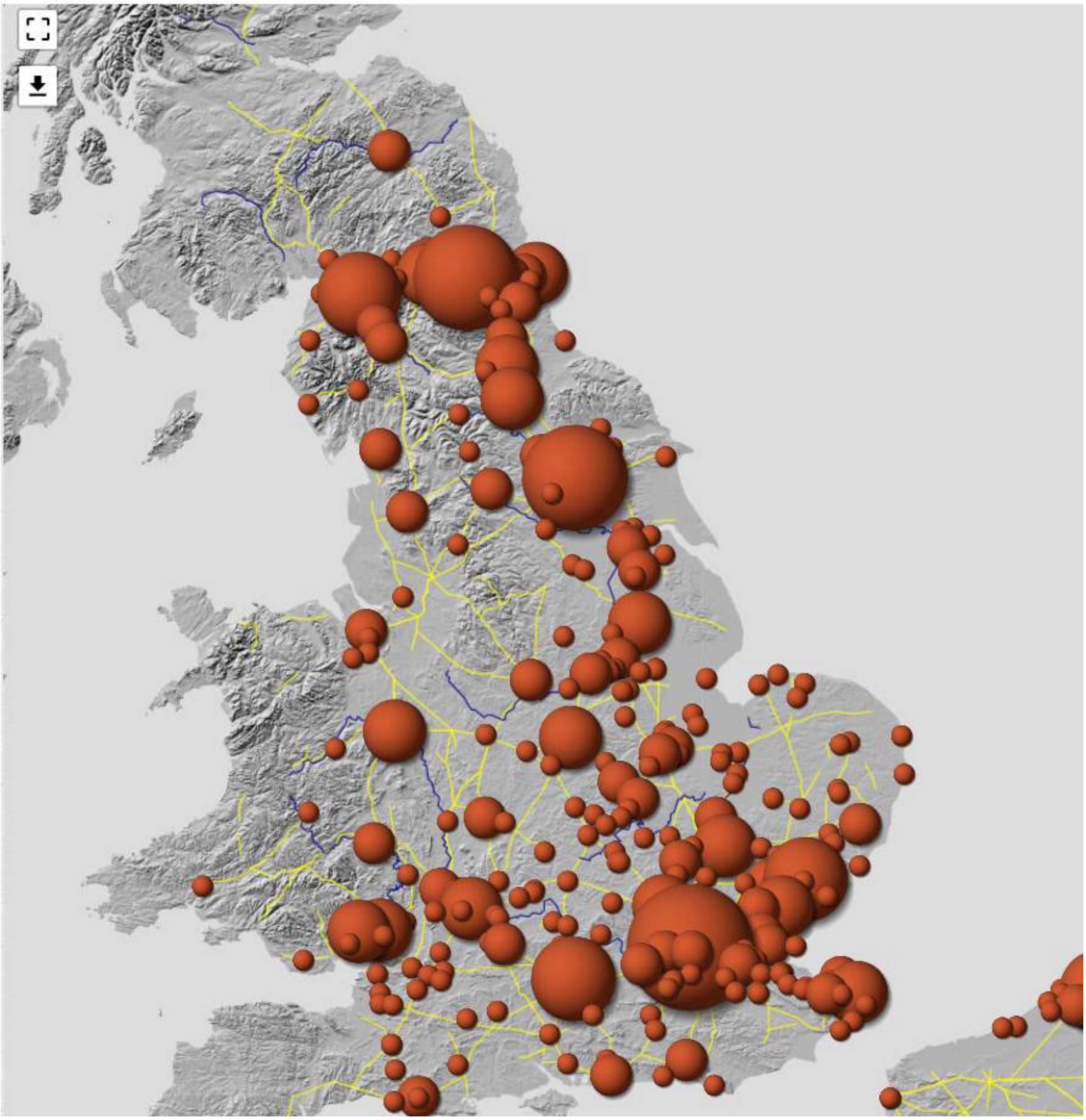


Figure 22. The distribution of all potters' stamps from Rheinzabern.

Figures 11-22: Distribution of potters' stamps from Lezoux and Rheinzabern.
Maps generated from Samian Research (http://www.rgzm.de/Samian) [18.05.2021].

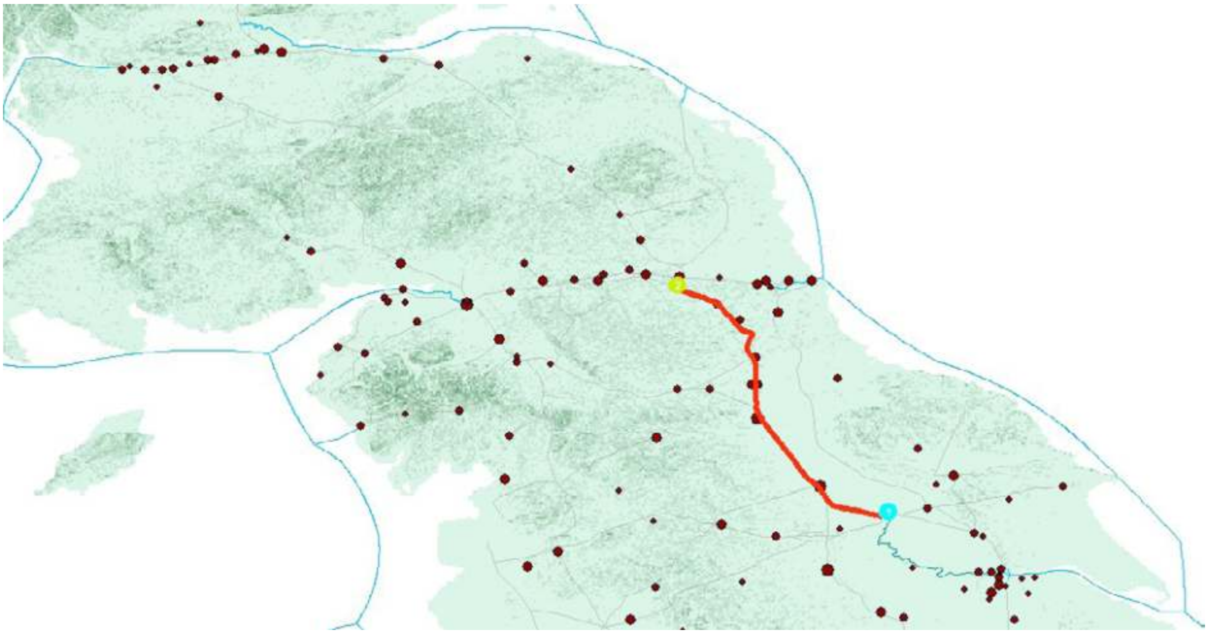


Figure 23. Least-cost analysis of transport between York and Corbridge along the available Roman network consisting of sea, river and land routes. The cost factors used here, 1 (sea) : 5 (river) : 28 (land), are derived from sources in antiquity. Base-map and routes after: Mees 2011: 259.

For the two most important potters of the Rheinzabern group, the situation is different. Here, there appears to be a south/north divide, with importation centred on London, and again the suggestion that another supply-chain began at York.[29] While South Shields fort appears on all of these maps, it seems unlikely that it would have distributed southwards to the Hinterland forts, for which York, and probably Catterick were better placed.[30]

A least-cost analysis of the possible transport routes between York and Corbridge clearly suggests that the direct land route between both places (via Catterick, Piercebridge and Binchester) was the preferable route from a cost perspective, even in comparison with the considerably longer route via the river systems and the North Sea. The cost factors used here, 1 (sea) : 5 (river) : 28 (land), are derived from a variety of sources in antiquity.[31] The considerable amount of samian found from sites along Dere Street between York and Corbridge suggests that it was not random distribution, but followed a 'least-cost' model, not excluding, but in preference to, regular importation by sea. To date no port facilities at the mouth of the Tyne have been identified, although given the scale of later industrial development their existence cannot be excluded.[32]

It is instructive to get a sense of scale relating to the weight of samian vessels, when compared to a staple. The table below records Drag. 37s, representative of some of the heavier vessels. They should be contrasted with examples of *tituli picti* on Dressel 20 *amphorae*, where the suggested ratio is 1 filled amphora weighing *c.* 67 kg (*c.* 200 *librae*) to between 0.5 - 1.5 kg for the decorated bowl.[33] Smaller vessels like dishes averaged *c.* 0.200 kg, and cups around 0.120 kg.[34] Thus the transport of samian represented significant loads. If the vessels from Les-Martres-de-Veyre and Rheinzabern, with diameters of 240mm are representative, weight would not seem to have been a cost sensitive factor in distribution.

Analysis of the distribution of Dressel 20 in Britain supports the routing discussed above for samian. Montfort sees importation of the oil contained in them coming through ports in south Britain, with

Table 9. Drag. 37 vessel sizes and weights: examples from London.

Ref at MoL	Diameter mm	Weight Kg	Kiln Source
27.92	125	0.500	Lezoux
S82886	160	0.572	Lezoux
3120	260	1.544	Lezoux
81353	240	1.130	Les-Martres-de-Veyre
24517	240	1.314	Rheinzabern

29 Dickinson and Hartley 1971, where important statistical information is given regarding samian and mortaria supplies on trading connections as then known.

30 The most recent evidence became available after this paper was written. It adds 195 stamps of Wall period, and 49 of pre-Wall period to the record and reinforces the argument for supply originating from the south (Monteil 2021).

31 Cf. Mees 2011: 259 with further sources.

32 Breeze 2006.

33 Frere and Tomlin 1994: 1 (introduction to *RIB* 2492).

34 Weights measured at Museum of London Archaeological Archive, with thanks to the staff.

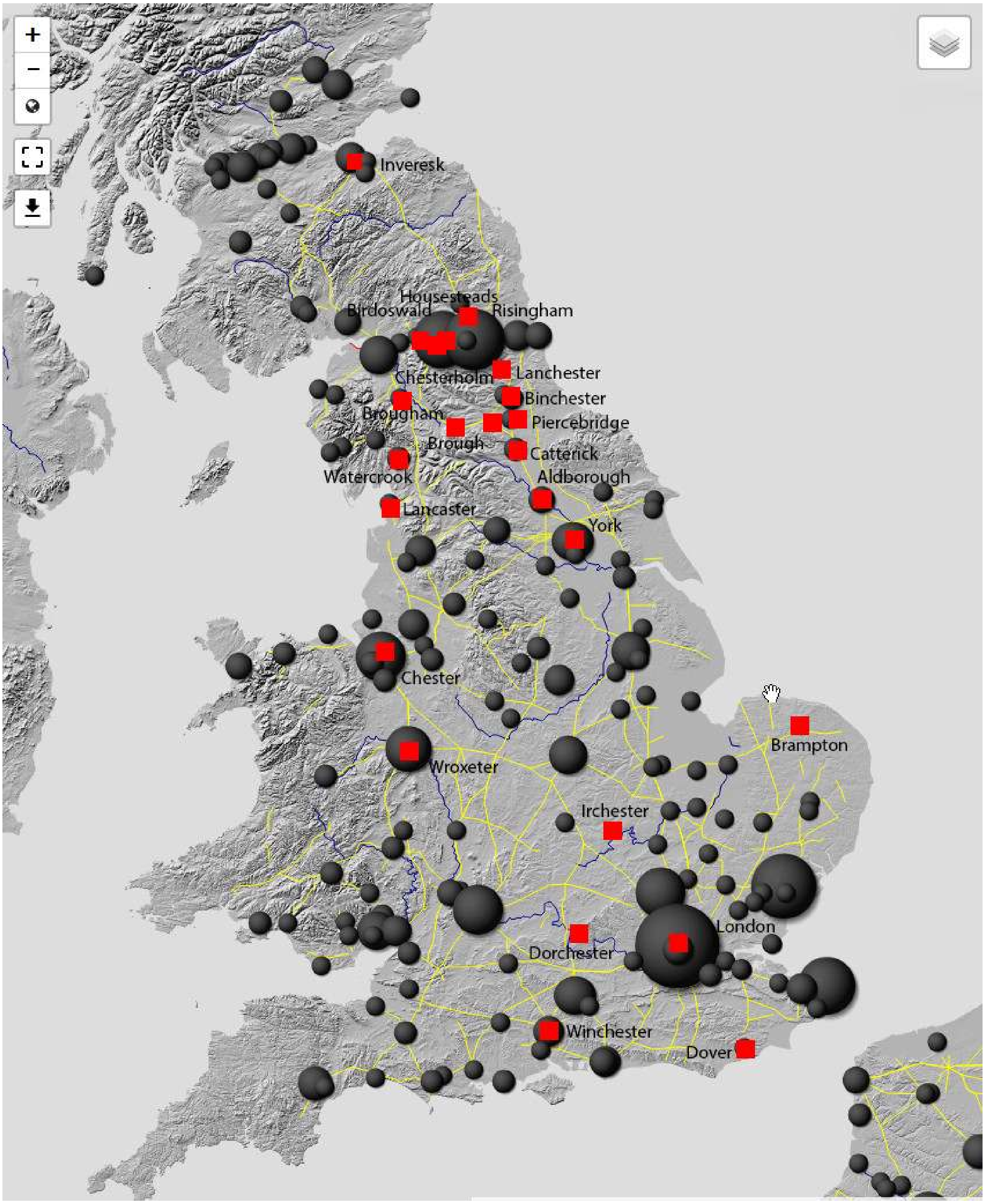


Figure 24. Distribution of Dressel 20 amphorae in Britain (black dots, log(10) scaled) and the locations of inscriptions of beneficiarii (red squares). Data generated from CEIPAC (https://romanopendata.eu/) [25.05.2021] and after Montfort 2002.

transmission thereafter to northern destinations.[35] Whether his pattern of the way in which consignments were redistributed was exactly the same for samian, given the variability of the stamp evidence on individual sites, is not clear but his observations about the roles and the distribution of *beneficiarii* (if indeed some were acting as tax collectors) give a plausible reason why samian, as a commodity, was of interest to the State.[36]

[35] Cf. Montfort 2002, and particularly the map on p. 89 showing the inscriptions along the line of Dere Street, the west coast and the Wall line.

[36] Cf. Dise 1997: 276-7 for the difficulty of assigning precise functions, but drawing attention to those at Celeia and Sirmium at either end of a trade route.

Summary

The pattern of samian loss at South Shields appears to be very similar to the other military installations on the line of Hadrian's Wall, even if some detail differs. The overwhelming quantity of supply from Lezoux was supplemented by a smaller quantity from diverse sources in the Argonne, *Germania Superior* and possibly Britain. There is no evidence that the quantitative decline of stamps, which appears to have begun *c.* 170-180, was reversed in the 3rd century, even though the fort was refurbished in the Severan period.[37]

This is not the place to enter into an extensive debate about whether or not the supply of samian occupied a privileged place on the military agenda. *Ex cathedra* statements like that of Barton (10.2.2 State Involvement compared to 10.2.2 Producer Involvement), prejudge and condition any of his arguments which follow:[38]

> The Roman State, by contrast, seems to have taken a close interest in samian supply. This involvement took a number of forms, including influencing the location of major kiln-sites, purchasing vast quantities of samian for military usage and utilizing military supply-trains to transport these wares to market. The pattern of official interventions varied over the course of the industry's life, as will be seen, but the state's active involvement in the supply-chain is clear in the case of each production centre.

That samian was popular with soldiers cannot be denied, the evidence of stores being emptied when units withdrew or forts rebuilt is clear.[39] However it is necessary to set out the nature of the evidence. The quantum of data is relatively small. The internet resource Samian Research comprises *c.* quarter of a million individual stamp records for all kiln locations and consumption sites.[40] In terms of kiln-loads at La Graufesenque, this equates to less than nine firing cycles at La Graufesenque for a production period over some 250 years.[41]

As a result the data exhibits great variability. Sources and potters represented show little consistency at all periods symptomatic of the small numbers and making both inter-site, and inter-potter comparisons dubious.

Many decorated vessels, and a number of plain vessels are missing from the data because either they were never, or seldom, stamped shapes.

Taking the above into account, one can also observe that the variation in the numbers of individual potters' stamps between sites can be related to the phenomenon of the 'hockey-stick' shapes of the curves plotted from the pre-consumption groups. It is likely that slowness of information transfer, physical transport, and the constraints of seasonal weather all combined to favour capital-intensive inventory-based commercialisation, far from modern 'just-in-time' models.[42]

So far no contemporary written records have been found to indicate pottery as a class of artefact of interest to the military.[43] Fort populations appear to have both an internal civilian component, and often a substantial external one making a simple division of consumers difficult to sustain.[44] As an example, *within* the military camp of Vindonissa, there is evidence for a civilian wine merchant running a shop.[45]

Examples of a samian retail outlets in civil settlements adjacent to military installations are well documented e.g., Aquincum-Forum,[46] Burghöfe,[47] Castleford,[48] Langenhain,[49] Mainz-Göttelmannstraße,[50] Nijmegen-Barbarossastraat[51] and Rottweil.[52] This suggests that commercial connections were with the *vici* and *canabae* rather than the forts themselves.

Groups of unused vessels are known from the following sites in primarily civilian commercial contexts: e.g. Bavay forum,[53] Gauting,[54] Gorsium,[55] Kempten,[56] Mandeure,[57] New Fresh Wharf,[58] Papkeszi,[59] Oberwinterthur-Keramiklager,[60] St. Pölten-Depot[61] and Pompeii.[62]

While nearly all of the sites surveyed show visible 'dips' in the time charts of stamp loss at the time when the Antonine Wall was occupied, suggesting some loss of buying power due to the military personnel having moved to the North, at least 80% of the samian

37 Bidwell and Speak 1994: table 1.1.
38 Barton 2015: 320.
39 Burghöfe Geschirrdepot (Ulbert 1959); Cirencester Fort ditch (Hartley and Dickinson 1982); Vindolanda fort ditch (Birley 1994).
40 https://www.rgzm.de/Samian.
41 Cf. Marichal 1988.

42 Cf. for transport, *Tabulae Vindolandenses* 34.
43 Fink 1971 and cf. the contrast in the range of foodstuffs, clothing and military equipment forming the subjects of both the Carlisle (Tomlin 1998) and Vindolanda tablets (Evers 2011, Appendix).
44 For Hadrian's Wall, cf. Breeze 2006 and cf. Allason-Jones 2009: 430, commenting on the evidence for women in the fort at Housesteads. cf. Whittaker 2002, which treats this problem extensively.
45 Speidel 1996: 77; Nr. 47: ---] / vinario / XIII
46 Mees 2002: 72.
47 Ulbert 1959: 54-58, esp. 54.
48 Dickinson 2009.
49 Simon and Köhler 1992.
50 Faber and Witteyer 1995.
51 Mees 1995: 63.
52 Mees 1995: 63.
53 see note 17 above.
54 Weber 2013.
55 Gabler and Kocztur 1976: 65.
56 Czysz 1982.
57 Mees 1995: 63.
58 Bird 1986.
59 Gabler and Mráv 2017.
60 Ebnöther *et al.* 1994.
61 Riegler 1998.
62 Dzwiza 2004.

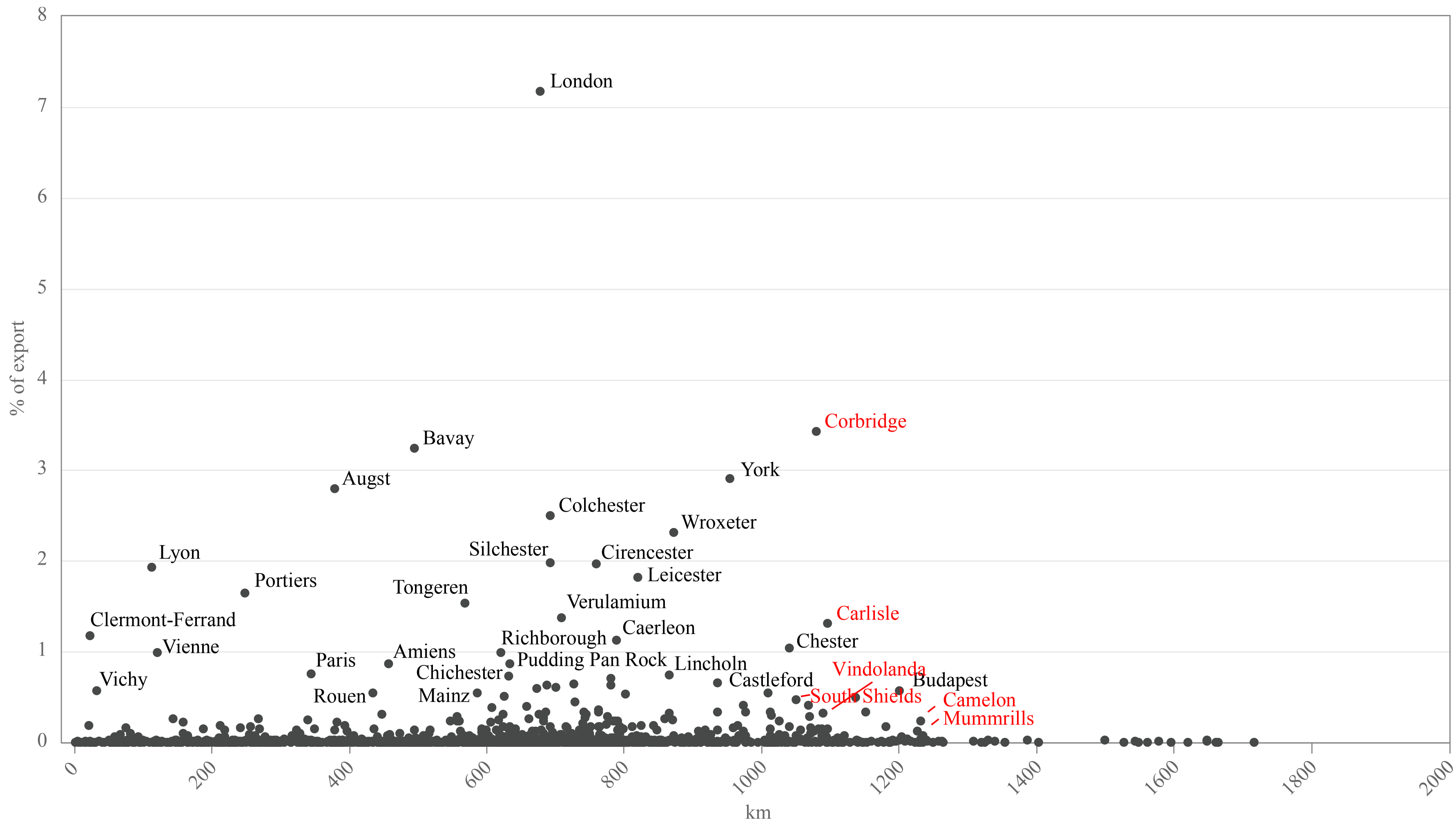


Figure 25. Export distances of samian stamps from Lezoux and percentages of the total export per site. Relevant northern Britain sites are displayed in red. Graph generated at Samian Research. On the horizontal x-axis, the distance in kilometres and on the vertical y-axis the export percentages are displayed. Data generated from Samian Research (https://www.rgzm.de/Samian) [17.05.2021].

consumption was continued. Whether this is a function of the dating model, or represents a continuance of civilian presence is unknown.

Neither the reduction in supply from La Graufesenque, which began *c.* 90 (allowing a margin of error for the greater number of unstamped forms introduced *c.* 70), nor that of Lezoux, after *c.* 180, was ever restored, which poses questions about the importance of samian to a favoured 'military market'.

Internal trade between soldiers within a military context is indicated by evidence from the Vindolanda tablets.[63] What appear to be civilian goods carried by road are evidenced by the London tablet <WT> 45.[64] However, the idea that the *cursus publicus* was used for such purposes is extremely unlikely, particularly in our period.[65]

The substantial amount of samian found *en route* between York and Corbridge suggests that this was not caused by any random distribution, but followed normal economic least-cost market rules.

The distance charts (Figure 25; Figure 26) suggest that the military and civilian sites associated with Hadrian's Wall were at the end of a long supply-chain which comprised populations of consumers sufficiently numerous and wealthy to make the transport to towns such as Bavay, Cirencester and London worthwhile. The trade appears to have been conducted by redistribution from hubs, which were pivotal intermediary points.

The commercialisation of samian appears to follow that of its predecessor Campanian wares and 'Arretine', i.e. Italic red-wares, in being an object of trade for profit, with a strong market distribution in centres of population across social groups. Until other hard facts emerge there seems no reason to suppose that the soldiers at South Shields were other than a particular segment of the general market, distinguished only by their financial clout.

Very similar observations can be made in looking at the export distances of *amphorae* type Dressel 20 which were produced in the southern Spanish province of *Baetica*. A trading pattern comparable with that of samian appears, in which most of the profits were made *en route* - and mostly in civilian contexts - whereas the military sites of the frontier zones at the far end of the trading trail were significant customers but, apparently not the largest sources of income (Figure 26).

[63] Cf. Birley 2002: 100-105 for a good survey of the evidence.
[64] Tomlin 2016: 156-9.
[65] Cf. Kolb 2016, and her references to the need for a diploma, and the restrictive edicts of Hadrian (p.6).

The circumstances in which this joint paper has been written without the ability to meet face-to-face due to 'The Pandemic' of 2020-1 merit consideration as to whether one of the episodes of the plague of the Antonine period might have played some part in undermining production at Lezoux. Starting in *c.* 165 they seem to cover the period when stamp supply plummeted and, as noted above, never recovered.[66]

Data provenance

The data can be queried online at:
http://www.rgzm.de/samian
WFS address to access the data with QGIS:
http://mzc14001/samian/home/wfs.html
LOD resources are available at: Github:
https://rgzm.github.io/samian-lod/

WikiData:
https://query.wikidata.org/#%23%20geospatial%20Linked%20Open%20Samian%20Ware%20matches%0ASELECT%20%3Fitem%20%3Fsamian%20%3FitemLabel%20%3Fgeom%0AWHERE%20%0A%7B%0A%20%20%3Fitem%20wdt%3AP361%20wd%3AQ90412636.%0A%20%20%3Fitem%20wdt%3AP625%20%3Fgeom.%0A%20%20%3Fitem%20wdt%3AP2888%20%3Fsamian.%0A%20%20SERVICE%20wikibase%3Alabel%20%7B%20bd%3AserviceParam%20wikibase%3Alanguage%20%22%5BAUTO_LANGUAGE%5D%2Cen%22.%20%7D%0A%7D

Zenodo:
https://zenodo.org/record/4314355
The REST interface is documented at:
https://www.rgzm.de/samian/home/JSONrequests.html

Bibliography

Allason-Jones, L. 2009. The Small Finds, in A. Rushworth, *Housesteads Roman Fort - The Grandest Station vol. 2, The Material Assemblages*: 430-87. Swindon: English Heritage.

Atkinson, D. 1942. *Report on Excavations at Wroxeter (the Roman City of Viroconium) in the County of Salop*, 1923-1927: Oxford.

Barton, G.J. 2015. *The Rôle of Supply-Chains in the Development of Cross-Channel Exchange in the Romano-British Period.* University of Gloucester Business School, Doctoral Thesis.

Bidwell, P. and S. Speak 1994. *Excavations at South Shields Roman Fort. Volume 1.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne..

Bird, J. 1986. Samian, in A. Miller, J. Schofield and M. Rhodes (eds), *The Roman Quay at St. Magnus House, London*: 139-185. London: London and Middlesex Archaeological Society.

[66] Eutropius XXXI, 6.24.

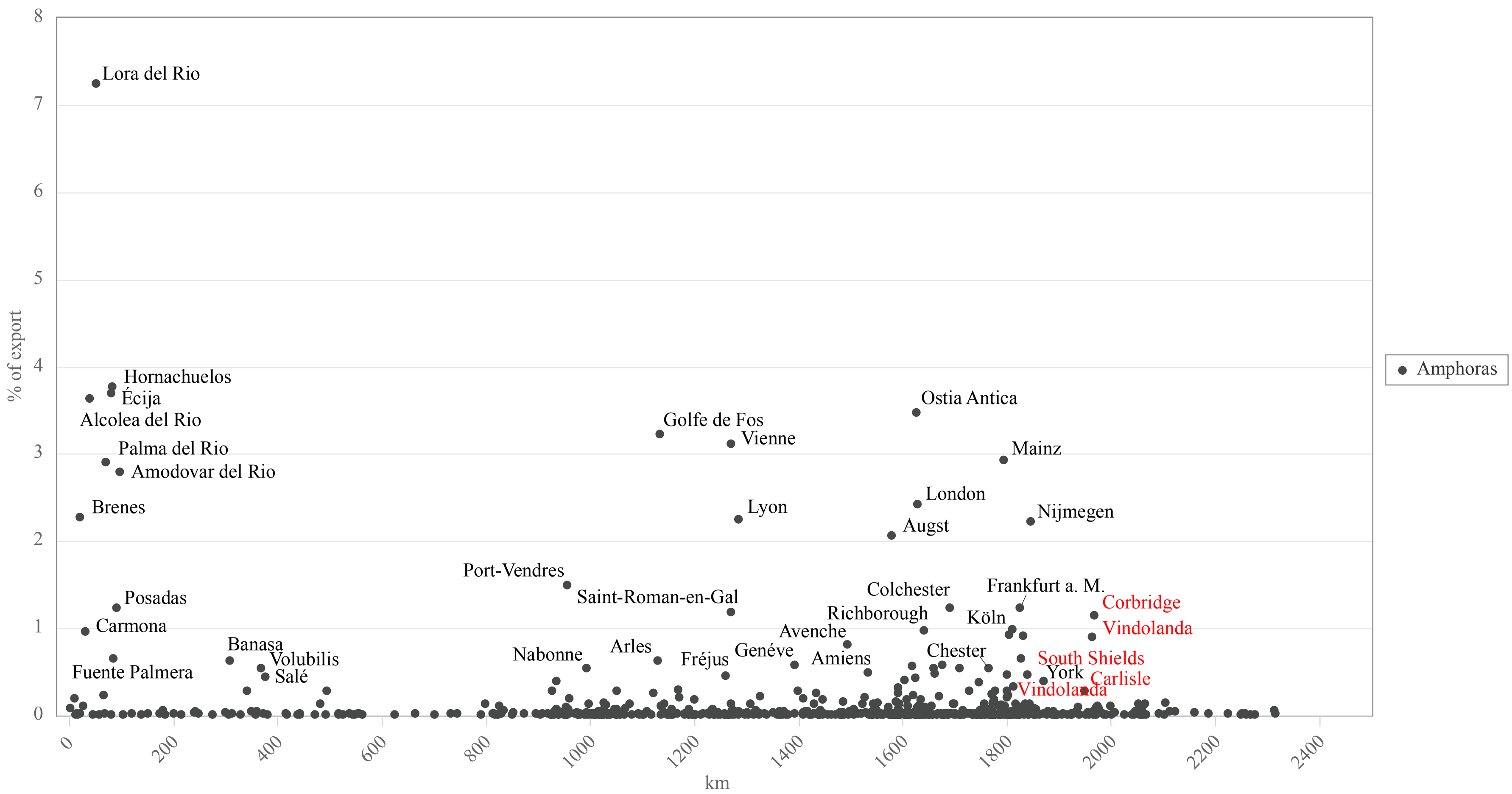


Figure 26. Export distances of Dressel 20 amphorae produced in the Roman province Baetica in southern Spain and percentages of the total export per site. Relevant northern Britain sites are displayed in red. On the horizontal x-axis, the distance in kilometres and on the vertical y-axis the export percentages are displayed. Data generated from Samian Research (https://www.rgzm.de/Samian) using the data of CEIPAC (https://romanopendata.eu/) [17.05.2021].

Birley, A.R. 2002. *Garrison Life at* Vindolanda*: a Band of Brothers.* Stroud: Tempus.

Birley, R. 1994. *The Early Wooden Forts. The Excavations of 1973-76 and 1985-89, with Some Additional Details from the Excavations of 1991-93.* Bardon Mill: Vindolanda Research Report 1.

Breeze, D.J. 2006. *J. Collingwood Bruce's Handbook to the Roman Wall.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Carmelez, J.-C. 1994. Un entrepôt de céramique détruit à la fin du IIe siècle à Bavay. Étude de synthèse et bilan. *Archéologie et* Pédagogie 14: 79-159.

Czysz, W. 1982. Der Sigillata-Geschirrfund von Cambodunum Kempten. Ein Beitrag zur Technologie und Handelskunde mittelkaiserzeitlicher Keramik. *Bericht der Römisch-Germanischen Kommission* 63: 281-348.

Dannell, G.B. and A.W. Mees 2013. New approaches to samian distribution, in M. Fulford and E. Durham (eds) *Seeing Red: New Economic and Social Perspectives on Gallo-Roman* Terra Sigillata: 165-187. London: Institute of Classical Studies.

Dickinson, B.M. 2009. The samian ware, in A. Rushworth, *Housesteads Roman Fort - The Grandest Station, Volume 2*: 488-498. Swindon: English Heritage.

Dickinson, B.M. and K.F. Hartley 1971. The evidence of potters' stamps on samian ware and on mortaria for the trading connections of Roman York, in: R. M. Butler (ed.), *Soldier and civilian in Roman Yorkshire*: 127-142. Leicester: Leicester University Press.

Dise, L.R. 1997. Trajan, the Antonines and the governor's staff. *Zeitschrift für Papyrologie und Epigraphik* 116: 273–28.

Dzwiza, K. 2004. Ein Depotfund reliefverzierter südgallischer *Terra Sigillata*-Schüsseln aus Pompeji. *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz* 51.2: 381-587.

Ebnöther, Chr., A.W. Mees and M. Polak 1994. Le dépôt de céramique du vicus de Vitudurum-Oberwinterthur (Suisse). Rapport préliminaire. *SFECAG, Actes du Congrès de Millau*: 127-131.

Evers, K.G. 2011. *The* Vindolanda *Tablets and the Ancient Economy*. Oxford: BAR British Series 544.

Faber, P. and M. Witteyer 1995. Ein Sammelfund südgallischer Sigillaten aus dem *Vicus* Mainz-Weisenau: Häusliches Inventar oder Händlerpost? *Mainzer Archäologische Zeitschrift* 2: 91-115.

Fink, R.O. 1971. *Roman Military Records on Papyrus*. Cleveland: The American Philological Association Monograph 26.

Frere, S.S. and R.S.O. Tomlin (eds) 1994. *The Roman Inscriptions of Britain II Fascicule 6* Stroud: Alan Sutton.

Gabler, D. and H. Kocztur 1976. *Terra sigillata* Depotfund von Gorsium. *Alba Regia* 15: 65-68.

Gabler, D. and Zs. Mráv 2017. Samian deposit (cache) from Papkeszi (Vesprém County, Hungary). *Acta Archaeologica Academiae Scientiarum Hungaricae* 68: 299-338.

Genin, M. 2007. *La Graufesenque (Millau, Aveyron) 2: Sigillées Lisses et Autres Productions*. Pessac: Fédération Aquitania.

Hanson, W.S, C.M. Daniels, J.N. Dore and J.P. Gillam 1979. The Agricolan Fort and supply base at Red House, Corbridge. *Archaeologia Aeliana* 5th series 7: 1-98.

Hartley, B.R. 1972. The Roman occupations of Scotland: the evidence of the samian ware. *Britannia* 3: 1-55.

Hartley, B.R. 1977. Some wandering potters, in J. Dore and K. Greene (eds) *Roman Pottery Studies in Britain and Beyond* (British Archaeological Reports supplementary series 30): 251-261. Oxford: British Archaeological Reports.

Hartley, B.R. and B.M. Dickinson 1982. The samian, in J.S. Wacher and A.D. McWhirr *Early Roman Occupation at Cirencester*: 133-143. Cirencester: Corinium Museum.

Hartley, B.R. and B.M. Dickinson 2001. The evidence for the date of the potters' stamps from Culip IV, in X. Nieto and A.M. Puig, *Excavacions Arqueològiques Subaquàtiques a Cala Culip.3, Culip IV: La* Terra Sigillata *Decorada de La Graufesenque*: 21-32. Girona: Monografies del CASC 3.

Hartley, B.R. and B.M. Dickinson 2008-2012. *Names on* Terra Sigillata*: an Index of Maker's Stamps and Signatures on Gallo-Roman* Terra-Sigillata *(Samian Ware)*. London: Institute of Classical Studies.

Kolb, A. 2016. *Mansiones* and the *cursus publicus* in the Roman Empire, in P. Basso and E. Zanini (eds) *Sostare e Vivere Lungo le Strade Romane*. Oxford: Archaeopress.

Kortüm, K. 1998. Zur Datierung der römischen Militäranlagen im obergermanisch-raetischen Limesgebiet. *Saalburg Jahrbuch* 49: 5–65.

Margary, I.D. 1973. *Roman Roads in Britain*. London: Baker.

Marichal, R. 1988. *Les Graffites de La Graufesenque*. Paris, Gallia Supplement 47.

Mees, A.W. 1995. *Modelsignierte Dekorationen auf südgallischer* Terra Sigillata. Stuttgart: Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 5.

Mees, A.W. 2002. *Organisationsformen römischer Töpfer-Manufakturen am Beispiel von Arezzo und Rheinzabern unter Berücksichtigung von Papyri, Inschriften und Rechtsquellen*. Mainz: Monographien Römisch-Germanisches Zentralmuseums 52 (https://doi.org/10.11588/propylaeum.519)

Mees, A.W. 2011. *Die Verbreitung von* Terra Sigillata *aus den Manufakturen von Arezzo, Pisa, Lyon und La Graufesenque. Die Transformation der italischen* Sigillata*-Herstellung in Gallien*. Mainz: Monographien des Römisch-Germanischen Zentralmuseums 93.

Monteil, G. 2021. *Cataractonium: Establishment, Consolidation and Retreat* [data-set, *A1L2B ECR Appendix G Pottery Raw Data-ECR Samian Stamps*]. York:

Archaeology Data Service [distributor] https://doi.org/10.5284/1078331

Montfort, C.C. 2002. The Roman military supply during the Principate. Transportation and Staples, in P. Erdkamp (ed.) *The Roman Army and the Economy*: 70-89. Amsterdam, Gieben.

Oswald, F. 1931. *Index of Potters' Stamps on* Terra Sigillata *('Samian Ware')*. East Bridgeford: privately printed.

Riegler, Ch. 1998. Die *Terra Sigillata* des Depotfundes vom Rathausplatz in St. Pölten/Niederösterreich. *Forum Archaeologiae. Zeitschrift für Klassische Archäologie* 7/VI. https://homepage.univie.ac.at/elisabeth.trinkl/forum/forum0698/07sigi.htm [09.06.2021]

Simon, H.-G. and Köhler H.-J. 1992. *Ein Geschirrdepot des 3. jahrhunderts. Grabungen im Lagerdorf des Kastells Langenhain*. Bonn: Materialien zur Römisch-Germanischen Keramik 11.

Sommer, S. 2011. Trajan, Hadrian, Antoninus Pius, Marc Aurel ...? – Zur Datierung der Anlagen des Raetischen Limes. *Bericht der Bayerischen Bodendenkmalpflege* 52: 137-180.

Speidel, M.A. 1996. *Die römischen Schreibtafeln von Vindonissa: Lateinische Texte des militärischen Alltags und ihre geschichtliche Bedeutung*. Baden-Dättwil: Veröffentlichungen der Gesellschaft Pro Vindonissa 12.

Tomlin, R.S.O. 1998. Roman manuscripts from Carlisle: the ink written tablets. *Britannia* 29: 31-84.

Tomlin, R.S.O. 2016. *Roman London's First Voices: Writing Tablets from the Bloomberg Excavations, 2010-14.* London: MOLA Monograph 72.

Ulbert, G. 1959. *Die römischen Donau-Kastelle Aislingen und Burghöfe. Die Funde aus den Jahren 1912 und 1913*. Berlin: Limesforschungen Band 1.

Walsh, M. 2017. *Pudding Pan: a Roman Shipwreck and its Cargo in Context*. London: British Museum Research Publication 202.

Weber, M. 2013. A reassessment of pre-consumption deposits and samian export in the Antonine period, in M. Fulford and E. Durham (eds) *Seeing Red: New Economic and Social Perspectives on Gallo-Roman* Terra Sigillata: 188-209, London: Institute of Classical Studies.

Whittaker, C.R. 2002. Supplying the army, in P. Erdkamp (ed.) *The Roman Army and the Economy*: 204-234. Amsterdam: Gieben.

Wild, F.C. 2015. Late Montans decorated samian ware from Scotland and North-West England. *Journal of Roman Pottery Studies* 16: 156-179.

Composite dice from Roman Britain

Stephen Greep

Foreword

I first met Paul while researching material for my PhD[1] in 1979. One of the very first objects I discussed with him was a small cubic, three-piece dice from excavations in Mermaid Yard, Exeter in 1977 (Figure 1). It was recovered from one of a series of seven pits from the north-west of the *via sagularis* of the legionary fortress, described as from 'military' phases, and therefore presumably pre-early Flavian in date. This was subsequently published in the 1991 Exeter Finds volume.[2] As one of the first objects Paul and I ever discussed it seemed appropriate, over 40 years on, to offer this contribution to celebrate Paul's career.

Introduction

In Britain, single piece, cuboid dice[3] are common finds from the Roman period (and later). There is, however, one particular dice form which is restricted to the earlier Roman period. Found throughout the Roman empire, these are larger dice, up to 26 mm wide in size, and typically made from squared sections of cattle metapodia, the hollow centre of which required 'blocking' to complete the cuboid shape – hence the term 'composite'. This short paper examines the evidence for these types in Roman Britain, their antecedents and places them in the context of examples recovered elsewhere in the Roman empire.

Description and manufacture

Composite dice are rarely perfectly shaped cubes, with sides normally varying by up to 2 mm, although in the Exeter example (**6**), the sides varied by 5 mm. Their overall size is obviously related to the material from which they were cut (see below); there is no evidence that any slightly larger sides were consistently 1 and 6, an arrangement often found on irregularly shaped single-piece dice.[4] Invariably opposite sides add up to 7, with 3 and 4 occupying the blocked ends. There are rare exceptions to this rule, such as the dice from London (**11.4 and 11.9**) with sides of 4+6, 3+4 and 2+? and 1+6, 2+2 and 3+4.

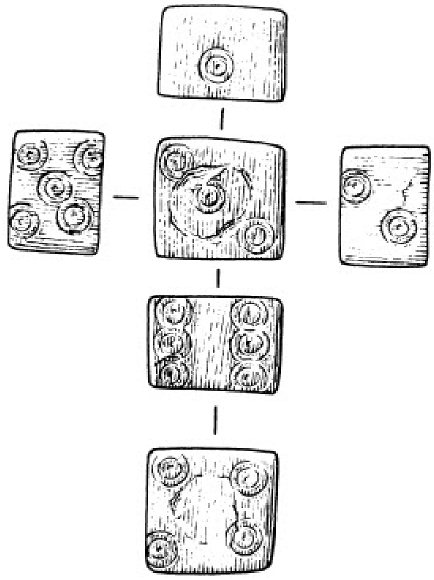


*Figure 1. A Roman composite dice from Mermaid Yard, Exeter (**6**). (Scale 1:1)*

The method of manufacture is clear. The raw material was typically a cattle metapodial, although other forms of bone were occasionally used, such as horse.[5] Cattle metapodials were the most common type of bone used in artefact manufacture in the Roman period – they were often discarded in the butchery process having little food value and would, therefore, have been a readily available and cheap form of raw material, as well as being ideal for the type of object under discussion.

Following removal of both epiphyses, the medullary canal was cleaned, and the remaining shaft worked into a squared section.[6] It is uncertain whether a single dice was made from each bone[7] or whether a series of dice were cut from each bone. A series of surviving squared *bos* metacarpals with three inscribed faces from the Etruscan period could well be unfinished examples of composite dice manufacture although the frequency of these finds suggest that they might be an object class in

[1] Greep 1983a.

[2] For the context see Bedford and Salvatore 2015: 16; subgroup 6.6 and fig. 7; and for the dice Holbrook and Bidwell 1991: fig. 122 no. 7 and here Figure 1).

[3] In this paper, I have followed modern practice and used *dice* for both the singular and plural. Throughout numbers in bold refer to dice in the catalogue.

[4] e.g. Barber and Bowsher 2000: 194; For a discussion on irregularly-sided dice and the impact on resulting throws see Swift 2017: 132-149.

[5] Ayalon 2005: 72 where of the 12 composite dice where the raw material was identifiable, seven were from cattle, one from horse, three either horse or cattle and one from a similarly sized animal. It is apparent that horse and cattle metapodia were often used together in bone working e.g. Bluer and Brigham 2006: 145.

[6] For the general process see Barbier 2016: figs 55-57.

[7] e.g. Schenk 2008: 78-9.

their own right.[8] If these are surviving waste pieces it demonstrates clearly that it was normal practice to mark the material out in three sections and to apply the numerals to the four worked surfaces with a single bit.[9] Therefore, each piece could produce three dice.

*Figure 2. Composite dice from London (**11.7**) showing blocking pieces (Scale 1.5:1)*

Evidence of both compact[10] and composite dice manufacture is rare. That the digits were applied before the dice were separated from the squared off section of bone is clear from the unfinished examples. Although it has been argued that a single piece was inserted to block both ends from the British examples at least, it appears that two separate blocking pieces were applied, fitted as closely to the cavity as possible and then, presumably, glued into place (Figure 2). Given that the use of additional 'blockers' was a pre-requisite of this type of manufacture, it is not surprising that the complete dice, with blockers intact, survives infrequently. In the examples from Great Dunmow (**10**), although the dice may have been through the pyre the blocking pieces were also recovered showing that the pips were added centrally to the blocking pieces. On one of the London dice (**11.6**) the third 'pip' on the three side had not yet been added, so there is a possibility that this piece was unfinished (unless this was always intended to be a 2). That the third 'pip' was the last part of the manufacturing process is demonstrated by examples where the application of this 'pip' is partly on the blocker and partly on the main part of the dice.

It is likely that the dice were finished by polishing with wax the 'pips' filled with coloured material thus giving an overall yellow appearance with coloured dots. Although there is no clear evidence for this on any of the British composite dice, the use of wax polish and coloured inlay seems to have been fairly widespread.[11] Often there are noticeable gaps between the blockers and the main dice (Figure 2).[12] In such cases it is logical to assume that the gaps were filled with wax. The original appearance of these dice would therefore have been 'creamy yellow' with black (normally) inlay to the pips.

Since dice can easily be cut from compact bone, the question must arise as to why this more complicated form was popular for such a long period of time. Barbier has shown that it is difficult to manufacture a solid cube much in excess of 16 mm from compact bone,[13] whereas composite dice have sides up to 26 mm. It may well, therefore, be that this rather cumbersome method of manufacture was simply to enable dice of larger form to be produced. It should not be forgotten, however, that a larger area of compact material was available from deer antler and some single-piece dice may have been manufactured from this material.[14] MacGregor points out that the larger Roman dice from Britain were likely derived from this source and most probably from the base of the antler near the burr. However, the two dice he lists as examples, from York

[8] Lovergne 2020.
[9] e.g. Bíró *et al.* 2012: fig. 32.
[10] There is some evidence for the manufacture of single-piece dice in Britain, although no examples are entirely persuasive e.g. London: Bluer and Bingham 2006: 143; Southwark: Stevenson 1992: 110 no. 62. For the best survey of the evidence in Gaul see Daniaux 2020; and also see Aquincum: Bíró *et al.* 2012: 110; Rome: Choyke 2012: 338 and Carthage: Hutchinson and Reese 1988: 579.
[11] Rodet-Belarbi *et al.* 2020: fig 1.
[12] This is a feature showing clearly in a number of the London dice illustrated in the Museum of London online catalogue: see **11.8-11.15**.
[13] Barbier 2016: 124.
[14] Bíró *et al.* 2012: 110 where one single-piece die is stated to be made from red deer antler.

and Dover, both fall within the sizes capable of being produced by using bone.[15] It is interesting to note that in Britain at least, while red deer antler was used in the earlier Roman period, bone was the preferred material of the two, until the later Roman period when red deer antler became the preferred material.[16]

Dating and distribution

The origins of the form belong to the Mediterranean, although it is unclear whether in Republican Rome or elsewhere. They are in use at least by the early 5th century as an example from Aleria, Sardinia, was found in a grave dated to 475-450 BC and other early examples are known from elsewhere.[17] Even at this date they existed alongside single-piece dice.[18]

Apart from this very early example there are other early composite dice known. Béal notes 2nd and 1st century BC examples from Asia Minor, Italy and Morocco.[19] There are five examples from Magdalensberg, at least three of which are from secure Augustan contexts.[20] From Italy, a single example occurred in Insula VI.I at Pompeii dated post AD 62 with a further, Italian, Flavian example from a grave (probably female) at Taranto.[21] Late 1st to early 2nd century examples are reported from Avenches.[22] There are many further examples which may be dated to the 1st century AD.

In Britain, the earliest examples were found in the King Harry Lane cemetery, St Albans (**14**) where two composite dice were found in a phase 2 grave, dated in the report to *c.* AD 30-50 and which could therefore conceivably be pre-conquest in date. Mackreth has argued for an earlier date for the King Harry Lane phase 2 graves of *c.* AD 20-40.[23] Whilst this would be entirely in keeping with dating evidence from outside Britain and would be a further example of 'Roman' finds from pre-conquest Britain,[24] further examination of the evidence suggests that it is more likely to be consistent with the original dating of *c.* AD 30-50 for the cemeteries' phase 2 contexts.[25]

Following on from the King Harry Lane pieces there is evidence for pre-Flavian examples from Canterbury (**3**) and Colchester (**5.3** and **5.6**), and Flavian (or earlier) pieces from Colchester (**5.5**), Exeter (**6**), Fishbourne (**7**), Gloucester (**8.1**), Great Dunmow (**10**), London (**11.6**), Piddington (**12**) and Richborough (**13**).

The end date for the type in Britain (and elsewhere) is slightly more problematical. Evidence from Britain, such as the examples from Colchester (**5.1**), Gorhambury (**9**) and London (**11.5**) point towards use into the 2nd century. The most northerly examples are those from Binchester (**1**) and Castleford (**4**), and although there are plenty of single-piece bone dice recorded from Hadrian's Wall sites none are of the composite type.[26] Given the large number of 1st-century composite dice recorded and few 2nd century ones, the date range for the form in Britain might be *c.* AD 43-125 and more widely be suggested as *c.* 475 BC – AD 125. It seems clear, therefore, that examples from Roman Britain belong to the end of a tradition of larger dice, lasting around 600 years.

Although here we are concerned with the examples from Britain, composite dice can be shown to have been widely used throughout the Roman world. Apart from the British examples catalogued here there are numerous examples: from Austria, France, Germany, Italy, Morocco, the Netherlands, Spain and Switzerland.[27] From the eastern empire, 16 examples found at Caesarea in Israel and an example from Hamma, Syria[28] show that these forms were used widely throughout the Empire, although recently published collections from Hungary, Dacia and Upper Moesia[29] show several single-piece dice, but no composite forms. Lack of published material may account for their apparent western bias, but it is clear that a fully comprehensive study of these forms across the Empire would result in a catalogue running into the hundreds.

General discussion

Composite dice were a long-lived form, occurring around the Mediterranean from the early 5th century and spreading with the development of the Roman Republic and Empire over a period of some six hundred

[15] MacGregor 1985: 131.
[16] See, for example Greep 2014.
[17] e.g. Jehasse and Jehasse 1973: pl. 166. See also Artefacts, reference code DEJ-3007 for a discussion on the early dating and further early examples. Accessed online 13.01.22 at https://artefacts.mom.fr/en/result.php?id=DEJ-3007&find=DEJ-3007&pagenum=1&affmode=vign
[18] Dugan 2015 notes dice including examples from Italian cemeteries as early as the 5th century BC.
[19] Béal 1983: 346, n. 5.
[20] Gostenčnik 2005: Taf. 42, 1-4, 6.
[21] Cool 2016: 231.
[22] Schenk 2008: 228-9.
[23] Mackreth 1994: 208; 2011: 243-252.
[24] Greep 1983b.
[25] I am grateful to Nina Crummy for this discussion.
[26] e.g. Rushworth and Croom 2016: 176-77, fig. 25.24, nos. 36-38; Wilmott 1997: 297, fig. 209 nos. 155-156.
[27] Béal 1983: pl. IX, 1230 and 1234 and p. 346 where examples from Germany, Morocco, Italy, Spain, Switzerland and the Netherlands (see also Roes 1963: 52 and pl. xliv) are referenced. For Austria see for e.g. Kramer 1957: Taf. 23 and especially Gostenčnik 2005: 191-2 and Taf. 41-2 and for Italy see fn. 21. Since Béal's publication there are numerous more recent examples published, particularly from Germany e.g. Mikler 1997: 31 and Taf. 21-2; Jung 2013: 107 and Taf. 85; but also from Switzerland (Deschler-Erb 1998: 147 and Taf. 27; Schenk 2008: 78-9 and figs 127-8), all with further parallels and discussion. The Artefacts web-site has numerous parallels (https://artefacts.mom.fr/en/home.php) (reference codes DEJ-3007 and DEJ-4002); see also fn. 17.
[28] Ayalon 2005: 74 with further references.
[29] Petrović 1995; Biro 1994; Vass and Panczel 2009 and Biro *et al.* 2012.

years. Their occurrence in Britain represents the latest phase of their use; although there is no direct evidence of local manufacture it is not inconceivable that some at least were made here. Many of the 43 British finds listed occur as isolated and often undated finds. The majority come from large towns in the south-east. Although composite dice are recorded from 18 different sites, over 50% of the total known are from just two, Colchester (**5**) and London (**11**); three come from villa sites (**7, 9** and **12**) and, maybe, one or two from military contexts (**6** and **8.1**). While it has been claimed, on evidence from Swiss sites, that composite dice are more common on military sites this is clearly not borne out by the British evidence.

Comparisons between the number of composite dice to single-piece dice from individual sites have been made on a number of occasions. However, although single-piece and composite dice overlap in terms of chronology,[30] single-piece dice have a much longer life in Roman Britain (and elsewhere), as the examples from Hadrian's Wall noted above testify. Such comparisons are, therefore, not relevant, except where the chronology of the finds is relatively restricted, such as at Magdalensberg.[31]

Nine of the dice were recovered from four separate cremations (**5.1**, **5.5**, **10** and **14**); two of the graves were probably female (**5.1** and **5.5**). The occurrence of gaming sets from graves is not uncommon,[32] but the association of counters and dice, of any form, is less common. Of the graves containing composite dice those from Colchester (**5.1**) were associated with gaming counters, although the exact nature of this association and the type and number of counters are unclear. The two dice from Great Dunmow (**10**) were associated with a single glass counter but, the single dice from a cremation at Colchester (**5.5**) and the two composite dice from St Albans (**12**) were not associated with other gaming equipment. There is no reason to suggest that composite dice were used in any different types of games than other forms of dice.

Conclusion

The 43 examples of composite dice from Roman Britain listed in the catalogue represent the end of a tradition of larger dice manufacture which had been common throughout the classical world from the 5th century BC. Their use spread with the development of the empire and they are particularly common in the west, although this may be a feature of publication data rather than reflecting a true geographic spread. Evidence from Britain shows that the forms went out of use in the earlier part of the 2nd century and are found on all types of sites across the province. It is unlikely that they were used in any different way to the smaller, single-piece dice. The Exeter example (**6**) shown to me by Paul some 40 years ago fits neatly within the sequence of composite dice from Roman Britain.

Catalogue of composite dice from Roman Britain (Figure 3)

The following is a list of those composite dice from Roman Britain. It does not claim to be totally comprehensive of all examples found to date, just those which I have recorded. Measurements have been included where available. Unless stated all are of the 'normal' configuration of 1+6, 2+5 and 3+4 with the 3+4 being the 'plugged' sides.

1. Binchester, County Durham: unpublished example. From a barrack block in the fort. *c.* 200 or later, but with much residual material back to the Flavian period. Information David Petts.
2. Caistor St Edmund, Norfolk: unpublished example, Castle Museum, Norwich. Accn No. 1929.152.O108. Worn example, complete but lacking the central blocking pieces. Sides of 20 and 23 mm. From a 'mixed' context containing material from throughout the Roman period. Mentioned in Swift 2017: 251.
3. Canterbury, Kent: Jenkins 1950, 87: fig. 16 no. 9. From a pre-Flavian hearth deposit. From the illustration it is not clear that this dice is of this type. However, it is in Canterbury Museum (Accn No. CANCM : 6253) and is clearly of composite form.
4. Castleford, West Yorkshire: Greep 1998: fig. 119 no. 123. From an area associated with the later Roman defences and contexts of *c.* 250-400, but probably residual. Flavian at the earliest. Sides 22 x 21 x 19 mm. Blocker in the side 4 lost, otherwise nearly complete.
5. Colchester, Essex (nine, examples):
   5.1 Four dice from a cremation, recovered together with a collection of 32 type 1 counters of earlier Roman form.[33] Joslin Grave Group 81/94 (May 1930: 275) where it is dated *c.* 100-150, although the dating and make-up of the grave groups recorded by Joslin in Colchester and not wholly reliable (e.g. Crummy 2010: 42-3). This entry lists the grave having 24 glass paste counters, fused together; one of the dice being burnt. The grave is also listed elsewhere (Crummy *et al.* 1981: 269) as having four dice and 24

[30] Note, for example, single-piece dice from pre-Flavian contexts at Kingsholm; Flavian contexts from Newstead (Curle 1911: pl. XCIII, 13); early 2nd century from Verulamium (Waugh and Goodburn 1972: fig. 56, no. 211); early Antonine from Cramond (Maxwell 1974: 197).
[31] Gostenčnik 2005.
[32] e.g. Cotton 2001; Schädler 2007: 366; Greep forthcoming b.

[33] For a typology of bone gaming counters see Greep 1995: 1125-1127.

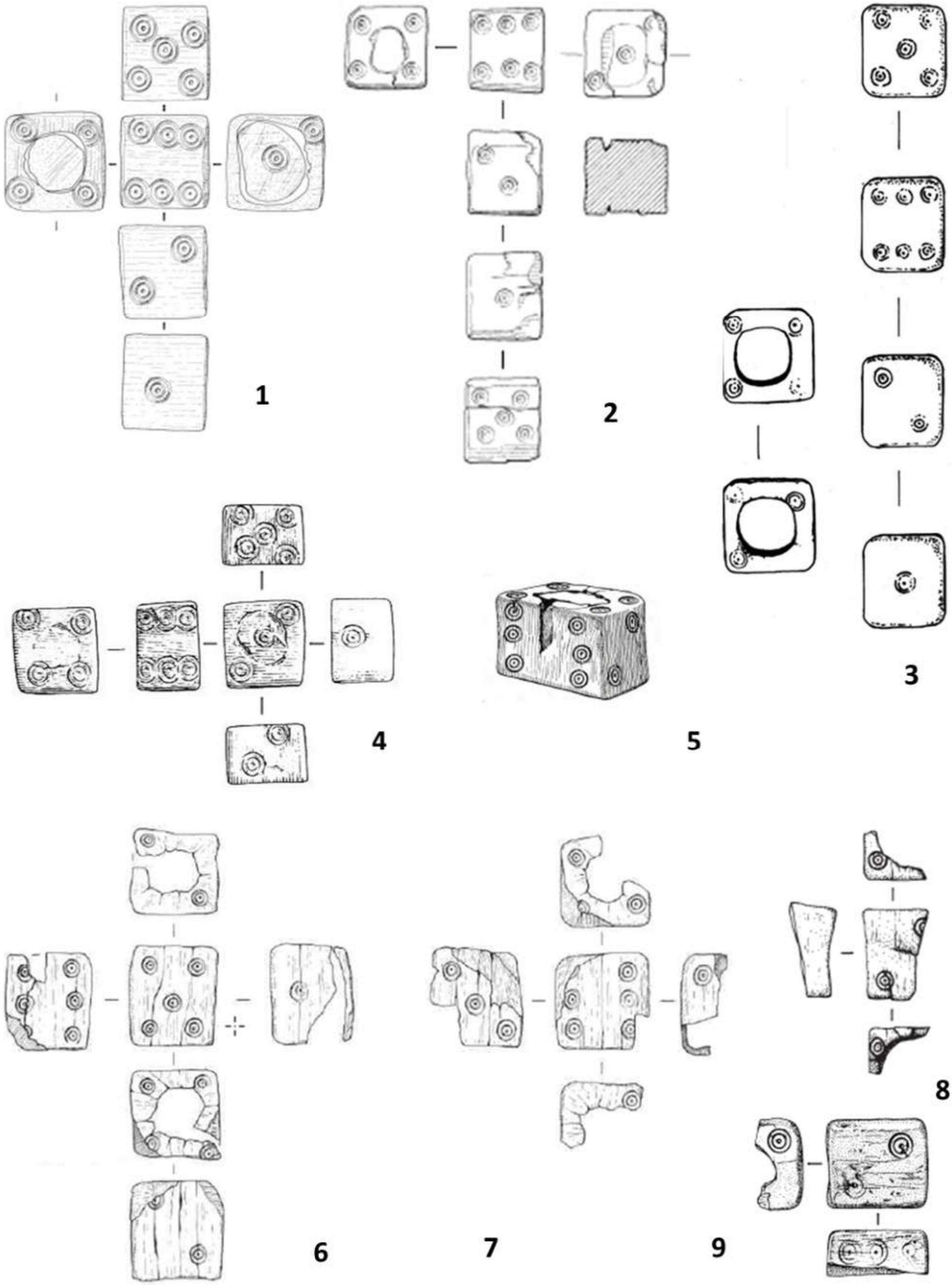


Figure 3. A selection of composite dice from Roman Britain.
*1. London (**11.6**); 2. Castleford (**4**); 3. Caister St Edmund (**2**); 4. Exeter (**6**); 5. Richborough (**13**); 6-7. Great Dunmow (**10**); 8-9. Colchester (**5.5 and 5.2**) (Scale 2:3 – except 5)*

bone counters. Like 5.5 below, probably a female burial with a casket.

5.2 Crummy 1983: fig. 102, no. 2501. Incomplete example, but probably of normal configuration. 19 x 17 mm. *c.* 275 – 400+. From a make-up layer in an area of gravelled surfaces and houses.

5.3 and 5.4 Crummy 1992: fig. 6.6, nos. 193 and 194 (microfiche entry). 193 is from the scorched floor of a building *c.* 49- 60/1. 194 was from a medieval pit, although it was suggested in the report that it might originally have formed a pair with 193.

5.5 Orr 2010: fig. 99, F199.7. One surviving edge 16 mm. From pyre debris associated with a rich cremation of an adult female which included a jewellery box. A lamp dated in the report to the final quarter of the 1st century and a scorched coin of Vespasian of 69-79, as well as some earlier material. Presumably, therefore Flavian in date. Possibly from the same cemetery as 3.1 above as Joslin lived opposite Handley House (Crummy *et al.* 1981: 259-60).

5.6 Wightman and Crummy 2017: fig. 77 no. 15. Fragmentary example from the Williams and Griffin site in Colchester. From Boudican destruction deposits. *c.* 60/61.

6. Exeter, Devon: Holbrook and Bidwell 1991: fig. 122, no. 5. Listed as 'military' and therefore presumably *c.* 55-75. Complete, including both blockers. Irregular sides, 18 x 13 x 16 mm.

7. Fishbourne, Sussex: Cunliffe 1971: fig. 67, no. 15. Fragmentary example. From construction levels of the Flavian palace.

8. Gloucester, Gloucestershire (two examples): Information Henry Hurst.[34]

8.1 Excavations at 13-17 Berkeley Street, Gloucester. Blocking pieces lost, but otherwise complete. From layers associated with the use of an oven set at the back of the rampart for the early Flavian fortress; probably *c.* 64-78. Largest side 25 mm.

8.2 Excavations 10 Eastgate Street, Gloucester. Complete example, including both blockers in situ, but unstratified.

9. Gorhambury, Hertfordshire: Neal, Wardle and Hunn 1990: fig. 141, no. 97. Fragmentary example dated 2nd century, from the stone villa, although from the report is not possible to locate a specific find spot.

10. Great Dunmow, Essex: Atkinson 2015: fig. 16. Two examples, together with a single glass counter; from a cremation, but thought to be pyre debris, dated *c.* 55-100. One dice and the counter found within a flagon. Both dice were burnt (but not the counter) and so had presumably been through the cremation pyre; the report suggested that they might have originally been held in a leather bag. Two of the 'blockers' found associated. It was not possible to determine whether the cremation was that of a male or female. Sides 19 x 19 x 21 mm and 20 x 21 x 19 mm.

11. London (15 examples)[35]

11.1. Unpublished Museum of London. Accn No. 1955.65, Bank of England. Sides of 25 x 20 mm.

11.2. Unpublished Museum of London. Accn No. 1354, Little Bell Alley.

11.3. Unpublished Museum of London. Accn No. 1348. Sides of 20 mm

11.4. Unpublished Museum of London. Accn No. 1351. Sides of 23 mm. Unusual configuration with sides of 4+6, 3+4 and 2+?

11.5. Dunwoodie, Harward, and Pitt 2015: fig. 108, S44. Earlier 2nd century. From dumping into a drainage channel on former site of the post-Boudican fort. One blocking piece lost, otherwise complete.

11.6 Stevenson 1992: fig. 33, no. 61. A complete example, 21 mm cube. From Flavian contexts. The 3 side is missing one of its pips.

11.7 Figure 2. Thames Foreshore. P.A.S. no. PUBLIC-C9A904. Size 25 x 19 x 19 mm. https://finds.org.uk/database/artefacts/record/id/950157 Last Accessed: 13 Jan 2022]

Numbers 11.8 – 11.15 are all illustrated in the Museum of London online collections catalogue. Last accessed 13/01/22.

11.8 Site code 15SKS80[1114] <1803>. Sides 21 x 21 x 19 mm.
https://collections.museumoflondon.org.uk/online/object/944263.html

11.9. Site code GPO75[1]<4327>. Non-standard arrangement of 1+6, 2+2 and 3+4 (the last pair 'plugged'). Sides 22 x 19 x 23 mm.
https://collections.museumoflondon.org.uk/online/object/349758.html

11.10 Site code EST83[508]<71>. Sides 23 x 23 x 24 mm.
https://collections.museumoflondon.org.uk/online/object/341086.html

[34] For the sites see Hurst 1972 and 1974.

[35] One of the Museum of London examples is published in the Guildhall Museum Catalogue (1908: pl. XXXIV, 4). Unfortunately, the text lists five dice together with the generic find spots of Thames Street and Lombard Street, 1864. It is unclear which (if any) of the catalogued finds above this refers to.

11.11 Site code PWB88 [1952]<1034>. Just possibly some black inlay surviving on this example – see the detail on side 6 of this piece in the online collection. Sides 16 x 17 x 17 mm.
https://collections.museumoflondon.org.uk/online/object/384850.html
11.12 Site code WAO06[345]<214>. Sides 26 x 26 x 20 mm. The central blockers are missing, but the three side has two 'pip' on the edge so this might originally have been an irregular configuration.
https://collections.museumoflondon.org.uk/online/object/944336.html
11.13 Site code FER97[2447]<1629>. Sides 23 x 25x 22 mm.
https://collections.museumoflondon.org.uk/online/object/544107.html
11.14 Site code 199BHS T XVIII. Sides of 18 x 18 x 18 mm.
https://collections.museumoflondon.org.uk/online/object/949197.html
11.15 Site code BZY10[6738]<9025>. Sides 23 x 23 x 22 mm.
https://collections.museumoflondon.org.uk/online/object/944329.html

12. Piddington, Northants. Greep forthcoming a. A complete example, from a ?military ditch sealed by the west wing of the early 2nd century villa. Probably Flavian.
13. Richborough, Kent: Bushe-Fox 1949: pl. 34, 81. Pre *c.* 85. Listed in the report as from Area XVIII, but probably from below the mixing floor for the foundations of the Richborough monument. Sides 24 x 17 mm.
14. St. Albans, Hertfordshire (two examples): Stead and Rigby 1989: 108 and fig. 89, no. 20. Fragments of two dice, burnt, together with a cremation (unsexed) found inside a grog-tempered jar in the King Harry Lane cemetery. Phase 2 cremation dated in the report *c.* 30-50. Lengths 18 and 16 mm.
15. Silchester, Hampshire (two examples): from excavations in Insula IX. One (18 x 17 x 16 mm) from Flavian-Trajanic contexts, one (22 x 19 x 19 mm) unstratified.
16. Wanborough, Wiltshire: Vaughan 2001: fig. 115, no. 293. Very worn, but complete except for the blockers which are lost. Undated.
17. Winchester, Hampshire: Greep forthcoming b. A very fragmentary example from late 1st-4th fourth century contexts.
18. Wroxeter, Shropshire: Unpublished and unstratified. From Bath-House excavations.

Note: There are two unprovenanced composite dice in British collections (excluding those in collections known to not have a British provenance).

1. Castle Museum, Colchester (Accn No. COLEM : 2010.T118). No information as to provenance, but possibly from Colchester.
2. Jewry Wall Museum, Leicester (Accn No. A739.1951 – F20). From a private collection which included local material but also finds from elsewhere.

An enigma!

A composite bone dice of apparent Roman form was found during excavations at Rattray, Aberdeenshire (Murray and Murray 1993: fig. 44, no. 278). The earliest occupation on the site is late 12th century, but the dice was recovered from the very latest phase – 15th century or later. There are no Roman finds from the site. I know of no other medieval dice of this construction, although as the report points out the use of 'blocking pieces' is known on Medieval chess pieces (Murray and Murray 1993: 109, n. 217).

Acknowledgments

I am grateful to the following for information about dice in the catalogue: Caistor (Natasha Harlow and for permission to reproduce the illustration of this dice), Colchester (Glynn Davis of Colchester Museum for information on the dice on the collections; Phillip Crummy for permission to reproduce published images from work undertaken by the Colchester Archaeological Trust), Great Dunmow (Mark Atkinson for further information and the permission to reproduce the Great Dunmow dice); Gloucester (Henry Hurst for contextual information from unpublished excavations), Leicester Museum (Laura Hadland on the provenance of the example in the collections), London (Mike Marshall and the 'dice team' from the Museum of London Archaeological Service for many useful comments and information on the London examples; The London and Middlesex Archaeological Society for permission to reproduce Fig. 3,1), Stuart Wyatt for information on **11.7** and permission to publish the photograph here at Figure 2), Richborough (Philip Smither, on the context and date of the published dice) and Silchester (Prof. Mike Fulford and the University of Reading). I am especially grateful to Nina Crummy for a discussion on the dating of the Kings Harry Lane graves and the Colchester and Silchester dice.

Bibliography

Atkinson, M. 2015. An early Roman cremation cemetery at Haslers Lane, Great Dunmow. *Essex Archaeology and History* 6 (4th Series): 189-234.

Ayalon, E. 2005. *The Assemblages of Bone and Ivory Artefacts from Caesarea Maritima, Israel, 1st – 13th Centuries CE* (British Archaeological Reports International Series 1457). Oxford. British Archaeological Reports.

Barber, B. and D. Bowsher 2000. *The Eastern Cemetery of Roman London. Excavations 1983-1990*. London: MoLAS Monograph 4.

Barbier, M. 2016. *L'Artisan de l'Os à l'Époque Gallo-Romaine de l'Ostéologie à l'Archéologie Expérimentale*. Oxford: Archaeopress.

Béal, J-C. 1983. *Catalogue des Objets de Tabletterie du Musée de la Civilisation Gallo-Romaine de Lyon*. Lyon.

Bedford, J. B. and J.P. Salvatore. 2015. *Excavations at Mermaid Yard, Exeter, 1977-8. Part 1 Roman Military.* Exeter Museums Archaeological Field Unit Excavation Report No 92.39. Accessed 15th October 2021 through: Archaeology Data Service: Exeter City Council, Cotswold Archaeology (2015) Excavations at Mermaid Yard, Exeter 1977-78 (Exeter archive site 63). York: https://doi.org/10.5284/1035200

Bíró, T.M. 1994. *The Bone Objects of the Roman Collections*. Catalogi Musei Nationalis Hungarici. Budapest: Series Archaeologica II.

Bíró, T.M., A.M. Choyke, V. Lóránt and V. Ádám 2012. *Bone Objects in Aquincum*. Budapest.

Bluer, R. and T. Brigham 2006. *Roman and Later Development East of the Forum and Cornhill. Excavations at Lloyd's Register, 71 Fenchurch Street, City of London*. London: MoLAS Monograph 30.

Bushe-Fox, J.P. 1949. *Fourth Report on the Excavations of the Roman Fort at Richborough*. Oxford: Report Research Committee Society Antiquaries London 16.

Choyke, A.M. 2012. Bone workshop from the area of the church of San Lorenzo in Lucina, in O. Brandt *San Lorenzo in Lucina: the Transformations of a Roman Quarter (Acta Instituti Atheniensis Regni Sueciae, 4th series 61)*: 335-346. Stockholm: Swedish Institute in Rome.

Cool, H.E.M. 2016. *The Small Finds and Vessel Glass from Insula VI.I Pompeii: Excavations 1995-2006*. Oxford: Archaeopress.

Cotton, J. 2001. Bibliography of sets of gaming counters. *Lucerna* 22: 12-13.

Crummy, N. 1983. *The Roman Small Finds from Excavations in Colchester, 1971-9.* Colchester: Colchester Archaeological Report 2.

Crummy, N. 1992. The Roman small finds from the Gilbert School site, in P. Crummy *Excavations at Culver Street, the Gilbert School, and Other Sites in Colchester 1971-85*: 206-250. Colchester: Colchester Archaeological Report 6.

Crummy, N. 2010. Bears and coins: the iconography of protection in late Roman infant burials. *Britannia* 41: 37-93.

Crummy, N., P. Crummy and C. Crossan 1981. *Excavations of Roman and Later Cemeteries, Churches and Monastic Sites in Colchester, 1971-88.* Colchester: Colchester Archaeological Report 9.

Cunliffe, B. 1971. *Excavations at Fishbourne 1961 – 1969. Volume II: The Finds.* London: Report Research Committee Society Antiquaries 27.

Curle, J. 1911. *A Roman Frontier Post and its People.* Glasgow.

Daniaux, T. 2020. Les dés pleins cubiques et parallélépidés en os de Gaule romaine. De leur production à l'art de les manipuler. *Instrumentum* 52: 35-46.

Deschler-Erb, S. 1998. *Römische Beinartefakte aus Augusta Raurica : Rohmaterial, Technologie, Typologie und Chronologie*, Forschungen in Augst 27. Augst.

Dugan, E. 2015. Strange games: some Iron Age examples of a four-player board game? *Board Game Studies Journal Online* 9: 17–40.

Dunwoodie, L, C. Harward and K. Pitt 2015. *An Early Roman Fort and Urban Development on Londinium's Eastern Hill: Excavations at Plantation Place, City of London, 1997–2003*. London: MoLAS Monograph 65.

Gostenčnik, K. 2005. *Die Beinfunde vom Magdalensberg.* Archäologische Forschungen zu den Grabungen auf dem Magdalensberg. Klagenfurt.

Greep, S. 1983a. Objects of Bone, Antler, Ivory and Teeth from Roman Britain. Unpublished PhD Dissertation. University College Cardiff.

Greep, S. 1983b. Pre-conquest objects of bone and antler from South-eastern England. *Britannia* 14: 259-61.

Greep, S. 1995. Objects of bone, antler and ivory, in K. Blockley, M. Blockley, P. Blockley, S.S. Frere, and S. Stowe *Excavations in the Marlowe Car Park and Surrounding Areas. Part II : The Finds:* 1112 - 1152. Canterbury: The Archaeology of Canterbury 5.

Greep, S. 1998. The bone, antler and ivory objects, in Cool, H.E.M. and C. Philo (eds) *Roman Castleford Excavations 1974 - 85. Volume 1 The Small Finds:* 267 – 285. Wakefield.

Greep, S. 2014. Red deer at the end of Roman Britain – a change in diet, hunting practices or new industrial processes? *Lucerna* 46: 7-9.

Greep, S. forthcoming a. *Objects of Bone, Antler and Ivory from Piddington Roman Villa*, Iron Age and Roman Piddington: 1, Fascicule 7.

Greep, S. forthcoming b. Gaming equipment, in F.M. Morris and M. Biddle 2022. *Venta Belgarum: Prehistoric, Roman, and Post-Roman Winchester*, Winchester Studies 3.i. Oxford: Archaeopress.

Guildhall Museum 1908. *Catalogue of the Collection of London Antiquities in the Guildhall Museum*. 2nd edition. London.

Holbrook, N. and P. Bidwell 1991. *Roman Finds from Exeter*. Exeter: Exeter Archaeological Reports 4.

Hurst, H. 1972. Excavations at Gloucester, 1968–1971: first interim report. *Archaeological Journal* 52: 24-69.

Hurst, H. 1974. Excavations at Gloucester, 1971–1973: second interim report. *Archaeological Journal* 54: 8-52.

Hutchinson, V. J. and D.S. Reese 1988. A worked bone industry at Carthage, in J. Humphrey (ed) *The Circus and a Byzantine Cemetery at Carthage Volume* 1: 549-594. Ann Arbour.

Jehasse, J. and L. Jehasse 1973. *La Nécropole Préromaine d'Alèria (1960-1968).* Paris: 5th Supplèment à Gallia.

Jenkins, F. 1950. Canterbury: excavations in Burgate Street, 1946-48. *Archaeologia Cantiana* 63: 82-119.

Jung, P. 2013. *Die Römischen Beinartefackte aus dem Gebiet der Colonia Ulpia Traiana (Xanten)* Mainz: Xantener Berichte 26.

Kramer, W. 1957. *Cambodunumforschungen 1951-2; Die Ausgrabungen von Holzhausern zwischen der 1 und 2 Querstrasse* (Materialheft zur Bayerischen Vorgeschicht 9).

Lovergne, E. 2020. Sur quelques pièces problématiques étrusquesen os en ivoire, *Instrumentum* 52: 30-32.

MacGregor, A. 1985. *Bone, Antler, Ivory and Horn: The Technology of Skeletal Materials since the Roman Period.* New Jersey.

Mackreth, D.F. 1994. The brooches, in R. J. Williams and R. J. Zeepvat, *Bancroft, A Late Bronze Age/Iron Age Settlement, Roman Villa, and Temple Mausoleum*: 285–303. Aylesbury: Bucks Archaeological Society Monograph 7.

Mackreth, D.F. 2011. *Brooches in Late Iron Age and Roman Britain*. Volume 1. Oxford.

Maxwell, G. 1974. Objects of bone, horn and jet, in A. Rae, and V. Rae, The Roman Fort at Cramond, Edinburgh: excavations 1954-66. *Britannia* 5: 162-225.

May, T. 1930. *Catalogue of the Roman Pottery in the Colchester and Essex Museum*. Cambridge.

Mikler, H. 1997. *Die Römischen Funde aus Bein im Landesmuseum Mainz.* Montagnac: Monographies Instrumentum 1.

Murray, H.K. and J.C. Murray 1993. Excavations at Rattray, Aberdeenshire. A Scottish deserted burgh. *Medieval Archaeology* 37: 109-218.

Neal, D.S, A. Wardle and J. Hunn 1990. *Excavation of the Iron Age, Roman and Medieval Settlement at Gorhambury, St Albans*. London: English Heritage Archaeological Report 14.

Orr, K. 2010. *An Archaeological Excavation at 1 Queens Road (Handford House, now 'Handford Place'), Colchester, Essex, February 2003 - January 2005.* Colchester Archaeological Report 323. Accessed online (October 2021) at: http://archaeologydataservice.ac.uk/archives/view/greylit/browse.cfm?unit=Colchester%20Archaeological%20Trust

Petrović, S. 1995. *The Roman Items of Bone and Antler from the Territory of Upper Moesia*. Belgrade: Archaeological Institute Belgrade Monograph 28.

Rodet-Belarbi, I., M. Regert, A. Mazuy, G. Le Dantec, D. Rosia-Maria, L. Briz, A. Henry and M. Rageot 2020. Brai de bouleau en Gaule romaine: nouveaux témoignages archéologiques, données textuelles et étymologiques. *Instrumentum* 51: 17-22.

Roes, A. 1963. *Bone and Antler Objects from the Frisian Terp-mounds.* Haarlem.

Rushworth, A. and A. Croom 2016. *Segedunum. Excavations by Charles Daniels in the Roman Fort at Wallsend (1975 – 1984). Volume 2: the Finds*. Oxford: Oxbow.

Schädler, U. 2007. The doctor's game – new light on the history of ancient board games, in P. Crummy, D. Shimmin, P. Crummy, V. Rigby and S. Benfield *Stanway: an Elite Burial Site at Camulodunum* (Britannia Monograph Series 24): 359-375. London: Society for Promotion of Roman Studies.

Schenk, A. 2008. *Regard sur la Tabletterie Antique. Les Objets en Os, Bois de Cerf et Ivoire du Musée Romain d'Avenches*. Documents du Museée Romain d'Avenches 15. Avenches.

Stead, I. M. and V. Rigby 1989. *Verulamium: the King Harry Lane Site*. London: English Heritage Archaeological Report 12.

Stevenson, J. 1992. Worked bone, in C. Cowan 1992. A possible *mansio* in Roman Southwark. Excavations at 15-23 Southwark Street, 1980-86: 106-10. *Transactions London Middlesex Archaeological Society* 43: 3-192.

Swift, E. 2017. *Roman Artefacts and Society. Design, Behaviour and Experience*. Oxford.

Vass, L. and S. Pánczél 2009. To play or not to play? Roman dice from Porolissum in the Wesselényi–Teleki Collection. *Ex Officina … Studia in Honorem Dénes Gabler:* 561-572. Győr.

Vaughan, S. 2001. Objects of bone and related materials, in A. Anderson, J. Wacher and A.P. Fitzpatrick 2001 *Romano-British Small Town at Wanborough, Wilts.* (Britannia Monograph Series 19): 322-332. London: Society for Promotion of Roman Studies.

Waugh, H. and R. Goodburn 1972. Objects of bone, in S.S. Frere, *Verulamium Excavations Volume 1*: 149-154. London: Report Research Committee Society Antiquaries of London 28.

Wightman, A. and P. Crummy 2017. *An Archaeological Excavation and Watching Brief at Fenwick, Colchester (formerly Williams and Griffin), 147-151 High Street Colchester, Essex. April-August 2014.* Colchester Archaeological Trust Report 1150.

Wilmott, T. 1997. *Birdoswald. Excavations of a Roman Fort on Hadrian's Wall and its Successor Settlement: 1987-1992*. London: English Heritage Archaeological Reports 14.

Defending the Walls: experiments with replica hand launched Roman weaponry

Bill Griffiths

Preamble

As an undergraduate at Exeter University in the mid-1980s I elected to produce a final year dissertation on the use of the sling in the Imperial Roman army. Concerned there would not be enough material I was encouraged by my tutors to broaden the topic out to look at hand-launched weaponry of the Roman army more generally. As I was embarking on this research, Paul Bidwell returned to his *alma mater* to lecture about his work at Vindolanda to the Archaeological Society. As a student representative I was deputed to take him for a coffee. This was the first time I met Paul, and he showed a genuine interest in, and gave encouragement to, my research.

My next meeting with Paul was in 1989 when I arrived at South Shields for a (successful) job interview. The reconstructed gateway had been completed the previous year and the re-enactment group Quinta (based on the 3rd-century auxiliary garrison of the fort at South Shields, *cohors V Gallorum*) had recently been formed, and from the outset was as much a research group as a public display troupe. The combination of gateway and re-enactment/research group presented a unique opportunity to experiment with the weapons I had only previously evaluated from the literature. The creation of the Arbeia Society, at Paul's behest, provided a forum for the publication of the experiments.

The experimental programme

The programme was initiated for three reasons:

1. To attempt to quantify the effectiveness of the weapons.
2. The presence of the reconstructed south-west gateway and associated ditch system at the Roman fort provided an ideal opportunity to assess the possible role of such weapons in the defence of a fort as well as in battlefield conditions.
3. The project offered the opportunity to demonstrate the value of re-enactment as a research tool to a largely sceptical audience (Bahn 1989: 52).

The testing followed a fairly set programme based on the following criteria:

- each weapon to be constructed from authentic materials
- each weapon to be constructed using, as far as possible, authentic techniques and tools
- each weapon to be the subject of one full day's experimentation by members of Quinta, testing its effectiveness both on the flat and from the reconstructed gateway (the only exception to this being the sling)
- a full article to be published on each weapon, pulling together the evidence of its use by the Roman army and the results of the tests
- only one weapon to be tested each year to ensure that as full and complete a study as possible was made for each, avoiding the risk of some weapons being less fully researched than others

Modern re-enactors have nothing like the training regime of the Roman soldier as outlined by Vegetius (I: 8-28), and we cannot assess the effect of a modern diet on fitness levels. However, it felt reasonable to assume that the distances achieved by untrained modern re-enactors would be the equivalent of the minimum performance of a fully trained Roman soldier. This would in turn provide us with a sense of the minimum effectiveness of the weapon to the Roman army.

Part of each experiment concerned the use of the weapon on level ground – in an attempt to get a sense of performance in the battlefield, but without the distractions and energy of a battle itself, as that was felt to be somewhat beyond the scope of the group!

In addition, in each case (with the exception of the sling) the parapet wall on the north side of the reconstructed gateway was used in order to assess the effectiveness of the weapon from that position, an all too rare opportunity to explore the capability of the weapons in a defensive, as distinct from an offensive, situation. The careful research that lies behind the reconstruction of the gateway (Bidwell *et al.* 1988), offered reassurance that the results achieved would be relevant within the framework of the experimental model proposed. The

Figure 1. Stones being thrown from the reconstructed gateway. Note the way the flattened sides allow for ease of stacking (author).

results from each set of experiments are outlined below – a fuller account appears in the relevant editions of the *Arbeia Journal*.

Over the course of four years a weapon was taken and studied each year. The work was published as follows:

The hand-thrown stone: Griffiths 1992

The javelin: Griffiths and Sim 1993

The sling: Griffiths and Carrick 1994

The *plumbata*: Griffiths 1995

The hand-thrown stone

The first weapon studied was the hand-thrown stone. Rounded stones with flattened sides are not uncommon finds across Roman military sites. Traditionally they are interpreted as artillery missiles for use in *ballistae*. However Dietwulf Baatz, among others, has suggested they may also have been for throwing by hand (Baatz 1983: 136). Their distinctive feature, the flattened sides, have been variously argued to be an aid for holding them in the *ballista*, a way of allowing them to be conveniently stacked ready for use (Figure 1), or a means of allowing them to be easily gripped for throwing. Indeed, the feature may have been designed to support all three functions. Such is the uncertainty about their use that other, unmilitary, suggestions have also been offered, from stoppers for amphorae to gaming balls (cf. Griffiths 2016: 196 for a summary). On balance though, given the majority of findspots for these stones (including 136 from the Roman fort at Wallsend alone), a military application would seem most likely. It is also probable that size matters in this context. Stones of this shape are found in a variety of sizes – some of which were clearly too large for any possible hand throwing – and in these cases use as ammunition for torsion machines would make more sense (cf. Wilkins 2017: 112-3 for a discussion of ammunition size). The stones used in the experiment were made from local sandstone and ranged in size from 59-83 mm to 71-96 mm in diameter and in weight from 625-950 gm.

This is not the place to repeat the evidence from classical sources for the use of the hand-thrown stone, particularly in defensive situations, in the ancient world (for which cf. Griffiths 1992: 2-6), although it is worth noting a reference from Vegetius regarding supplies required for the defence of a Wall:

> Round stones are very carefully collected from rivers, because they are heavier in proportion to their density and more suitable for throwing. The walls and towers are filled with them, the smallest for casting by slings and staff slings [fustibali] and by hand.... (IV: 8)

The first point to note is range. The gateway at South Shields was protected by a triple ditch system with the centres of the ditches at 6, 16 and 24 m from the fort wall respectively. Throwing from the parapet, into a headwind, the best throw achieved was 27.9 m, and the average for the three best throwers of 24.31 m.

Tests also revealed the stones could be thrown with a high degree of accuracy against a man-sized target, not least on account of them being of a similar size and weight. However, perhaps the most interesting aspect of this research was an experiment with volley fire – that is, the participants throwing stones out from the wall with a 2-3 second rapidity. Watching from the side it was clear that for any attacker this would represent a hailstorm from hell, and while struggling across the ditches the stones could knock shields aside, land heavy blows on helmets and the like.

It cannot be proven that stones such as these were regularly deployed as a hand-thrown missile by the Roman army. However, the experiments conducted from the gateway at South Shields make a compelling case for their effectiveness if so used.

The javelin

The second year's experiment presented a different level of technical difficulty, in terms of ensuring the replica weapons were made using the techniques that would have been employed by the Romans in their construction. In this the project was supported by David Sim, a former blacksmith who was researching Roman smithing techniques. The resulting paper was a joint collaboration (Griffiths and Sim 1993).

The javelin-head David made replicas of was a find from South Shields. Dated by context to the early 3rd century (the period when the original *cohors* V *Gallorum* was the garrison), its light weight and short length (140 mm) indicated it could only have functioned as a javelin, as distinct from a spear.

The act of creating the replicas was an experiment in its own right, and led to a separate paper by Sim in the same volume of the *Arbeia Journal* (Sim 1993). One of the first surprising results from the work was just how robust the javelin-heads were. Indeed they remain in use 30 years later for displays. When presenting them David was concerned they would break at the metal collar of the socket but in fact only the wooden shaft itself ever actually breaks. Sim noted that the production time for a javelin-head comes out at a little over an hour. This seemed excessive, until the experiment revealed just how reusable and long-lived they can be.

What was of particular interest was that having reconstructed the javelin-heads using authentic smithing techniques it was found that the tips of the javelins turned very easily. Two minutes' work served to repair them, but it did mean they could not be thrown straight back by an attacker, bearing witness to an observation originally made by Polybius (VI: 22).

The wood used for the javelin shafts was ash. There is no surviving evidence of the wood used for shafted weapons at South Shields, but ash has been found at several other sites, including Corbridge. Similarly there is no clear evidence for the lengths of the shafts. A range of sizes were produced, and the conclusion drawn was that it was probably a matter of preference for the individual soldiers concerned.

In terms of references in classical texts, accounts of javelins refer to offensive situations, usually in the hands of light armed troops operating at the wings of the army and in skirmish order before battle lines are fully joined. Throws made on the flat as part of the experiment reached distances of up to 20 m, again with the assumption that this represented the minimum effectiveness for the weapon given the lack of a training regime for modern re-enactors. This felt like a short range for battle so a quick test was devised to quantify this. One javelineer agreed to throw five javelins from behind a shield and draw his sword in the time it took another re-enactor to run 20 m towards him. The javelins were thrown to one side to avoid injury and of course no time was taken in aiming, but to the surprise of all present all five were discharged and the sword drawn by the time the attacker had covered just over 10 m. It is notable that this was achieved without training – and certainly gives some insight into what is possible.

However, for the purpose of this paper the main focus is on the use of the javelin from the gateway parapet – and again the ranges achieved can only indicate the minimum effective range for the weapon. The standard javelins reached distances of 15-20 m from the gateway (Figure 2), with the longer shafted examples landing at 45% from the vertical and the shorter shafted versions tending to land more vertically. Each has its advantages when considering reaching attackers, but we have no evidence to allow us to speculate further on this.

The sling

The experiments with the sling are of less relevance here in terms of assessing their ability to defend from a wall, as untrained slingers require more space for slinging. In addition, the lack of practice meant the shot could go in any direction posing significant risk, so no attempt was made to assess this weapon from the reconstructed gateway. This is not to suggest the sling would not have been used in a defensive situation, as evidence from Velsen 1 clearly demonstrated, with the Roman defenders of the fort resorting to ever faster

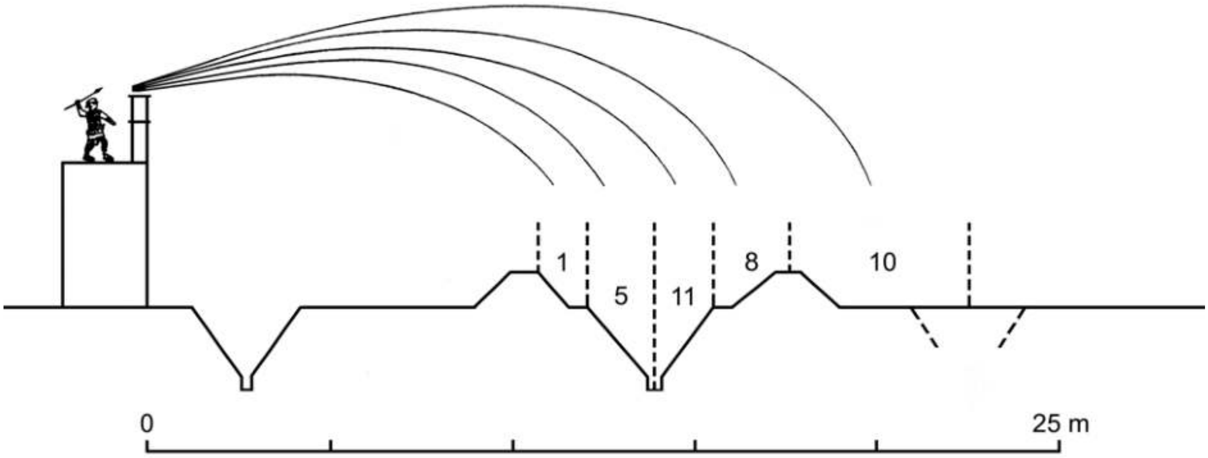


Figure 2. Cross-section through fort wall and ditches indicating ranges achieved in the javelin experiment; the numbers indicate the number of javelins landing in each zone (drawn by R. Lavery).

techniques to make lead shot to drive back attackers (Bosman 1995). It is also fair to note that since these experiments almost 30 years ago, there has been a considerable amount of new research into slinging, not least that conducted as a result of work at Burnswark (Reid and Nicholson 2019: 469-71).

The *plumbata*

The final weapon studied was the *plumbata*, the lead-weighted javelin or dart described by Vegetius (I:17). The other writer to reference it is the anonymous author of *De Rebus Bellicis.* He describes it as having 'a lead weight and flights attached... so that the bulbous weapon, assisted by the weight of the lead and the swiftness of the flights, will be powerful enough to penetrate very easily the enemy's shields and similar obstacles' (XI: 1). In addition to its being lead-weighted and flighted, the alternative name for the weapon, *martiobarbulus*, suggests that it was also barbed. A small number of examples of the weapon have been found across the Empire (including from at least five different sites in Britain), although none can be securely dated to earlier than the late 3rd century, suggesting it was a weapon of the later Empire (Bennett 1991; Bishop and Coulston 2006: 200), with a concentration of finds in Serbia supporting Vegetius' assertion that it was used by legions in that territory (Vujovic 2009). Examples recovered from Wroxeter and Burgh Castle in Britain showed different construction methods, so for the experiment examples of both types were made. Again this work was carried out by David Sim who also published a detailed account of the construction (Sim 1994), with a grant from the Roman Research Trust to cover the costs of manufacture.

Of all the weapons covered in this series of experiments it is worthy of note that the *plumbata*, although the rarest form, was the most studied by previous experiments, notably by Musty and Barker (1974) and Eagle (1989) (see Griffiths 1995: 4 for a full discussion). These experiments confirmed the *plumbata* as a fierce and unique weapon for the battlefield. As anticipated the lead weight helped 'punch' the barbed head further into a target. The experiments also revealed another fascinating aspect of the weapon, its ability for the lead weight to cause it to land more vertically that other shafted hand-launched weapons.

The Quinta experiments were designed to build on the data set already achieved in earlier experiments. They bore out the conclusion of Eagle, in particular, that an underarm throw was best, doubling the ranges achieved with an overarm throw, to 18-20 m.

The few references we have to them records their use in battle (by legions). We were also keen to carry out experiments in throwing them from a parapet wall in order to assess their effectiveness in a defensive situation. Due to the parapet wall only overarm throws could be achieved, but it was easily possible to reach the central ditch without training, and the weapon tended to land more vertically than a regular javelin, sinking well into the soil due to the presence of the lead weight.

Training

Overall this set of experiments provided a data set for the minimum performance of a series of hand-launched weapons – a performance that would have been much improved by training. Training was a highly important aspect of life in the Roman army. As Le Bohec states, 'it is this that largely explains the success of the Roman Army' (1994: 105). Training is vital to the successful use of missile weapons if a significant range and accuracy are to be achieved. This is a fact stressed time and again by several classical authors including Onasander (X:1) Arrian (*Tactical Handbook* 34-43) Vegetius (javelins I:14; slings I:16;

plumbatae I:17, hand-thrown stones and training with missile weapons in general II:23). Such training is one aspect of ancient soldiering that the members of Quinta could not replicate as part of this experiment, not least as the demands of modern life prevented the re-enactors from practicing for several hours a day. Although it should be noted, but not come as a surprise, that several members carried out limited practice, particularly with the javelins, following the experiment, and noted a marked improvement in range and accuracy.

Defending the fort

Of particular relevance to this paper are the results achieved from the parapet wall of the reconstructed gateway. Classical texts referring to the army tend to focus on the battlefield. There is comparatively less discussion about defensive operations. Where they do occur, they tend to refer to the defence of a town than the defence of an encampment. Examples include Vegetius (IV:1-11), Aeneas Tacticus and Vitruvius (I:5).

Nevertheless, there are classical accounts of Roman fort defence (e.g. Cassius Dio 56.22.2a–3) and the style of construction of a Roman fort shows that where necessary soldiers would be able to deploy missiles from the ramparts to fend off attackers. This is reinforced by the presence of ditches, designed to break up an attacking force, slowing them down and making them more vulnerable to missile fire as they attempt to attack.

In this context it is important to note that even in the hands of untrained modern novices it was perfectly possible to reach the central of the three ditches with any of the weapons available, and most re-enactors were able to reach the outer ditch. This set of experiments therefore confirms that the ditches effectively create what can be referred to as a 'kill zone' around a fort, the ditches slowing up attackers at the very moment they come within range of hand-launched missile weapons that any soldier could deploy (Richmond 1968: 68-9). The potential role of artillery – explicitly attested at some Roman fort sites – should not be forgotten and explains why multiple ditch systems are sometimes of a width that will have taken them beyond the range of hand-launched missiles.

One of the great challenges for defending a parapet wall arises once an attacker reaches its base. Usually to aim a weapon at them a defender has to lean out exposing them to attack in turn. However, with the *plumbata* and the hand-thrown stone, these need simply to be dropped as the weight in them does not require additional force for them to be effective.

Of course none of this proves the weapons were used in this way – it merely lays out the possibility, but when taken in context with the defensive system of a Roman fort, of which missile weapons were a necessary part, an understanding of their potential is vital.

Walking on the Wall

Ultimately, though, it is not contentious to suggest that the Roman army was prepared to fight from the walls of its defended camps in time of need. To suggest the same may have happened on Hadrian's Wall, once accepted as an incontrovertible fact, has in recent years become somewhat more controversial.

A starting point to this argument needs to acknowledge the absence of evidence for the form of the top of the Wall. All we truly know of the barrier's scale is its width. Interpretations for the way the Wall may have functioned range from a fighting platform to hold off a concerted attack, through a patrolled walkway enabling the potential interception of small-scale incursions, to a barrier without patrolled top that simply marked the edge of Empire and would encumber any attacking force long enough to enable Roman forces to be built up to mount a response appropriate to the scale of the threat. Paul Bidwell has traced the evolution of the various arguments in his paper for the 2006 Arbeia Society conference 'Understanding Hadrian's Wall' (Bidwell 2008), concluding that a wall-walk did exist.

The weaponry experiments set out above cannot materially contribute to this debate. They provide a data set that indicates the weapons would have been useful in defending a wall such as Hadrian's Wall, but this cannot act as proof they were used in this way. However, for this writer, the effectiveness of the weapons, when combined with discovery of the additional defensive features found on the berm in several locations in the eastern sector of the Wall (see Bidwell 2005 for a detailed account of the obstacles), and possibly now the west too (Bidwell 2019: 186), emphasise the likelihood of a patrolled walkway.

The defensive features on the berm between the Wall and the ditch to the north are interpreted as a form of above-ground series of obstacles creating in effect a form of natural barbed wire entanglement. Given enough time an attacking force would be able to neutralise them in order to give themselves passage, but the obstacles would severely hamper progress for a time. In particular, they would slow advance almost to a halt, making any would-be attacker easy prey to a soldier throwing missiles from a wall-walk. Yet without such a wall-walk it would be relatively easy for a small force to negate the obstacles and clear the Wall at night. Without a wall-walk the ability of the defenders to observe any such insertion would be much reduced.

Breeze argues passionately against the existence of a wall-walk, stating that the Roman army was an offensive fighting force who would march out from their defences to fight against an enemy *en masse* stating that 'to argue that the Roman soldiers fought from the top of it is to fly in the face of all that we know of Roman fighting tactics' (2019: 74). In this he is of course correct, when considering a Roman response to a large force. The intelligence gathered by forward scouts would be of far more value than the Wall itself in enabling the Roman military to meet a large-scale threat. Indeed, such a threat would likely be of such a scale that soldiers on a parapet wall could be rendered ineffective by missile fire from slings and arrows. Although even then no military force would ever willingly ignore a topographical feature which gave it a height advantage over an enemy, which a wall-walk certainly would have done. However, the fact remains that the Wall would be highly effective against small-scale incursions, but only if Roman soldiers had the operational capability to meet the threat from an elevated position at the point where a breach of the frontier is threatened – a situation which calls for a wall-walk.

Did the Wall face small-scale incursions? Symonds suggests a patrolled walkway would have been needed not least as the Wall 'scythed through populous farming communities. the greater risk of a backlash from this disruption to local interests could have made incorporating a wall-walk seem like a sound precaution' (2021: 63).

The presence of the obstacles and ditch only make sense if there is a wall-walk (Hodgson 2017: 162-4). In addition, the presence of the obstacles on the berm precludes cavalry from being of much use in defeating a small-scale incursion on the north side of the Wall. In the dark, without a wall-walk, it would be hard to be sure of the exact position of an incursion over the wall at any distance from a turret. The evidence concerning the obstacles to date suggests they are not present near turrets (Figure 3), possibly in order to encourage attackers to chance their luck at heavily defended elements of the frontier – something that could only happen if the lightly held sections were nevertheless capable of providing an active deterrent, in the form of short-range missile weapons launched from the wall-walk.

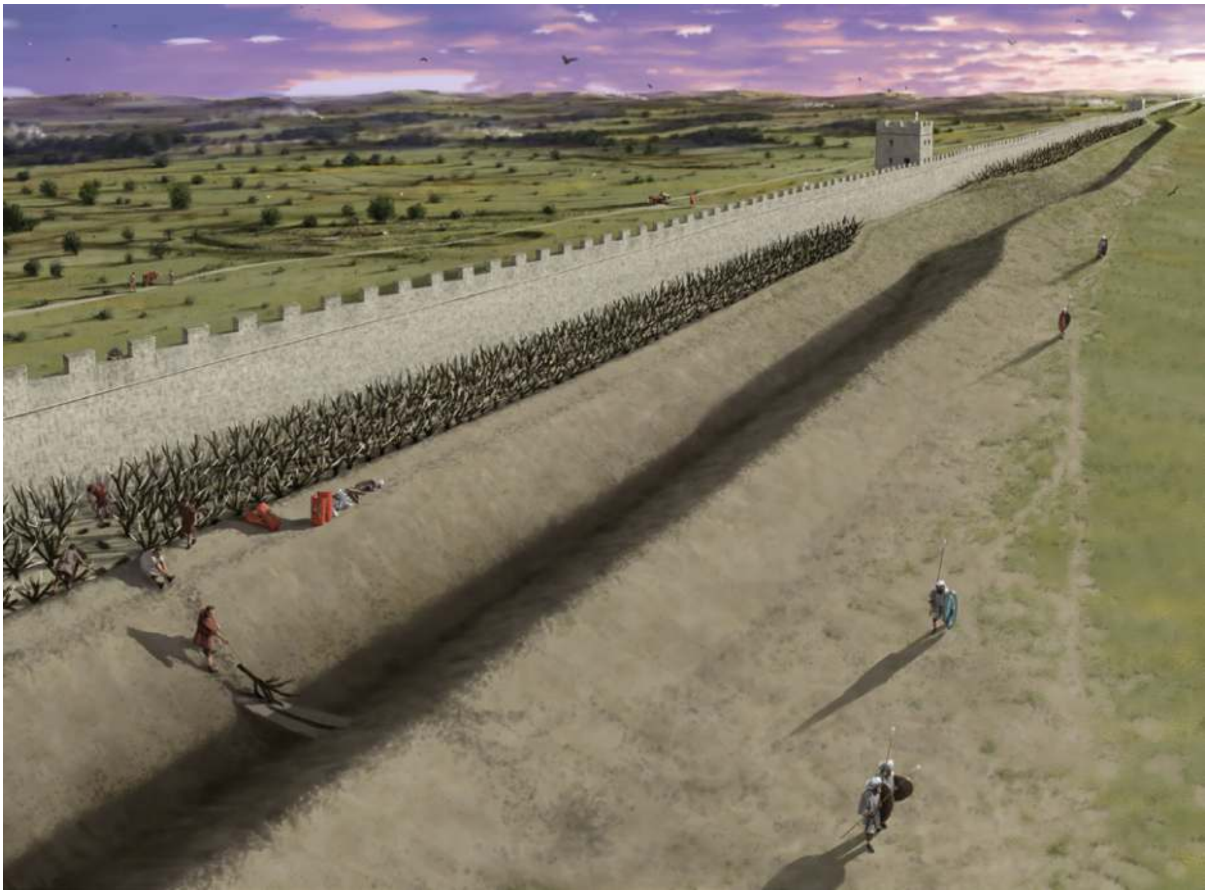


Figure 3. A reconstruction of Hadrian's Wall and its defensive outworks (Tyne and Wear Archives and Museums).

Conclusion

The debate about the presence of a wall-walk will undoubtedly long continue – until perhaps excavation yields a definite proof one way or the other (Bidwell 2008: 142). However, a greater understanding of additional defensive features both on the berm, and perhaps beyond, gradually revealed by excavation and geophysical prospection (on the Antonine Wall as well as Hadrian's), these areas being often neglected in archaeological exploration to date, will surely shift thinking further as to the initial proposed functioning of the Walls. The same can be applied to forts. In Britain alone, additional defences on the berm have been noted at Piercebridge (Cool and Mason 2008: 78-80) and are famously attested beyond the Antonine Wall ditch at Rough Castle, strongly implying there is more to discover elsewhere. So this paper will close with a plea to continue to survey and excavate beyond the obvious elements of Roman military installations and frontiers and consider the wider landscape in terms of features, but, as importantly, missile finds, in order to shed stronger light on the intended operation of such systems.

Acknowledgements

The observations presented here are offered to Paul in humble thanks for his encouragement of, and interest in, this small slice of experimental archaeology, and his vision and leadership in seeking opportunities to consistently explore as wide an area of the Wall as is physically possible within the constraints of urban environments, which has led to the discovery of the defensive features on the berm, bringing a fresh dimension to our understanding of Hadrian's Wall, the most unique of Roman frontiers. I am also grateful to Alex Croom and Nick Hodgson for commenting on an earlier draft of this paper – but any errors and opinions remain my own.

Bibliography

Ancient sources

Aeneas Tacticus *On the Defence of Fortified Positions*
Anonymous *De Rebus Bellicis*
Arrian *Tactical Handbook*
Cassius Dio *Roman History*
Onasander *The General*
Vegetius *Epitome of Military Science*
Vitruvius *The Ten Books of Architecture*

Modern works

Baatz, D. 1983. Town walls and defensive weapons, in J. Maloney and B. Hobley (eds) *Roman Urban Defences in the West* (Council for British Archaeology Research Report 51): 136-40. London: Council for British Archaeology.

Bahn, P. 1989. *Bluff Your Way in Archaeology*, Horsham, Oval.

Bennett, J. 1991. *Plumbatae* from Pitsunda (Pityus), Georgia, and some observations on their probable use. *Journal of Roman Military Equipment Studies* 2: 59-63.

Bidwell, P.T. 2005. The systems of obstacles on Hadrian's Wall: their extent, date and purpose. *Arbeia Journal* 8, 53-76.

Bidwell, P.T. 2008. Did Hadrian's Wall have a wall-walk?, in P.T. Bidwell (ed.) *Understanding Hadrian's Wall*, 129-143. Kendal: The Arbeia Society.

Bidwell, P.T. 2019. Wall miles 48 and 49 (magnetometer surveys). in R. Collins and M. Symonds (eds), *Hadrian's Wall 2009-2019*: 186. Kendal: Cumberland Westmorland Antiquarian and Archaeological Society/Society of Antiquaries of Newcastle upon Tyne.

Bidwell, P.T., R. Miket, and W. Ford 1988. The reconstruction of a gate at the Roman fort of South Shields, in P.T. Bidwell, R. Miket and W. Ford (eds) *Portae cum Turribus: Studies of Roman Fort Gates* (British Archaeological Reports British Series 206): 155-225. Oxford: British Archaeological Reports.

Bishop, M.C. and J.C.N. Coulston 2006. *Roman Military Equipment from the Punic Wars to the Fall of Roman Empire* (2nd ed.). Oxford: Oxbow.

Bosman A.V.A.J. 1995. Pouring lead in the pouring rain: making lead shot under battle conditions, in C. van Driel-Murray (ed.) *Roman Military Equipment: Experiment and Reality*: 99-103 = *Journal of Roman Military Equipment Studies* 6: 99-103.

Breeze, D.J. 2019. *Hadrian's Wall: a Study in Archaeological Exploration and Interpretation*. Oxford: Archaeopress.

Cool, H.E.M. and D.J.P. Mason (eds) 2008. *Roman Piercebridge: Excavations by D.W. Harding and Peter Scott 1969-1981*. Durham: Architectural and Archaeological Society of Durham and Northumberland.

Eagle, J. 1989. Testing *plumbatae*, in C. van Driel-Murray (ed.), *Roman Military Equipment: the Sources of Evidence* (British Archaeological Reports International Series 476): 247-253. Oxford: British Archaeological Reports.

Griffiths, W.B 1992. The hand-thrown stone. *Arbeia Journal* 1: 1-11.

Griffiths, W.B. 1995. Experiments with *plumbatae. Arbeia Journal* 4: 1-11.

Griffiths, W.B. 2016. 'Ballista' balls, in A. Rushworth, and A. Croom, *Segedunum: Excavations by Charles Daniels in the Roman Fort at Wallsend (1975-84) Volume 2: the Finds*: 192-198. Oxford: Oxbow.

Griffiths, W.B and P. Carrick 1994. Reconstructing Roman slings. *Arbeia Journal* 3: 1-11.

Griffiths W.B. and D. Sim 1993. Experiments with replica Roman javelins. *Arbeia Journal* 2: 1-13.

Hodgson, N. 2017. *Hadrian's Wall: Archaeology and History at the Limit of Rome's Empire*. Marlborough: Hale.

Le Bohec, Y. 1994. *The Imperial Roman Army*. London: Batsford.

Musty, J. and P. Barker 1974. Three *plumbatae* from Wroxeter, Shropshire. *Antiquaries Journal* 54: 275-277.

Reid, J.H. and A. Nicholson 2019. Burnswark Hill: the opening shot of the Antonine reconquest of Scotland? *Journal of Roman Archaeology* 32: 459-477.

Richmond, I.A. 1968. *Hod Hill: Excavations Carried out Between 1951 and 1958. Volume 2.* London: British Museum.

Sim, D. 1993. The manufacture of javelin heads. *Arbeia Journal* 2: 37-40.

Sim, D. 1994. Experiments to examine the manufacturing techniques used to make *plumbatae*. *Arbeia Journal* 4: 13-19.

Symonds, M. 2021. *Hadrian's Wall: Creating Division*. London: Bloomsbury.

Vujovic, M.B. 2009. The *plumbatae* from Serbia. *Journal of Serbian Archaeology* 25: 203-218.

Wilkins, A. 2017. *Roman Imperial Artillery.* Dumfries: Solway.

Southern art on the northern frontier: a remarkable Iron Age harness fitting from Doune Roman fort

Fraser Hunter

with an appendix by Mary Davis
and contributions by
Alan Braby, Neil McLean and Lore Troalen

In 2010 excavations within the Flavian fort of Doune (Stirling) uncovered a remarkable bronze strap junction with red glass inlay, decorated in styles of Celtic art typical of southern Britain rather than its immediate environs (Figure 1). Unfortunately, post-excavation funding for this phase of work was not forthcoming for anything more than partial treatment of the assemblage; as a result, the published account is brief and the accompanying drawing inaccurate in some details.[1] This paper seeks to remedy this, and consider parallels in other exotic metalwork from northern forts and the possible mechanisms behind this.

Figure 1. The Doune strap junction. Photo by Neil McLean, image © National Museums Scotland.

[1] Hatherley 2020: 23, illus. 11.

Paul's career has taken him from the south coast to the northern frontier, mirroring the journey of this outstanding find. It thus seems an appropriate item to offer as thanks to him for many enjoyable discussions over the years, often with a gently phrased nudge to indicate where my enthusiasm for a topic might be leading me onto unfruitful or implausible terrain.

The fort at Doune

In the summer of 1983 aerial photography identified a previously unknown fort at Doune, on a strong promontory position above the river Teith to the north-west of Stirling (Figure 2).[2] The 'parrot beak' terminals of the triple ditches indicated a Flavian date, and this was confirmed between 1999 and 2010 in three phases of excavations conducted in advance of development at Doune Primary School by Headland Archaeology.[3] It is one of a series of forts on the edges of the Forth valley which probably served to control movement across this marshy and intractable landscape.[4] Doune was founded around 83 and abandoned in 86 or 87.[5]

The published report does not seek to push beyond the excavation results in order to consider the fort as a whole. David Woolliscroft and Birgitta Hoffmann discussed its likely plan and orientation on the basis of the interim data,[6] and this was clarified by geophysical surveys conducted by David Woolliscroft and Oliver O'Grady in 2010 which identified the south-west gate and parts of the ditches on all four sides.[7] From this it was clear that the fort faced south-east, and in conjunction with the excavation data this now allows its plan to be reconstructed in outline (Figure 3).[8] The resistivity survey gives an overall area within the ditches of *c*. 160 x 140 m (2.24 ha); the excavated rampart width allows the internal area to be calculated as 136 x 120 m (1.63 ha).

The variety of Flavian fort plans north of the Forth-Clyde line[9] cautions against pushing the data too far, and variability is clear in this case with the off-centre position of the *via praetoria*, but from the excavated barrack widths up to 14 buildings of this scale could have been accommodated (not all necessarily barracks, of course). In the *retentura*, buildings 2 and 3 plausibly formed a facing pair of barracks, each some 7.5 m wide with a 10 m gap between. Buildings 4 and 5 form a similarly-spaced facing pair, slightly narrower at some 6.4 m wide. Building 5 has a post-in-trench veranda in front, and the other barracks have postholes in similar positions. There would be space for a pair of similar barracks spanning the *via decumana*,[10] but the traces exposed in the slot trench in this area cannot readily be resolved as such. There is also space for a further building between the attested barrack-pairs and the *intervallum* road (probably not further barracks, as these tend to be paired). Thus there could readily have been six barracks in total in the *retentura*; as a minimum, there are two plausible barrack-pairs and space for four further buildings. In the *praetentura*, the noticeably greater width of building 123 (9.0 m) would still allow up to six such buildings on this alignment, assuming a pair in each quarter and another flanking the *via praetoria*. At the rear of the fort, two multi-roomed buildings (or, more likely, one corridor building with two wings) parallel to the rampart and within the line of the *via sagularis* are best seen as stores or workshops.[11] Industrial activity[12] was recorded in the intervallum area here and on the north-eastern side of the *praetentura*.

The excavation report suggests that different barrack styles (from partly-exposed buildings) in the *praetentura* and *retentura* indicate a *cohors equitata*. It is unwise to

2 Maxwell 1984.
3 Hatherley 2020.
4 Discussed in Maxwell 1984.
5 The latest coin recovered from the site is a tantalising one, as corrosion of the inscription makes it unclear whether it was struck in 86 (as is typical in these northern Flavian forts) or 87 (which would be exceptional). The specialist clearly suspected, but could not prove, the latter; Holmes 2020.
6 Woolliscroft and Hoffmann 2006: 81–85. While the larger excavated areas revealed coherent partial building plans, the authors rightly caution about the dangers of extrapolating from the tantalising patterns of foundation trenches seen very partially in the narrower trenches.
7 Hunter 2011: 331; Woolliscroft and O'Grady 2010: 168 for illustration of the resistivity survey, which has the clearest results. The results were not incorporated in the recent publication.
8 Given the honorand's extensive work on Roman forts (e.g. Bidwell 2007), these extrapolations are presented somewhat diffidently and with a deliberate avoidance of contentious detail! However, the rampart width and *intervallum* spacing are consistent in the excavated north-west and south-east corners; the north-west end of building 123 is consistent with the line of the *via principalis* that can be deduced from the resistivity survey; and the extent of building 5 gives the minimum depth of the *retentura*. For the reconstruction in Figure 3, the outline is taken from the resistivity survey with the excavated data locked in on the north-west and north-east sides by the relative position of these trenches and the presence of the ditches in excavated sections. The resistivity survey suggests the south-west side is very slightly angled.
9 Conveniently presented in Woolliscroft and Hoffmann 2006.
10 The position of the *via decumana* is not obvious in the excavated slot trench (trench 3); the foundation trenches 107/109 seem to leave no space for it where it would be expected. However, these trenches align on the wall of building 6, interpreted by the excavator as an earlier structure before the main buildings were erected (Hatherley 2020: 15), most plausibly a temporary *principia*. Hence these slots could well have been backfilled when the main building phase was conducted; the line of the *via decumana* on Figure 3 follows this argument.
11 If the barracks were a consistent length, this would leave space for more such buildings in this area in front of the north-western rampart. Such buildings are a common feature of Flavian forts in this area: see Woolliscroft and Hoffmann 2006: 54, fig. 17 (Fendoch), 112–113, fig. 47 (Strageath), and arguably 162, fig. 75 (Cardean).
12 Industrial debris interpreted as evidence of iron-smelting was found in the north-west rampart area (Photos-Jones 2020); debris from the north-east *intervallum* area in the 2010 excavations was not studied. The mention of 'crucibles' from the 1999 work suggests that non-ferrous metalworking was also taking place, but the sherds are not published in detail.

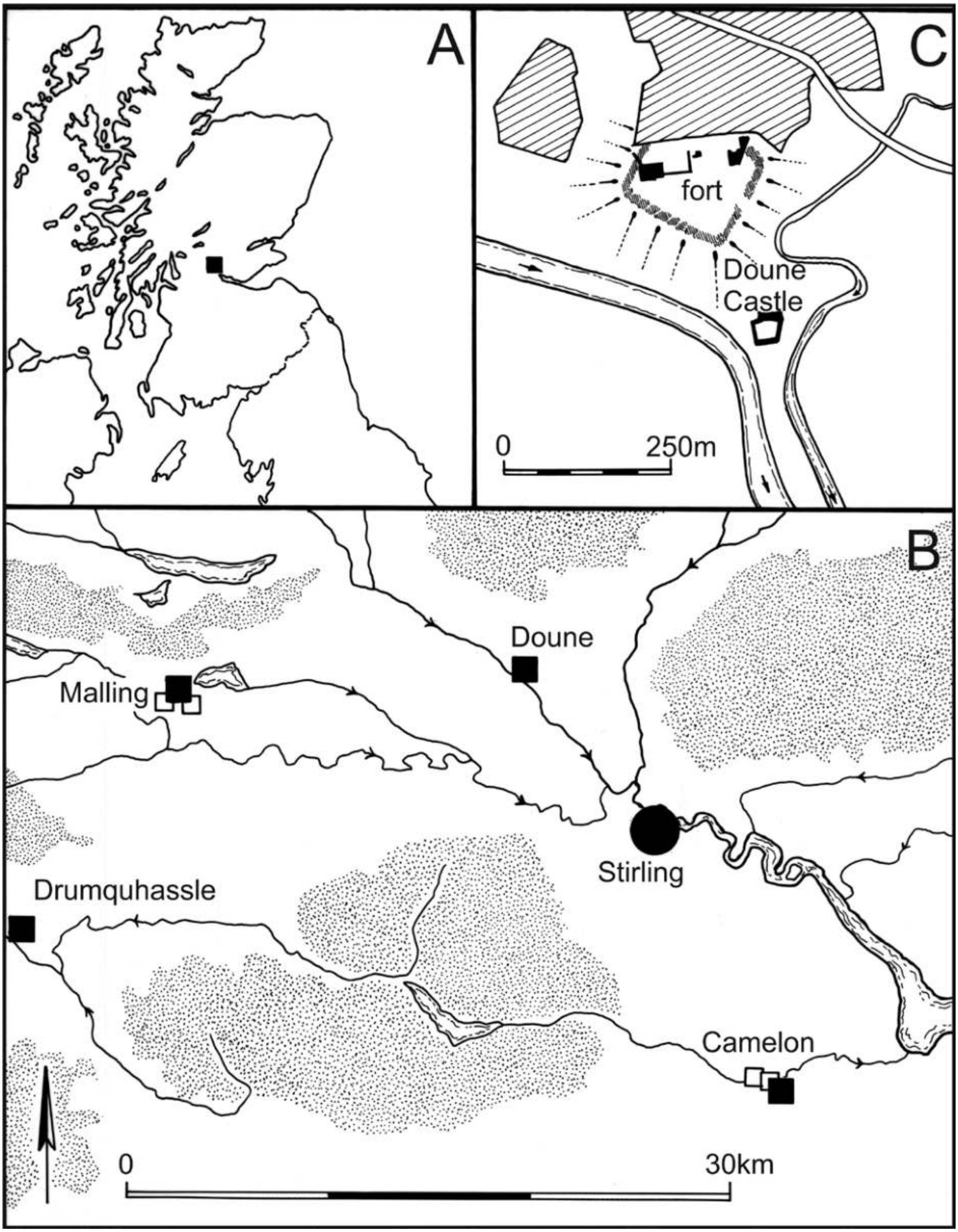


Figure 2. Location of the site, and Roman sites in the vicinity. Ground over 180 m is stippled. Drawn by Alan Braby, © National Museums Scotland (2b modified from Maxwell 1984: fig. 1; 2c modified from Hatherley 2020: illus 1).

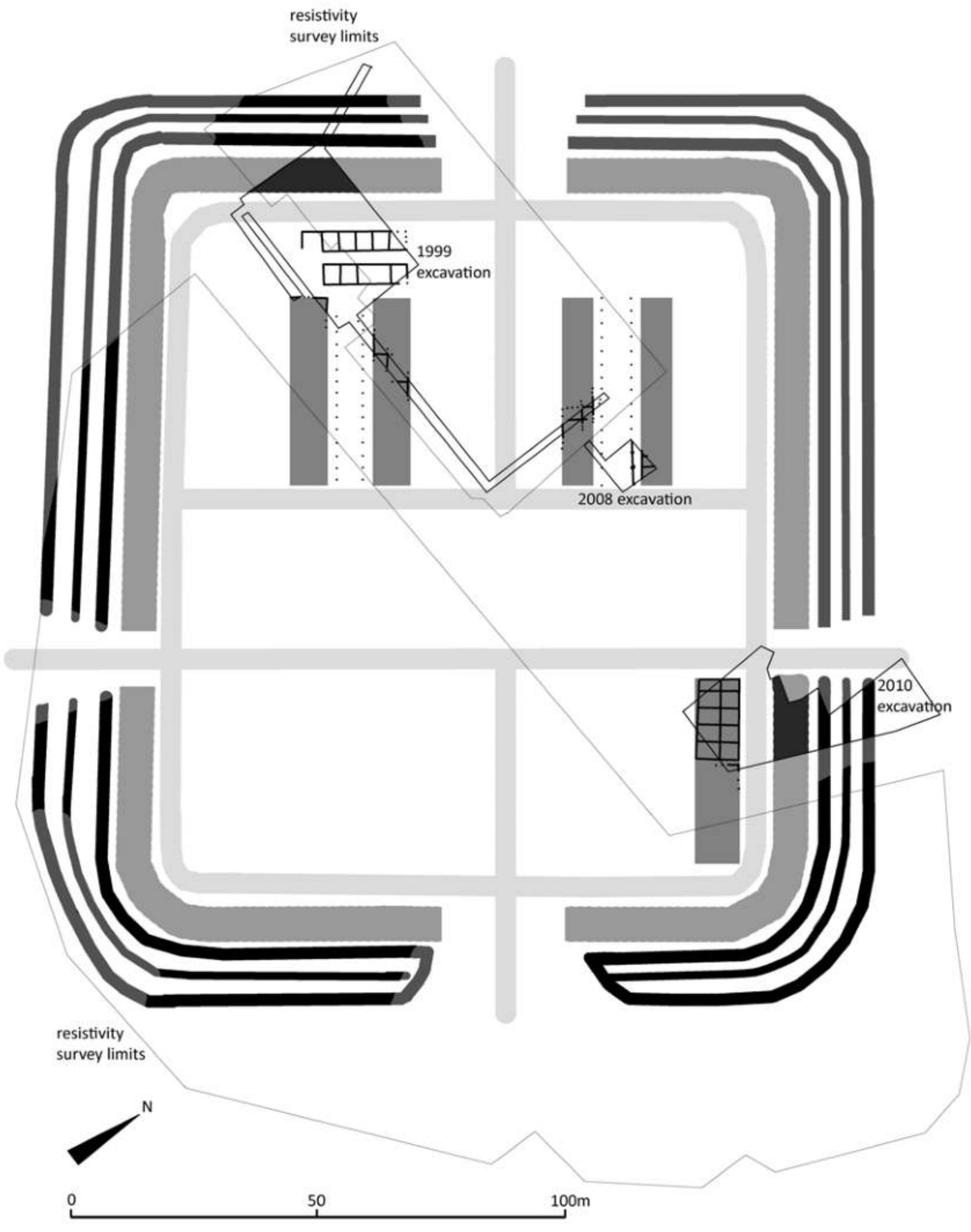


Figure 3. Outline reconstruction of the plan of the Doune fort. Image by Fraser Hunter, © National Museums Scotland.

be too dogmatic on this point,[13] but the presence of drains in the outer rooms of the excavated *praetentura* barrack-block is certainly consistent with the stabling of horses,[14] and this is supported by the discovery of the enamelled harness junction within the building which forms the subject of this paper.

The Doune harness junction: discovery and description

The mount came from the 2010 work, within a building identified as a cavalry barrack (building 123). It was found in one of a series of pits dug into this building, interpreted as part of the abandonment and destruction

[13] See our honorand's comments on the topic: Bidwell 2007: 64–66.

[14] Hodgson and Bidwell 2004: 131–136; Bidwell 2007: 62–64. The two exposed outer rooms in building 5 also included central sub-rectangular features, and could readily be seen as a further cavalry barrack; no such pit was recorded in the only exposed room of its barrack-pair, building 4.

process;[15] similar processes were identified in building 1 in the north-west of the fort. In many cases the interpretation seems clear given the considerable amounts of debris in these pits,[16] but at least one of the pits in building 123 is notably rectangular rather than the irregular forms of the others and may have been a primary feature.[17]

Details of pit 009 are not published, but the original assessment report reveals it contained a wide range of finds consistent with it being a demolition pit, and overlay an earlier pit which again had demolition debris within it.[18] The association of the harness fitting with other material best seen as debris suggests it too was discarded as an unwanted item prior to the abandonment of the fort despite its long and exotic history, presumably because it was broken. No details of how it was positioned in the pit are recorded, making it hard to argue that it was purposefully placed.

This remarkable find is a strap junction rather than a strap mount, as it has loops for two straps on the rear whereas mounts typically have only one.[19] Its basic form is a saw-toothed quadrilobate disc, each lobe having a straight vertical edge and a convex outer one. One lobe had broken off before deposition, which probably led to its discard. The surface is in generally good condition, but the edges are lost or corroded in places; where the original edge survives, it was outlined by an incised marginal line. It is 91 mm in diameter; the upper surface is very gently convex.

The elegant and balanced composition combines positive and negative forms defined by incised lines (Figure 4). Positive shapes are infilled with incised patterns or red glass, while negative ones are left blank. The two interact to create the design, which can be viewed differently depending on whether one focuses on the blank metal or the infilling.[20] The overall design falls into three zones, shifting from a four-fold design in the outer lobes to a three-fold design in the others: a circle containing a triskele, which in turn contains another decorated circle with a trefoil design.

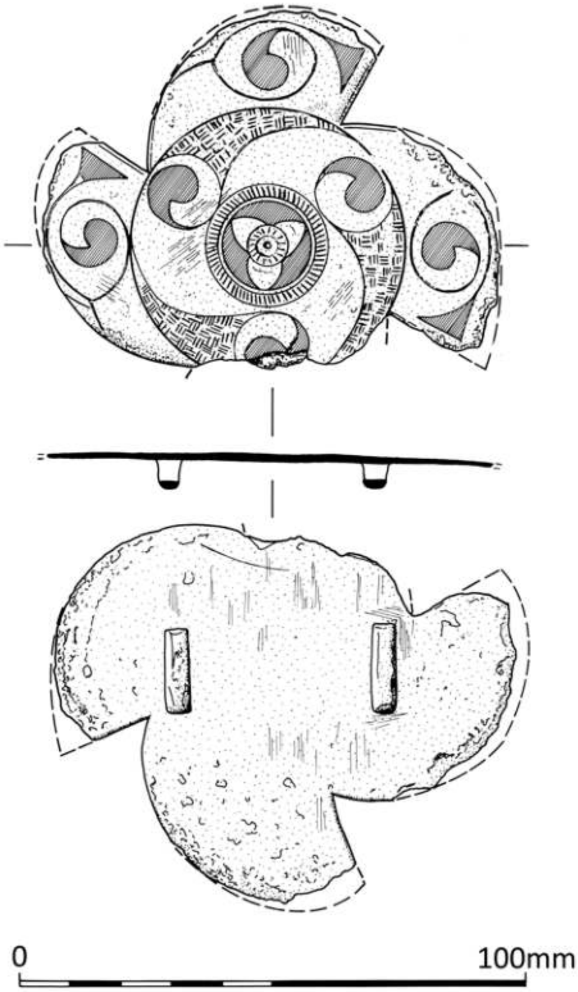


Figure 4. Drawing of the Doune strap fitting. Drawn by Alan Braby (modified from Hatherley 2020: illus 11).

Each lobe is filled with a spiral design, with one end flared into a convex-sided triangle against the vertical edge and the other ending in a comma-scroll. The design (including the incised line)[21] was infilled with red glass, the comma forming half of a yin-yang design with the reserved metal. The tip of the scroll opposite the basal triangle comes to a slight point, and from this a line curved down to the outer edge. This line is very poorly preserved, and in places lost; it is unclear if the area between it and the outer edge had any infilling decoration.

15 Hatherley 2020: 15, illus. 4; labelled as pit 009.

16 Hatherley 2020: 16, illus. 8.

17 It is worth noting that some of the barracks in the Flavian fort at Elginhaugh included occasional shallow rectangular pits; Hanson 2007: 64–66; 97, figs 5.1 and 6.2 (pit 439, in a rear room of barrack 1; pit 1784 in the officers' quarters of barrack 7).

18 In the original assessment report (Masser 2010: 11), 009 is actually the fill of pit 033, a shallow rectangular cut 2.3 x 1.6 m in area and 0.12 m deep which overlay pit 049. The fills of both features are rich. Context 009 produced 180 g of daub, ten sherds of amphorae and 14 of coarse ware, eight hobnails, 50 nails, six other iron objects, eight slingshot, a brooch and three vessel glass sherds as well as the harness fitting. Context 21, filling pit 49, included 170 g of daub, only two potsherds and one hobnail, 35 nails, three other iron objects, a slingshot, a sherd of window glass and one of vessel glass.

19 Soil around the loops was left in situ during conservation, but there are no indications of leather and it seems the mount had been detached. The slots in the loops indicate they could take straps up to 12 mm wide and 3 mm thick. The loops are centred 41 mm apart, and are 17.5 mm in length, 4.5 mm in width and 5 mm high.

20 This balance of positive and negative designs is typical of the art of the late Iron Age in southern Britain; it can be seen in so-called 'Mirror style' and in the curvilinear glass-inlaid traditions discussed later. See Joy 2010.

21 It is unusual to see such thin lines infilled with red glass; more commonly they are just inscribed (M. Davis, *pers. comm.*).

Figure 5. Microscope photo showing detail of the basketry. © National Museums Scotland.

The main circle contains a reserved triskele with a circular yin-yang on each tip, one element inlaid with red glass. The gaps between the triskele and the outer edge form fin motifs filled with basket-hatching (sets of three lines set perpendicular to one another). These are classic late Iron Age motifs best known from decorated mirrors (Figure 5).[22]

The central circle within the triskele has four concentric zones: an outer band with slightly angled incised lines; a narrow reserved band; a broad circle with reserved trefoil motif set against peltas of red glass; and within this, a very worn circle with double-outlined edge and incised lines angled like those in the outer band. There is a central dot from use of a compass. The central circular device is so worn as to be almost invisible, and parts of the hatched basketry are also worn away, indicating the piece saw considerable handling.

The overall design is interesting with its switch from a four-part outline to a tripartite central element. The quadrilobate form is a typical one for strap junctions,[23] but here the curved outer lobes give a sense of movement, and this is picked up by the central element with its combination of reserved triskele appearing to rotate clockwise and hatched fins rotating anticlockwise.

The basic form of the mount was cast; [24] qualitative surface XRF analysis by Lore Troalen identified the alloy as a bronze with some lead. Compasses were used for much of the layout.[25] The sharp walls and slightly softened top edges of the cells indicate they were modelled in wax (Figure 6), and the same is true of the basket-hatching given its subtlety and softness (Figure 5).[26] The red glass was inlaid in a heat-softened state into the recesses. Analysis by Mary Davis showed that the glass is a 'sealing wax' red, high in copper and lead, which is characteristic of the insular Iron Age (see Appendix).

[22] Joy 2010.
[23] Taylor and Brailsford 1985.

[24] Under the microscope a dendritic as-cast structure is visible.
[25] Overall diameter 91 mm. Triskele circle diameter 55 mm; yin-yang devices on triskele tips 14 mm diameter. Central circle diameter 24 mm. Overall height 9 mm; plate thickness 4 mm. Only a single central compass-point survives; other layout points have been polished away or incorporated in the design.
[26] I am grateful to Mary Davis and Lore Troalen for very valuable discussions on the technology in the course of microscopic examination.

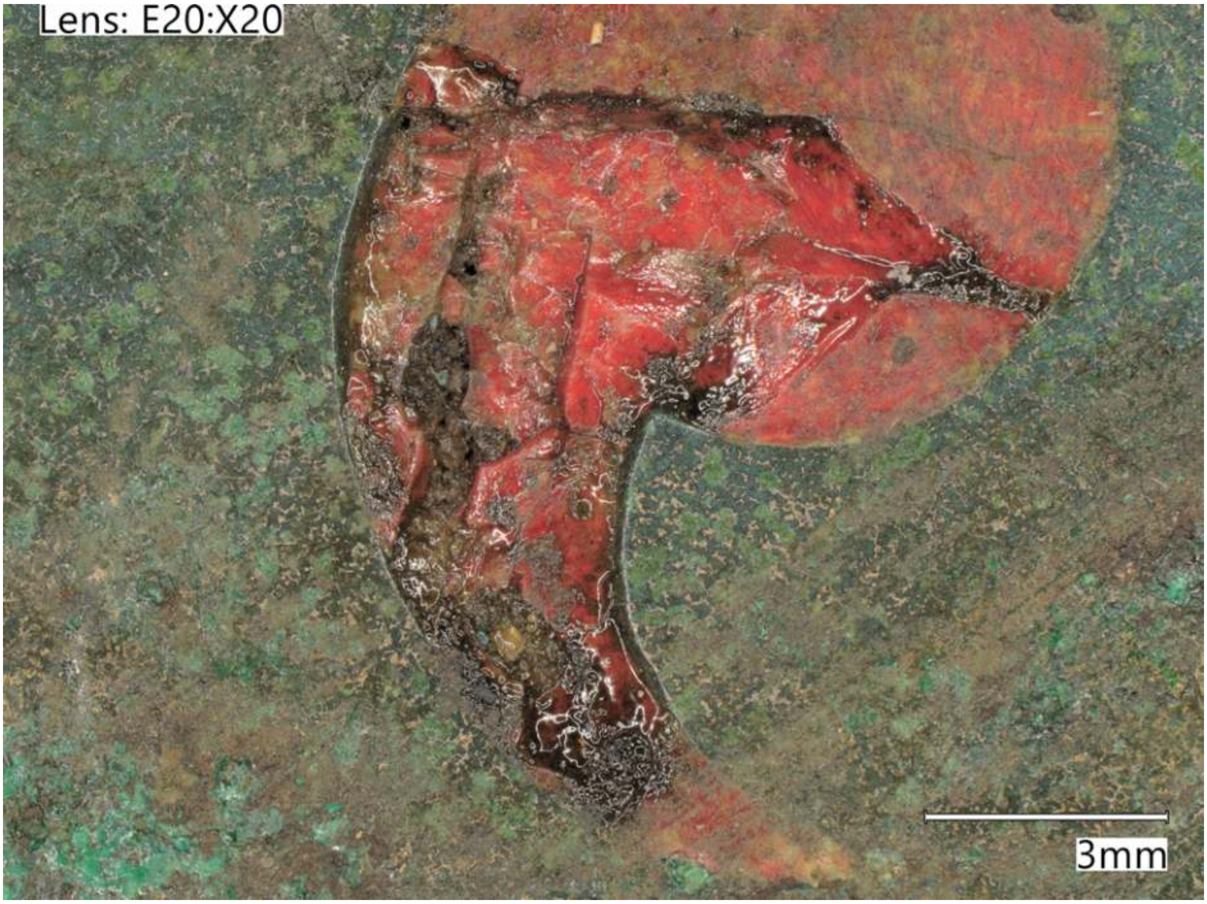


Figure 6. Microscope photo showing detail of the modelling of a recessed area, consistent with it being modelled in wax rather than cut out later. © National Museums Scotland.

The background to the Doune strap junction

The Doune fitting does not fall into standard forms of strap junction,[27] but it is not without parallel though it is extremely rare. So far the writer has traced only a single kindred piece, a mount from Fison Way, Thetford, Norfolk (Figure 7).[28] Its outer form is identical to that of Doune, but the internal decoration is rather different. The lobes have double-ended reserved trumpet motifs in combination with red glass, while the centre is a four-armed whirligig rotating in the opposite direction to the overall piece, again reserved in red glass. While it has none of the echoes of Mirror style found on Doune, the two do share circles with incised ribbing. The only other tangentially related piece traced so far is a symmetrical quadrilobate junction probably from the Cheltenham area, Gloucestershire, connected to our find by the presence of glass-inlaid triskeles in two lobes, but it is not a close parallel.[29]

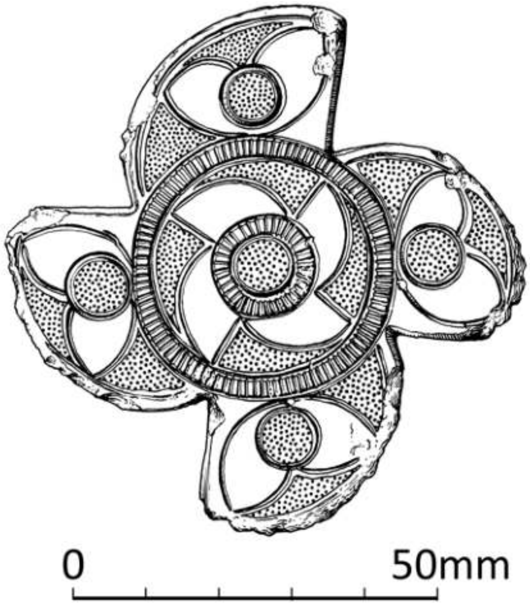


Figure 7. The mount from Fison Way, Thetford. From Gregory 1991: fig. 156.

[27] Taylor and Brailsford 1985.
[28] Gregory 1991: 202; Davies 2008: fig. 109. This mount has a single tang on the rear for insertion through leather. It is 73 mm in diameter. No parallels are known from standard catalogues (e.g. Jope 2000), and none could be located on the Portable Antiquities Scheme database, accessed 12.10.21, <https://finds.org.uk/>
[29] Taylor and Brailsford 1985: 265, fig. 14, no. 48.

Figure 8. Other finds of southern-style glass-inlaid metalwork from Scotland. a Crescentic terret, Auchendolly, Kirkcudbrightshire/Dumfries and Galloway. Width 87 mm. b Harness slider, Eckford, Roxburghshire/Scottish Borders. Length 107 mm. © National Museums Scotland.

Jody Joy has commented that classic Mirror style occurs near-exclusively on decorated mirrors, but elements taken from this repertoire are often found on other items in combination with different styles.[30] That is certainly the case here. The hatching and fin motifs are classic Mirror style. The interplay of positive and negative is integral to Mirror style but is also a key part of the curvilinear glass-inlaid tradition of southern England (mostly red, but other colours came into use): some such pieces use basket-hatching or pointillé to create a visual interplay with the inlaid and reserved zones.

While no exact analogies for the careful and elegant design of Doune have yet been found, the specific motifs are readily paralleled in southern British metalwork.[31] This puts the Doune fitting into the middle decades of the 1st century AD.[32] It is probably unwise to try to pinpoint a closer origin, given that the distribution of this curvilinear glass-inlaid tradition covers East Anglia, southern and south-west England, and south Wales, and regional sub-styles have not yet been differentiated. However, it is worth noting that the only parallel for the form comes from Norfolk, and that related metalwork is associated with fort sites in Norfolk but not so far with those from south-west England.[33]

Southern art in northern Britain

The Doune strap junction is not alone in northern Britain: similar glass-inlaid items in southern British Iron Age styles occur, albeit rarely (Figure 8). A crescentic terret with curvilinear decoration was found in a wet context at Auchendolly (Kirkcudbrightshire/Dumfries and Galloway), presumably a deliberate offering, while a slider in similar style came from a hoard of ironwork (and two bronzes) at Wooden, Eckford, Roxburghshire/Scottish Borders.[34] The Eckford hoard is one of a series of ironwork hoards found in southern Scotland, and opinion is divided on whether these should be seen as deposits from Roman military or local hands.[35] The Auchendolly terret is most plausibly an Iron Age

[30] Joy 2010: 48.

[31] Triskeles: Cheltenham area strap junction (Jope 2000: pl. 270). Central triple-lobe motif: Westhall, Suffolk (Jope 2000: pl. 296d). Enamelled yin-yangs: Santon, Norfolk and Westhall, Suffolk (Jope 2000: pl. 296 a, b). Concave-sided triangles and hatched infill: Polden Hill, Somerset (Jope 2000, pl. 299b).

[32] Dating evidence relies entirely on associated Roman material, which biases it inherently to the conquest period or later and represents time of deposition, providing a *terminus ante quem* for the tradition. There is also a tendency for scholars to date deposits to the time of known Roman activity in an area, for instance the conquest period or the Boudican revolt, although there is rarely if ever supporting evidence such as a coin sequence. With all these caveats, while the origins of the style cannot be pinpointed the associations make it clear that it was current around the middle decades of the 1st century AD: Folly Lane, 45–65 (Niblett 1999: 44); Polden Hill, middle of the 1st century AD (Brailsford 1975: 234); Santon, *c.* 40–70 (Spratling 1966 [2009]: 65–71).

[33] Notably glass-inlaid metalwork in a version of this tradition from metal-detecting around the fort of Swanton Morley, on display in Norwich Castle Museum. The material is not yet published, but I am grateful to John Davies and Tim Pestell for information. See Davies 2008: 148–150, and https://www.heritage.norfolk.gov.uk/record-details?mnf17486.

[34] MacGregor 1976: nos. 45 and 62.

[35] Piggott 1953 for the three main hoards, to which should be added two lost hoards which appear closely similar, one from Caddon Linn near Galashiels (Selkirkshire/Scottish Borders) and one from Fendoch (Perth and Kinross); Hunter 2019: 65–66, table 5, nos. 21 and 44, with further references. A smaller hoard, with a bronze jug handle associated with four iron axeheads from Kirkmuir, near Cairnholy, Kirkcudbrightshire/Dumfries and Galloway, may also be relevant (Jardine 1867: 10–11). For the debate on the deposition of these hoards, see *inter alia* Manning 1972: 242; Hunter 1997a: 116–117; Hutcheson 1997.

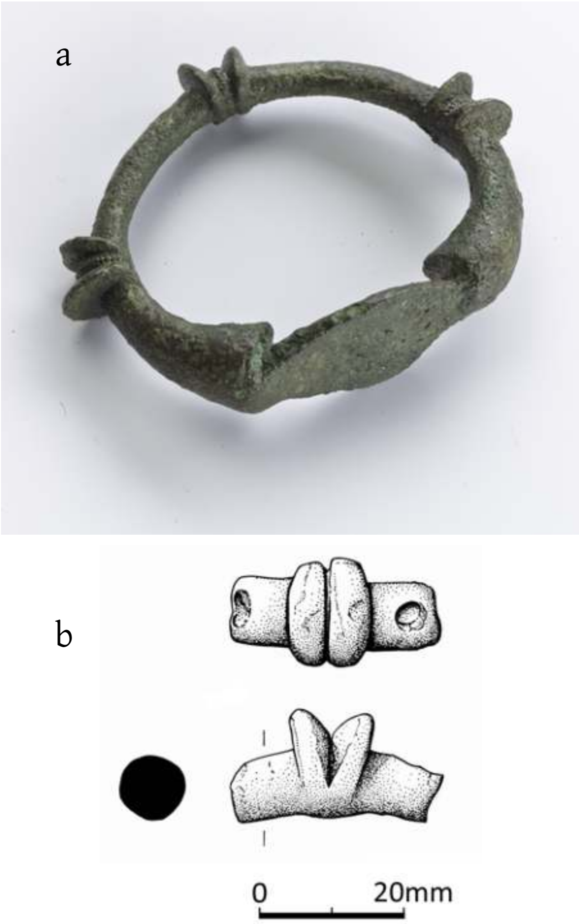


Figure 9. Other finds of southern-style metalwork from Roman forts in Scotland. a Lipped terret, Newstead, Roxburghshire/Scottish Borders. Width 83 mm. b Lipped terret fragment with glass-inlaid spot, Cargill, Angus. Length 29 mm. Drawing by Marion O'Neil. © National Museums Scotland.

deposit; a series of Iron Age offerings was placed into the wider drainage of this river system.[36]

Although not in the same style, other pieces of southern British Iron Age metalwork are occasional finds from Roman forts.[37] Again, they are related to horse harness (Figure 9): a complete lipped terret from a Flavian context at Newstead (Roxburghshire/Scottish Borders), and a fragment of another from fieldwalking at Cargill (Angus), probably also Flavian, with red glass inlay similar in style to that from the Melsonby hoard.[38] Such terrets with transverse lips are alien to local traditions, but are found widely south of the Humber.[39]

Mirror-style elements occur on a range of items in Scotland, in some instances as a dominant element of the decoration, and it seems elements of this decorative style were widely adopted.[40] The Doune find, however, is clearly exotic as the glass-inlaid design is distinctively southern.[41]

Celtic art in Roman forts

The occurrence of pieces of Celtic art in Roman military contexts is not unexpected; for different categories of finds bearing Celtic art, between 30% and 60% of northern British examples come from Roman sites.[42] This figure considers only items which are typologically Iron Age, not the abundant hybrid pieces incorporating local decorative styles on Romano-British brooches, for instance. In most instances, the decorated items come from the relevant regional milieu (as far as one can tell),[43] and reflect connections between the military and local rather than distant groups. Thus, most of the items from the northern frontier zone are boss-style metalwork which is typical of the area from the Humber to the Forth.[44] Figure 10 illustrates this with a focus solely on finds from fort sites, split by geographical area from north to south. All areas show a diversity of styles, but boss-style is dominant from the Antonine Wall to Wales, peaking in central Britain (from the Antonine Wall to the Humber). Geometric enamelling is the second most common form overall, though notably sparser in Hadrian's Wall and northern England. The small dataset from north-east Scotland is diverse. In southern Britain, southern-style metalworking was more common than elsewhere, confirming this sense of a 'local' Celtic art prevailing in any particular area.

These finds reflect a complex picture rather than a single process.[45] Different functional types followed different trajectories: for instance, military equipment (specifically sword and scabbard fittings) was a fast-burn phenomenon limited to the later 1st and earliest 2nd century. By the time Hadrian's Wall was built, this tradition had disappeared: it was a phenomenon of

36 Goldberg 2015: 219–220.
37 Interestingly none are known from Hadrian's Wall forts, suggesting the habit had died out by the early 2nd century.
38 Curle 1911: 302, pl. LXXV, 2; MacGregor 1976: no. 63; D Woolliscroft, *pers. comm.* For the site, see Woolliscroft and Hoffmann 2006: 150–155; some later material is recorded as stray finds, but both fort and fortlet were Flavian in origin.For Melsonby, see note 41.
39 MacGregor 1976: 66, map 8; this is now very outdated, with many more examples known between the Severn-Wash and Mersey-Humber line (e.g. Lewis 2015: 162, map 4), but they remain rare north of this apart from the atypical Melsonby (North Yorkshire) hoard (MacGregor 1962).
40 Joy 2010: 136–140; add a further example from Aldourie, Inverness-shire (Hunter 2006: 151–2).
41 Unpublished analysis by Ian Freestone has identified such red glass inlays in dots on harness set D at Melsonby, North Yorkshire (MacGregor 1962 for the harness; I owe information on the analysis to Mary Davis), but this too is best seen as a southern style as the lipped motifs characteristic of this set are similar to the terrets discussed above, and to finds such as Polden Hill, Somerset (Brailsford 1975).
42 On the last published figures (Hunter 2007: fig. 5).
43 Not all styles can be pinned down to regional traditions; some, such as small-cell enamelling or trumpet-based designs with enamelling, seem genuinely widespread.
44 Leeds 1933: 54–55; 110–111; for a recent distribution map, see Hunter 2019: 119, fig. 77.
45 Hunter 2015.

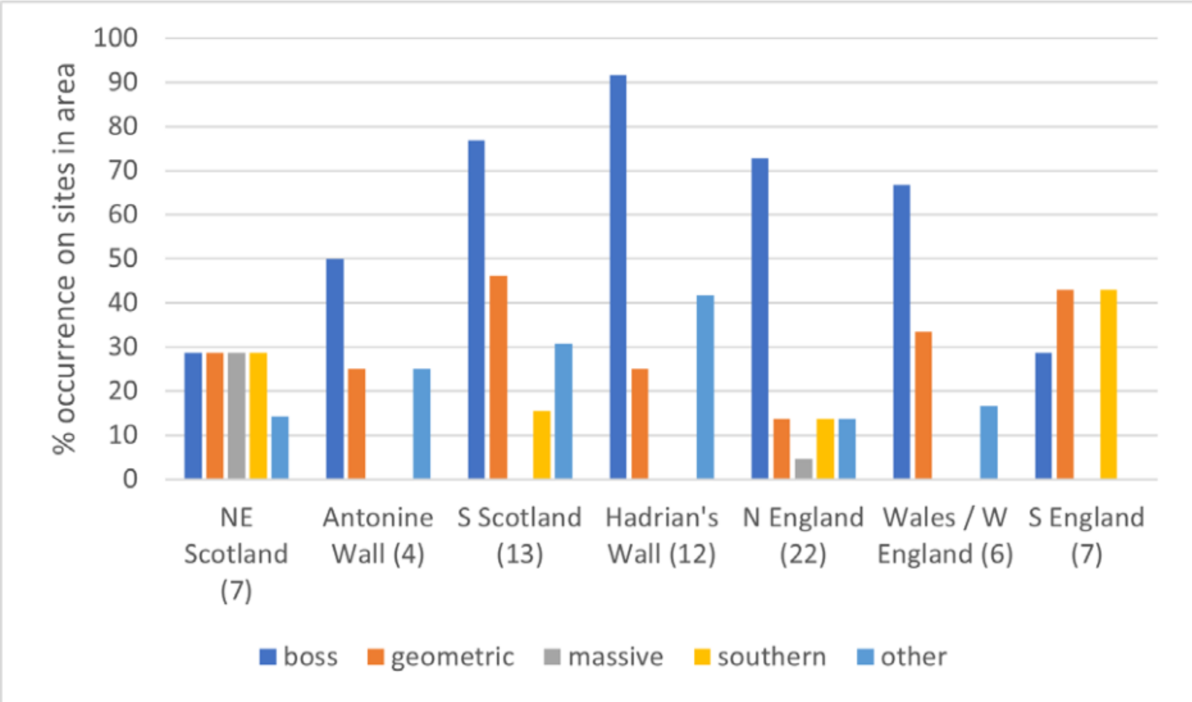


Figure 10. Percentage of excavated fort sites in various areas producing different styles of Celtic art.

the conquest period, perhaps reflecting recruitment patterns or a form of battle honour.[46] In contrast vehicle fittings, notably terrets, persisted through the 2nd century. Hybrid forms mixing local and Roman habits show this was a live artistic tradition, presumably within the context of an active practice of vehicle manufacture.[47] Such Iron Age styles of objects were clearly a regular part of frontier life: any fort dug at a significant scale produces multiple examples.[48]

But what of 'alien' pieces such as the Doune harness junction and the Cargill and Newstead lipped terrets? Their links lie to the south, and they presumably reflect material brought north when garrisons shifted from that area. This is also the likely explanation for the thin scatter of British Iron Age coins known from northern Roman forts.[49] The habit has also been identified in pottery, with specific instances of regionally distinctive pots turning up far from the homeland; their individual nature indicates they travelled in soldiers' kitbags rather than being part of trade. This is best attested at Flavian Camelon, where sherds from a range of vessels from south-west England and East Anglia have been identified[50] – both areas where distinctive metalwork that parallels Doune is found.

The Doune fitting thus tells about interactions between local populations and the military in the south of the province, not the north. Here too, finds of Iron Age metalwork occur alongside distinctively Roman and Romano-British material, both on Roman fort sites[51] and in hoards. The hoard from Polden Hill (Somerset), for instance, which provides some parallels to the Doune mount, included distinctively Romano-British finds such as brooches alongside the enamelled Iron Age harness mounts.[52] The Santon (Norfolk) hoard included more such harness mounts as well as Romano-British brooches and Roman vessels, a steelyard weight, and *lorica segmentata* fittings,[53] while the Seven Sisters hoard (Glamorgan) had a complex mixture of traditional Iron Age material, clearly Roman finds, and hybrid types arising in this contact period.[54] Again, horse and chariot gear dominated. The burial deposits from Folly Lane, St Albans, Hertfordshire, likewise included Iron Age styles of material and Roman vehicle fittings.[55] These hoards and burials are all unusual deposits which represent

[46] Discussed in detail in Hunter 2016.
[47] Summarised in Hunter 2015.
[48] For instance Newstead, Roxburghshire/Scottish Borders (summarised in Garrow and Gosden 2012: 294–304) and Castleford, West Yorkshire (Bishop 1998: 63–4; fig. 22, nos. 233–7; fig. 23, no. 266; fig. 24, nos. 278 and 281; fig. 26, no. 306).
[49] Haselgrove 1996: 82; Hunter 1997b: 522–523.
[50] Swan and Bidwell 1998; Bidwell 2020: 269.
[51] Especially sword fittings, local styles of which are known from a number of conquest-period forts in the south; Hunter 2016: fig. 3.
[52] Brailsford 1975.
[53] Spratling 1966 (2009).
[54] Davies and Spratling 1976; Davis and Gwilt 2008.
[55] Foster 1999. In Iron Age style, a derivative three-link bit with small-cell enamelling, and a 'horse brooch' and slider with swirly champlevé enamel; Roman cavalry harness fittings and a decorated nave hoop.

a socially restricted part of society where Iron Age-style and Roman-style objects co-occurred, and where new hybrid forms were being created in this period of uncertainty and change.

With single finds from forts, it is impossible in any specific case to divine their history. Metalwork of Iron Age character is only an occasional find on southern forts compared to northern ones. They could of course be war trophies, but this mixing of classically 'military' and 'local' objects in hoards suggests greater complexity. It finds parallels in other Iron Age or hybrid habits on southern fort sites such as glass bangles (derived most likely from late La Tène traditions) and beads, although these are at a rather less rarefied level than the complex and prestigious horse gear.[56] In the same way, the emergence of Romano-British brooch styles (commonplace on military sites) shows a similar cultural and craft mixing.[57] Behind objects are people; the mixture of such styles reflects the mixture of troops in the auxiliaries and of the communities associated with them.

The Doune strap junction could have been used on a ridden or driven horse. Iron Age associations of strap junctions are overwhelmingly with vehicles but the object itself could readily have been used on a cavalry mount. The degree of wear indicates it was much used when it was deposited in 86 or 87. It is entirely feasible that it came with a newly recruited trooper into the army in southern Britain in the 60s or early 70s – potentially an officer, if the Iron Age prestige of such finds is reckoned with – and was deposited when he was on the verge of retirement. It could also have been passed on to another trooper, but the rarity of such pieces in the north suggests their use-lives did not extend much beyond the working lives of their original owners. It is not the only antique from the site: one of the mortaria was identified as a Claudio-Neronian heirloom.[58]

Conclusions

Spectacular finds such as the Doune fitting catch the eye, but can such seductive individual items reveal broader stories? It is argued here that it speaks of an individual's journey from recruitment in the south to service on the northern frontier, and this can be shown to fit a wider pattern. The thin scatter of southern-style prestige metalwork in northern forts sits with evidence of pottery moving as individual property of soldiers from southern postings to garrison the Flavian northern frontier.

This raises a couple of wider questions and observations. Should the other items of such southern metalwork known from the north be seen in a similar military trajectory, or do they represent pre-Roman contacts? The Auchendolly terret lacks informative associations, but the slider from Eckford comes from a hoard which includes some clearly Roman forms of ironwork; here one might suspect that the slider came north with an auxiliary. This hoard also contained a knobbed terret, a typically local style but one familiar from both Iron Age and Roman contexts.

The second point is their lifespan and impact. There is no sign that the curvilinear glass-inlaid traditions of the south had any impact on northern styles of the Roman Iron Age; this exotic import remained a curio. With the lipped terrets, these too had no impact on northern frontier styles, but hybrid lipped terrets are known from the Midlands,[59] where the lipped decoration co-occurs with Roman-style fixings. This fits the wider pattern identified above: local traditions of Celtic art were adapted into Roman-period traditions, whether the boss-style of the northern frontier, lipped terrets in the Midlands, or the enamel and glass traditions identified in the south (seen most clearly in the Seven Sisters hoard). The Doune harness junction was a southern migrant to the northern frontier which tells its individual tale and illustrates a wider picture of troop movements, but such occasional exotic metalwork had no impact on local traditions.

Appendix: analysis of the red glass

Mary Davis

Methodology

The glass was analysed using a CamScan Maxim 2040 scanning electron microscope fitted with an Oxford Instruments energy-dispersive X-ray detector and INCA spectrometer. Operating conditions employed a 30° take-off angle, a 20 kV accelerating voltage, and the samples were detected for 100 live seconds using a count rate of *c.* 4000 counts per second when on a metallic cobalt standard. The spectrometer was calibrated using pure elements, oxides and minerals; Sheffield glass standards were also used to improve the silica to lead oxide ratio in highly leaded glass. Corning and Sheffield glass standards were used further to assess the accuracy and precision of the analysis.

The glass was sampled using the method devised by Bronk and Freestone,[60] which employs a re-usable diamond-coated file, the edge of which is scored across a small section of the surface of the object to produce fine glass flakes. 'The precision of the procedure is

[56] Ivleva 2020; Hoffmann 2003.
[57] Hunter 2008: 138–139, tables 8.3–8.4.
[58] Hatherley 2020: 42, no. 6.
[59] Spratling 1971.
[60] Bronk and Freestone 2001.

Table 1: glass analysis (%)

Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	SO_2	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	CoO	CuO	SnO_2	Sb_2O_3	PbO	Total
12.8	0.6	1.9	44.4	0.1	0	0.9	0.4	4.1	0.1	0.2	0.5	0	7.5	0.2	1.2	25	100

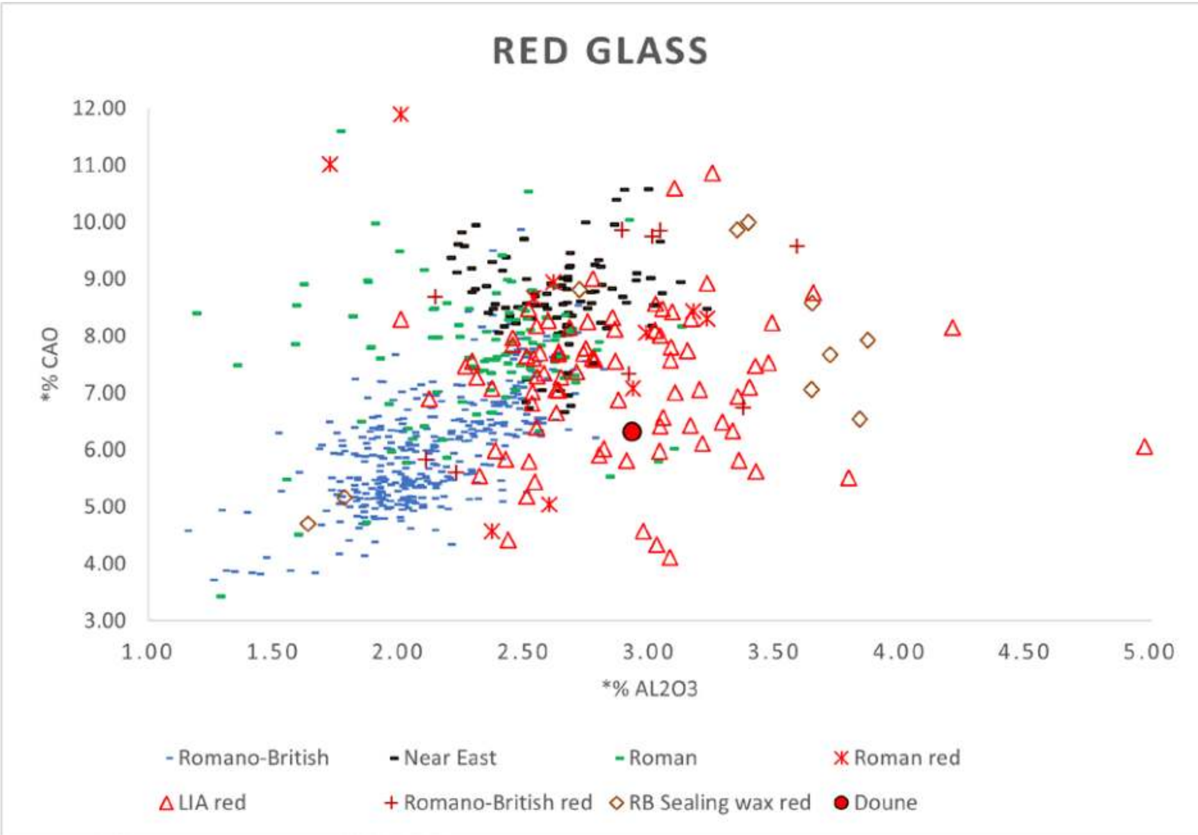


Figure 11. Alumina and lime content for glass from the Near East, Roman Italy and England, plus red glass from various sites in Britain and the Roman Mediterranean. The Doune glass is represented by a filled red circle (indicates the 'base' glass composition; colourants and additional elements have been removed (Fe and higher), and the glass composition normalised to 100%). The background symbols '-' represents analysed glass from the Eastern Mediterranean: Jalame, 4th century AD (Brill 1988), and Jerusalem 1st century BC to 1st century AD (I. Freestone, pers. comm.). Glass from the Roman Mediterranean: Roman mosaic glass 1st century BC to 1st century AD (Freestone and Stapleton 2015), and Augusta Praetoria (Aosta) 1st to 3rd century AD (Mirti et al. 1993). Glass from Roman Britain is from Colchester, Binchester and Lincoln, and dates from the 1st to 3rd century AD (Heyworth et al. 1990; Paynter 2006; Jackson 2005). Base glass from red coloured artefacts is represented by a variety of symbols: Iron Age sealing glass red (Davis and Freestone 2018; Davis 2014; I. Freestone pers. comm.). Roman tesserae (Mass et al. 1998): Roman mosaic glass (Freestone and Stapleton 2015): Romano-British red enamel (Bateson and Hedges 1975): Romano-British sealing wax red (Bayley 2001; 2003; 2005).*

assessed to be high enough to allow the classification of glass types and to draw useful conclusions about raw materials, provenance and date'.[61]

Five readings were taken from the sample (several minute flakes). The protocol devised by Bronk and Freestone requires analyses to be as close to 100% as possible; in practice they fell within 90–110%. All the totals were normalised to 100% (Table 1) so they could be compared to one another and to other results.[62]

[61] Bronk and Freestone 2001: 525.
[62] Brill 1999.

Discussion

Two main primary glass types were in use in the Roman/Romano-British period: manganese-decolourised glass, with higher lime and alumina, which was produced from at least the Hellenistic period in the Levant, and a glass with lower lime and alumina, which was probably made in Egypt from the 1st century AD. Figure 11 shows the base composition of these two major glass groupings, in terms of lime versus alumina, plus the analysed sample from Doune. The red glass from Doune is a soda-lime-silica glass containing lead and coloured with reduced copper oxide, often referred to as 'sealing wax' red glass.

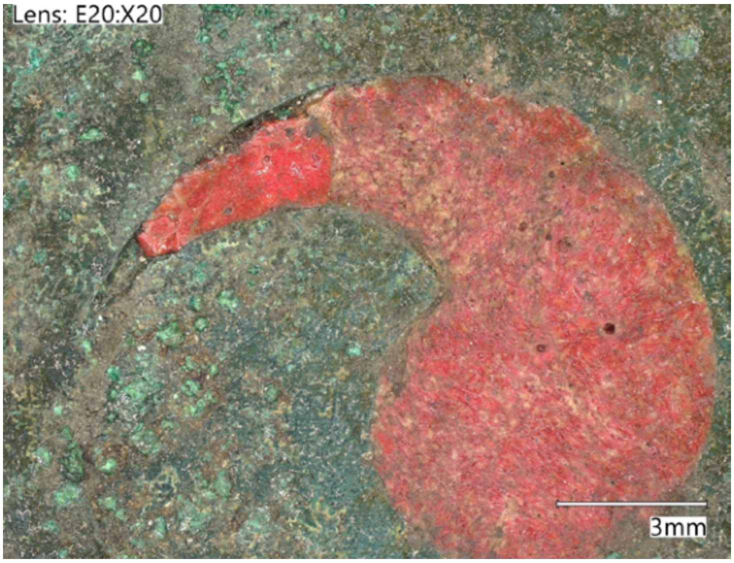


Figure 12. Microscopic image of inlaid red 'sealing wax' glass; differential surface weathering clearly shows two separate pieces of glass have filled the decorative motif. © National Museums Scotland.

In addition to the different composition of the base glass, two main kinds of red glass were used in the 1st century AD in Britain. The first of these is 'sealing wax' red and has a high lead/high copper content. It derives from a manufacturing tradition related to continental La Tène red glass, but also occurs in the British late Iron Age (1st century AD). The brightness and opacity of the glass is due to the growth of red cuprite dendrites within the glass matrix and can be seen as an indigenous technology. 'Sealing wax' red glass needs to be heat-softened, inlaid and polished, as the cuprite readily oxidises and discolours.[63] Inlaying of adjacent different pieces of red glass can be clearly seen in some of the design elements (Figure 12).

Although there is some variety of compositions for 'sealing wax' red, Figure 11 shows that the red inlaid glass from Doune sits well within the range of base glasses seen for Late Iron Age 'sealing wax' red from Britain. The variability, particularly of alumina, within the red glass seen in Figure 11 is probably due to the secondary process of colouring the base glass in a crucible; the reactive character of lead-rich glass will have resulted in the absorption of varying amounts of alumina and iron oxide.[64]

The second type of red glass originated in Roman Italy in the 1st century BC.[65] This is a duller red-coloured glass often found specifically in Roman contexts and often used on Romano-British enamelled objects.[66] It has a relatively low lead/low copper content and is coloured by sub-micron particles of copper.[67]

A clear distinction can be seen in Figure 13 between these two chemically distinct types of red glass; the red triangles represent late Iron Age glass, and the circles Roman-style glass.

The composition of the glass and the presence of cuprite dendrites visible within its matrix make it directly comparable to the insular late La Tène tradition in Britain. Red 'sealing wax' glass has been analysed from similarly decorated objects from hoards at Polden Hill, Westhall, Stanwick, Seven Sisters and Pentyrch, as well as several single finds. The high lead/high copper glass with minor quantities of antimony is very characteristic and inlaid into many of the most spectacular pieces of metalwork from this period. The use of this glass is in contrast to that used on Romano-British objects from the 1st century AD onwards.

Acknowledgements

I am grateful to Candy Hatherley for providing access to the mount for extended study, to John Davies and Tim Pestell for advice on Norfolk parallels, and to multiple colleagues in National Museums Scotland for assistance: to Lore Troalen for X-radiography and XRF analysis of the mount; to Neil McLean for the photography; and in particular to Mary Davis for her work on the glass and for very helpful discussions of the fitting and its wider interpretation. Drawings are by Alan Braby; microscope photos are by Mary Davis and Lore Troalen.

Bibliography

Barber, D., I. Freestone and K. Moulding 2009. Ancient copper red glasses: investigation and analysis by microbeam techniques, in A. Shortland, I. Freestone and T. Rehren (eds) *From Mine to Microscope: Advances in the Study of Ancient Technology*: 115-127. Oxford: Oxbow.

Bateson, J.D. and R.E.M. Hedges 1975. The scientific analysis of a group of Roman-Age enamelled brooches. *Archaeometry* 17, 2: 177-190.

Bayley, J. 2001. Evidence for enamelling from Elms Farm, Heybridge, Essex (Centre for Archaeology Report 001/2002). Portsmouth: English Heritage.

Bayley, J. 2003. Evidence for the production and use of opaque red glass in Roman Britain. *Annales du 15e*

[63] Bimson 1963; 1987.
[64] Davis and Freestone 2018.
[65] Boschetti *et al.* 2008; 2009.
[66] Bateson and Hedges 1975; Henderson 1991.
[67] Barber *et al.* 2009.

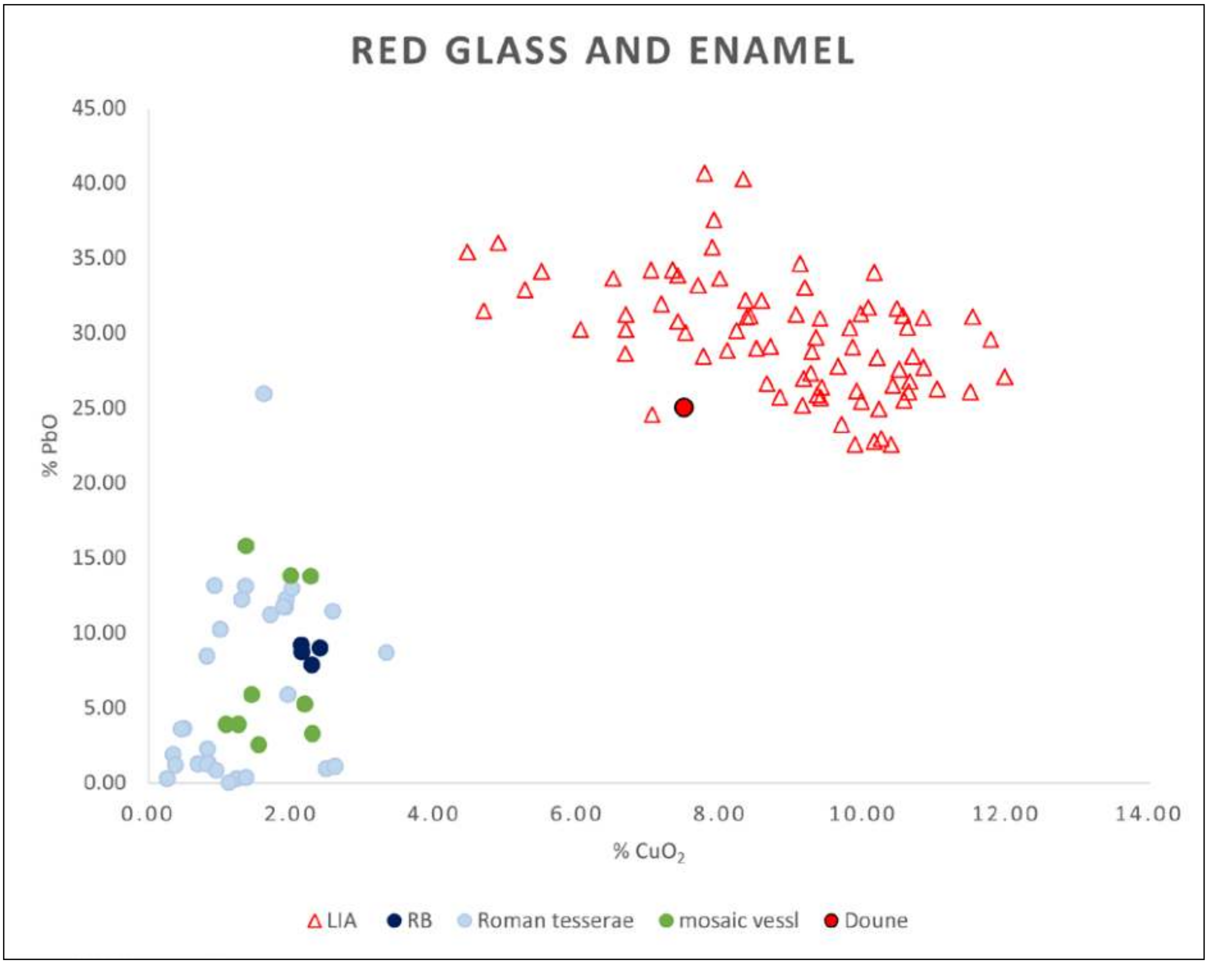


Figure 13. Scatter diagram showing lead oxide and copper oxide content of red glass from Britain and the Roman Mediterranean. The large red circle represents the red glass from Doune, which falls within the main distribution of LIA sealing wax red glass. Sources: Iron Age sealing glass red (Davis and Freestone 2018; Davis 2014; I. Freestone, pers. comm.) Roman tesserae (Mass et al. 1998; Boschetti et al. 2008); Roman mosaic glass (Freestone and Stapleton 2015); Romano-British red enamel (Bateson and Hedges 1975).

Congrès de l'Association Internationale pour l'Histoire du Verre: 45-48.

Bayley, J. 2005. Roman enamel and enamelling: new finds from Castleford, Yorkshire. *Annales du 16e Congrès de l'Association Internationale pour l'Histoire du Verre*: 72-74.

Bidwell, P. 2007. *Roman Forts in Britain*. Stroud: Tempus.

Bidwell, P. 2020. The external supply of pottery and cereals to Antonine Scotland, in D.J. Breeze and W.S. Hanson (eds) *The Antonine Wall. Papers in honour of Professor Lawrence Keppie*: 263-285. Oxford: Archaeopress.

Bimson, M. 1963. Opaque red glass and its use as an 'enamel'. Unpublished report, British Museum.

Bimson, M. 1987. Opaque red glass: a review, in M. Bimson and I.C. Freestone (eds) *Early Vitreous Materials* (Occasional Paper 56): 165-171. London: British Museum.

Bishop, M.C. 1998. Military equipment, in H.E.M Cool and C. Philo (eds) *Roman Castleford Volume I: the Small Finds*: 61-81. Wakefield: West Yorkshire Archaeology Service.

Boschetti, C., C. Leonelli, M. Macchiarolac, P. Veronesib, A. Corradi and C. Sada 2008. Early evidences of vitreous materials in Roman mosaics from Italy: an archaeological and archaeometric integrated study. *Journal of Cultural Heritage* 9: 21-26.

Boschetti, C., C. Leonelli and A. Corradi 2009. The earliest wall mosaics and the origin of Roman glass in Italy: archaeological considerations for an archaeometric study. *Annales du 18e Congrès de l'Association Internationale pour l'Histoire du Verre*: 139-144.

Brailsford, J.W. 1975. The Polden Hill hoard, Somerset. *Proceedings of the Prehistoric Society* 41: 222-234.

Brill, R.H. 1988. Scientific investigations of the Jalame glass and related finds, in G.D. Weinberg (ed.) *Excavations at Jalame: Site of a Glass Factory in Late Roman Palestine*: 257-294. Columbia: University of Missouri Press.

Brill, R.H. 1999. *Chemical Analyses of Early Glasses, Volumes I and II*. New York: Corning Museum of Glass.

Bronk, H. and I.C. Freestone 2001. A quasi non-destructive microsampling technique for the analysis of intact glass objects by SEM/EDXA. *Archaeometry* 43, 4: 517-527.

Curle, J. 1911. *A Roman Frontier Post and its People: the Fort of Newstead in the Parish of Melrose*. Glasgow: Maclehose.

Davies, J.A. 2008. *The Land of Boudica. Prehistoric and Roman Norfolk*. Oxford: Norfolk Museums and Archaeology Service.

Davies, J.L. and M.G. Spratling 1976. The Seven Sisters hoard: a centenary study, in G.C. Boon and J.M. Lewis (eds) *Welsh Antiquity: Essays Mainly on Prehistoric Topics Presented to H.N. Savory upon his Retirement as Keeper of Archaeology*: 121-147. Cardiff: National Museum of Wales.

Davis, M. 2014. Technology at the Transition: Relationships Between Culture, Style and Function in the Late Iron Age Determined Through the Analysis of Artefacts. PhD dissertation, Cardiff University, viewed 8 February 2022, <https://orca.cardiff.ac.uk/73215/>.

Davis, M. and I.C. Freestone 2018. Trading north: glass-working beyond the edge of the Empire, in D. Rosenow, M. Phelps, A. Meek and I. Freestone (eds) *Things That Travelled – Mediterranean Glass in the First Millennium CE*: 107-133. London: UCL Press.

Davis, M. and A. Gwilt 2008. Material, style and identity in 1st century AD metalwork, with particular reference to the Seven Sisters Hoard, in D. Garrow, C. Gosden and J.D. Hill (eds) *Rethinking Celtic Art*: 146-184. Oxford: Oxbow.

Foster, J. 1999. The metal finds, in R. Niblett *The Excavation of a Ceremonial Site at Folly Lane, Verulamium*: 133-170. London: Society for the Promotion of Roman Studies.

Freestone, I.C. and C. Stapleton 2015. Composition, technology and production of coloured glasses from Roman mosaic vessels, in J. Bayley, C. Jackson and I. Freestone (eds) *Glass of the Roman World*: 90-105. Oxford: Oxbow.

Garrow, D. and C. Gosden 2012. *Technologies of Enchantment? Exploring Celtic Art: 400 BC to AD 100*. Oxford: Oxford University Press.

Goldberg, M. 2015. Belief and ritual(isation) in later prehistoric Scotland, in F. Hunter and I. Ralston (eds) *Scotland in Later Prehistoric Europe*: 211-223. Edinburgh: Society of Antiquaries of Scotland.

Gregory, T. 1991. *Excavations in Thetford, 1980-1982, Fison Way* (East Anglian Archaeology 53). Gressenhall: Field Archaeology Division, Norfolk Museums Service.

Hanson, W.S. 2007. *Elginhaugh: a Flavian Fort and its Annexe*. London: Society for the Promotion of Roman Studies.

Haselgrove, C.C. 1996. Iron Age coinage: recent work, in T.C. Champion and J.R. Collis (eds) *The Iron Age in Britain and Ireland: Recent Trends*: 67-85. Sheffield: Sheffield Academic Press.

Hatherley C. 2020. *Doune Roman Fort, Stirlingshire: Excavations in 1999, 2008 and 2010* (Scottish Archaeological Internet Reports 92). Edinburgh: Society of Antiquaries of Scotland. Viewed 8 February 2022, <https://doi.org/10.9750/issn.2056-7421.2020.92>

Henderson, J. 1991. Technical characteristics of Roman enamels. *Jewellery Studies* 5: 65-76.

Heyworth, M.P., M.J. Baxter and H. Cool 1990. Compositional analysis of Roman glass from Colchester, Essex (Ancient Monuments Laboratory Report 53/1990). London: English Heritage.

Hodgson, N. and P.T. Bidwell 2004. Auxiliary barracks in a new light: recent discoveries on Hadrian's Wall. *Britannia* 35: 121-57.

Hoffmann, B. 2003. Roman glass from Newstead and Vindolanda. *Annales du 15e Congrès de l'Association Internationale pour l'Histoire du Verre*: 41-44.

Holmes, N. 2020. The 2008 coins, in C. Hatherley *Doune Roman Fort, Stirlingshire: Excavations in 1999, 2008 and 2010* (Scottish Archaeological Internet Reports 92): 21. Edinburgh: Society of Antiquaries of Scotland. Viewed 8 February 2022, <https://doi.org/10.9750/issn.2056-7421.2020.92>

Hunter, F. 1997a. Iron Age hoarding in Scotland and northern England, in A. Gwilt and C. Haselgrove (eds) *Reconstructing Iron Age Societies*: 108-133. Oxford: Oxbow.

Hunter, F. 1997b. Iron Age coins in Scotland. *Proceedings of the Society of Antiquaries of Scotland* 127: 513-525.

Hunter, F. 2006. New light on Iron Age massive armlets. *Proceedings of the Society of Antiquaries of Scotland* 136: 135-160.

Hunter, F. 2007. Artefacts, regions and identities in the northern British Iron Age, in C.C. Haselgrove and T. Moore (eds) *The Later Iron Age in Britain and Beyond*: 286-296. Oxford: Oxbow.

Hunter, F. 2008. Celtic art in Roman Britain, in D. Garrow, C. Gosden and J.D. Hill (eds) *Rethinking Celtic Art*: 129-145. Oxford: Oxbow.

Hunter, F. 2011. Roman Britain in 2010: Scotland. *Britannia* 42: 328-336.

Hunter, F. 2015. Interpreting Celtic art on the Roman frontier – the development of a frontier culture in Britain?, in L. Vagalinski and N. Sharankov (eds) *Proceedings of the 22nd International Congress of Roman Frontier Studies, Ruse, Bulgaria, September 2012*: 721-727. Sofia: National Archaeological Institute and Museum.

Hunter, F. 2016. Iron Age swords and Roman soldiers in conquest-period Britain, in X. Pauli Jensen and T. Grane (eds) *Imitation and Inspiration: Proceedings of the 18th International Roman Military Equipment*

Conference, Copenhagen 2013 (= *Journal of Roman Military Equipment Studies* 17): 11-21.

Hunter, F. 2019. *The Carnyx in Iron Age Europe: the Deskford Carnyx in its European Context*. Mainz: Römisch-Germanisches Zentralmuseum/National Museums Scotland.

Hutcheson, A.R.J. 1997. Native or Roman? Ironwork hoards in northern Britain, in K. Meadows, C. Lemke and J. Heron (eds) *TRAC 96. Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield 1996*: 65-72. Oxford: Oxbow.

Ivleva, T. 2020. The origin of Romano-British glass bangles: forgotten artefacts from the late pre-Roman Iron Age. *Britannia* 52: 7-52.

Jackson, C.M. 2005. Making colourless glass in the Roman period. *Archaeometry* 47, 4: 763-780.

Jardine, W. 1867. Address of the President. *Transactions and Journal of Proceedings of the Dumfriesshire and Galloway Natural History and Antiquarian Society session 1864-5*: 1-24.

Jope, E.M. 2000. *Early Celtic Art in the British Isles*. Oxford: Clarendon Press.

Joy, J. 2010. *Iron Age Mirrors: a Biographical Approach* (British Archaeological Reports British Series 518). Oxford: Archaeopress.

Leeds, E.T. 1933. *Celtic Ornament in the British Isles Down to AD 700.* Oxford: Clarendon Press.

Lewis, A. 2015. Iron Age and Roman-era Vehicle Terrets from Western and Central Britain: an Interpretive Study. PhD dissertation, University of Leicester.

MacGregor, M. 1962. The early Iron Age metalwork hoard from Stanwick, N.R. Yorks. *Proceedings of the Prehistoric Society* 28: 17-57.

MacGregor, M. 1976. *Early Celtic Art in North Britain*. Leicester: Leicester University Press.

Manning, W.H. 1972. Ironwork hoards in Iron Age and Roman Britain. *Britannia* 3: 224-250.

Mass, J.L., R.E. Stone and M.T. Wypyski 1998. The mineralogical origins of Roman opaque coloured glasses, in W.D. Kingery and P. McCray (eds) *Prehistory and History of Glassmaking Technology*: 121-145. Westerville, Ohio: American Ceramic Society.

Masser, P. 2010. Doune Roman fort: excavations to the east of Doune primary school carried out in 2010. Data Structure Report. Unpublished archive report, Headland Archaeology.

Maxwell, G.S. 1984. New frontiers: the Roman fort at Doune and its possible significance. *Britannia* 15: 217-223.

Mirti, P., A. Casoli and L. Appolonia 1993. Scientific analysis of Roman glass from Augusta Praetoria. *Archaeometry* 35, 2: 225-240.

Niblett, R. 1999. *The Excavation of a Ceremonial Site at Folly Lane, Verulamium*. London: Society for the Promotion of Roman Studies.

Paynter, S. 2006. Analyses of colourless Roman glass from Binchester, County Durham. *Journal of Archaeological Science* 33: 1037-1057.

Photos-Jones, E. 2020. The industrial remains, in C. Hatherley *Doune Roman Fort, Stirlingshire: Excavations in 1999, 2008 and 2010* (Scottish Archaeological Internet Reports 92): 29-30. Edinburgh: Society of Antiquaries of Scotland. Viewed 8 February 2022, <https://doi.org/10.9750/issn.2056-7421.2020.92>

Piggott, S. 1953. Three metal-work hoards of the Roman period from southern Scotland. *Proceedings of the Society of Antiquaries of Scotland* 87 (1952-3): 1-50.

Spratling, M. 1966 (revised 2009). The Santon hoard reconsidered: a rich burial of the mid-first century AD from Norfolk. Revised version of University of Cambridge BA dissertation, privately circulated.

Spratling, M.G. 1971. Bronze terret: 113-115, in P.V. Webster, Melandra Castle Roman fort: excavations in the civil settlement, 1966-1969. *Derbyshire Archaeological Journal* 91: 58-118.

Swan, V.G. and P.T. Bidwell 1998. Camelon and Flavian troop-movements in southern Britain: some ceramic evidence, in J. Bird (ed.) *Form and Fabric. Studies in Rome's Material Past in Honour of B.R. Hartley*: 21-30. Oxford: Oxbow.

Taylor, R.J. and J.W. Brailsford 1985. British Iron Age strap-unions. *Proceedings of the Prehistoric Society* 51: 247-272.

Woolliscroft, D.J. and B. Hoffmann 2006. *Rome's First Frontier: the Flavian Occupation of Northern Scotland*. Stroud: Tempus.

Woolliscroft, D.J. and O.J.T. O'Grady 2010. Doune Roman Fort. *Discovery and Excavation in Scotland* new series 11: 168.

Crop prevalence and surplus production in Roman and medieval Northeast England

Marijke van der Veen

Introduction

In a recent paper Paul Bidwell (2017) reviewed the evidence for the role of the region's rural population in supplying the Roman army in the North. In it he highlights the role of South Shields Roman fort as a supply base for the army along Hadrian's Wall. It is estimated that the 24 granaries here could hold 3,356 tonnes of grain, enough to feed the army located on Hadrian's Wall and its outposts, excluding dependants, for *c.* six months (Bidwell and Speak 1994: 29-30). In one of them, the forecourt granary dating to the late 3rd century AD, a large deposit of burnt grain was discovered. As South Shields is located at the mouth of the River Tyne much of the grain and other needs of the army would have arrived by sea. But what of the local rural population? Might they have been required to supply grain and other produce? And if so, to what extent would they have been able to meet the demand?

The grain in the forecourt granary seems to consist of roughly equal quantities of spelt and bread wheat, although it is worth mentioning here that the identification of the bread wheat (cf. *Triticum aestivum*) was tentative as no chaff was present. Grains of spelt and bread wheat are very difficult to tell apart, as there is overlap between the shape of the grain of both crops, and the presence of chaff is usually required to give a definitive identification (Van der Veen 1994). Granaries do not often hold much chaff however, they store cleaned grain, and in this granary just some glumebases of spelt were found. Furthermore, chaff of bread wheat, and other so-called free-threshing cereals, has a much lower chance of survival in archaeological deposits compared with spelt, due to differences in the way the two crops are processed. Hence it is less frequently recovered and then almost always in low amounts.

Spelt wheat was the dominant wheat crop in the Iron Age and Roman periods in the Northeast and England more widely, but bread wheat was present throughout the Roman period in low quantities (see below). In the 1994 publication I speculated that the spelt grain could have been supplied by the local population, because seeds of heath grass (*Sieglingia decumbens*, since renamed *Danthonia decumbens*) were found in amongst the grain. Heath grass is a characteristic weed in Late Iron Age and Roman assemblages of charred plant remains in Northeast England, but less so further south, although it is found in the south-west and in Wales. As there was little evidence for the extensive production of bread wheat in the Northeast, I speculated that the bread wheat might have been supplied from further afield, either from southern Britain or from northern France (Van der Veen 1994: 258).

While the role of bread wheat in the Roman period remains uncertain, evidence for its more extensive cultivation increases considerably in the Anglo-Saxon period, though explanations for this switch have remained elusive (Greig 1991; Moffett 2006; 2011). Here I will review the evidence for crop prevalence in Northeast England during the Roman and medieval periods. It forms part of an England-wide research project that tracks the presence and frequency of crops across the country and over a long time span (1st-15th centuries), to identify key moments of change and regional diversity, as well as explore possible reasons for the changes observed.

Methodology

A brief mention of the methodology is in order here. The timespan under consideration has been divided into eight periods (Table 1), and the region consists of the counties Northumberland, Tyne and Wear, Durham, and former Cleveland. Charred remains of cereals, pulses and flax from rural sites have been recorded. Poorly dated assemblages (just 'Roman', 'Saxon' or 'medieval') could not be used, as were publications that did not include detailed data tables, only descriptions of the data, unless I was able to obtain the tables and original report. In fact, this research could not have been conducted without the help of many people who sent data (see acknowledgements). As the research focuses on evidence for local farming, data from military sites (intra- and extramural) and major towns have been excluded, as have those from lesser towns after the 11th century. This because these types of sites may derive their grain from a variety of different sources.

The focus is on charred remains of cereals (grains and certain categories of chaff), pulses (seeds, cotyledons, and detached hila), and flax (seeds and capsule fragments), and their presence at a site or in a sample is recorded when either one, both, or all of these plant categories were present (Table 2). Crops such as fruits, herbs and vegetables are usually preserved in waterlogged form and are not considered here.

Table 1. Chronological subdivisions used in the text.

Period	Approximate time period	Common reference
R1	1st century AD, including sites continuing into the 2nd century, and late Iron Age sites going into the 1st or early 2nd century AD	Early Roman
R2	2nd and 3rd centuries AD	Mid Roman
R3	4th century AD, including sites that started in the 3rd but continued into the 4th century	Late Roman
M1	5th - 7th centuries (c. AD 410 - 650/700), though excluding sites that start in the 7th century	Early Anglo-Saxon or post-Roman
M2	8th - 9th centuries (c. AD 650/700 - 900)	Middle Anglo-Saxon
M3	10th - 11th centuries (c. AD 900 - 1066/1100)	Late Anglo-Saxon, Anglo-Scandinavian
M4	12th - 13th centuries (c. AD 1066/1100 - 1300), including sites dated 12th-14th or 12th-early 14th centuries	High Medieval
M5	14th - 15th centuries (c. AD 1300 - 1500)	Late Medieval

Table 2. Names, plant parts and abbreviations of the crops considered here. The presence of each crop in a site or sample is based on the presence of either the grain, the chaff or both in the case of cereals, either the seeds, cotyledons, or detached hila, or any combination thereof for pulses, and seeds and/or capsule fragments for flax/linseed.

Glumewheats - GLW	Spelt wheat, *Triticum spelta*	grains and/or glumebases
	Emmer wheat, *Triticum dicoccum*	grains and/or glumebases
	Einkorn, *Triticum monococcum*	grains and/or glumebases
	Emmer/Spelt, *Triticum dicoccum/spelta*	grains and/or glumebases
	Einkorn/Emmer, *Triticum monococcum/dicoccum*	grains and/or glumebases
	Gumewheats undifferentiated	grains and/or glumebases
	Triticum sp. glumebases	glumebases
Free-threshing wheats - FTW	Bread wheat, *Triticum aestivum*	grains and/or rachis nodes
	Club wheat, *Triticum compactum*	grains and/or rachis nodes
	Bread/Club wheat, *Triticum aestivo-compactum*	grains and/or rachis nodes
	Rivet wheat, *Triticum turgidum*	rachis nodes
	Free-threshing wheats undifferentiated	grains and/or rachis nodes
Barley	Six-row barley, *Hordeum vulgare*	grains and/or rachis nodes
	Six-row barley, *Hordeum hexastichum*	grains and/or rachis nodes
	Two-row barley, *Hordeum distichum*	grains and/or rachis nodes
	Barley, *Hordeum* sp.	grains and/or rachis nodes
Cultivated oats - C. Oats	Common oats, *Avena sativa*	grains and/or floret bases, not awns
	Bristle oats, *Avena strigosa*	grains and/or floret bases, not awns
Oats	wild or cultivated oats, *Avena* sp.	grains and/or floret bases, not awns
	Common oat, *Avena sativa*	grains and/or floret bases, not awns
	Bristle oats, *Avena strigosa*	grains and/or floret bases, not awns
Rye	Rye, *Secale cereale*	grains and/or rachis nodes
Pulses	Pea, *Pisum sativum*	seeds, cotyledons, and/or detached hila
	Celtic or fava bean, *Vicia faba*	seeds, cotyledons, and/or detached hila
	Large pulses, *Vicia/Pisum*	seeds, cotyledons, and/or detached hila
	Pulses > 4 mm	seeds, cotyledons, and/or detached hila
Flax	Flax, linseed, *Linum ussitatissimum*	seeds and/or capsule fragments

As will be clear from the graphs given below, the number of rural sites with charred plant remains from this region is still extremely low, and the graphs thus come with a warning that the relative proportions displayed on the graphs are provisional. It is not possible to calculate relative proportions accurately when only so few data points exist. The two reasons that the graphs are nevertheless presented here are, firstly, to highlight what we currently know and how few data points we currently have, and, secondly, because, remarkably, despite the low numbers, the graphs show considerable agreement with regions where more data are available (Van der Veen forthcoming).

Two ways of quantifying the data have been used. Firstly, a basic prevalence or presence/absence analysis, which records the presence/absence of each crop at each site/period and calculates the proportion of sites at which each crop occurs. The advantage of this method is that the data can be collected quite quickly, and that it gives a good overview of when significant changes occur. The proportions for each crop are calculated independently of one another, so that crops that have a higher chance of survival in the archaeological record do not swamp those that have a low chance of survival. However, the method does not give a clear idea of how common a crop might have been in any one period. Rare crops would still be recorded as present, so such crops tend to be over-represented. This analysis was used to monitor crop prevalence across the entire timespan (R1-M5), with data deriving from 66 sites.

The second method employed is a frequency or ubiquity analysis, employed for those periods that were identified as seeing considerable change in crop prevalence, i.e., R3-M3. This method offers an indication of how common a crop might have been. Here the frequency of a crop (how commonly it occurs) is calculated by recording in how many samples (rather than sites) it occurs in any one period and expressing its frequency as the proportion of the total number of samples in a particular period. Again, the proportions for each crop are calculated independently of one another. Note that data from old publications (pre-1970), and from provisional assessments are excluded in these frequency calculations (they are utilized in the prevalence analysis), unless sufficiently detailed and with good dating evidence. Furthermore, charred remains in waterlogged deposits have been excluded, because the formation processes of these are not directly comparable to deposits with charred remains. The frequency analyses are based on 202 samples from 28 sites.

For both the presence and frequency analyses it is important to focus on the shape of the curve and the trend of the bars, rather than on the actual percentage point on the graph. Minor fluctuations in the curves are unlikely to be meaningful, especially where small numbers of sites and samples are involved, as is the case here, because much of the survival of crop plants in the archaeological record is due to accidents, rather than deliberate actions. Major changes in the direction of a curve, such as sharp increases or decreases, and gradual but consistent increases or decreases, are likely to be highly significant, as are long steady stretches. Trends should be observed for each crop separately, as differences between crops may be due to variations in their survival chances.

Finally, it is important to emphasise here that while these frequencies give an indication of how common a particular crop was at each period, the relative proportions do not equate directly with the importance of a crop in the agricultural system. Besides considerable differences in survival chances, a crop's 'importance' can be difficult to define. A crop can be valuable in the diet either as the main staple and provider of energy or as an essential nutrient; it can be central in terms of its monetary value at market or as the required tribute or tax to a lord or master; it can have great cultural significance; it can play an crucial role in the agricultural system, for example by re-introducing valuable soil nutrients (e.g. nitrogen by pulses), or being less demanding of soil conditions (e.g. barley, rye and oats), or giving a more reliable harvest (e.g. spelt versus bread wheat); or it can be an important fodder crop for the working animals or a supplementary feed in the winter. The discussion below thus focuses on identifying broad trends and time periods during which major changes occurred, rather than on defining which crop was 'the most important'.

Data analysis

Crop Prevalence

The presence of the cereals, pulses and flax in the different time periods is given in Figure 1. Note that the data have been divided into three separate sections, solely to make the graphs easier to read. The top section (Figure 1a) shows that wheat and barley are present in nearly all sites across the 1st-15th centuries. There is a minor reduction in wheat during R2 (mid Roman) and in barley during M3 and M4 (10th-13th C), but these may not be significant. In Figure 1b the two different categories of wheat are separated into glumewheats and free-threshing wheats. The glumewheats consist of emmer and spelt, with spelt being the more common one (Table 3). Free-threshing wheats include bread wheat and rivet wheat, though in the Northeast rivet wheat is rare, see below. What is immediately clear from this graph is that glumewheats see a sharp decline during M1, the immediate post-Roman period,

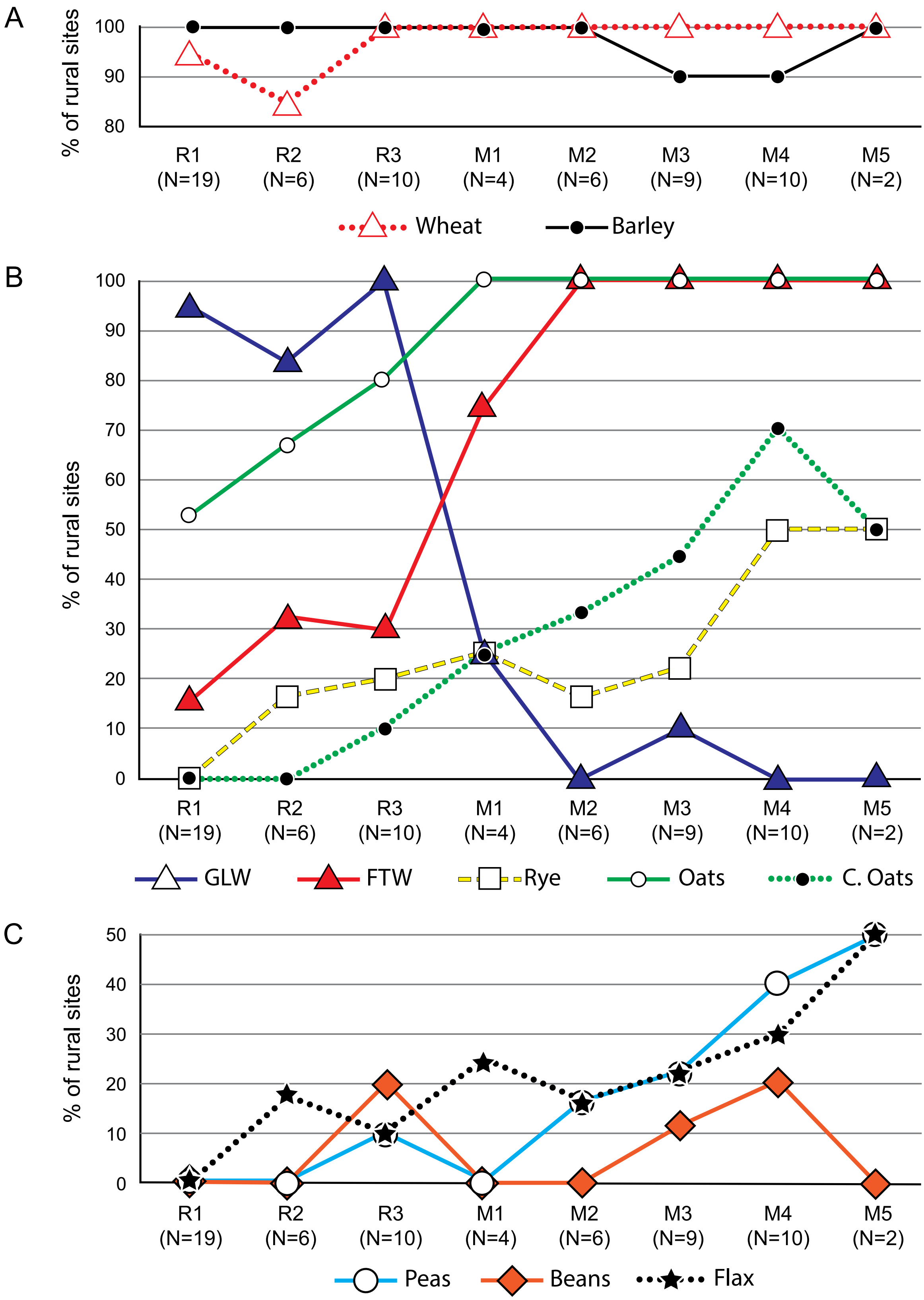


Figure 1. The prevalence of each crop in each period, expressed as the percentage of sites in which they occur. Charred remains from rural sites only. N = number of sites, GLW = glumewheats, FTW = free-threshing wheats, C. Oats = cultivated oats. See Table 1 for the time spans covered by each period. Minor fluctuations in the graph are not significant; the general trend of a curve probably is. The relative proportions of the crops are calculated independently of one another. N.B. For all periods the number of sites with charred plant remains is too low to calculate relative proportions reliably.

Table 3. Prevalence (presence/absence) and frequency of emmer and spelt wheat in each period. Charred remains from rural sites only. The figures for GLW show the data for emmer, spelt and undifferentiated glumewheats combined. N = number of sites or samples, GLW = glumewheats; see Table 1 for the time spans covered by each period.

Prevalence in no. of sites	**R1 (N=19)**	**R2 (N=6)**	**R3 (N=10)**	**M1 (N=4)**	**M2 (N=6)**	**M3 (N=9)**	**M4 (N=10)**	**M5 (N=2)**
All GLW	95%	83%	100%	25%	0	11%	0	0
Emmer only	47%	17%	30%	0	0	0	0	0
Spelt only	84%	67%	100%	25%	0	0	0	0
Frequency in no. of samples			**R3 (N=88)**	**M1 (N=27)**	**M2 (N=60)**	**M3 (N=27)**		
All GLW			89%	7%	0	15%		
Emmer glumebases			5%	0	0	0		
Emmer grain			2%	0	0	0		
Spelt glumebases			74%	4%	0	11%		
Spelt grain			64%	4%	0	4%		

and effectively disappear from the records thereafter. The few records of glumewheats in M3 may simply represent residual Roman material or remains of a relict crop that is tolerated within the bread wheat crop. In the same period that glumewheats decline rapidly, the free-threshing wheats, in this case bread wheat, see a sharp rise and by M2 are present at all sites.

The data for oats are displayed in two ways. The curve for cultivated oats refers to cultivated oats only. But as it is frequently not possible to distinguish cultivated oats grains from wild oat that grows as a weed amongst cereal crops, this curve is likely to underestimate its prevalence. The curve for oats combines cultivated oats with remains of oats that could not be identified to species level. Thus, this curve will likely include wild oat – remains that were identified as definitely wild oat (using the floret-bases) are excluded – and slightly overestimate the prevalence of the cultivated species. The curves mirror one another, suggesting that the increase shown by both curves does represent a significant rise in cultivated oats, present at most sites from the early medieval period onwards.

Rye occurs in a few sites initially but shows an increase over time and certainly by M4. Finally, Figure 1c shows the presence for two pulses, peas and Celtic beans (also called fava bean, a small variety of the broad bean), as well as flax. All three crops have a low chance of survival in the archaeological record, and flax is often preserved in waterlogged rather than charred deposits, thus its curve needs to be interpreted with caution. Peas shows an increase from M2 onwards, the curve for beans is more erratic, while flax shows a gradual increase over time.

The reason that emmer and spelt wheat are often combined into the category glumewheats is because differentiating between them is only possible if the material is well preserved, and chaff is more easily identified than grain. Thus, in many assemblages only a proportion is identified as emmer or spelt, and the rest is identified as just ‘glumewheats’ in cases where both occur. Only recording the definite identifications would have considerably under-estimated the proportion of these wheats, but the actual figures for both are given in Table 3.

Similarly, the reason bread wheat and rivet wheat are usually combined into the category free-threshing wheats is because these two types of wheat can, currently at least, only be distinguished if well preserved rachis internodes are present, which is rarely the case. In fact, in Northeast England rivet wheat has, to date, only been identified twice, in 13th-century Darlington (Beaumont Street Multi Storey Car Park; Armstrong 2020) and in 14th-century Newcastle (Mansion House; Huntley 1995), both towns rather than rural sites, and not included in this study.

The Decline of the Glumewheats

To explore the post-Roman decline of the glumewheats in more detail, a frequency analysis of glumewheats versus free-threshing wheats (here bread wheat) is given in Figure 2. Here the frequencies are expressed as a proportion of the samples, not sites. There are only four M1 sites in this dataset (North Seaton, Ashington and Lanton Quarry in Northumberland, East Rainton in Tyne and Wear, and Newton Bewley in Durham), and at each of these the density of plant remains is very low. Extreme caution is thus needed in relying too heavily on the current results. For comparison, the data for the other regions of England are also presented here, and as these highlight similarities between the Northeast and

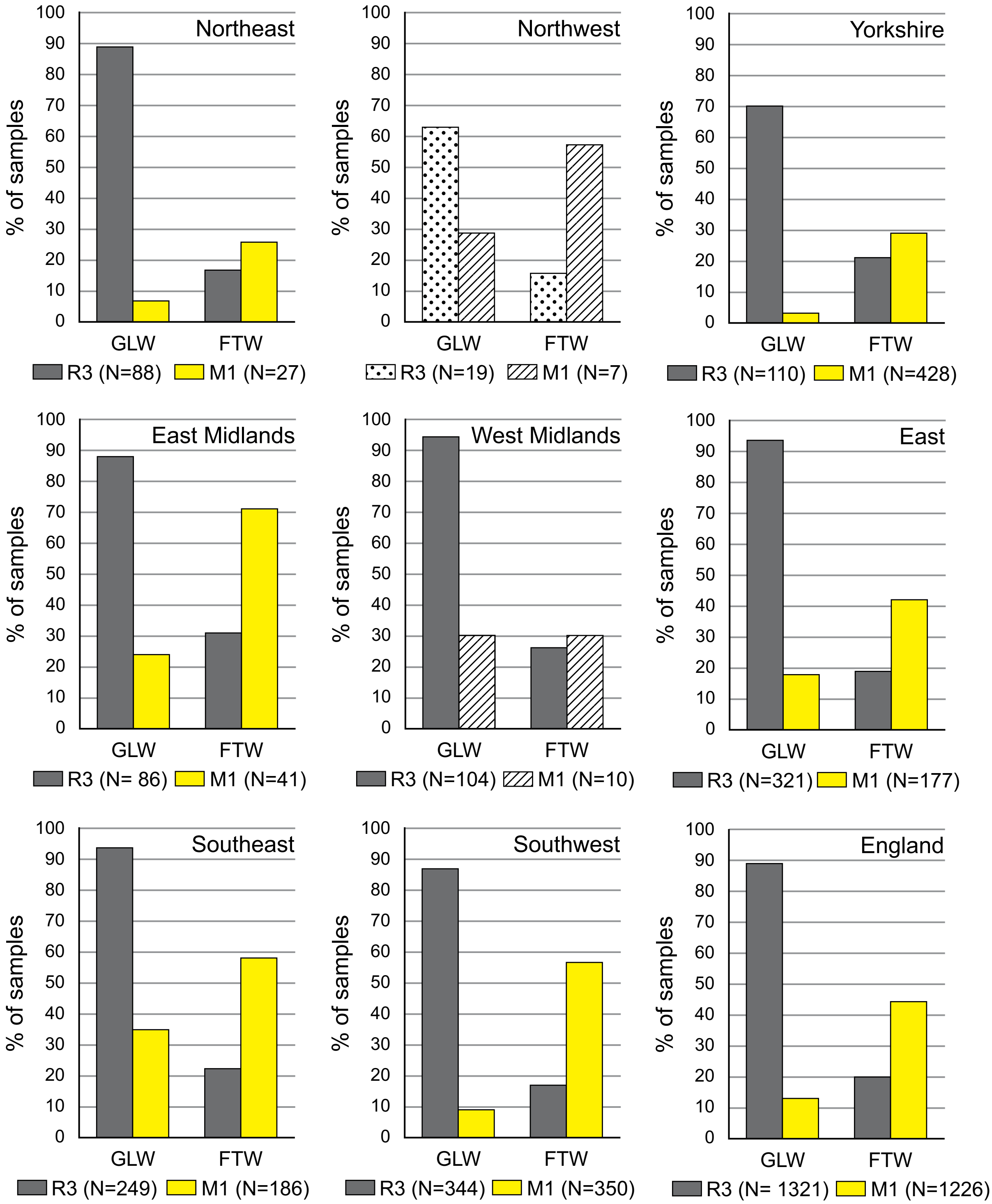


Figure 2. The frequency of glumewheats versus free-threshing wheats, expressed as the proportion of samples (not sites) in which each occurs. Charred remains from rural sites only. N = number of samples, GLW = glumewheats (emmer and spelt), FTW = free-threshing wheats (bread wheat). See Table 1 for the timespans covered by each period. The relative proportions of the crops are calculated independently of one another. Where N = < 25, the calculation cannot be regarded reliable, and those figures are given for illustrative purposes only.

other regions of England, the Northeast data may be significant. The sharp drop in the glumewheats in the post-Roman period already identified in the prevalence analysis (Figure 1), is also clearly visible in this frequency analysis, and is seen not just in the Northeast, but across the entire country. In the Northeast this is accompanied by a modest rise in the free-threshing cereals, but this rise does not fully compensate for the decline in the glumewheats. There is, thus, an overall decline in the frequency of wheat. This decline is particularly marked in the Northeast (as well as in the northwest, west and far southwest, see Van der Veen forthcoming). Of the four M1 sites, two (North Seaton and Newton Bewley) show some continuity in occupation from the Late Roman period. The number of samples and the seed density of these two Late Roman sites are also very low, preventing a more detailed analysis. Both produced very small numbers of glumewheats, but no free-threshing wheats.

New Crops

The frequencies of all crops is given in Figure 3. Here the same data are presented twice, once to show the pattern for each crop (Figure 3a), and once for each period (Figure 3b). Only periods R3 to M3 are given, as that is the timespan during which most changes occurred, based on the data from Figure 1.

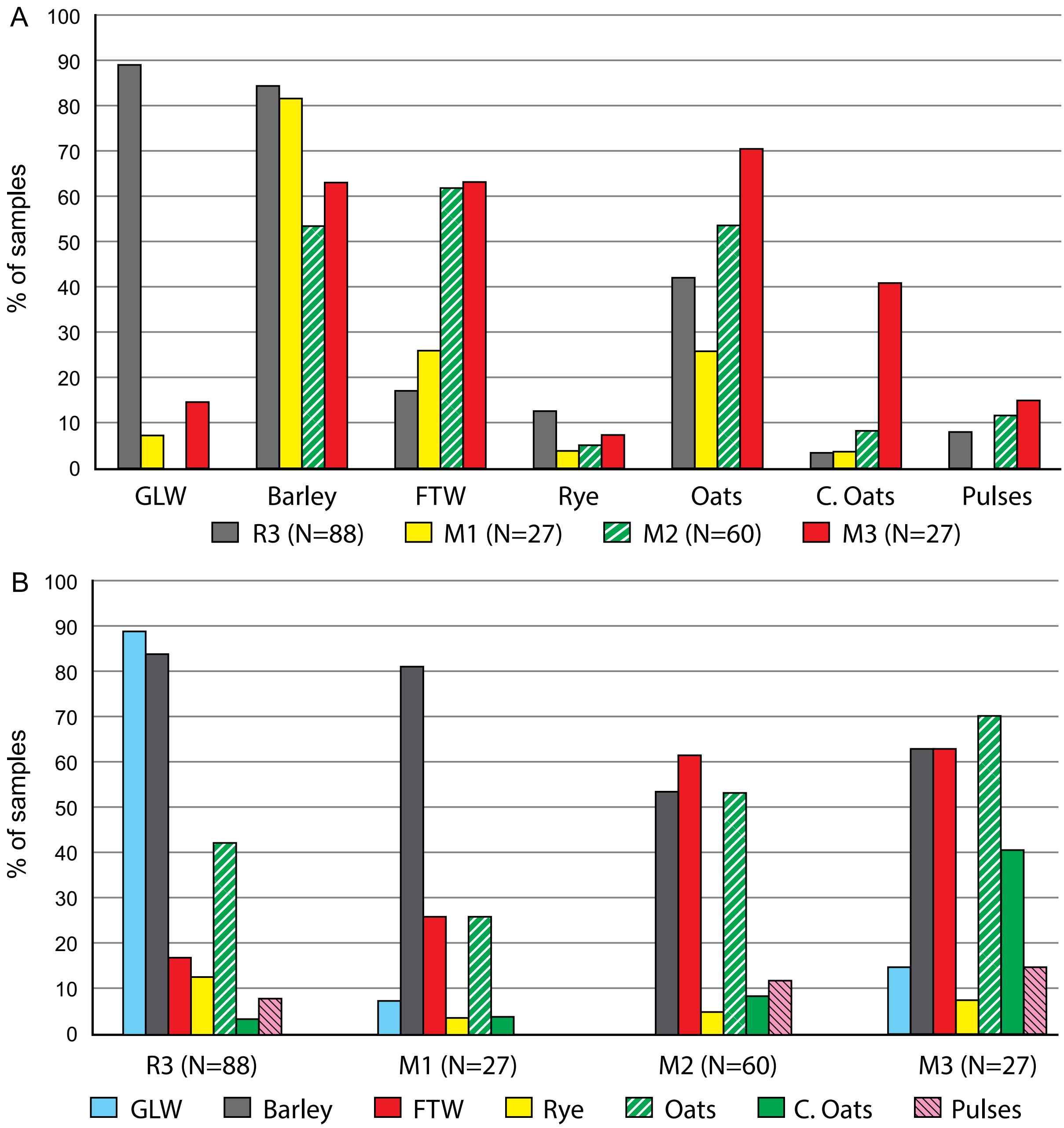


Figure 3. The frequency of each crop in periods R3 through to M3, expressed as the proportion of samples (not sites) in which each occurs. Charred remains from rural sites only. N = number of samples, GLW = glumewheats, FTW = free-threshing wheats, C. Oats = cultivated oats. See Table 1 for the time spans covered by each period. The relative proportions of the crops are calculated independently of one another. Figure 3A shows this data organised by crop, Figure 3B shows the same data organised by chronological period. Minor fluctuations in the graph are not significant; consistent trends are. N.B. For all periods the number of samples with charred plant remains is very low and especially so for periods M1 and M3; consequently, caution is needed when interpreting these results.

The rapid decline of the glumewheats has already been mentioned, while the increase in free-threshing wheats occurs more slowly than the data in Figure 1 would suggest. Barley drops somewhat during M2 and M3, something also seen in Figure 1, though there the decrease starts in M3 and continues into M4. The pattern for rye is less clear, but rye does not seem to have featured as a particularly common crop in the Northeast. The most frequent occurrence of rye is at Thornbrough in Northumberland, located 5 miles south of Hadrian's Wall and 3 miles southeast of the fort at Corbridge. It concerns a Late Roman settlement excavated in 1983 and 1984 under the direction of Peter Clack, but never published, though the botanical data are published in Van der Veen (1992). Rye, both grain and rachis, was present in 10 out of the 23 samples analysed. Two radiocarbon dates on rye grains gave the following dates: OxA-2130: 252 AD-584 AD (95%) and OxA2131: 234 AD-542 AD (95%). (N.B. using the latest calibration curve, these dates vary very slightly from those published in Van der Veen 1992). As the pottery was entirely Roman, the rye is assumed to be Late Roman in date.

Oats show a rise in frequency over time, with cultivated oats especially frequent during M3, and oats slightly more frequent that bread wheat by then. This rise in oats matches the pattern in Figure 1, where oats are seen to be present in all sites from the early medieval period onwards. In fact, several medieval sites in the Northeast have corn driers or drying kilns that contain very large numbers of oat grains, see below.

The pulses category here combines peas, Celtic beans and remains identified as 'large pulses indet.' (Poor preservation makes identification to genus or species level frequently impossible.) The pulses increase slowly over time, though none were found in the few M1 rural sites considered here. The data for flax, not shown in Figure 3, are difficult to interpret as mentioned above, though there is a slight increase over time.

Finally, Figure 3b shows which crops are the most frequent in each period. In the Late Roman period the emphasis is on glumewheats (mostly spelt) and barley, with oats, free-threshing wheat (bread wheat) and pulses occurring in low frequencies. In the early post-Roman period, the pattern shifts, and barley becomes the dominant crop, with lower frequencies of bread wheat and oats (though note that the calculations are based on just four sites). By the 8th/9th century we see a more even balance between barley, bread wheat and oats, with cultivated oats showing strongly during M3, and with the pulses slowly increasing. As mentioned above, in all these discussions it must be kept in mind that the number of sites and samples is extremely low, and that the patterns observed might change when more data become available.

Discussion

Surplus Production in the Roman Period?

Nearly forty years after the excavation of the forecourt granary at South Shields the exact nature of arable production in the region is still poorly understood. While the number of rural sites with substantial quantified charred plant assemblages has increased since Hall and Huntley's 2007 survey, it remains frustratingly low; yet important new data have become available. What we do know is that spelt wheat and barley were the main crops cultivated. They are also the ones most frequently found at military sites in the region. Bread wheat is present in very small quantities on 30% of rural sites in the Late Roman period and in 17% of all samples by that period. This is comparable to other parts of England (Figures 1 and 2; see also Lodwick 2017; Van der Veen forthcoming).

Returning to the question of the origin of the bread wheat in the South Shields forecourt granary, there are several possibilities. First, the identification, which was a cautious one due to the lack of diagnostic chaff, might, of course, be wrong. The shorter compact grains that were identified as possible bread wheat might, instead, represent a variety of spelt with relatively short grains or slightly deformed spelt grains. A new technique, geometric morphometrics, has recently become available, which can assess differences in grain shape much more accurately than traditional methods which use length/width/thickness measurements (Bonhomme *et al.* 2017). It would be beneficial to have this technique applied to the South Shields wheat grains. This would, however, require a research project analysing modern dry and artificially charred grain (spelt and bread wheat) before it could be applied to the archaeological material.

Second, the bread wheat was imported, with France the most likely origin, even though none of the weeds associated with the grain are suggestive of a foreign origin (Van der Veen 1994: 258). This might possibly be tested by strontium (87Sr/86Sr) isotope analysis of the grains, to assess whether they were cultivated in similar or different geologies to those of spelt, but this would, again, require a significant research project, including an assessment of the degree of hydrochloric acid (HCl) leaching (Styring *et al.* 2018; see also Larsson *et al.* 2020).

Third, the bread wheat was imported from southern Britain. The coastal location of South Shields is indicative of it being largely supplied by sea, with the grain subsequently moved to forts along Hadrian's Wall. Again, isotopic studies might help here, though a recent detailed review of the archaeobotanical data from Roman rural settlements concludes that bread wheat was only a minor crop throughout Britain, and this possibility is dismissed there (Lodwick 2017: 20). However, it is worth remembering that bread wheat tends to be underrepresented in the archaeological record, especially in situations where large amounts of spelt wheat are also present. The substantial degree of overlap in grain shape means that many, and sometimes most, grains are identified as spelt/bread wheat, that is, as hexaploid wheats, not further identified. Frequently, only the chaff can give definitive identifications. Spelt chaff (glumebases) are very commonly preserved in the archaeological record and easily identified, while chaff of bread wheat (rachis internodes) occurs much less commonly due to significant differences in the way this crop is processed (more on this in Van der Veen forthcoming). The apparently low occurrence of bread wheat compared with spelt in Late Roman England does not rule out the possibility of some batches of bread wheat being dispatched to South Shields from southern Britain.

Finally, the grain was supplied by the local farmers, but for a variety of reasons we are not seeing arable cultivation on any scale in the region, though see below for new evidence from the Tees Valley area.

It is worth considering first what we mean by surplus production, and how we identify it in the archaeological record. It is important to distinguish between 'normal surplus', needed for seed corn, to cover annual fluctuations in the harvests, social obligations and rental dues, and surplus that goes above the subsistence requirements of the farming unit and is used for capital projects, purchase of luxuries, etc. In the context of this paper, we are interested in the latter. We tend to identify such surplus by monitoring the presence of large, grain-rich, or chaff-rich deposits, as well as large processing and storage facilities (corn driers, barns, granaries). In subsistence societies the grain harvests would be small, stored within the extended household, and processed piecemeal, on a day-to-day basis. Accidents during which grain stores go up in flames, or are deliberately burnt in an act of violence, are likely to have been rare. Such accidents are much more likely when large quantities of grain are handled and processed at any one time. Using specialised structures, corn driers, to dry the grain or create a malt for the brewing of beer, significantly increases the risk of accidental conflagrations. Thus, frequent grain or chaff rich deposits tend to point to large-scale processing and are indicative of surplus production (Van der Veen and Jones 2007).

Until recently, such large grain or chaff rich deposits were rarely found in the Northeast compared with parts of southern England, suggesting that production was at subsistence level here during the Roman period. Several authors have proposed that the local population in the military zone was treated differently to those in the civilian zone further south and east. Mattingly (2006: 174) highlights that the early relationship between the army and native northern Britons was one of exploitation, and that the heavy military presence in the north will have hindered economic expansion. Others point to the fact that farmers in southern and central England were taxed differently from those in the military zone (Brindle 2016; Petts 2013; Shotter 2004). In the so-called civic zone farmers sold their surplus at local markets and paid their taxes in coin, although that changed in the later 3rd and 4th centuries. This facilitated the accumulation of wealth, which could be used to purchase certain goods, invest in elaborate accommodation, or invest in a better agricultural infrastructure, such as corn driers, storage barns, larger mills, better ploughs, etc. In fact, we know that farmers turned part of their produce, usually spelt, into a cash 'crop', beer, produced with the help of the so-called corn driers that were often used to produce malt for the brewing process. Most of the harvest arrives at one time in the year, which can bring the price down. Holding back some grain and converting it into beer later in the year would thus diversify and likely increase one's income (Jones 1981; Van der Veen 1989).

In contrast, farmers in the north are thought to have been taxed in kind from the start. This would have had a negative effect on wealth accumulation and innovation and have prevented any investment in corn driers or large storage barns. Neither would, in effect, have been needed if the grain due to the imperial army was removed from the settlements immediately after the harvest. The negative effect of the army on local rural settlement is also in evidence in the settlement pattern, with the area north of Hadrian's Wall suffering a drastic reduction in settlement by the end of the 2nd century, while that to the south saw a smaller drop (75% versus 30%; Brindle 2016; Hodgson *et al.* 2012). Thus, we may be seeing a situation where the army was skimming the small surpluses produced by subsistence farmers in the north, consequently stifling any innovation or scaling up, while a slightly less detrimental relationship was achieved by some farming communities south of the immediate military zone.

The situation appears somewhat different in the southern part of the region reviewed here. In the Tees lowlands some villas or putative villas did develop, such as Faverdale, Ingleby Barwick and Dalton-on-Tees (Petts 2013). Furthermore, corn driers have now been found at the late Roman settlements of Butterwick Moor Wind Farm, Ingleby Barwick (Quarry Farm), Rockliffe Park (Hurworth-on-Tees) and Saltholme (Cowpen Bewley), all in county Durham. Some of these sites also have substantial charred plant assemblages. At Butterwick Moor Wind Farm one sample produced some 2500 grains, mostly poorly preserved and thus not identified to species, but both wheat and barley were present (Drew 2012). At Ingleby Barwick a late 4th-century sample produced 1000+ wheat grain and 1000+ spelt glumebases, while a late 4th- or early 5th-century sample produced 2500 spelt glumebases and nearly 1000 grains of wheat (Huntley 2008). Late Roman samples at Saltholme contained more than 45,000 spelt glumebases and *c.* 750 grains of spelt (Treasure 2020). And all these sites produced seeds of *Sieglingia decumbens* (*Danthonia decumbens*), the weed found in the South Shields granary.

Small amounts of bread wheat were found at Late Roman Ingleby Barwick, Rockliffe Park and Saltholme, and at mid Roman Ingleby Barwick and Catcote (Huntley 1989; 2008; Schmidl and Jaques 2009; Treasure 2020). Just outside the region considered here, at the Late Iron Age settlement of Rock Castle (North Yorkshire) one sample contained 125 rachis fragments of bread wheat. Two radiocarbon dates on this material from the same context combined gave a Late Iron Age-Early Roman date (OxA-1737 and OxA-2132: 41 cal BC-210 cal AD; this calibration is slightly different from that published in Van der Veen (1992: 61) due to using the most recent calibration curve).

That the area north of the wall was also capable of producing large harvests is clear from Late Iron Age/ Early Roman West Brunton on the Northumberland coastal plain, where plant remains from one context produced just over 1450 grains of barley, a further 1000+ grains of cereals not further identified, 1000+ rachis internodes of barley and 1000+ glumebases of spelt, together representing a density of remains per litre of sieved sediment considerably higher than that in the South Shields granary (O'Brien and Ranner 2012). The grain was radiocarbon dated to 40 cal BC-cal AD 210 (95%; UBA-7816) and cal AD 60-230 (95%; UBA-7815) (Hodgson *et al.* 2012: 118). These quantities of barley and spelt grain and chaff, and those at the sites mentioned above, point to large scale processing of the grain harvests in one go, rather than the piecemeal day-to-day processing usually seen at subsistence farms (Van der Veen and Jones 2007), and are thus highly indicative of surplus production.

To sum up, bread wheat was known in the region from the Late Iron Age/early Roman period onwards, the lower lying parts of the region north and south of Hadrian's Wall were certainly capable of producing large quantities of grain, and the southernmost part of the region (Tees Valley) shows evidence of large-scale cereal processing by the Late Roman period in the form of both grain and chaff rich deposits and corn driers, suggestive of surplus production.

It is worth reiterating here that we might under-estimate the amount of surplus produced in parts of northern England. The heavy presence of the army and a different taxation system will have stifled development and meant farmers were not able to generate enough profits to invest in new infrastructure. Consequently, the absence of corn driers and storage barns would have significantly reduced the risk of large amounts of grain or chaff going up in flames and entering the archaeological record. While there can be no doubt that the army stationed at Hadrian's Wall received large amounts of grain and other supplies by sea from southern Britain and abroad, via South Shields, the role of local farmers in this supply should not be discounted, though it may largely have taken the form of forceful removal of the 'normal' surpluses, impoverishing the rural communities here and thus stifling any innovation and increase in production. By the late Roman period, when the size of the army posted in the North had been much reduced (Bidwell 2017: 304), the grip on the local population may have eased slightly, allowing farmers in the southernmost part of the region to flourish, possibly being now outside of the army's reach.

Crop Diversification in the Medieval Period

The period immediately following the withdrawal of the Roman army shows remarkable changes in crop cultivation. As mentioned above, the glumewheats, and this is by now almost entirely spelt wheat, show a sharp decline, from a frequency of 89% of samples in the Late Roman period to just 7% in the early Anglo-Saxon period (Figures 2 and 3). The glumewheats, and their glumebases in particular, are very recognisable in the archaeological record, and this drop in glumewheats is unlikely to be one of differential preservation. The glumewheats are partially replaced by bread wheat which increases from 17% to 26% in the samples during the same period, with a more significant increase from 26% to 62% in the Middle Anglo-Saxon period, and barley appears temporarily to have become the main crop (Figure 3). Until more data become available (we currently only have four Early and six Middle Anglo-Saxon sites with sufficient plant remains), we cannot assume that this pattern is reliable, though, as mentioned, the pattern appears very similar to that in other regions of England (Van der Veen forthcoming). The drop in spelt wheat may be understood, at least partially, as a response to the reduction in the demand for spelt following the withdrawal of the imperial army and consequent end of taxation in kind, together with a decline in population size. However, the subsequent switch to bread wheat remains difficult to understand, though it suggests a break with tradition. The nature of the Roman to early medieval transition has been the subject of much debate, with arguments for both continuity and dislocation put forward. Unravelling the many potential factors behind the switch to bread wheat is complex and outside the scope of this paper but will be explored in Van der Veen (forthcoming).

By the middle Anglo-Saxon period we see a different repertoire of crops established: bread wheat, barley, cultivated oats, small quantities of rye, as well as some pulses and flax. The introduction of oats, rye and pulses alongside bread wheat and barley is significant. Bread wheat offers high yields in good growing conditions, especially on heavy and nutrient-rich soils, and is usually sown in winter, but its yields are less reliable than those of the other cereals. It needs higher levels of soil nutrients than either spelt, barley, oats or rye and is more prone to disease and bird damage, due to its open and upright ear structure (Jones 1981; Moffett 2006). But it is also the favoured wheat to make bread; its flour is high in gluten and makes a good, leavened loaf and, when the bran is removed, can make a perfectly white bread, something widely preferred.

In contrast, barley can tolerate a wide range of soils, including light and poorer soils. It is a short-season crop well suited to temperate climates and can be sown in autumn or spring. It has a shorter and weaker straw than wheat or rye. Oats are also short-season crops, and they can tolerate acid and infertile soils, as well as high rainfall, better than either wheat or barley, but are less frost hardy and thus often grown as spring crops. Its straw is the weakest but also the most nutritious if used as fodder. Common oat (*Avena sativa*) is higher yielding than bristle oat (*Avena strigosa*), but both are lower yielding than the other cereals. Bristle oats is the lowest yielding of them all. Rye is a very hardy crop and more drought tolerant than the other cereals. It has tall and strong straw and is primarily winter-sown. It can grow quite successfully in dry soils due to its long root system, and it can tolerate acidic and poor soils. It is thus often grown on sandy soils (Jones 1981; Moffett 2006).

While bread wheat is a high-risk crop, more so than spelt, barley, oat, and rye, it can offer high rewards. Combining these lower-risk crops with an increase in the production of bread wheat thus helps farmers balance the overall risks. It allows them to grow a much-preferred crop, bread wheat, but offers the protection needed in bad years with these more reliable cereals. Both barley and oats can be sown in spring, thus also offering a spread of labour. Buffering risk could also be achieved by mixing crops in the same field. Mixtures such as maslin (winter wheat and rye), dredge (spring oat and barley) and mixtil (winter wheat and barley) are known from documentary evidence, though difficult to identify in the archaeological record (Jones and Halstead 1995; Moffett 2006). Growing crops in rotation can also help maintain soil fertility, by leaving part of the land fallow every other or every third year and alternating less-demanding crops (e.g. spring barley or oats) with a high-demanding one (e.g. winter wheat) on the remaining land, and/or by introducing peas and beans to the fields, rather than growing these in kitchen gardens. These pulses are vital as they actively put nitrogen back into the soil, while wheat, and the other cereals, remove it. Growing pulses in fields, in rotation with cereals, can thus help maintain soil fertility.

While bread wheat is the preferred crop for leavened bread and used almost exclusively in human consumption, barley is widely used in fodder, and in flat breads, soups, stews, and pottage, as well as in the production of beer (in the Roman period beer made with spelt was the preferred drink). Oats has the highest protein and fat content of these cereals and is thus particularly nutritious. It is usually prepared as a porridge, as biscuits or mixed with other grains in pottage or stews, but it is also an important fodder crop. Rye makes quite a heavy loaf (it contains less gluten than wheat) but is often mixed with wheat flour to create a lighter bread. Pulses are highly nutritious, offering essential protein in communities where meat is a luxury, as well as carbohydrates and fibre, while flax provides oil and a textile fibre. The chaff and straw of all cereals will have been used as fodder, bedding (for animals and humans), thatching, and mixed in daub and flooring.

Corn driers and malting kilns were not solely a characteristic of the Roman period. They have been found on many medieval sites, though possibly more so in the north and west. They have been found at several medieval sites in the region. At some sites their number, for example four at East Rainton, Tyne and Wear, and three at Acomb, Northumberland, and the costs involved in constructing and maintaining these, suggests they were used communally, or were part of a manor or estate (Vance forthcoming). The quantities of grain recovered highlight the considerable scale of cereal production in the medieval period, as well as the sizeable losses incurred during accidents. For example, samples from a 10th/11th-century corn drier at Dinnington, Northumberland, produced some 100,000 grains of oats, but also 2000 grains of barley and *c.* 600 of bread wheat (Gardiner 2017). At 11th/12th-century East Rainton one corn drier produced roughly equal quantities of wheat, barley, and oat (*c.* 2000 each), whereas another contained over 17,000 grains of wheat and 11,500 of oat, while a different context in the same drier produced more than 40,000 grains of oat (Adams and Allott forthcoming). Finally, at 11th/12th-century Heddon on the Wall, Northumberland, some 14,000 grains of oat were found (Ranner 2008), while a 9th/11th-century grain-drying kiln at Bamburgh Castle, Northumberland, contained *c.* 90% oat (Blakeney 2017).

These finds highlight that oat was now frequently cultivated, but, as mentioned above, care is needed in assuming that these very high numbers of oat grains mean it was the most important crop. Apart from the difficulty of defining what is meant by 'important', we need to recognize the role of formation processes in the archaeobotanical record. Drying of the grain would normally have occurred out in the fields before the harvest, with further drying taking place in barns after the harvest where needed. However, wet weather conditions during the harvest may have necessitated the use of drying kilns, and drying grain in advance of large-scale storage, processing and/or transport is also common practice, as is the use of such kilns in the malting process. There might be specific reasons why oat grains are commonly associated with these drying kilns. Oats are sometimes harvested slightly early, under-ripe, while there is still a tinge of green, this to avoid the loss of grain from shattering (or 'shaking', Wendy Carruthers, *pers. comm.*; Findlay 1956: 136-139; Woodward and Luff 1983: 39). This may require the grain to be dried in kilns if drying in the stooks in the fields is not feasible. Additionally, oat grains contain more fat than the other cereals and might thus clog up the grooves of the millstones when not fully dry (Fenton 1978: 375-38; Gibson 1989). Drying prior to milling or rolling may thus have been common practice once bulk processing, using large mills, became the norm. Consequently, their abundance at these drying kilns does not automatically mean they were the most abundant crop. These drying kilns are a feature of the expansion of agriculture at medieval sites, but caution is needed in comparing different crops using simple numerical grain counts.

To conclude, our impression of the abundance or importance of a crop and its scale of production is thus heavily dependent on the chances of large batches of grain becoming charred, and corn drying ovens and malting kilns seem to increase that risk considerably, while simultaneously being used as evidence for that increased scale of production.

Summary and conclusion

A review of the charred plant remains from Roman and medieval sites in the Northeast highlights that there are still few rural sites with such remains and even fewer with large, fully quantified and well-dated assemblages. Detailed discussions of the agricultural practices during these periods must, as a result, wait until more of these become available. What is clear from this broad overview is that spelt wheat and barley were the main crops during the Roman period, with emmer, bread wheat, rye, pulses and possibly some cultivated oats present as minor crops. The lack of evidence for substantial cultivation of bread wheat matches that found for the province of *Britannia* as a whole.

As a result, the presence of bread wheat in a late Roman granary at the supply base of South Shields remains somewhat of a conundrum. Various possibilities have been discussed. What seems clear is that the heavy presence of the army in the region and the taxation in kind rather than coin has had a significant and detrimental effect on local farming communities. Here there was not much possibility of increasing production and selling surpluses for money, other goods, or using it to invest in farm infrastructure. The consequent absence of corn driers and large storage facilities may thus obscure the degree to which surplus was produced. It is rare accidents or deliberate, violent acts that cause large quantities of grain to go up in flames, but removal of the grain to the forts on Hadrian's Wall immediately after the harvest will have reduced those accidents to an absolute minimum, and their absence cannot, in this situation, be taken as definitive proof that no surpluses were produced. It is instructive that in the Tees Valley area where a few villas have been discovered and where several settlements have corn driers, large amounts of burnt grain and/or chaff have been recovered. This area would certainly have been able to supply grain to the army by the late Roman period, when the size of the army had been reduced, but it may also have found itself outside its reaches. In this consideration of surplus production, we need to take care to distinguish between the 'normal' surplus that all subsistence communities produce for seed corn, social obligations and to safeguard against bad harvests, and the type of surplus that is converted into cash and used to display wealth and status. Converting the spelt wheat harvest into malt and brewing beer to be sold at market is an example of the latter.

Remarkably, spelt wheat drops out of favour quite rapidly during the early medieval period, with bread wheat increasing slightly. By the middle Anglo-Saxon period the characteristic medieval crop repertoire of barley, bread wheat, oats and pulses had become established with rye a less frequent cereal. These crops remain the core of the agricultural production during the medieval period and beyond. The quantities of cereal grains recovered from sites such as West Brunton and the medieval grain dryers highlight the region's potential in arable surplus production.

This broad-brush overview of the prevalence and frequency of crops has identified several significant changes in crop choice during the late Roman to early medieval transition and during the later Anglo-Saxon period. Placing these within their wider context of England is currently in progress. I hope that in future new techniques such as stable isotope analyses and geometric morphometrics, may help determine the origin of the South Shields bread wheat, and that larger assemblages of charred plant remains from the region become available soon and will be fully analysed and combined with radiocarbon dating of the remains.

Through an analysis of the weeds these would then allow examination of the growing conditions in the fields, changes in the nutrient status of the soils, differential treatments of the various crops, as well as rotation patterns, and, combined with a study of the faunal remains and isotopic analyses, offer a better understanding of temporal changes in crop husbandry regimes and agricultural production in the region and the responses of farmers to the ever-changing socio-economic circumstances they experienced.

Acknowledgements

I am grateful to the following colleagues and organisations for supplying reports, publications, and other information, without which this research could not have been conducted: Janice Adams, AD Archaeology, Archaeological Services Durham University, Richard Carlton, Robin Daniels, David Fell, Lynne Gardiner, Nick Hodgson, Jacqui Huntley, Warren Muncaster, Northern Archaeological Associates, Charlotte O'Brien, Don O'Meara, David Petts, Pre-Construct Archaeology, Jennifer Proctor, Edward Treasure, and Stephen Sherlock, Tees Archaeology, and Wardell Armstrong, as well as to Alexandra Livarda and Alistair Hill who assisted in the early stages of data collection and recording. I also benefitted from discussions with Neil Christie, Nick Hodgson, and Jeremy Taylor and from comments on earlier drafts of the text by Wendy Carruthers and Jacqui Huntley. I would like to thank Sean Goddard for drawing up the figures.

Bibliography

Adams, S. and Allott, L. forthcoming. Charred and mineralised macrofossils and charcoal, in Vance forthcoming.

Allen, M., L. Lodwick, T. Brindle, M. Fulford and A. Smith 2017. *New Visions of the Countryside of Roman Britain, Volume 2: The Rural Economy of Roman Britain* (Britannia Monograph 30). London: Society for the Promotion of Roman Studies.

Armstrong, C. 2020. The palaeoenvironmental evidence, in Beaumont Street Multi Storey Car Park, Darlington. Post-excavation analysis. Unpublished client report no. 5233 Archaeological Services Durham University.

Bidwell, P. 2017. Rural settlement and the Roman army in the North: external supply and regional self-sufficiency, in Allen *et al.* 2017: 290-305.

Bidwell, P. and S. Speak 1994. *Excavations at South Shields Roman Fort, vol. 1* (Society of Antiquaries of Newcastle upon Tyne Monograph Series 4). Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne and Tyne and Wear Museums.

Blakeney, R.A. 2017. On food and fodder: archaeobotanical investigations of Bamburgh Castle's west ward: 9th through 12th centuries. Unpublished MSc (Res) dissertation, University of Nottingham.

Bonhomme, V., C. Forster, M. Wallace, E. Stillman, M. Charles and G. Jones 2017. Identification of inter- and intra-species variation in cereal grains through geometric morphometric analysis, and its resilience under experimental charring. *Journal of Archaeological Science* 86: 60-67.

Brindle, T. 2016. The North, in A. Smith, M. Allen. T. Brindle and M. Fulford 2016. *New Visions of the Countryside of Roman Britain, Volume 1: The Rural Settlement of Roman Britain* (Britannia Monograph 29): 308-330. London: Society for the Promotion of Roman Studies.

Drew, C. 2012. The palaeoenvironmental evidence, in Butterwick Moor Wind Farm, Sedgefield, County Durham. Unpublished client report no. 2839 Archaeological Services Durham University.

Fenton, A. 1978. *The Northern Isles: Orkney and Shetland*. Edinburgh: John Donald.

Findlay, W.M. 1956. *Oats. Their Cultivation and Use from Ancient Times to the Present Day* (Aberdeen University Studies 137). Edinburgh: Oliver and Boyd.

Gardiner, L. 2017. Archaeobotanical and charcoal analysis, in D. Jackson, Front Street, Dinnington, Newcastle upon Tyne. Unpublished client report Wardell-Armstrong Archaeology.

Gibson, A. 1989. Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire. *Proceedings of the Society of Antiquaries of Scotland* 118: 219-229.

Greig, J.R.A. 1991. The British Isles, in W. Van Zeist, K. Wasylikowa and K.-E. Behre, (eds) *Progress in Old World Palaeoethnobotany*: 299-334. Rotterdam: Balkema.

Hall, A.R. and J.P. Huntley 2007. *A Review of the Evidence for Macrofossil Plant Remains from Archaeological Deposits in Northern England* (English Heritage Research Department Report Series 87/2007). London: English Heritage.

Hodgson, N., J. McKelvey and W. Muncaster 2012. *The Iron Age on the Northumberland Coastal Plain. Excavations in advance of development 2002-2010.* Newcastle upon Tyne: TWM Archaeology and the Arbeia Society, Tyne and Wear Archives and Museums Archaeological Monograph No. 3.

Huntley, J.P. 1989. The plant remains, in B.E. Vyner, B.E. and R. Daniels, Further investigation of the Iron Age and Romano-British settlement site at Catcote, Hartlepool, Cleveland, 1987. *Durham Archaeological Journal* 5: 11-34.

Huntley J.P. 1995. The plant remains, in R. Fraser, C. Jamfrey and J. Vaughan, Excavation on the site of the Mansion House, Newcastle, 1990. *Archaeologia Aeliana* 5th series 23: 145-213.

Huntley, J.P. 2008. The environmental evidence, in S. Willis and P. Carne, A Romano-British Villa and

Settlement at Ingleby Barwick, Stockton-on-Tees. An Archaeological Excavation. Unpublished client report no. 1709 Archaeological Services Durham University.

Jones, G. and P. Halstead 1995. Maslins, mixtures and monocrops: on the interpretation of archaeobotanical crop samples of heterogeneous composition. *Journal of Archaeological Science* 22: 103-114.

Jones, M. 1981. The development of crop husbandry, in M. Jones and G.W. Dimbleby (eds) *The Environment of Man: The Iron Age to the Anglo-Saxon Period* (British Archaeological Reports British Series 87): 95–127. Oxford: British Archaeological Reports.

Larsson, M., O. Magnell, A. Styring, P. Lagerås, and J. Evans 2020. Movement of agricultural products in the Scandinavian Iron Age during the first millennium AD: 87Sr/86Sr values of archaeological crops and animals in southern Sweden. *STAR: Science & Technology of Archaeological Research* 6:1: 96-112. DOI: 10.1080/20548923.2020.1840121

Lodwick, L. 2017. Arable farming, plant foods and resources. Chapter 2, in Allen *et al*. 2017: 11-84.

Mattingly, D. 2006. *An Imperial Possession. Britain in the Roman Empire*. London: Allen Lane.

Moffett, L. 2006. The archaeology of medieval plant foods, in C.M. Woolgar, D. Serjeantson and T. Waldron (eds) *Food in Medieval England. Diet and Nutrition*: 41-55. Oxford: Oxford University Press.

Moffett, L. 2011. Food plants on archaeological sites: the nature of the archaeobotanical record, in H. Hamerow, D.A. Hinton and S. Crawford (eds) *The Oxford Handbook of Anglo-Saxon Archaeology*: 346-360. Oxford, Oxford University Press.

O'Brien, C. and H. Ranner 2012. The plant macrofossils: West Brunton, in Hodgson *et al*. 2012: 169-171.

Petts, D. 2013. Military and civilian: reconfiguring the end of Roman Britain in the North. *Journal of European Archaeology* 16(2): 314-335.

Ranner, H. 2008. The environmental evidence, in Archaeological Services, Land adjacent to 4/6 Hexham Road, Heddon-on-the-Wall, Northumberland. Archaeological monitoring and recording. Unpublished client report no. 2014 Archaeological Services Durham University.

Schmidl, A. and D. Jaques 2009. Biological remains assessment, in P. Johnson, Rockliffe Park, Hurworth-on-Tees, County Durham. Post-Excavation Report. Barnard Castle: unpublished client report Northern Archaeological Associates NAA 09/03.

Shotter, D.C.A. 2004. *Romans and Britons in North-West England* (3rd edition). Lancaster: University of Lancaster, Centre for North-West Regional Studies.

Styring, A.K., J.A. Evans, E.K. Nitsch, A.S. Lee-Thorpe and A, Bogaard. 2018. Revisiting the potential of carbonized grain to preserve biogenic 87SR/86SR signatures within the burial environment. *Archaeometry* 61(1): 179-193.

Treasure, E. 2020. The palaeoenvironmental evidence, in Saltholme, Cowpen Bewley, Stockton-on-Tees, Post-Excavation Analysis. Unpublished client report no. 5290 Durham University Archaeological Services.

Vance, S. forthcoming. Archaeological Excavations at East Rainton, Tyne and Wear and Acomb, Northumberland: Medieval Corn Dryers. *Archaeologia Aeliana.*

Van der Veen, M. 1989. Charred grain assemblages from Roman-period corn driers in Britain. *The Archaeological Journal* 146: 302-319.

Van der Veen, M. 1992. *Crop Husbandry Regimes. An archaeobotanical study of farming in northern England 1000 BC – AD 500* (Sheffield Archaeological Monographs 3). Sheffield: J.R. Collis Publications.

Van der Veen, M. 1994. The biological remains, in Bidwell and Speak 1994: 243-266.

Van der Veen, M. forthcoming. All change on the land? Wheat and the Roman to early medieval transition in England. *Medieval Archaeology*.

Van der Veen, M. and G. Jones 2007. The production and consumption of cereals: a question of scale, in C. Haselgrove and T. Moore (eds) *The Later Iron Age and Beyond*: 419-429. Oxford: Oxbow Books.

Woodward, L. and P. Luff 1983. *The Field Guide, A Farmland Companion*. Poole: Blandford Press.

Southern Britain

Failed and failing bath-houses in late first century Britain

Michael Fulford

A very significant aspect of Paul's contribution to Roman archaeology is his work on bath-houses (Bidwell 1979; 2002; 2009). At the very beginning of his career as Assistant Field Archaeologist at Exeter City Museums, he was responsible for the day-to-day running of the excavations which took place following the demolition of the early Victorian church of St Mary Major at the west end of Exeter's Cathedral Close. These yielded extensive and well-preserved remains of the bath-house of *legio II Augusta*, above which had been built the forum basilica of the *civitas* capital, *Isca Dumnoniorum*, which was established *c.* 80 following the departure of the legion. Paul was then responsible for writing up the results which were published only two years after the last piece of excavation (Bidwell 1979). The resulting monograph remains an outstanding contribution to our knowledge of Roman legionary bath-houses, the Roman conquest of Britain, Roman public building and the transition from military to civil administration.

In this tribute to Paul, my interest is in exploring the reasons for the sometimes major changes, including abandonment, that are evidenced in the remains of bath-houses, in this case in early Roman Britain. How far, for example, can we distinguish between those changes which were precipitated by the condition of the building and those which were solely on the initiative of the controlling authority, such as an extension or embellishment of the existing bath-house. An inscription found at Cliburn, Cumbria, but probably relating to a bath-house at Brougham, gives a particular instance of re-building prompted by decay and fire: 'this bath-building...which after the old work had been burnt and had fallen into ruin...by renewing the pillars in all the rooms and by...the channels and pipes' (*RIB* 790).

The excavation of the legionary bath-house at Exeter uncovered the *caldarium*, part of the *tepidarium*, one of the two furnace-houses serving the *caldarium*, part of the *palaestra* and various service areas (Bidwell 1979). The bath-house was originally constructed *c.* 60-65 and significantly reduced in size in the Flavian period. Though there were other changes, the alterations principally involved the demolition of the *tepidarium* and the division of the *caldarium* into two, one half continuing as *caldarium*, the other as replacement *tepidarium*. It was initially suggested that the reduction in size was to meet the reduced needs of a much smaller urban population, but the reduced size of the baths was still thought to be too great for such a population and was more consistent with the requirements of a smaller garrison following the departure of the main body of the legion, *c.* 75 (Bidwell 1979: 65; Henderson 1988: 108; Bidwell 2021: 155). Holbrook *et al.* have speculated that rather than building the forum basilica on the site of the fortress' principia, placing it on the site of the baths allowed for an uninterrupted *cardo maximus* across the town (2021: 171), but this objective could equally have been met by placing the forum basilica on the other side of the street, opposite the baths. If the bath-house was essentially sound, complete demolition and replacement would have involved considerable costs. What did precipitate the final abandonment of the legionary bath-house and its replacement with the forum basilica is not known.

The wholesale replacement of legionary bath-house with civil forum basilica at Exeter has a parallel at Wroxeter where Donald Atkinson had earlier discovered a similar situation (1942). While its late 1st century dating throws doubt on whether the bath-house was built to serve the legionary fortress which, as at Exeter, preceded the development of the *civitas* capital, the scale of the structure is similar to the legionary bath-house at Exeter. The same question arises: why, rather than modify it, as happened at Vindonissa (Hartmann 1986: 110-15), or re-build it, abandon a bath-house and replace it with another, completely different, civic building, in the case of both Wroxeter and Exeter a forum basilica? Is it just a coincidence that the two known examples where a legionary or, in Wroxeter's case, a possible legionary bath-house, was abandoned in this way occurred where the successor development was of a *civitas* capital? Was there a particular protocol or policy to be followed when a civil, urban settlement succeeded a military fortress? With Colchester, Gloucester and Lincoln, where a *colonia* succeeded the legionary fortress, the forum basilica was developed on the site of the military *principia*. What happened to the development of bath-houses in these three cities, and whether there was radical change with the conferring of *colonia* status, remains to be discovered.

In Wroxeter's case Atkinson argued that the bath-house was abandoned before it was finished. He noted that several of the piers dividing Rooms 7 (*tepidarium*) and 13 (*caldarium*) had collapsed towards the west. He speculated:

> 'Some part of this collapse took place during the demolition, but there is reason to think that piers 3, 5 and 6 had partially given way earlier, and the instability of the wall may have had some influence on the decision not to complete the building.' (Atkinson 1942: 36).

The case for an unfinished bath-house rested on the following:

> 'The most decisive [evidence] is the presence in Rooms 7 and 13 of undisturbed soil to a level high above the hypocaust floors, for the character of the wall between these two rooms makes it certain that both were intended to contain pillared hypocausts. But the absence of tile-facings in the passages between the *praefurnia* and the *caldarium* is almost equally weighty, for the great heat required to warm two rooms of these dimensions must have pulverised the sandstone walls in a very short time, nor is it possible to explain the absence of a *praefurnium* connected with the south *sudatorium* on any other hypothesis.' (Atkinson 1942: 43).

At the same time Atkinson noted that there had been changes to the original plan: a wall had been inserted to subdivide Room 6 (*frigidarium*) to create a second room (5) to contain, he suggested, a bath and the west wall of Room 6 had been strengthened by the addition of five 'bases' (Atkinson 1942: 33-5 and fig. 13, which shows the relationship between base and wall). While it is possible that these changes were introduced at an early stage in the building programme, a considerable amount of the superstructure of the baths must have been completed in order for issues with the wall, which required remedial action, to become apparent.

Atkinson did not provide a plan of his trenches, but the photographs of his excavation show that his method was to follow the walls, digging deeply on both sides to beneath the foundation offset, but leaving the interior spaces largely unexcavated. One drawn section (1942: fig. 12) across the apse of the *frigidarium* appears to document this approach. An exception was made in the case of Room 1 which was chosen for complete excavation and the stratigraphic sequence within it described (Atkinson 1942: 28, fig. 9). A similar sequence was observed in the adjacent Room 3 (Atkinson 1942: 29, fig. 10).

While in Room 1 the natural soil at the base of the stratigraphic sequence is described as 'sandy drift', the 'undisturbed soil' in Rooms 4, 8, 10, and 12 is 'a heavy boulder clay' (Atkinson 1942: 28-9). In Room 7 where 'the subsoil is sand' at the south wall, at the east end of the north wall it is clay (Atkinson 1942: 35-6). In the case of the *caldarium* (Room 13) the natural is simply described as 'undisturbed soil' (Atkinson 1942: 39-41). With such variability across a relatively limited area, one wonders whether the natural was actually reached in all the places where it is claimed, for example, some of the deposits being make-ups employing re-deposited natural material.

As we have seen, Atkinson claimed undisturbed soil 'high above the hypocaust floors' in Rooms 7 and 13, but did not test this by excavation. It seems unlikely that the builders of the bath had not fully prepared the site before starting on the building and a likely explanation for the 'undisturbed soil' is that it was re-deposited topsoil. Atkinson was perhaps expecting the fills of all the different rooms of the bath to be the same as it was for Rooms 1 and 3, but this need not have been the case. At Exeter it was reported that the apses and central recess on the side of the *caldarium* were filled to a certain depth with brown loam; the remainder of the fill being of rubble (Bidwell 1979: 67). Almost equally weighty, Atkinson thought, was the absence of tile facings in the passages between the *praefurnia* and the *caldarium* 'for the great heat required to warm two rooms of these dimensions must have pulverized the sandstone walls' (1942: 43). The basis for supposing this is not explained. We might compare this with the situation at Exeter where, albeit with a different type of rock, there is no indication that the stone blocks flanking the flue of the *praefurnium* heating the *caldarium* were damaged by the heat (Bidwell 1979: 37-8, pl. 5). As for the absence of a *praefurnium* for the south *sudatorium*, the two 'Xs' on the photo of Room 1 look as if they are flanking edges of two robber trenches (of the side walls) cutting through the rubble fill (Atkinson 1942: Pl. 5A).

To conclude, while the evidence for the Wroxeter baths being unfinished is far from persuasive, further to Atkinson's comment above, it would seem from the provision of the added bases that subsidence may have played a role in their abandonment and demolition. Atkinson also commented in respect of the west wall of the west recess of the *caldarium* that 'The great depth of this foundation made it impossible to ascertain on what it rested, but it may be supposed that it was inserted because of a soft place, whether natural or artificial, in the subsoil.' (1942: 41).

In 1977-8, almost at the same time as the fortress baths in Exeter were being discovered, the Fortress Baths at Caerleon, to which *legio II Augusta* transferred in *c*. 75, were also under excavation. Like at Exeter, only part of the complex was exposed, in this case the *natatio*, *frigidarium* and part of one heated room, a probable *apodyterium* (Zienkiewicz 1986). Unlike Exeter, however, the baths continued in operation until *c*. 230, but experienced substantial changes over their lifetime. The initial build dated to *c*. 75 was swiftly followed by the addition of a *basilica*, but within about a generation, it was estimated, by the beginning of the 2nd century, extensive remedial works were required (Phase III). Perhaps the most significant alteration at this time was the raising of the floors in and around the baths. Including changes to the *frigidarium*, the hypocausts of the *tepidarium* and *caldarium* were gutted and replaced at a higher level. Whether these required consequential heightening to ceilings and roofs is not known and cannot easily be established. Further extensive renovation was required around the middle of the 2nd century and a final restoration after what appeared to be the beginnings of an attempt to dismantle the baths took place in the early 3rd century (Zienkiewicz 1986: 37-43). The baths were finally closed *c*. 230. While it is clear that waterlogging precipitated the work of Phase III, Zienkiewicz links subsequent phases of repairs and alterations with periods of re-occupation of the fortress following the temporary deployment of large detachments of the legion to the northern frontier (1986: 46-50). His explanation for an early closure of the baths in about 230 is 'that the fortress cannot thereafter have held sufficiently large a garrison to support the spacious baths and to justify their undoubtedly vast consumption of fuel.' (Zienkiewicz 1986: 49).

The extensive alterations requiring a raising of floor levels at Caerleon finds a parallel at the civic bath-house at Silchester. Although the antiquarian excavators recognised that the building had undergone several changes over its lifetime through the Roman period, they missed a most important development, as we can now see, that the baths had been completely re-built – and then undergone subsequent alterations (Hope and Fox 1905). Renewed excavation of the bath-house and its immediate environs since 2018 and ongoing has confirmed the long-held view that the first civic bath-house is of pre-Flavian and probably Neronian date, but that it was completely replaced in the early 2nd century by a larger facility, but one which does not correspond with the enlarged baths of Hope and Fox's (1905) Phase III (Fulford *et al*. 2018: 2019). The new build, as at Caerleon (Phase III), involved raising the levels of the floors, in this case by about 0.5 metres. Although change may have been driven by flooding and overall disrepair of the first bath-house, Boon suggested that the enlargement (as it was seen) reflected 'at least to some extent, the growth in population of the town' which he presumed took place in the 2nd century (Boon 1974: 130).

The final 1st century bath-house to be considered here is also probably the best known. Located to take advantage of the hot springs at Bath (*Aquae Sulis*), it was first built in the Neronian/early Flavian period (Cunliffe 1969: 89-147; Blagg 1979). Study of the surviving remains revealed by various investigations between the early 18th century and the early 20th century combined with very limited stratigraphic excavation in cramped cellar environments, initially by Sir Ian Richmond in the 1950s and later by Sir Barry Cunliffe, 1964-8, led the latter to propose six periods of development, all of which, following the initial build, involved major changes except the sixth. These principally related to the development of 'Turkish' type bath suites at either end of the Great Bath. Although there was no way that changes in structures at each end of the Great Bath could be demonstrated to be contemporary, Cunliffe proposed that they were broadly synchronous. All except the fifth of these developments, which was seen in large part as a response to flooding in the later Roman period, and the sixth, which saw the abandonment of the south-east hypocausts, were seen as developments of a progressive nature.

Looked at in greater detail, the second period saw an extension of the existing bathing facilities which involved major changes at the eastern end of the Great Bath with the construction of a 'Turkish' suite to match comparable facilities at the western end, the latter undergoing only relatively minor changes and additions. However, these did include the raising of the floor level of the *tepidarium*, the reason for which is not known, though flooding, as at Caerleon and Silchester, may have been the cause. The substantial enlargement of the main piers around the Great Bath coupled with the provision of new piers in the north and south ambulatories provide the evidence for the third period re-roofing of the entire area with a massive masonry barrel-vault to replace a timber roof. Alternatively, these modifications could have been driven by the need to reinforce a barrel vault which was integral with the original build; there is no existential evidence for an initial timber roof. The only dating evidence for this period is a *terminus post quem* provided by a coin of Hadrian found mortared to the base of one of the additional piers.

It is possible that the strengthening of the supports for the vaulting over the baths was contemporary with the re-building, almost in their entirety and on a grander scale, of the baths at the east end. This is otherwise assigned to a fourth period which is undated and linked to substantial changes to the baths at the west end. These included the re-flooring of the south-west rooms at a higher level. Although the fourth period changes undoubtedly saw an enhancement of the facilities, evidenced particularly by the changes at the east end, whether the desire to improve was the main motivation to re-build or whether it was also driven by the dilapidation of the existing building cannot now be discerned, but the raising again of floors in the west baths is suggestive of further flooding, perhaps a forerunner of what was to happen to the east baths where flooding was recognised to be a significant factor in the changes assigned to the fifth period referred to above.

All five of the bath-houses considered here were originally constructed in the second half of the 1st century and all required major remedial work and/or replacement. In the case of Exeter and Caerleon major alterations were required within, respectively, about 15 and about 25 years. Apart from the second period at Bath with its new build at the east end of the Great Bath, which is associated with late 1st-to early 2nd century pottery, the subsequent major changes are not closely dated. Exeter, Silchester and Wroxeter also required complete new builds; in the same location at Silchester but in new positions at Exeter and Wroxeter, both in an insula adjacent to the forum basilica. The replacement bath-house in Exeter is very poorly understood but must be later than *c.* 80, the date assigned to the setting up of the *civitas* (Bidwell 1979: 121-3; 1980: 52-3), while Wroxeter's new baths and basilica complex was built *c.* 130/50 next to the forum basilica (Ellis 2000). Why was a new location preferred for the bath-houses at Exeter and Wroxeter, and not at Bath, Caerleon or Silchester? Maintaining proximity to the hot springs is certainly the explanation at Bath, while at Silchester, where the baths are located beside springs at the lowest point of the town, construction elsewhere would have required seeking a different source for the water involving yet greater expense, etc. In the case of Exeter and Wroxeter the replacement of the legionary fortress with a new town gave greater flexibility in the location of public buildings at the outset but, as at Caerleon, once built and part of the fabric of the town, any major repairs, alterations or re-building had to take place on the same site; re-building elsewhere within the town (or the fortress) was not an easy option.

The mass of these large fortress and civic bath-houses must have exerted a considerable pressure on the ground beneath leading to subsidence and this may be one explanation for floors needing to be raised, presumably to avoid flooding, as at Caerleon, Silchester and, if not for the second and fourth period raising of floor levels, certainly for the fifth period at Bath. Besides the character of the underlying geology being a major consideration, there was also the potential of disruptive impact from earlier occupation, as, for example, at Silchester where the baths were built within and beside the defensive ditch (Inner Earthwork) of the late Iron Age oppidum. At Exeter and Wroxeter the later, civic baths were built on the site of the legionary fortress. If subsidence generally was a problem, as seems also to have been the case with the late 1st century baths at Wroxeter, it may explain why the solution of complete demolition rather than re-build was taken at Exeter and Wroxeter. A further benefit would be that the remains of the dismantled structures would give a sound foundation for the principal public building of the town, the forum basilica, to be built on top of them.

Bath-houses were complicated structures and vulnerable to failure, particularly through subsidence, which, depending on seriousness could have a devastating effect, whether locally, causing failure of, say, a hypocaust floor, or, catastrophically, to the superstructure as a whole. Winter conditions of freeze-thaw must also have led to major problems. For us archaeologists working in the province of *Britannia*, we are generally only able to trace the story of a bath-house through its foundations and the remains of its hypocausts and drains; very rarely do the walls of any of these structures survive to any height. So, our insights into the behaviour of the superstructure of bath-houses is often limited to the proxy evidence of waste building material, including lumps of mortar, *opus signinum*, painted plaster and the like, from alterations and repairs and dumped beside the building.

Like Caerleon and Exeter, most of the large (legionary) military and civil bath-houses of Roman Britain are buried beneath modern towns and cities giving only occasional glimpses of their character and whatever changes might have been made to them over time and recorded by the excavator. The Huggin Hill baths in London are a case in point (Marsden 1976; Rowsome 1999). What is known of them suggests a large and complex establishment, built on terraces where the ground otherwise slopes down to the R. Thames, but, except where *pilae* have been identified, it is hard to interpret individual spaces and make much sense of the overall plan which is a composite of discrete elements that cannot be comprehensively linked, one with another. This, as well as differences in methods of construction, in itself suggests that there are multiple phases, which have been interpreted as responses to increased demand arising from a growing population (Rowsome 1999: 267). Its original construction is dated to the Flavian period, though the presence of some relief-patterned tile, which can now be dated to the pre- or early Flavian period, suggests the possibility of a pre-Flavian phase (Fulford and Machin 2021). The complex does not seem to have lasted beyond about the middle of the 2nd century before a large proportion, at least, of it was demolished and replaced by two less substantial Roman stone buildings. What precipitated the demolition is not known, but Rowsome speculated that it arose from a combination of high maintenance costs and declining utility of the facility because of the economic decline of London and associated population loss (1999: 272). Alternatively, just as earlier changes might have been driven by structural failure, we cannot exclude the latter as the reason for the final abandonment. Documentary evidence suggests that perhaps a small part of the bath-house survived as a structure into the Saxon period (Rowsome 1999: 26).

Did urban bath-houses, as new builds of the 2nd century fare any better? We only have two extensively explored examples to consider: Leicester and Wroxeter. In the case of the former, the remains were poorly preserved and it is not possible to assess the extent and scale of any subsequent changes (Kenyon 1948). However, although it is dated to the Antonine period, the presence of some relief-patterned tile, as at Huggin Hill, suggests the possibility of an earlier, pre- or early Flavian bath-house on the site and what has been regarded as a new build is, in fact, a re-build (Fulford and Machin 2021).

With Wroxeter, we can be in little doubt that the original construction of the bath-house in Insula V dates to the early 2nd century (= Wroxeter's Period 2): a carinated bowl of Flavian/Trajanic date was associated with phase 1 and a samian sherd dated to the first half of the 2nd century and other early 2nd century pottery was associated with a phase 2 modification of the original build (Ellis 2000: 19-25). Looking at the Insula V public buildings as a whole, it is suggested that work began in the 120s or 130s and finished around the middle of the century (Ellis 2000: 47-8). Major changes are assigned to the 3rd century (= Wroxeter's Period 3). These include the infilling of the *natatio* and the construction of an additional or replacement *praefurnium* on the east side to heat the existing *tepidarium* (Ellis 2000: 48-9; 68-9), while a new *caldarium* and *praefurnium* were added on the west side of the baths. Alterations dated to the mid-3rd century were made to the *praefurnium* on the south side (Ellis 2000: 49-55). All these changes involved the raising of levels, but none is at all securely dated and the only evidence for the use of the baths in the 4th century is a bone pin stratified in a dump within the *praefurnium*, Room 7 (Ellis 2000: 49-55). However, the widespread re-flooring across Insula V around 300 suggests that the baths did continue in use into the 4th century (Ellis 2000: 77). Rather than the new heated suites added on the east and west sides being additional, responding to increasing demand, as White had earlier suggested (1999: 290), Ellis offers the alternative interpretation that they replaced the original *tepidarium* and *caldarium* which were abandoned and demolished (2000: 75, fig. 2.74). White offered two thoughts on this: either that the size of the population of Wroxeter was insufficient to justify maintaining the enlarged facility (as he saw it), or that the authorities could not afford or were not competent to undertake essential repair work (1999: 290).

Of the five urban or legionary bath-houses from 1st century Roman Britain for which we have a good published excavation record and have been discussed above, three were completely demolished before the end of the century, two (Exeter and Wroxeter) being eventually replaced in a completely new location, one (Silchester) being re-built in the same location, while Bath and Caerleon were extensively modified around the turn of the 1st and 2nd century, the former with a new suite at the east end of the Great Bath, the latter with significant enlargement of the *natatio*. The principal driver of change has been put down to changes in size of the user population, for example the reduction and eventual departure of the legion from Exeter, *c*. 75. Although it has been suggested that even the reduced size of the Exeter baths was perhaps too large for the civil population, we do not know the size of the baths which were built for the *civitas* capital and therefore what was perceived to be appropriate for the new town's population. As we have seen phases of investment or dis-investment, including the proposed closure of the Fortress baths at Caerleon in *c*. 230, have also been linked with changes in the size of the garrison. The abandonment of the early bath-house at Wroxeter has been linked to the move of the legion to Chester (e.g. White and Barker 1998: 74-5), while Rowsome has suggested that, just as the development and expansion of the Huggin Hill baths in London can be explained by growth in the town's population, so its abandonment around the mid-2nd century can be attributed to a reduction in its economic prosperity (1999: 271-3). Awareness of the cost of running, especially the heating, a large bath-house (cf Blyth 1999) is apparent in several discussions of the reasons for change in our urban and legionary bath-houses (e.g. Zienkiewicz 1986: 49; Rowsome 1999: 272; White 1999: 290).

Structural reasons for major change have not been prominent in discussions up to now, though Atkinson long ago suggested that subsidence was the reason for the late 1st century Wroxeter bath-house not being finished (1942: 43). Zienkiewicz saw that waterlogging accounted for the major Phase III works at the Fortress Baths, Caerleon (1986: 39-40) and a similar explanation may be invoked, at least in part, for the replacement of the Neronian baths at Silchester (Fulford *et al*. 2019). Rising water levels also played a part in the changes evidenced at Bath. Perhaps major structural failure, rather than concern for changes in the size of the user population, also contributed to the reduction in size and eventual demise of Exeter's legionary bath-house? Adapting to a different size of population, whether military or civilian, may not be the only explanation: we do not know the size of the bath-house provided for the town and it may well have been comparable to the civic bath-house (excluding its *basilica*) in Insula 5 at Wroxeter, which was on a similar scale to the abandoned legionary bath-house. The terraced hillside at Huggin Hill may well have provided an unstable setting for the bath-house, with subsidence accounting for its demise. Equally the low-lying location of the Silchester bath-house alongside the ditch of the late

Iron Age Inner Earthwork was far from ideal and the east wall of the second bath-house was rebuilt at least twice. Likewise the rebuilding in the 3rd century of the fort baths at Wallsend on Hadrian's Wall was probably precipitated by the impact of land-slip on the original building (Hodgson 2020: 68-70).

To conclude, and at its simplest, when considered across the piece, there is a pattern whereby legionary and urban bath-houses in early Roman Britain required major alterations or re-builds or even justified abandonment within about 25 years or less after their initial construction. Structural issues appear to have been as likely an explanation or stimulus for the changes observed as responses to postulated growth or decline in demand for the facilities.

Bibliography

Atkinson, D. 1942. *Report on Excavations at Wroxeter (the Roman City of Viroconium) in the County of Salop 1923–1927*. Oxford: The University Press.

Bidwell, P.T. 1979. *The Legionary Bath-House and Basilica and Forum at Exeter* (Exeter Archaeological Reports Vol. 1). Exeter: Exeter City Council.

Bidwell, P.T. 1980. *Roman Exeter: Fortress and Town*. Exeter: Exeter City Council.

Bidwell, P.T. 2002. Timber baths in Augustan and Tiberian fortresses, in P. Freeman, J. Bennett, Z.T. Fiema, and B. Hoffmann (eds) *Limes XVIII: Proceedings of the XVIIIth International Congress of Roman Frontier Studies Held in Amman, Jordan (September 2000)* (British Archaeological Reports International Series 1084 (1)): 467–481. Oxford: Archaeopress.

Bidwell, P.T. 2009. The earliest occurrence of baths at auxiliary forts, in W. Hanson (ed.) *The Army and Frontiers of Rome: papers offered to David J. Breeze* (Journal of Roman Archaeology Supplementary Series 74): 55–62. Portsmouth, Rhode Island: Journal of Roman Archaeology.

Bidwell, P. with M. Maltby 2021. The Legionary Fortress and its Landscape Context, in S. Rippon and N. Holbrook (eds) *Roman and Medieval Exeter and their Hinterlands. From* Isca *to* Excester: 127-66. Oxford: Oxbow.

Blagg, T.F.C. 1979. The date of the temple at Bath. *Britannia* 10: 101–7.

Blyth, P.H. 1999. The consumption and cost of fuel, in J. DeLaine and D.E. Johnston (eds) *Roman Baths and Bathing Part 1: Bathing and Society* (Journal of Roman Archaeology Supplementary Series 37): 87–98. Portsmouth, Rhode Island: Journal of Roman Archaeology.

Boon, G.C. 1974. *Silchester. The Roman Town of Calleva*. Newton Abbot: David and Charles.

Cunliffe, B. 1969. *Roman Bath* (Reports of the Research Committee of the Society of Antiquaries of London 24). Oxford: The Society of Antiquaries.

Ellis, P. (ed.) 2000. *The Roman Baths and* Macellum *at Wroxeter. Excavations by Graham Webster 1955–85* (English Heritage Archaeological Report 9). London: English Heritage.

Fulford, M., Clarke, A., Durham, E., Fry, R., Machin, S., Pankhurst, N. and D. Wheeler 2018. *Silchester Roman Town. The Baths 2018*. Reading: University of Reading.

Fulford, M., Clarke, A., Eaton, J., Fry, R., Lambert-Gates, S., Machin, S., Pankhurst, N. and D. Wheeler 2019. *Silchester Roman Town. The Baths 2019*. Reading: University of Reading.

Fulford, M. and S. Machin 2021. Building Britannia: Pre-Flavian Private and Public Construction across Southern Britain. *Britannia* 52: 207-225.

Hartmann, M. 1986. *Vindonissa. Oppidum, Legionslager, Castrum*. Windisch: Effingerhof.

Henderson, C.G. 1988. Exeter (*Isca Dumnoniorum*), in G. Webster (ed.) *Fortress into city: the consolidation of Roman Britain, first century AD*: 91–119. London: Batsford.

Hodgson, N. 2020. *The Roman Baths at Wallsend* (Arbeia Society Roman Archaeological Studies 2). South Shields: Arbeia Society and Tyne and Wear Archives and Museums.

Holbrook, N., with P. Bidwell and M. Maltby 2021. The *Civitas* capital, in S. Rippon and N. Holbrook (eds) *Roman and Medieval Exeter and their Hinterlands. From* Isca *to* Excester: 167-219. Oxford: Oxbow.

Hope, W.H.St.J. and G.E. Fox 1905. Excavations on the site of the Roman city at Silchester, Hants, in 1903 and 1904. *Archaeologia* 59: 333–70.

Kenyon, K.M. 1948. *Excavations at the Jewry Wall Site, Leicester* (Reports of the Research Committee of the Society of Antiquaries of London 15). Oxford: University Press.

Marsden, P. 1976. Two Roman Public Baths in London. *Transactions of the London and Middlesex Archaeological Society* 27: 1–70.

Rowsome, P. 1999. The Huggin Hill baths and bathing in London: barometer of the town's changing circumstances?, in J. DeLaine and D. E. Johnston (eds) *Roman Baths and Bathing Part 2: Design and Context* (Journal of Roman Archaeology Supplementary Series 37): 262–78. Portsmouth, Rhode Island: Journal of Roman Archaeology.

White, R.H. 1999. The evolution of the baths complex at Wroxeter, Shropshire, in J. DeLaine and D.E. Johnston (eds) *Roman Baths and Bathing Part 2: Design and Context* (Journal of Roman Archaeology Supplementary Series 37): 278–91. Portsmouth, Rhode Island: Journal of Roman Archaeology.

White, R. and P. Barker 1998. *Wroxeter. The Life and Death of a Roman City*. Stroud: Tempus.

Zienkiewicz, J.D. 1986. *The Legionary Fortress Baths at Caerleon*, Vol. 1. *The Buildings*. Cardiff: National Museum of Wales and Cadw.

The public baths of Cirencester: antiquarian records and modern interpretation

Neil Holbrook

Antiquarian interest in Cirencester

Cirencester is mentioned in many modern accounts of Roman Britain in the context of urban wealth exemplified by its fine collection of mosaics and stone sculpture. That reputation gained widespread prominence following the discovery by workmen in 1849 of a large, intricate, figured mosaic in Dyer Street.[1] The find made a national impression: it was reported in the *Times* and the *Gentleman's Magazine*, and an iconic image was published in the *Illustrated London News* on 8 September showing the mosaic being lifted from the ground with the imposing edifice of the church of St John the Baptist in the background. In 1856 the mosaic was put on display in a newly constructed museum and an expression of the interest it created is provided by an excursion train that ran from London to the town in the same year. The tourists took in visits to Cirencester Park and the museum.[2] Art historical perspectives dominated published considerations of the Cirencester mosaics, as exemplified by a volume published in 1850 by local scholars John Buckman and Charles Newmarch entitled *Illustrations of the Remains of Roman Art, in Cirencester, the Site of Ancient Corinium*.[3] Francis Haverfield was distinctly lukewarm in his assessment of the value of this book when he came to write his account of Roman Cirencester some seventy years later: 'A well illustrated quarto with a useful list of Roman coins found in the town ...; it is somewhat one-sided, owing to the importance which its authors attached to the technique of mosaic floors, and is hardly up to the level of archaeologists' knowledge of Roman things which was current about 1850'.[4]

Prior to 1849 antiquarians had noted the mosaics of Cirencester to varying degrees, although interest in Cirencester as a place with a Roman heritage was relatively meagre in comparison with some other British towns. William of Worcester visited in 1480 but much of his account is fanciful.[5] Leland, King's Antiquary to Henry VIII, comes from an altogether different scholarly tradition as his reputation in subsequent centuries as the father of English antiquaries makes plain. Leland seems to have made two visits to Gloucestershire, probably in the 1540s.[6] He identified Cirencester as the *Coriminum* (sic) of Ptolemy's Geography, described the Roman walls and amphitheatre and mentioned the discovery of a floor '*de testellis versicolorbus*' (a pavement of dice like bricks of sundry colours). The other great British antiquary of the 16th century, William Camden, said much the same in 1586, '*Cyren-caester*, we in these daies Circester and Circiter. The ruinate wals do plainely shew that it was verie large, for by report they tooke up two miles in compasse. That it was a famous place, the Romane coins, the cherkerworke [checkered] pavements, and the engraven marble stones that now and then are here digged up (which have beene broken, and to no small prejudice of Antiquitie) do evidently testifie'.[7]

A significant archaeological discovery was made in the late 17th century which gained Cirencester some national renown as it came to the attention of the eminent scholars of the day, but surprisingly it was not a mosaic that captured interest, rather a fine example of a hypocaust. The purpose of this paper is to discuss that discovery and place it within the context of our present knowledge of the Roman town.

History of discovery

John Aubrey in his *Monumenta Britannica* records 'Around 1685 a hypocaustum was found at Cyrencester; of which Mr Ths Pigot M.A. Coll. Wadh Socius, wrote a description with gelt of his brother'.[8] Pigot (1657–86) was an Oxford cleric and academic with some interest in antiquities (he possessed fragments of mosaic from a Roman floor at Badminton, Gloucestershire).[9] Samuel Rudder, writing in 1779, says the discovery was actually made in 1683 on the authority of an unspecified manuscript.[10] Robert Atkyns (1647–1711) says of Cirencester in his *Ancient and Present State of Gloucestershire* (published posthumously in 1712): 'Here

[1] The so-called 'hunting dogs' mosaic. Cosh and Neal 2010: no. 421.45. For the context of the mosaic McWhirr 1986: 249–54.
[2] Hoselitz 2007: 95–106.
[3] Buckman and Newmarch 1850.
[4] Haverfield 1920: 199.
[5] Harvey 1969. This was in keeping with prevailing approaches that focused on mythical accounts of the early history of Britain.
[6] Latimer 1889–90: 224; Leland 1964, volume 5: 64–5.
[7] English translation in the 1610 edition: Camden 1610: 366.
[8] Aubrey 1665–93: v. 225; Fowles 1980–2.
[9] Aubrey 1898: 155; Osgood 2009: 203; Royal Society record for Thomas Pigot: https://catalogues.royalsociety.org/CalmView/Record.aspx?src=CalmView.Persons&id=NA7797&pos=1
[10] Rudder 1779: 346. He perhaps drew this date from Ralph Bigland (died 1784) who also gave the year of discovery as 1683 (Firth 1989: 357).

are often dug up in old foundations, a great many and great variety of Roman coins. There was accidentally discovered in a meadow near the town, an ancient building under ground. It was 50 foot long and 40 broad, and about 4 foot high, supported by 100 brick pillars, inlaid very curiously with tesseraick work, with stones of divers colours, little bigger than dice. It is supposed to have been a bathing place of the Romans'.[11] The meadow that Atkyns mentions was known as the Leauses or Lewis Grounds; it covered the whole of the south-eastern half of the Roman town beyond the line of the street between the Verulamium and Bath Gates (preserved in the modern street plan by London Road, Lewis Lane and Querns Lane; Figure 1).

William Stukeley visited Cirencester on 23 August 1721 in the company of Roger Gale and produced the sketches and notes that appeared in the first edition of *Itinerarium Curiosum* published in 1724; the second edition appeared posthumously in 1776. Rudder says that Stukeley came to Cirencester in 1723, perhaps a second visit.[12] Stukeley described the Roman town thus:

> A great part of the ground comprehended within this circuit is now pasture, corn-fields, or converted into gardens, beside the site of the present town. Here they dig up antiquities every day, especially in the gardens; and in the plain fields, the track of foundations of houses and streets are evident enough. Here are found many Mosaic pavements, rings, intaglia's, and coins innumerable, especially in one great garden called *lewis* grounds, which signifies in British a palace, *llys.* I suppose it was the *praetorium*, or head magistrate's quarters. Large quantities of carved stones are carried off yearly in carts, to mend the highways, besides what are useful in building. A fine Mosaic pavement dug up here Sept. 1723. with many coins. .... Mr. Richard Bishop, owner of the garden, on a hillock near his house, dug up a vault sixteen foot long and twelve broad, supported with square pillars of Roman brick three foot and a half high; on it a strong floor of terras: there are now several more vaults near it, on which grow cherry-trees like the hanging gardens of Babylon. I suppose these the foundations of a temple; for in the same place they found several stones of the shafts of pillars six foot long, and bases of stone near as big in compass as his summer-house adjoining (as he expressed himself): these, with cornices very handsomely moulded and carved with modilions, and the like ornaments, were converted into swine-troughs: some of the stones of the bases were fastened together with cramps of iron, so that they were forced to employ horses to draw them asunder; and they now lie before the door of his house as a pavement: capitals of these pillars were likewise found, and a crooked cramp of iron ten or twelve foot long, which probably was for the architraves of a circular portico. A Mosaic pavement near it, and intire, is now the floor of his privy vault. Mr. Aubury in his MS. coll. says an hypocaust was here discovered; and Mr. Tho. Pigot, fellow of Wadham, wrote a description thereof.[13]

Itinerarium Curiosum did not include a plan of Cirencester but Stukeley's sketch dated 23 August 1721 is preserved in the Bodleian Library.[14] It is a far from accurate survey, but marks on the south-east side of Lewis Lane (seemingly somewhere within *insulae* I and II of the Roman town; Figure 1) a rectangle annotated 'Luyis Grounds where stood a Roman temple', thus the site of the hypocausts. Gloucestershire historian Ralph Bigland repeats Atkyns' description of the hypocaust in his publication of 1791 which drew on research compiled between 1750 and 1784, adding 'a great number of funnels were suspended by iron bars' [presumably flue tiles attached to the walls] before going on to state: 'A few years since, these discoveries were further investigated and have attracted the notice of the curious. The most probable conjecture is, that it was an *officina*, or kiln, where the *tesserae* were prepared as there were many ovens, or hypocaustic ducts, necessary for that manufacture, ...'.[15] Thus it appears that there was some further investigation of the hypocausts around the middle of the 18th century, but we know nothing of what was found, and it was Samuel Rudder who provides further significant information. Rudder was a Cirencester printer who updated Atkyns' county history with his *New History of Gloucestershire* published in 1779.[16] In the original edition of his history Rudder mentions the hypocaust without adding much to the information provided by Atkyns. However a hypocaust was exposed in 1780, and in the 1783 re-print of the book Rudder inserted an extra leaf annotated thus 'The Editor, from repeated inspection of these ruins, being enabled to give a more perfect account of them than he has ever seen, could not resist the pleasure which he promised himself of obliging the public with it [March 6, 1782]'.[17] Rudder provided a detailed description of the hypocaust, published in its fullest state along with an etching of the remains in his *History of the Ancient Town of Cirencester* (Figure 2).[18] He concluded that 'it seems probable that the ancient building mentioned by Sir Robert Atkyns .... was in part dug up and destroyed by the gardener, in Dr Stukeley's time. What remained of

[11] Atkyns 1712: 350.
[12] Rudder 1779: 345.
[13] Stukeley 1776: 66.
[14] MS Top. Gen. d. 13; reproduced as the frontispiece of Darvill and Gerrard 1994: ii.
[15] Firth 1989: 357.
[16] Herbert 2006; Rudder 1779.
[17] Rudder 1783: [346].
[18] Rudder 1800: 42–57.

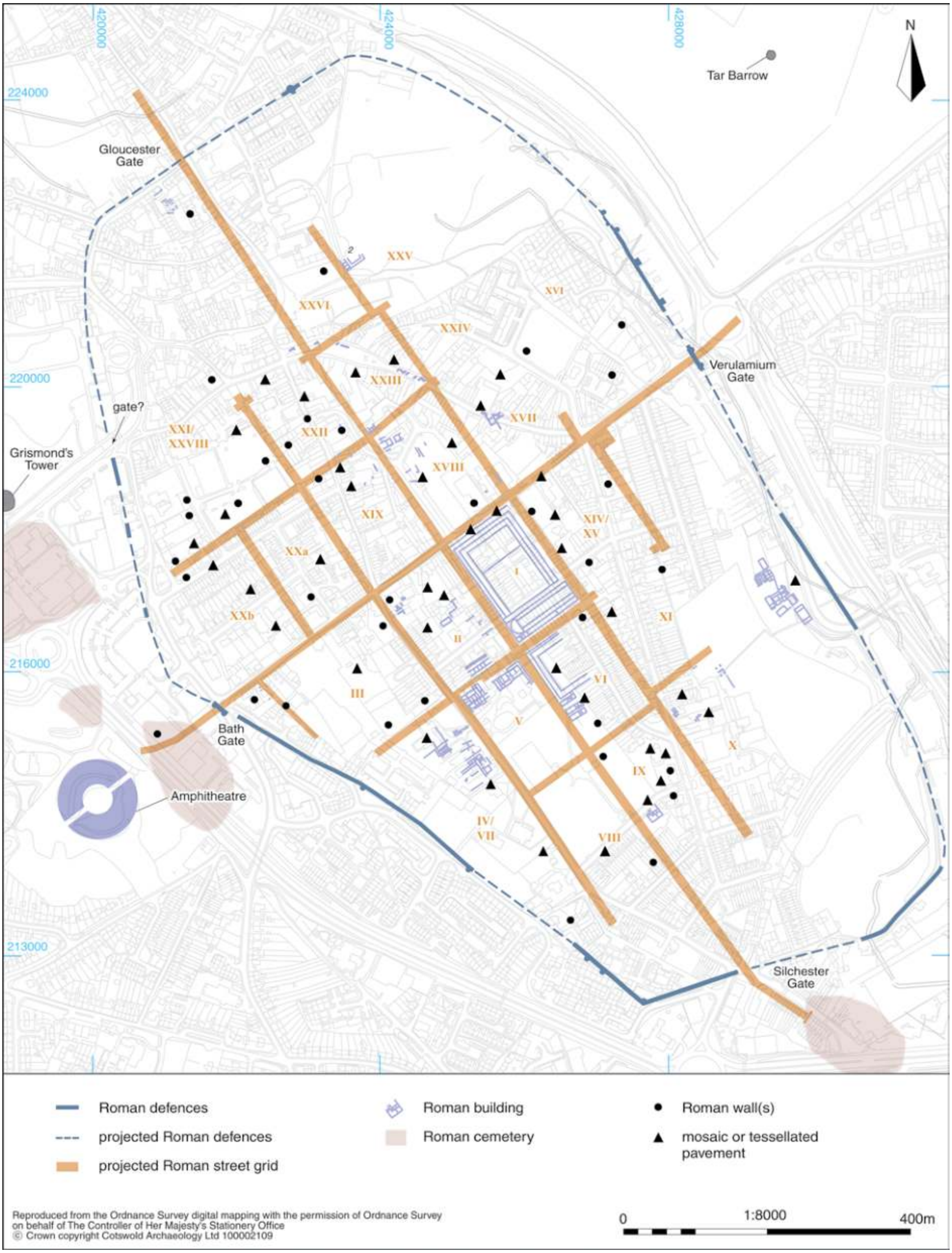


Figure 1. Plan of Roman Cirencester. The hypocaust and baths are located in insula II immediately south-west of the forum. The three mosaic or tessellated pavements marked in this insula derive from the listing by Haverfield (1920: 177, 179, nos. 29–31). © Cotswold Archaeology.

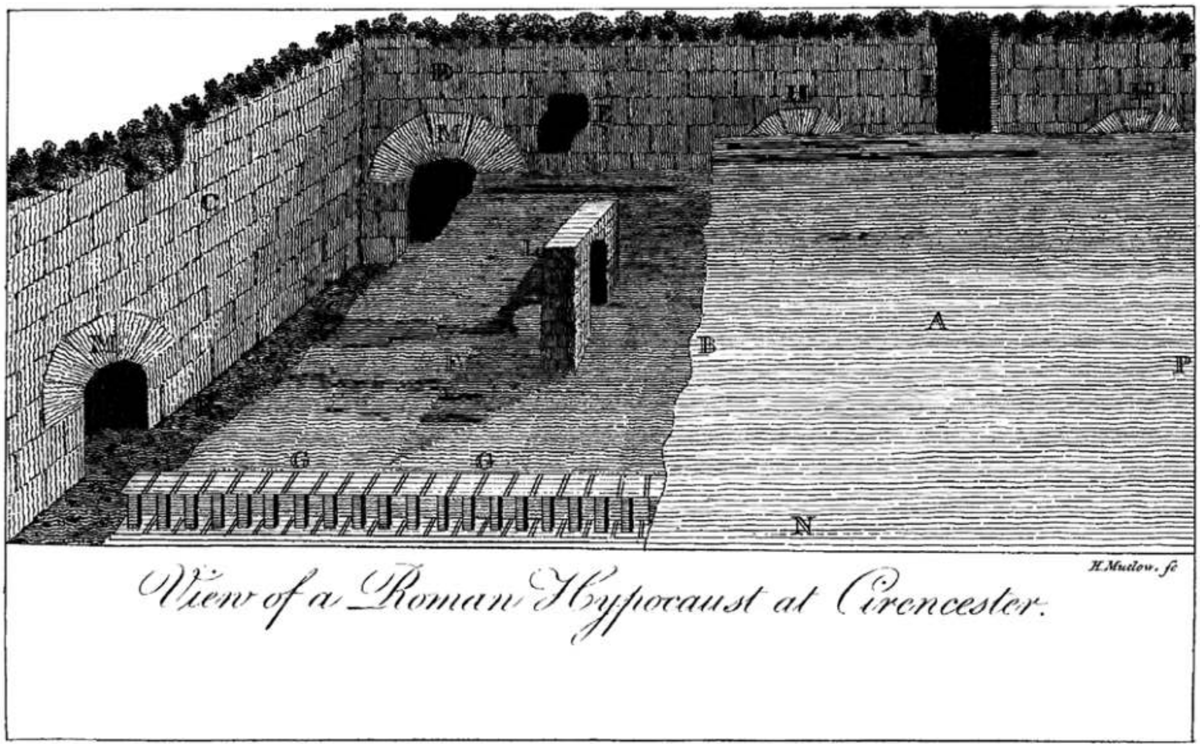


Figure 2. Engraving of the remains of the hypocaust exposed in 1780 published by Rudder (Rudder 1800: facing page 42).

it being afterwards covered over with earth, was again opened in 1780'.[19]

News of the exposure of the hypocaust spread, and in the volume of *Archaeologia* published in 1785 it was reported that a number of subterranean vaults were revealed in the summer of 1780, including a surface 24 feet long by 14 feet wide supported on 26 brick pillars. 'At the desire of Lord Bathurst Mr Master [the owner of Lewes Grounds] caused a considerable part of the spot to be further uncovered with care so that the remains of the hypocaust may be viewed with greater ease. Sir Henry Englefield 1782 measured the hypocaust thirty-two feet by twenty-four'.[20] Englefield was an antiquary and astronomer, and Fellow of the Society of Antiquaries of London.[21] In 1788 the hypocaust was recorded by John Carter, draughtsman to the Society. Englefield was one of Carter's patrons, and conceivably commissioned him to record the hypocaust during one of regular tours.[22] Carter's sketches are preserved in the British Library, and three are published here for the first time (Figure 3). His worked-up drawing of the hypocaust was published in his *Ancient Architecture of England* which was issued in 27 parts between 1795 and 1814; the hypocaust drawing is dated February 1796 (Figure 4).[23]

At first sight Carter's plan seems to show a rectangular room, but this is misleading. While the straight edges at the bottom and left of the room as drawn do indeed represent Roman wall faces, the edges on the other two sides are simply the limits of investigation. Comparison of the view published by Rudder and Carter's survey show that the site had been partially backfilled and landscaped by the time of Carter's visit in 1788, and that a flight of wooden steps had been installed to assist people in climbing down into the hypocaust basement. One feature marked by Rudder, a tile wall with arch (L), had disappeared altogether by 1788 and so some degradation of fabric occurred in the eight years since re-exposure. Carter plotted the location of the hypocaust on a sketch plan of Cirencester annotated 'Very slight by memory'.[24] He marks it a short distance to the north-east of Watermoor Road, although he omits from his sketch the crossroads with Lewis Lane/ Querns Lane which would have fixed the location more securely (the modern streets are marked on Figure 6). Carter's location does not therefore precisely match that of Stukeley's temple, although we should be wary of placing undue reliance on the accuracy of Stukeley's highly schematic sketch.

[19] Rudder 1783: [346].
[20] Anon. 1785: 406–7.
[21] Nurse 2008.
[22] Nurse 2011.
[23] BL, Add MS 29928; Carter 1845: 7, pl. 5. The significance of this published survey seems not to have been widely appreciated. K. Beecham was aware of its existence, but it seems not to have been known to Haverfield when he produced his study of the Roman town, or to subsequent scholars (Beecham 1887: 265; Haverfield 1920). This paper therefore sets Carter's survey within its rightful context for the first time.
[24] BL, Add MS 29928 fol 26.

Figure 3. Original sketches of the hypocaust drawn by John Carter in 1788. © The British Library Board (BL, Add MS 29928 ff. 30).

It was Samuel Lysons who first marked the location of the hypocaust with any degree of accuracy on his plan of Roman Cirencester published in volume 2 of *Reliquiae Britannico-Romanae.*[25] Thomas Bravender's map of Roman remains published in 1887 in K. Beecham's *History of Cirencester* marks the location more precisely, doubtless from personal observation of the site.[26] The locations of the hypocaust given by Lysons and Beecham have been transcribed onto Figure 6; Beecham's is doubtless the more accurate. We can now appreciate that the hypocaust was situated centrally within *insula* II of the Roman town which lay immediately to the south-west of the forum (Figure 1).

No further archaeological investigation occurred in the vicinity of the hypocaust until 1986 when the nursery was developed for housing.[27] Despite much of the south and east part of the nursery site being designated as a scheduled ancient monument, legislation at the time provided relatively little protection of archaeological remains and permission was granted for development without prior excavation. A watching brief during groundworks by David Wilkinson of the Cirencester Excavation Committee was the sole mitigation (Figure 5).[28] Sheppard Frere, Chairman of the Committee, was forthright in his condemnation: 'The situation illustrates once again the futility of protection afforded by scheduling as at present administered'.[29] The findings are discussed below.

Description of the hypocaust

In the following description the letters referred to are those marked on Rudder's plate (Figure 2), not Carter's survey (Figure 4). The hypocaust described and planned by Rudder and Carter is unlikely to have been the same as that mentioned by Atkyns as the latter seemingly supported a mosaic floor, whereas that revealed in 1780 had a plain mortar floor (most likely brick mortar or *opus signinum*). Stukeley's vault is only approximately located in *insula* I or II and as it measured 4.9 m by 3.7 m it could have been the same as that seen by Rudder. As Rudder does not mention any demolition or other material above the suspended floor (A), this could suggest that prior

[25] Lysons 1817a: pl. 3, b. The plan is at a small scale so precision in the location of the hypocaust is not to be expected. The location has been transcribed onto Figure 6. Lysons doubtless served as the source for the location of the hypocaust marked on the 1875 Ordnance Survey map.

[26] Beecham 1887: plan at p. 250. Bravender was the surveyor to Cirencester Town Council during the construction of a mains sewage system in 1878–80. K. Beecham (1887: 265) states 'The remains of the hypocaust were propped up and covered over, but the site may be seen and additional facts elicited by a visit to the Nursery'. The hypocaust was probably backfilled shortly after Carter's visit in 1788. W.K. Beecham writing in 1842 gives no personal recollection of having seen it (Beecham 1842: 205).

[27] The site is called Tower Street 1986 on Figures 5 and 6.

[28] Wilkinson 1987; Wilkinson 1988; Frere 1988: 465–7; Holbrook 1998b: 188, fig. 82.

[29] Frere 1988: 465–7.

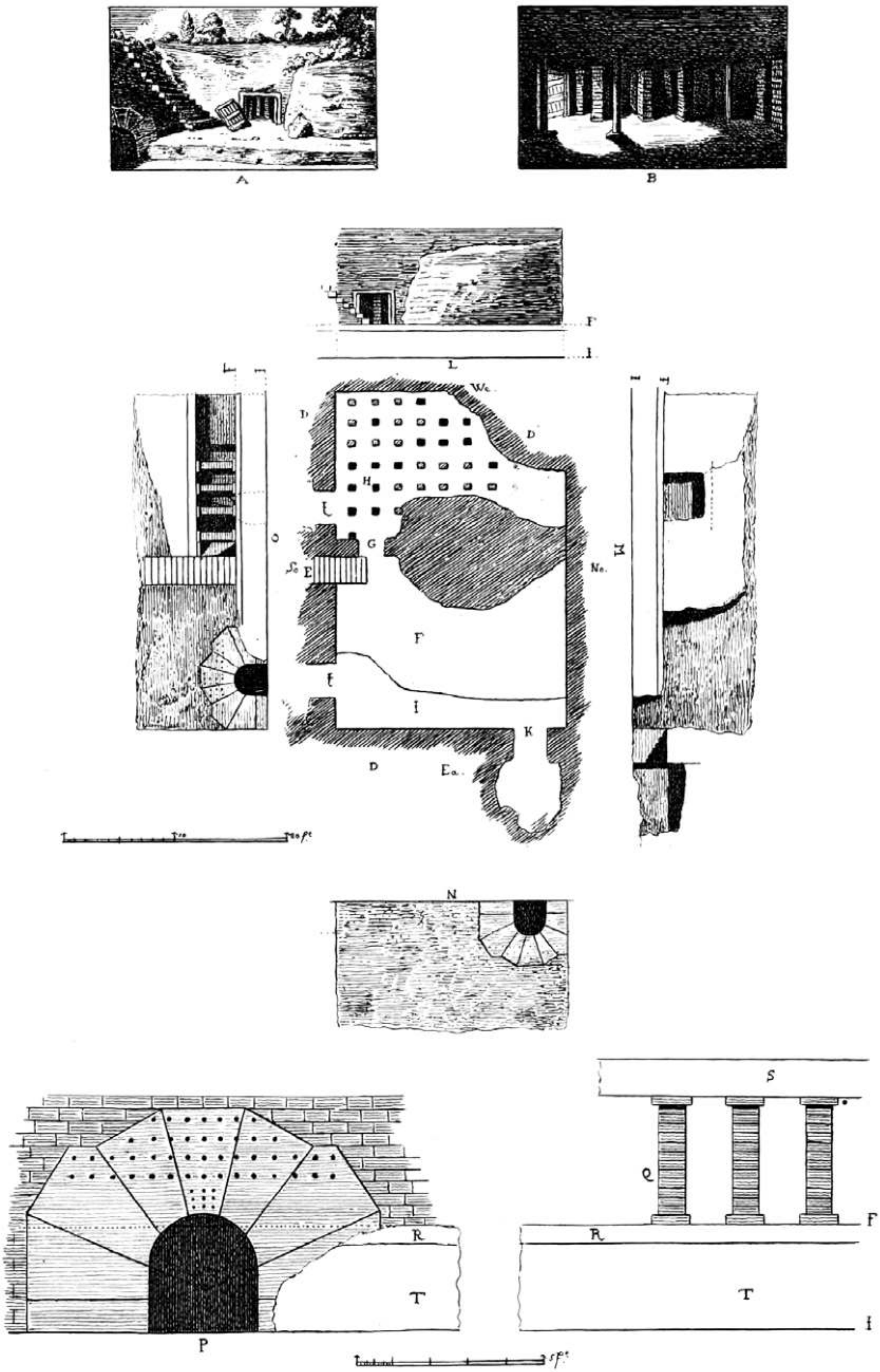


Figure 4. Inked-up version of Carter's survey of the hypocaust dated 1796 and published as Carter 1845: pl. 5.

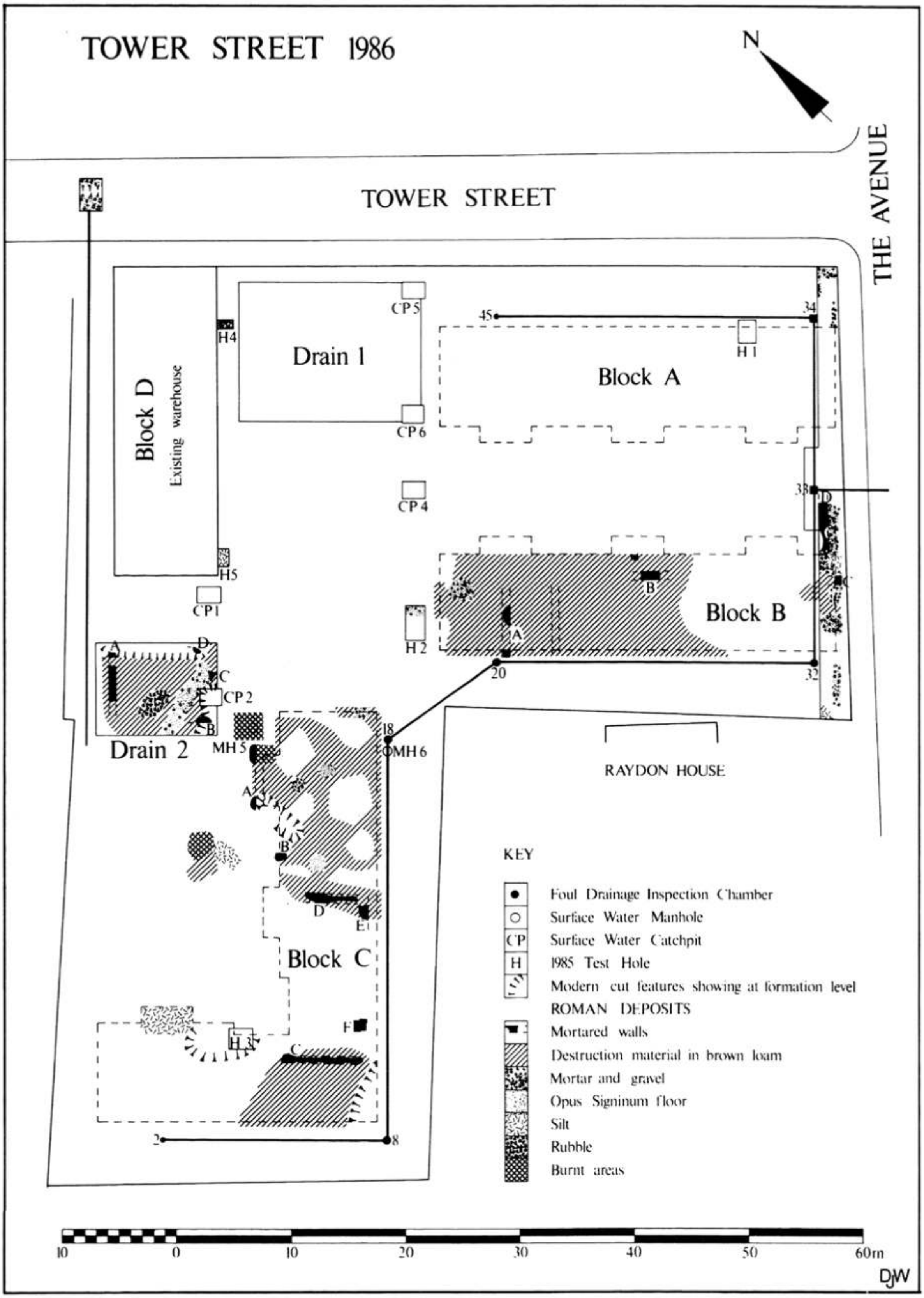


Figure 5. Plan of the observations made during redevelopment in 1986 by David Wilkinson of the Cirencester Excavation Committee.

Figure 6. Plan of insula II of the Roman town.

investigation had proceeded to this level and exposed the surface of the floor. Alternatively, Stukeley's hypocaust could have belonged to a separate room in the vicinity.

The 1780 hypocaust heated a room of unknown extent. Englefield gave its dimensions as 9.7 m by 7.3 m, while in Carter's survey of 1788 the north-east wall (C) was exposed for *c.* 6.3 m, and the south-east (D) for *c.* 9 m.[30] Wall C was faced on its interior side only with courses of dressed stone 0.13 m high. It must have retained solid fill behind it and thus the Roman ground level would have been at the level of the suspended floor, with the hypocaust basement excavated into natural or earlier deposits. Masonry wall D was 1.0 m thick with a second hypocausted room beyond it. Both walls survived to a height of *c.* 3.4 m. The original floor of the hypocaust basement (K) was 'a very strong floor of terras'; it was only exposed in a narrow cutting adjacent to wall C. Wall C was pierced by a single hypocaust arch (M), 4.9 m from the room corner. The arch was formed from dressed stone voussoirs; the opening was 0.9 m wide, 0.97 m high and 1 m deep. There was some irregular-shaped investigation to the rear of the arch, but seemingly no walls were found. This must have been the site of the furnace house and Carter depicts a layer of what is presumably burnt material here. The walls of the furnace house may have been robbed or else have lain beyond the limits of the sondage.

Wall D incorporated three hypocaust arches (M, H, H) of similar design to that in wall C. The arches were 0.89 m wide and 0.94 m from crown to floor. Four rows of small holes were apparent in the upper part of the voussoirs of arch M, some still containing iron hooks and hold fasts which fixed box tiles to the wall (Figure 4, detail bottom left).[31] Floor K extended under the arches and was covered by a thin layer of ash. The *pilae* associated with the primary phase of the hypocaust had been removed when the floor of the hypocaust was raised by 0.86 m through the deposition of rough stones and 'rubbish'. The make-up was covered with a mortar floor (F) which formed the base for the second phase of the hypocaust and supported the extant *pilae*. The floor was covered with wood ashes and 'coals'. Resting on floor F, and *c.* 3.5 m–4.0 m from wall C, was a 1.8 m length of brickwork walling pierced by an arched opening 0.46 m wide (L). This is omitted from Carter's plan so it must have decayed or been destroyed in the eight years since it was exposed. Perhaps this wall was a secondary partition wall, the arch replacing the original furnace arch which become redundant when the floor was raised? In this case the room would have been reduced in size with the furnace inserted in the eastern corner. It might explain why the floor and hypocaust did not survive in proximity to wall C – the broken edge of the suspended floor A lay 4.6 m from wall C.

A grid of six rows of *pilae* supported the exposed portion of floor A; 22 *pilae* survived in all covering an area of *c.* 4.4 m by 3.9 m, not dissimilar from the measurements given by Stukeley for his hypocaust.[32] They were 1 m high and 0.2 m square formed from 14 tiles, each tile 45 mm thick. The *pliae* were founded on a larger tile 280 mm square with another of the same size as the capital which supported *bipedales* tiles 0.6 m square. Resting upon these *bipedales* was mortar floor (A), 355 mm thick and composed of three layers of 'coarse strong mortar'.

The hypocaust arches went out of use in this secondary phase as the surface of the hypocaust basement was only 4cm below the crown of the arches in wall D. A doorway (I) in wall D, 6 m from the corner, relates to this phase. It was 0.9 m wide between squared stone quoins. The room to the south-east on the other side of wall D was only examined cursorily. The s*uspensura* had been destroyed but some *pilae* survived amongst a considerable debris of flat tiles and box tiles. Carter describes this room in the notes accompanying his sketch as 'parts already dug into' which suggests that previous investigation had occurred here.

Rudder appreciated that the remains encountered were of more than one period and that the hypocaust arches went out of use in the second period. Carter did not understand this and fancifully proposed that the hot air in the hypocaust was not transmitted to the other room by the arches but rather by the holes in the voussoirs which we now realise were the fixings for the box tiles.

Subsequent excavations and records in *Insula* II

The results of the observations during the redevelopment of the nursery in 1986 were patchy and disjoined as they derived from observations of two soakaway areas; the foundations for three residential blocks (Blocks A–C) and narrow trenches for services and boundary walls (Figure 5, where the site is called Tower Street). Block C and Drain 2 are the areas closest to the site of the hypocaust recorded by Beecham (Figure 6). Roman demolition deposits were exposed in

[30] Carter's annotations suggest that the room was aligned on the cardinal points of the compass, and indeed in older accounts it was commonplace to speak of the Roman town as if it was thus orientated. But in actual fact the street grid was aligned on a long axis orientated north-west to south-east (Figure 1). On the basis that the baths were orientated with the street grid we can thus correct the orientations given by Carter, and indeed the walls discovered during the watching brief in 1986 were aligned on the street grid (Figure 6).

[31] The absence of other fittings for box-tiles in walls C and D is curious. Perhaps they were less visible in this cruder masonry and were not recorded?

[32] Carter states that the 16 stacks marked in black on Figure 4 were still extant in 1788; those in lighter shade had been replaced with wooden posts.

Block C along with the tops of several walls. Following the nomenclature marked on Figure 5, walls C and D exposed in Block C lay *c.* 13.5 m apart. They defined a room, of which wall fragment E might represent the south-east side. The walls were heavily disturbed, although wall D was estimated to be about 0.8 m thick and a few of the surviving facing stones displayed evidence of burning. At the location marked F a base was found formed from two stones with overall dimensions of 1.15 m long by 1.05 m wide, but no adjacent Roman surfaces. To the north a second block, *c* 1 m x 0.8 m x 0.4 m thick, lay at a steep angle within a modern humic deposit.[33] Wilkinson observed that the area between wall E and point F was filled with dark humic soil which he associated with a former greenhouse at this location and noted two other areas of modern disturbance to the south-west (denoted by hachures on Figure 5). Given the close correspondence of walls C and D in Block C with the location of the hypocaust given by Beecham I propose below that this room is in fact one and the same as that recorded by Rudder and Carter.[34] To the north-east of wall D small patches of *opus signinum* flooring survived in discrete areas. In Drain 2 wall A aligned north-east to south-west was found, with a layer of pink buff plaster on its north-west side. Much of the trench was occupied by stone rubble containing sandstone roofing tiles and fragments of ceramic tile (*tegula*, box and *pila*). At the south-east end of the trench there was evidence for burning (a charcoal rich deposit was also observed in nearby MH5) and further small fragments of walling were noted. At point C there appeared to be a wall on a diagonal (east-west) alignment while at D a small fragment of curving walling with a convex face was recorded.

Further south-east in Block B two walls and an area of mortar and gravel surface were recorded. In a drainage run just to the south-east of Block B a mortared wall 0.83 m wide was observed on a north-west/south-east alignment with a mortar and gravel floor on its south-west side. A second wall met the first wall at right angles and was traced for a length of over 4 m. To the south-east of this wall brown gravel was overlaid by rubble make-up beneath a possible mortar floor. Demolition debris containing stone and ceramic tile (including box and *pila*) found over most of the site produced two 4th-century coins.

There have been some other investigations within *insula* II which have produced substantive results. In the western corner of the *insula* observations at Cotswold Mill were made by the town surveyor F.W. Taylor in 1911 and 1915 and there was work of limited extent in the same locality by Cotswold Archaeology in 1998–9 (Figure 6).[35] Various walls were recorded 25–30 m behind the Fosse Way frontage and in one location a more thorough investigation of the sequence was possible. Here a masonry building was constructed in the late 1st or early 2nd century but had been demolished by the middle of the 2nd century to be replaced by a new structure built to a different plan. That building seemingly continued in use into the 4th century and contained an *opus signinum* floor. To the south of these remains the corner of a stylobate wall was located, with a 3.5–4.0 m wide corridor behind it. The top of the stylobate was capped with a cambered scree of mortar. Taylor also noted two Roman columns in the vicinity and a stone pier, most probably an impost supporting the arch of a gateway or arcade.

At the opposite end of the *insula* excavations by John Wacher in 1961 at Leaholme Gardens revealed an integrated range of masonry shops fronting onto street F.[36] The shops were not built before the early 2nd century, and perhaps not completed until the middle of the century. The shop units were flanked on either side by porticos with an open yard to the rear. The top of the front portico wall was rendered smooth with mortar like that found at Cotswold Mill. A notable modification, sadly not closely datable, was an attempt to construct a massive wall foundation (wall G) in the yard just outside the stylobate wall of the inner portico (position marked on Figure 6). The foundation was 2 m wide and butted against the pre-existing stylobate. The wall may never have been completed, or else demolished within the Roman period, for in one location the foundation was sealed beneath a thick deposit of courtyard gravel. This might have been a consequence of the marked subsidence of the wall into earlier features; at one point the foundation had tipped sharply to one side. Attempts to trace wall G in a trench dug in 1967–8 proved inconclusive. A robber trench was found, but it was not necessarily for wall G. A large fragment of a column capital with simple mouldings was noted amongst the rubble debris.[37] It is unlikely that wall G was intended to replace the original stylobate as it was totally out of proportion with the rest of the building and indeed the wall may not have been of this thickness throughout. The range of shops continued in use into the 4th century with new floors laid and pits dug after *c.* 330, although it may have been abandoned, and perhaps partially demolished, *c.* 350–60. Demolition deposits included fragments of Purbeck marble and numerous box tiles.[38]

[33] While the stones are undoubtedly Roman, they might not have been *in situ*. For instance, in the 19th century a large Corinthian capital sat on a base was displayed for public view within the nursery (there is a drawing in Beecham 1842).

[34] Thus the wall termed by Wilkinson as Block C wall D is one and the same as Rudder wall C, and Wilkinson wall E is Rudder's wall D.

[35] Holbrook and Thomas 2008.

[36] Holbrook 1998b.

[37] Brown *et al.* 1969: 229–30.

[38] A small test-pit evaluation in this area in 2019 provided details on the height of surviving Roman deposits, but otherwise adds little new information (Gethin 2019).

Table 1. Levels of selected features in insula *II and in the neighbouring forum*

Observation	*Ht above OD*	*Reference*
Top of stylobate at Cotswold Mill	110.0	Holbrook and Thomas 2008: fig. 43
Base of mortared sections of walls at Cotswold Mill	109.8	Holbrook and Thomas 2008: fig. 43
Level of 1st century pit at Cotswold Mill	107.9	Holbrook and Thomas 2008: fig. 43
Opus signinum floor in Block C	110.4 & 110.6	Wilkinson 1987
Top of wall C in Block C	111.0	Wilkinson 1987
Floor in Block B	108.9	Wilkinson 1987
Top of stylobate (wall B) in trench AMIII	108.9	Wacher and McWhirr 1982: fig. 6; Holbrook 1998b: fig. 130
Forum courtyard in trench AY1	108.1	Wacher and McWhirr 1982: fig. 22; Holbrook and Timby 1998: fig. 64
Surface in SW range of forum	108.8	Wilkinson 1987: fig. 9, obs. 9
1986 ground surface in Block C	111.4	Wilkinson 1987: fig. 9
1986 ground surface in Block B	109.8	Wilkinson 1987: fig. 9

Wilkinson noted that the Roman floors revealed during the construction of Block C of Minerva Court were *c.* 2.5 m higher than the level of the forum courtyard in the neighbouring *insula* (Table 1). There is no topographical reason to explain this disparity and the most likely explanation is that the late floors revealed in Block C were part of a substantial building which underwent various episodes of rebuilding such that there was a marked rise in level over time. This process was apparent at Cotswold Mill where the second phase building was created at a level *c.* 2 m higher than that adopted for the initial structure. The floors in Blocks B and C lay *c.* 0.8–1.0 m below the ground surface as it existed in 1986. Given that no substantial development has occurred on the site since the Roman period it is reasonable to suppose that the ground level was little changed compared to that when the hypocaust was revealed in 1780. Rudder records that Floor A lay 1.1 m below the ground surface and the top of wall C at a depth of 0.6 m, so their level would have been comparable to the floors found by Wilkinson in the near vicinity. The site of the building which contained the hypocaust may have stood proud of the surrounding area given Stukeley's description of the site as a 'hillock'.

Haverfield marked three tessellated floors on the north-western edge of Jeffries Nursery on his plan of the Roman town.[39] His source was a map of discoveries first maintained by Wilfrid Cripps and continued after his death in 1903 by his widow Helena. The evidential basis for these records is unknown. Haverfield thought Cripps was interpreting 'marks' on Bravender's plan of the Roman town published by K. Beecham in 1887, but that does not show any such obvious annotation hereabouts.[40]

Architectural fragments have been recorded from the general vicinity of the hypocausts, although in no case can it be shown that they were certainly found within *insula* II as they could have come from the much wider expanse of the Lewis Grounds. Stukeley said shafts of pillars 1.8 m long along with stone capitals and bases, and moulded cornices with modillions were recovered from the vicinity of the hypocaust. The monolithic columns would be appropriate for use in porticos and Blagg wondered whether a small fragment of a modillion cornice in the Corinium Museum is the sole survivor of those seen by Stukeley.[41] The cornice is one of the largest and most elaborate known from Roman Britain and must have come from an impressive building, perhaps an imposing classical temple. It is possibly of mid-2nd century date by analogy with a similar, but smaller, cornice from the Verulamium theatre. Lysons thought that a large Corinthian capital discovered in 1808 near a mosaic pavement came from the same locality as Stukeley's finds but this cannot be so.[42] He marks the location of the mosaic well to the south-west of the hypocaust within what we now recognize as *insula* VI.[43] The capital is the largest known from Roman Britain and would have graced a column around 13 m high.[44] A column drum of commensurate size with imbricated leaves suggests that the capital

[39] Haverfield 1920: pl. XI, nos. 29–31.

[40] Haverfield 1920: 179; Beecham 1887. Haverfield is the source for the three tessellated pavements marked in this part of *insula* II on the current plan of the Roman town (Figure 1).

[41] Blagg 1993: 64; cat. no. 274.

[42] Lysons 1817b: 124, pl. 8, no. 1.

[43] Lysons 1817a: pl. 3, d; not *insula* XIV as stated by Cosh and Neal 2010: no. 421.42.

[44] Blagg 1993: no. 197.

formed part of a Jupiter column, perhaps of late 1st-century date.[45] If the location marked by Lysons is correct, the column perhaps stood in the courtyard surrounded by an ambulatory of public building VI.1. While the interpretation of the building is uncertain as only part of it has been exposed, a *temenos* surrounding a temple is plausible.[46]

Interpretation

The hypocaust exposed in 1780 lay within a room of uncertain size, but it was clearly too large to be a domestic structure. Given that there was a second heated room to the south-east combined with Stukeley's mention of 'several more vaults' in the vicinity, and Atykns' account of a hypocaust covering an area of 50 x 40 feet (15.2 m x 12.2 m) furnished with a mosaic, then it seems assured that there was a public building here containing several heated rooms. The public baths of *Corinium* are the obvious interpretation. That was Atkyns' original guess, although the identification was restated with more authority by McWhirr.[47] The location of the baths in the *insula* adjoining the forum would be entirely appropriate as it is a juxtaposition found in numerous towns in Britain and beyond.

On this basis we can reasonably assume that the room exposed in 1780 was either the *caldarium* or *tepidarium*. As the room lay roughly *c.* 65 m from the north-west frontage and 90 m from the south-east there would have been adequate space for the other two principal bathing rooms to have extended to either the north-west or south-east of the room exposed. For instance, at both Chester and Wroxeter the distance from the dividing wall of the *caldarium* and *tepidarium* to the outer wall of the baths basilica was in the order of 50–55 m. It can be plausibly argued that the room recorded by Rudder and Carter was the *tepidarium*, with the hypocaust arches in wall D drawing the hot air from the *caldarium* that lay to the south-east. The presence of a hypocaust arch M at the north-east end of wall D would suggest that there was no hot bath situated up against wall C as it would not be usual for hot air to be conducted from underneath a bath into a hypocaust arch leading to the next room.[48] The flue in wall C is therefore likely to have belonged to a furnace that provided heat to the *tepidarium* in addition to the hot air drawn from beneath the *caldarium*.

Furnaces feeding a *tepidarium* are known from several civilian baths in the north-west provinces, for instance Augst Women's Baths (mid-1st century), Avenches City Baths (late 1st century; rebuilt in the 2nd century) and Xanten City Baths (late 2nd century).[49] At the Wroxeter later baths a furnace was added to the original *tepidarium* in the 3rd or 4th century, a tile foundation flanking the furnace flue extending into the hypocaust basement, most likely to support a hot bath at floor level. Perhaps the room was converted into a *caldarium* in the late Roman period?[50] At Cirencester the similarity in the form of the furnace arch in wall C with the flues in wall D, as well as their corresponding level, indicates that the furnace was a primary feature of the baths.

On this interpretation the room to south-east of wall D is therefore likely to have been the *caldarium*, or just possibly a second *tepidarium* (the latter would be a relatively unusual arrangement). At the Xanten City Baths there were vestibules between the *frigidarium* and *tepidarium*, seemingly not furnished with hypocausts and thus there would not have been hypocaust openings in the dividing wall with the *tepidarium*. At the Wroxeter later baths there was a pair of rooms between the *tepidarium* and the *frigidarium*, likely lobbies (Figure 7). In the original design the rooms were not furnished with hypocausts, but at a later date the solid floors were dug out and a hypocaust inserted. The wall separating these rooms from the *tepidarium* must have been pierced by hypocaust flues at this time as the lobbies had no furnace of their own. But this is a later Roman modification and is likely associated with the conversion of the *tepidarium* to a *caldarium* mentioned above.[51]

While not beyond all doubt, the simplest and neatest explanation is to regard the room depicted by Rudder as the *tepidarium* with the *caldarium* on the other side of wall D to the south-east. The *frigidarium* would therefore have lain to the north-west, behind the viewer in the engraving. An orientation frequently, although by no means invariably, adopted for public baths was for the *caldarium* to lie at the southern end of the building, which accords with Vitruvius' ideal arrangement.[52]

We can therefore reasonably propose that Atkyns' hypocaust was in fact the *caldarium*, and that this lay in the room to the south-east of wall D which seems to have been heavily disturbed, perhaps following discovery in the 1680s? Carter states that this room had been previously investigated. If Atkyns' mention of a mosaic can be taken at face value we might have expected some mention by Rudder of *tesserae* in the debris in

[45] Blagg 1993: no. 213.
[46] Timby *et al.* 1998.
[47] McWhirr 1976: 83.
[48] At the Exeter fortress baths the hypocaust piercings in the wall between the *caldarium* and the *tepidarium* were located between the two *caldarium* hot baths (Bidwell 1979: fig. 43, elevation 2).

[49] Nielsen 1990: 83, n. 71; the other plans are conveniently collected in this volume.
[50] Ellis 2000: 48, 82.
[51] Ellis 2000: 82.
[52] 'The rooms for the hot and tepid baths should be lighted from the south-west, or if the nature of the situation prevents this, at all events from the south, because the set time for bathing is principally from midday to evening', Vitruvius, *Ten Books on Architecture*, X.1 (trans. Morgan 1914).

Figure 7. Suggested reconstructed layout of the Cirencester baths with the later baths at Wroxeter for comparison (Wroxeter after Ellis 2000: fig. 2.7).

the bottom of the hypocaust basement, although little of this room was exposed and was perhaps not seen by him. Mosaic floors would be entirely appropriate in a public bath-house in Britain and are known, for example, from the heated rooms at the Huggin Hill baths in London; the later baths at Wroxeter and the legionary baths at Chester and Caerleon.[53]

It was common for a furnace serving a *tepidarium* to be located halfway along the side wall of the room. If this was the case here the room would have been *c.* 10.8 m long. The width of the room is provided by Wilkinson's observations. The correspondence of his walls in Block C and the location of the hypocaust is striking, although curiously it was an association not made in his report. The disturbance recorded by Wilkinson between walls C and D also suggests that the room had been previously dug out. Thus we can assert with some confidence that the *tepidarium* was 13.5 m wide and 10.8 m long. On this basis the doorway I in Rudder's plate would have been in the centre of the wall and we can restore four hypocaust openings in the wall.[54]

Table 2. Internal dimensions of heated rooms in selected British public baths (apses and niches excluded)

Town	Dimensions (m)	Area (m²)
Cirencester		
?Caldarium (Atkyns)	?15.2 x 12.2	?185
?Tepidarium (Rudder/Carter)	?13.5 x 10.8	?146
Wroxeter (early)[55]		
Caldarium	14.4 x 10.0	144
Tepidarium	14.4 x 10.0	144
Wroxeter (later)[56]		
Caldarium	15.0 x 12.5	187
Tepidarium	15.0 x 10.0	150
Leicester[57]		
Caldaria (x 3)	Each 9.8 x 13.7	134
Tepidarium (Room X)	9.1 x 5.9	54

It would be usual in baths of row-type plan for the three principal bathing rooms to be of similar width, niches and apses excepted, and for the rooms to be wider than

[53] Neal and Cosh 2009: 419–20; Cosh and Neal 2010: 287–88, 318–19, 333–4.
[54] The early baths at Wroxeter (those beneath the forum) had eight hypocaust openings in the wall between the *caldarium* and *tepidarium*; in the later baths at the same town there were five openings in the corresponding wall, while there were six at the fortress baths at Exeter. Atkinson 1942: 36; Ellis 2000: fig. 2.8B; Bidwell 1979: 28.
[55] Atkinson 1942: 35–42.
[56] Ellis 2000: 19–25.
[57] Kenyon 1948: 28–32.

they were long. So it would appear that the *tepidarium* was a little narrower than the room we now interpret as the *caldarium*, if we accept Atkyns' dimension of 15.2 m x 12.2 m as broadly accurate (although Atkyns is likely to have relied on the memory of approximate measurements which were rounded up).

We can therefore envisage a public baths of row-type plan with the *caldarium* to the south-east located centrally within *insula* II. Wilkinson found further walls to the north-east of the *tepidarium* including patches of *opus signinum* flooring. The convex wall in Drain 2 could have been part of an apse, and the plaster-lined wall part of a bath. The charcoal-rich burnt deposits in MH5 suggests proximity to a furnace, perhaps even rake-out from the furnace house partially explored in 1780. There were therefore evidently further rooms to the north-east of the main row of the principal bathing rooms, as at the later baths at Wroxeter for instance. A reconstruction of the room dimensions of the Cirencester baths (Figure 7) suggests that they were of comparable size to the earlier and later baths at Wroxeter (Table 2).

On this reconstruction there would have been plenty of space within the *insula* for a *palaestra*, perhaps with an open air swimming pool, especially to the south-west of the complex.[58] We might also reasonably expect a baths basilica at Cirencester by analogy with the complexes at Leicester and Wroxeter, in which case it would likely have lain at the north-west end of the baths to connect with the *frigidarium*. If so we have no certain trace of it unless this was the source of the columns and capitals mentioned by Stukeley? But the modillion cornice would be hard to place in such a building, and if it does indeed derive from a building in this *insula* (rather than just being reused here) a temple is a more likely context as Blagg supposed. A temple hereabouts is possible as the baths are unlikely to have filled the whole of this large *insula* themselves and there would have been enough space for other public buildings. A temple near to the forum is likely enough, and the plausible one behind the basilica in *insula* VI has already been mentioned. In this context we can note the fine torso of a three-quarters life-sized statue of Minerva recovered from the north-east side of the *insula*.[59]

Wacher wondered whether the building he discovered at Leaholme Gardens was a *macellum* or covered market, but a range of shops in single ownership on a commercially valuable street frontage adjacent to the forum is equally likely.[60] Indeed, the shops might have been of integral design with the public baths, as for instance at Ostia and Pompeii where shops lined the street frontages of the *palaestrae* of the Neptune Baths and Central Baths respectively, or in the north-west provinces at places such as Augst and St Bertrand de Comminges.[61] The 2 m-wide wall G to the rear of the shops is difficult to interpret. The wall is broader than those of the basilica, but it is important to appreciate that the wall was only shown to be of this width in one narrow trench. Rather than being a wall of a massive building, conceivably wall G at this location might just have been a foundation for a large pier or base which supported some manner of localised superstructure. The discoveries in the western corner of the *insula* are hard to interpret, but the columns and impost recorded by Taylor, and the stylobate located in 1998–9, all point to another public building here. The available dating evidence does not contradict the notion that the structures on the north-west and south-east frontages of *insula* II were constructed as part of a single coordinated building programme in the first half of the 2nd century, and this most probably included the baths themselves.

Water supply and drainage

The evidence for the water supply and drainage systems of the Roman town have been previously discussed, but it is worth revisiting this topic in the context of supply to the public baths.[62] Cirencester lies in the valley of the river Churn and springs occur on the valley sides at the interface of the impermeable clay of the Fuller's Earth and the overlying Forest Marble. It has long seemed likely that springs on the north-eastern valley side would have been exploited as the source of the piped water system detected in excavation inside the town. Fresh water must have entered the town at or near the Verulamium Gate as a water pipe trench has been found in the street immediately behind the gate, but water would also likely have entered Cirencester in the vicinity of the Gloucester Gate to supply the north-western half of the town. Geophysical survey and trial trench evaluation at a site 0.5–1 km north of the Gloucester Gate may now provide some supporting evidence for this hypothesis. The work occurred at a site off Bowling Green Lane on the sloping flank of the Churn valley.[63] Geophysical survey detected a meandering linear feature which closely followed the contour of the hillside. Trenching established that the feature in fact comprised a pair of flat-bottomed cuts, one the recut of the other. The primary feature varied from 0.5–1.5 m wide in the two locations it was

[58] I previously wondered whether the yard revealed at Leaholme Gardens was part of the *palaestra*, but *palaestrae* usually had sanded surfaces, while the surface revealed by Wacher was of gravel, so this interpretation is likely incorrect: Holbrook 1998b: 188.

[59] Henig 1993: 29 and pl. 24, no. 85; Beecham 1887: 276; the findspot was marked on the 1875 Ordnance Survey map.

[60] Wacher 1962: 9.

[61] Ward-Perkins 1981: 151, 163–4; Nielsen 1990: figs 96, 146.

[62] Holbrook and Salvatore 1998: 25–6.

[63] Cotswold Archaeology 2016.

sectioned and was up to 0.5 m deep. The recut was 1.7–2.3 m wide and of similar depth. The upper fills of the features were silty and largely stone free, suggestive of a build-up of water-borne sediments. Sherds of Roman pottery were recovered from the excavated sections. Between the two excavated sections, which were 160 m apart, the base of the primary cut fell by only 0.1 m, and the recut by 0.5 m.

The course adopted by these features on the sloping valley side rather than on the edge of adjacent flat-topped hill makes an interpretation as a land boundary implausible, and more likely they were open leats that transported water. The leats lay at an elevation of 119 m AOD within the site, and the natural topography slopes gently down towards the site of the Gloucester Gate where modern ground level is at 113 m AOD. Thus the possibility exists that the leats were part of an aqueduct which transported water from a spring towards the Gloucester Gate. Once inside the town the water could have been carried to the baths site, which lay at 110 m AOD, in wooden pipes laid alongside Ermin Street. The scraps of pottery recovered from the cuts provide little assistance in determining when they fell out of use, although that the primary feature was comprehensively recut suggests some longevity.

No trace has yet been found of the principal outfall drain from the baths, which must have drained south-east to follow the natural topography of the town (modern ground level at the site of the Silchester Gate is at *c.* 107 m AOD). Later Roman drains have been found in the streets to the south-east of the baths site which could have been associated with the disposal of water, but none seems large enough to have been the principal outfall drain.[64] Street F formed the south-eastern boundary of *insula* II and a stone-lined drain within it was 0.4 m wide and 0.35 m deep filled with green silt, presumably a cess-rich deposit from a latrine.[65]

Conclusions

The interest that the hypocaust provoked in the 17th and 18th centuries as an example of Roman civilisation translated to Britain can be seen very much in terms of national perspectives, interests and fashions prevalent at the time.[66] A convincing case can now be made for the hypocaust forming part of the public baths of Cirencester. We know very little of the form and chronology of the baths, but future opportunities to increase that understanding through remote sensing or further excavation will doubtless present themselves.[67] As a major town of the province we can reasonably expect the baths to have been on some scale, and seemingly comparable in size to those at Wroxeter. Where our evidence is of sufficient quality, the public baths in the major towns of Roman Britain were mostly maintained in use well into the 4th century, as for instance at Dorchester and Wroxeter.[68] Given the 4th-century renovations of the adjacent forum in Cirencester, we might reasonably expect the baths to have had an equally complex and prolonged history and perhaps to have received some renewed investment in the 4th century.[69] Cirencester is often considered to have been the capital of the late Roman province of *Britannia Prima*, although this is not assured, and Gloucester could make an equal claim to this distinction. The modifications to the forum have sometimes been considered in the context of its possible conversion to a late Roman governor's residence, although Luke Lavan sums up the situation succinctly and wisely '… one could hypothesise almost endlessly, as the site presents no strong parallels with more securely identified governors' palaces. However, in those cities which became provincial capitals for the first time under the reorganisation of Diocletian, it is highly likely that official buildings of the provincial administration were established inside pre-existing civic structures'.[70] The baths are also likely to have served the needs of late Roman officialdom resident in the town.

Dedication

I first met Paul Bidwell when I was an undergraduate at Newcastle University and he was writing up the results of his excavation at Vindolanda. Our increasingly lengthy conversations had an immediate and enduring effect on my understanding of Roman archaeology, primarily via a heightened appreciation of what could be gained by meticulous excavation and detailed consideration of artefacts. We became firm friends and he inspired me to follow a career in field archaeology. Paul gave me my first big career break, the opportunity to direct an excavation on Hadrian's Wall at a relatively young age, and afterwards I followed in his footsteps to Exeter. The values that Paul taught me as a young man endure just as much today as they did then. It is an honour to be invited to contribute to this volume

[64] Holbrook and Salvatore 1998: Ermin Street (Street A), observation 4; Street F, observations 1 and 3; Street C, Observation 5.

[65] Holbrook 1998a: 189, feature AMV3; fig. 131.

[66] Hingley 2008.

[67] Analysis of ceramic building material from the central part of the Roman town might assist in identifying material that could have derived from the baths. The only sizeable assemblage that has been recorded to contemporary standards of accuracy derived from the Corn Hall (*insula* XXIII; Warry 2015). Flue tile was well represented here, but the source of the material is unknown. The flue tile included one fragment of *parietalis* and one *tegula mammata* (Brodribb 1987: 65 notes another four complete examples of the latter type from the town). Such tiles are normally broadly dated to the 1st century and this dating would suggest they may have come from a public building, perhaps the baths.

[68] Rogers 2011: 83–89; Putnam 2007: 70–71; Ellis 2000: 75–77; White and Barker 1998: 112–15.

[69] Holbrook and Timby 1998.

[70] Lavan 1999: 138.

as I owe Paul so much professionally, and I have valued and enjoyed his friendship over many years. In my estimation he is one of the greatest excavators of his generation and everything he writes is worth reading. I hope he finds some interest in this contribution.

Acknowledgements

I am grateful to Cotswold Archaeology for permission to reproduce Figure 1 and to Aleksandra Osinska of the same organisation for producing the other illustrations. Figure 3 is reproduced with permission from the British Library. I wish to acknowledge the assistance of the following individuals for assistance on tracking down manuscripts or digital copies of illustrations: Jerrell Jones, University of Houston Digital Library, Jeff Kattenhorn, Manuscripts and Maps Reference Service, The British Library, and Becky Loughead, Librarian of the Society of Antiquaries of London. Nick Hodgson kindly commented on an earlier draft of this paper and made a number of valuable, and doubtless correct, comments on interpretation. Peter Warry also advised me on aspects of the ceramic building material from Cirencester.

Bibliography

Anon. 1785. Some account of a brass image of Roman workmanship found at Cirencester. In a letter from the Rev. Mr John Price of the Bodleian Library at Oxford, 1767. *Archaeologia* 7: 405–407.

Atkinson, D. 1942. *Report on the Excavations at Wroxeter 1923–1927*. Oxford: Birmingham Archaeological Society.

Atkyns, R. 1712. *Ancient and Present State of Gloucestershire*. London: Bowyer.

Aubrey, J. 1665–93. *Monumenta Britannica*. Oxford, Bodleian Library MS. Top. gen. c. 24: https://digital.bodleian.ox.ac.uk/objects/d16a4a69-e9c2-430a-85ad-7dfe769931e7/

Aubrey, J. (ed. A. Clark) 1898. *Brief Lives Chiefly of Contemporaries Set Down by John Aubrey Between the Years 1669 and 1696*. Oxford.

Beecham, K. 1887. *History of Cirencester and the Roman City Corinium*. Re-print 1978. Dursley: Alan Sutton.

Beecham, W.K. 1842. *The History and Antiquities of the Town of Cirencester, in the County of Gloucester, with Views of the Town, Tesselated Pavements, and Other Roman Remains*. Cirencester: Thomas Philip Baily.

Bidwell, P.T. 1979. *The Legionary Bath-House and Basilica and Forum at Exeter* (Exeter Archaeological Report 1). Exeter: Exeter City Council and University of Exeter.

Blagg, T.F.C. 1993. Architectural carvings, in M. Henig 1993. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 7. Roman Sculpture from the Cotswold Region with Devon and Cornwall:* 63-77. Oxford: British Academy.

Brodribb, G. 1987. *Roman Brick and Tile*. Stroud: Alan Sutton.

Brown, P.D.C, A.D. McWhirr and D.J. Smith 1969. Cirencester 1967–8: eighth interim report. *Antiquaries Journal* 49: 222–243.

Buckman, J. and C.H. Newmarch 1850. *Illustrations of the Remains of Roman Art, in Cirencester, the Site of Ancient Corinium*. London: George Bell.

Camden, W. (trans. P. Holland) 1610. *Britain*. London.

Carter, J. (ed J. Britton) 1845. *Ancient Architecture of England, including the Orders during the British, Roman, Saxon, and Norman Eras; and under the Reigns of Henry III, and Edward III, illustrated by one hundred and nine engravings*. London: Bohn.

Cosh, S.R. and D.S. Neal 2010. *Roman Mosaics of Britain. Volume 4: Western Britain*. London: Society Antiquaries of London.

Cotswold Archaeology 2016. Land of Bowling Green Lane, Cirencester, Gloucestershire. Archaeological Evaluation. Report 16024. Cirencester: Cotswold Archaeology, viewed 4 March 2022, <https://reports.cotswoldarchaeology.co.uk/>

Darvill, T. and C. Gerrard 1994. *Cirencester Town and Landscape: an Urban Archaeological Assessment*. Cirencester: Cotswold Archaeological Trust.

Ellis, P. 2000. *The Roman Baths and* Macellum *at Wroxeter. Excavations by Graham Webster 1955–85* (English Heritage Archaeological Report 9). London: English Heritage.

Firth, B. (ed.) 1989. *Ralph Bigland Historical Monumental and Genealogical Collections Relative to the County of Gloucester, Part 1: Abbenhall-Cromhall* (Gloucestershire Record Series volume 2). Gloucester: Bristol and Gloucestershire Archaeological Society.

Fowles, J. (ed.) 1980–2. *John Aubrey's Monumenta Britannica*. 3 volumes, Dorset Publishing Company, Sherborne.

Frere, S.S. 1988. Roman Britain in 1987. I. Sites explored. *Britannia* 14: 416–484.

Gethin, B. 2019. *Land at Leaholme Court, The Avenue, Cirencester, Gloucestershire. Archaeological Evaluation*. Archaeology Warwickshire Report 19106.

Harvey, J.H. (ed.) 1969. *William of Worcester: the Itineraries*. Oxford: Clarendon Press.

Haverfield, F. 1920. Roman Cirencester. *Archaeologia* 69: 161–209.

Henig, M. 1993. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World. Great Britain, 1, 7. Roman Sculpture from the Cotswold Region with Devon and Cornwall.* Oxford: British Academy.

Herbert, N. 2006. Introduction to the 1977 edition, in S. Rudder *A New History of Gloucestershire*. 2006 reprint: v–xvi. Stroud: Nonsuch.

Hingley, R. 2008. *The Recovery of Roman Britain 1586–1906. 'A Colony so Fertile'*. Oxford: Oxford University Press.

Holbrook, N. (ed.) 1998a. *Cirencester: The Roman Town Defences, Public Buildings and Shops.* Cirencester

Excavations 5. Cirencester: Cotswold Archaeological Trust.

Holbrook, N. 1998b. The shops in *insula* II (the possible *macellum*). Excavations directed by J.S. Wacher 1961, in Holbrook 1998a: 177–188.

Holbrook, N. and J.P. Salvatore 1998. The street system, in Holbrook 1998a: 19-34.

Holbrook, N. and A. Thomas 2008. Excavations in *insula* II at Cotswold Mill, 1998–9, in N. Holbrook (ed.) *Excavations and Observations in Roman Cirencester 1998–2007* (Cirencester Excavations 6): 62–67. Cirencester: Cotswold Archaeology.

Holbrook, N. and J. Timby 1998. The basilica and forum. Excavations directed by J.S. Wacher 1961 and 1963, in Holbrook 1998a: 99–121.

Hoselitz, V. 2007. *Imagining Roman Britain*. Woodbridge: Royal Historical Society / Boydell Press.

Kenyon, K. 1948. *Excavations at the Jewry Wall Site, Leicester* (Reports of the Research Committee of the Society of Antiquaries of London 15). Oxford: Society Antiquaries of London.

Latimer, J. 1889–90. Leland in Gloucestershire. *Transactions of the Bristol and Gloucestershire Archaeological Society* 14: 221–284.

Lavan, L. 1999. The residences of late antique governors: a gazetteer. *Antiquité Tardive* 7: 135–164.

Leland, J. (ed. L. Toulmin Smith) 1964. *The Itinerary of John Leland in or about the Years 1536–1539*. London.

Lysons, S. 1817a. *Reliquiae Britannico-Romanae: Containing Figures of Roman Antiquities Discovered in Various Parts of England, Volume II*. London.

Lysons, S. 1817b. An account of the remains of several Roman buildings and other Roman antiquities discovered in the county of Gloucester. *Archaeologia* 18: 112–125.

McWhirr, A.D. 1976. Cirencester (*Corinium*): a civitas capital in the west country, in K. Branigan and P.J. Fowler (eds) *The Roman West Country*: 81–98. Newton Abbot: David and Charles.

McWhirr, A.D. 1986. *Houses in Roman Cirencester* (Cirencester Excavations 3). Cirencester: Cirencester Excavation Committee.

Morgan, M.H. 1914. *Vitruvius, the Ten Books on Architecture.* Trans. M.H. Morgan. Harvard: Harvard University Press.

Neal, D.S. and S.R. Cosh 2009. *Roman Mosaics of Britain, Volume 3: South-East Britain*. London: Society of Antiquaries of London.

Nielsen, I. 1990. *Thermae et Balnea*. Aarhus: Aarhus University Press.

Nurse, B. 2008. Englefield, Sir Henry Charles, seventh baronet (*c.* 1752–1822). *Oxford Dictionary of National Bibliography,* viewed 28 March 2021, <https://doi.org/10.1093/ref:odnb/8812>

Nurse, B. 2011. John Carter, F.S.A. (1748–1817): ‘The ingenious and very accurate draughtsman’. *Antiquaries Journal* 91: 210–252.

Osgood, R. 2009. The first Badminton House: discovery of a late Roman mosaic in South Gloucestershire. *Transactions of the Bristol and Gloucestershire Archaeological Society* 127: 203–211.

Putnam, B. 2007. *Roman Dorset.* Stroud: Tempus.

Rogers, A. 2011. *Late Roman Towns in Britain: Rethinking Change and Decline.* Cambridge: Cambridge University Press.

Rudder, S. 1779. *A New History of Gloucestershire*. Cirencester: Rudder.

Rudder, S. 1783. *A New History of Gloucestershire*. 2006 reprint. Stroud: Nonsuch.

Rudder, S. 1800. *The History of the Ancient Town of Cirencester in Two Parts*. Cirencester: Rudder.

Stukeley, W. 1776. *Itinerarium Curiosum; or, an Account of the Antiquities, and Remarkable Curiosities in Nature or Art, Observed in Travels through Great Britain.* London.

Timby, J., T.C. Darvill and N. Holbrook 1998. The public building in *insula* VI. Excavations directed by J.S. Wacher 1961, A.D. McWhirr 1974–6 and T.C. Darvill 1980, in Holbrook 1998a: 122–141.

Wacher, J.S. 1962. Cirencester, 1961: second interim report. *Antiquaries Journal* 42: 1–14.

Wacher, J.S. and A.D. McWhirr 1982. *Early Roman Occupation at Cirencester* (Cirencester Excavations 1). Cirencester: Cirencester Excavation Committee.

Ward-Perkins, J.B. 1981. *Roman Imperial Architecture*. Harmondsworth: Penguin.

Warry. P. 2015. Cirencester Cornhall— CBM Report. Unpublished report for Cotswold Archaeology.

White, R. and P. Barker 1998. *Wroxeter: Life and Death of a Roman City.* Stroud: Tempus.

Wilkinson, D. 1987. Archaeological Observations at Tower Street, Cirencester (formerly Jeffries Nursery). Revised Detailed Archive Report. Cirencester: Cirencester Excavation Committee unpublished typescript report.

Wilkinson, D. 1988. Archaeological observations at Tower Street, Cirencester. *Transactions of the Bristol and Gloucestershire Archaeological Society* 106: 201–3.

Forty years on: some Roman placenames of South West England four decades after Rivet and Smith

F. M. Griffith

It gives me great pleasure to offer a contribution to this Festschrift, as I believe the early Exeter friendship of Paul and my late husband Chris Henderson (who worked on the archaeology of Exeter until his death in 2001) was a factor in their development into two of the outstanding archaeologists of their day. Had he lived, I am sure Chris would have been the contributor to this work, albeit offering a very different paper.

By the time he left Devon in 1980, Paul had already completed and published his first major piece of work (Bidwell 1979). Working for Exeter City Council's new Archaeological Unit after completing his law degree at Exeter University, he was largely responsible for the excavation of the bath-house of the newly identified legionary fortress at Exeter, a building which to this day remains the oldest known Roman stone building in Britain. In the frenzy of commercial development of the 1970s and 80s, work by John Collis, then of Exeter University, together with the Unit under its successive directors Mike Griffiths and Chris Henderson, was identifying the defences, *fabricae*, barrack blocks and roads of the fortress beneath the known Roman town. Lady (Aileen) Fox, whose own earlier and much less well-resourced work in the post-war period had done so much to identify elements of the Roman town of Exeter, and who had recognised for the first time its military component in a ditch at Exeter's South Gate, touchingly described visiting Paul's excavation in the Cathedral Close:

> ...The returns exceeded all expectations. I shall long remember seeing in one of the first cuttings the monumental flight of steps which subsequently proved to belong to Isca's basilica, superimposed on the hypocaust of what could only be a military Bath Building (Fox in Bidwell 1979, vi).[1]

[1] Lady Fox was always positive and generous toward her successors in Exeter's archaeology. In marked contrast to some other senior figures dealing with the younger generation, she was always keen to keep in touch with progress, and both politically and practically supportive of the work of the Archaeological Unit, for whose formation she had lobbied vigorously. When she visited Chris Henderson's excavations at the South Gate in 1989, which partially re-excavated her 1964 trench across the tower of the gate of the Roman town (Fox 1968: 12-23), she reacted with delight when he pointed out some small but critical traces of the footings of the tower which she had not recognised at the time, which demonstrated conclusively that it had been set flush with the front face of the town wall (Henderson 2001: 68). It is perhaps an understatement to say that this is by no means a universal response of an older scholar to such a situation.

To the present day, Paul continues to contribute very fully to our further study of the Roman South West, most notably in his contributions to ceramic studies, and his chapters on a number of different topics in the two recent volumes of the *Exeter, A Place in Time* project (Rippon and Holbrook 2021a and b). But before he left Exeter he produced another volume, *Roman Exeter, Fortress and Town* (Bidwell 1980) which summarised not only the known information on the city in the Roman period, but also the context of Roman activity in South West England as then known. In the period since then, a combination of aerial reconnaissance, the study of LiDaR, geophysical surveys on a scale previously undreamed of, and an increase in rescue archaeology beyond the cities, has radically changed the picture of Roman military activity in the South West, perhaps more than in any other part of the country. The same factors have very much altered the picture of the intensity of Romano-British civilian and rural settlement in the peninsula. The changing military picture is spectacularly illustrated by comparison of Figure 1 (redrawn from Bidwell 1980: fig. 4) with the current map of our fast-evolving picture of military sites in Devon and Cornwall (Figure 2, which also shows other places named in this discussion).

At the same time as Paul was publishing his original two Exeter volumes, Leo Rivet and Colin Smith published their magnificent *Place-Names of Roman Britain* (Rivet and Smith 1979; hereafter R and S). It follows therefore that they were working, for South West England, from a picture very similar to Figure 1, at a time when the understanding of the Roman South West was changing quite rapidly, a point which they recognised in their work (R and S: 508). The object of this small paper offered to Paul is to try to provide an update for some of the placenames in the light of our expanded knowledge of Roman military activity in Devon and Cornwall (but without discussion of Scilly). I shall not here be venturing into problems of the texts of the ancient geographers, nor the reading of the geographical coordinates in the manuscripts (e.g. R and S: 130-1), nor far into the actual etymology of the names. For the convenience of the reader and the typesetter I shall be using the transliterations of placenames given in R and S's Alphabetic List of Names rather than, for example, giving the Greek of Ptolemy.

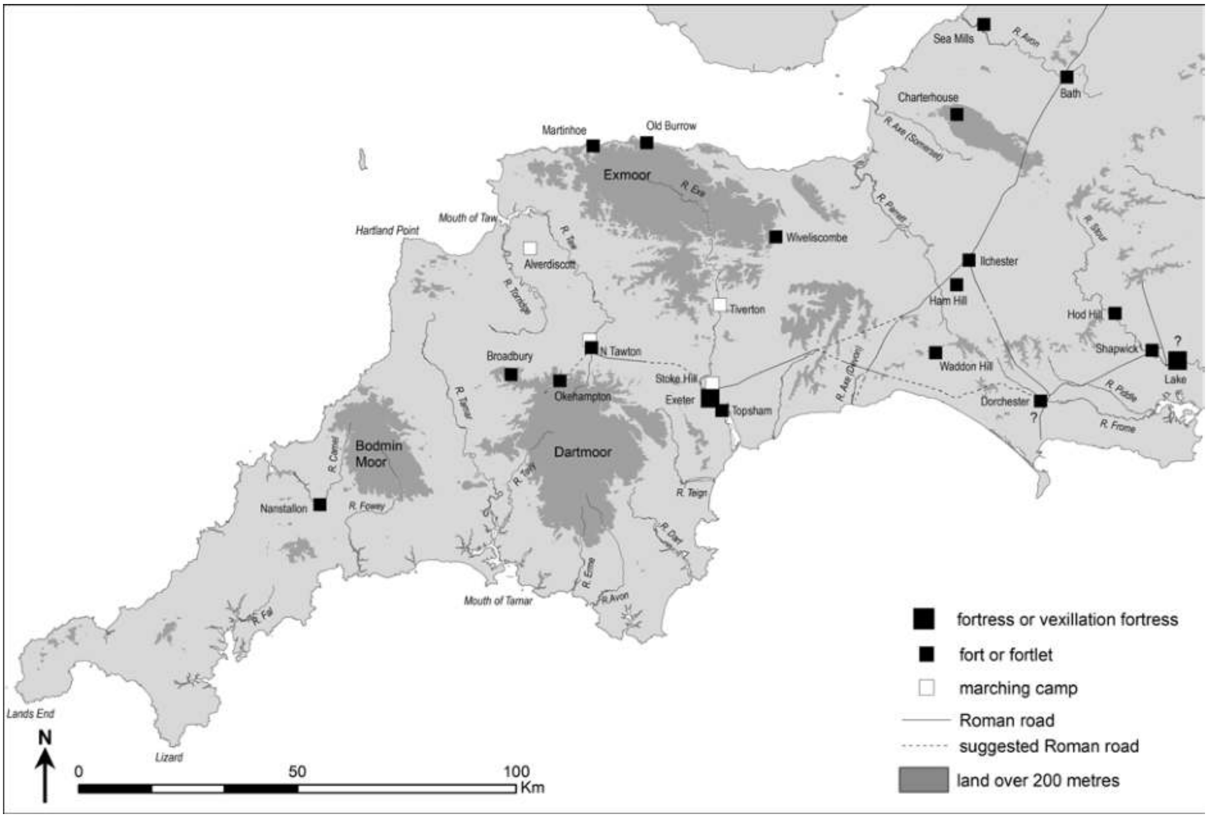


Figure 1. The Roman South West in 1980. Redrawn from Bidwell 1980: fig. 4.

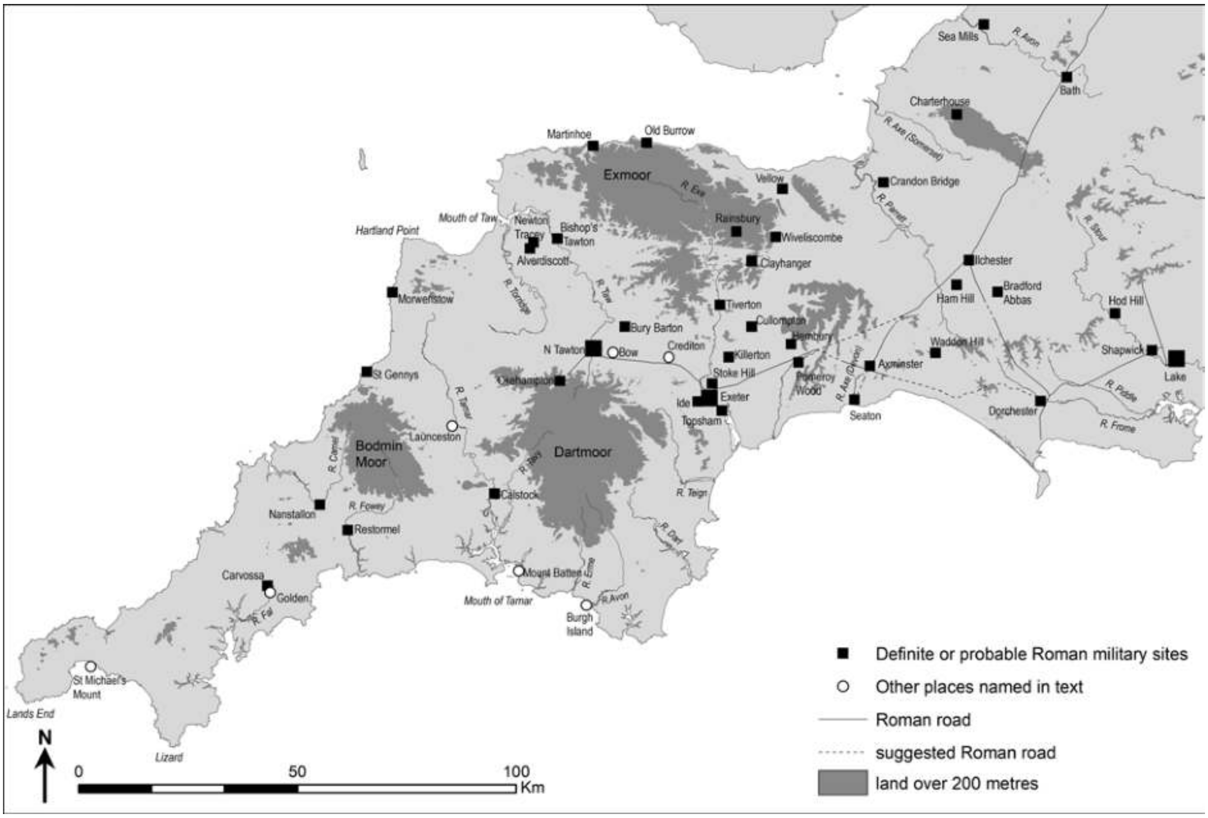


Figure 2. South West England, showing Roman military sites and other places named in the text.

Ptolemy

The oldest references to South West Britain in the sources for Roman placenames, and the ones I shall principally be discussing, are in (much later) manuscripts of the work of Ptolemy, a second-century AD Greek geographer. Unlike many of the sources discussed here, Ptolemy took an avowedly geographical approach, providing latitude and longitude coordinates for locations, as well as some distances in the British portion. He explains in some detail the projection he uses for his coordinates (*Geography* 1,1; all references given here are to the *Geography*), although unfortunately for us, it appears that his information may derive from different sources and not be entirely compatible (see below).

For our region, Ptolemy (II, 3, 12-13) states that there are four *poleis* in Dumnonia. However, R and S (105) suggest that, for *polis*,

> ...the word means no more than 'place' [rather than 'city'], or perhaps 'place-with-a-name', so it is legitimate to seek his *poleis* not only in towns but also in forts or even camps.

In South West Britain it is perhaps more likely that we should be seeking identification of placenames with sites that, although their origin may lie in the sites of 1st-century forts or camps, can be seen to have continued in use, either official or civilian, in the post-military period, and which we identify now as *mansiones, stationes*, continuing *vici,* or roadside settlements. In contrast to when Rivet and Smith were writing, over the past 40 years we have now expanded the range of such sites, usually as a result of initial investigation of a military site, and these, together with the expansion of our picture of the military scene, puts us in possession of more candidates for the identification of the locations of Roman placenames than were available to Rivet and Smith at that time.

The four *poleis* in the country of the Dumnonii mentioned by Ptolemy are (R and S: 144): *Voliba, Uxel(l)a, Tamara,* and *Isca, Legio II Augusta.* I will discuss these below. In addition, Ptolemy's list of features of the coasts of Britain contains, for South West England, three landmarks (Promontory of Heracles, *Antivaestum/ Bolerion*, and *Damnonium/Ocrinum* promontory) which are identified by R and S as Hartland Point, Land's End and the Lizard respectively, as well as the estuary of the *Uxela* on the north coast and the estuaries of three rivers on the south coast of modern Devon and Cornwall – the *Cenio*, *Tamarus* and *Isca*. The last three rivers can be identified with reasonable confidence as the estuaries of the Fal (it has been suggested that the river Kenwyn conserves the name, though this is doubtful), the Tamar and the Exe. I will discuss *Uxela* below. R and S (116-7) comment on the lack on correlation between the coordinates in the coastal list and for the inland names such as *Isca*, and suggest that for Britain (unlike the survey for Ireland), the two sets of data derive from separate sources of information, possibly an official survey for the coastal list.

Other sources

The other principal sources for placenames in the South West are the Peutinger Table (*PT* - only for *Moridunum* and *Isca Dumnoniorum)*, the Ravenna Cosmography (*RC*), which is fairly problematic for our region, and the Antonine Itineraries (*AI*), which add very useful additional information – partly simply because of the fact that their placenames are presented in what should be a sequential linear order – and offer additional possibilities for us. In addition to these, Diodorus Siculus is our main source for the name *Ictis*, which may or may not be of concern to us in the South West.

Isca Dumnoniorum (Ptolemy II, 3.13 [17°30', 52°45']; *PT*; *AI Itinera* XII and XV; *RC* $106_{2,}$ $106_{6\text{-}9;}$ *PT*)

Perhaps I may start with the most universally agreed name – *Isca*, and *Isca Dumnoniorum.* This is the major Roman military complex at Exeter and its later Roman town. We now know that the fortress at Exeter was surrounded by a number of other military establishments, extending to its port at Topsham (Rippon and Holbrook 2021a; Kaye and Salvatore, this volume; Maxfield forthcoming). As with others of the four *poleis*, Isca shares its name with one of the principal rivers whose estuaries are mentioned by Ptolemy. There is general agreement that **isc-* and cognate forms must relate to a pre-Roman word for water or a watercourse (Ekwall 1928: 154-7). The present-day river names Usk, Esk and so on, with sundry rivers Axe, Exe probably showing Anglo-Saxon metathesis, and their parallel Continental forms, have been discussed in detail by Ekwall, and by Jackson (1970: 74-5), among others. Although, then, the river name *Isca* is widely found (see map: R and S: fig. 30), the presence of the name *Isca Dumnoniorum*, containing the name of the local tribe the Dumnonii, in all the sources and its appearance in the 'right' place for Exeter in the Peutinger Table's fragmentary map makes this attribution fairly certain. The fact that Ptolemy writes *Legio II Augusta* after *Isca* suggests either that he is using a 1st-century source (when we know the legion was in Exeter), or that the legion's later presence at another *Isca* – Caerleon/Usk – has caused confusion (see R and S: 378 for further discussion of this). One may add that Russell *et al.* (2020: 118) have recently made a bid, following Norman Field (1968), for the identification of the vexillation fortress at Lake Farm as the *Isca* in the *AI Iter* XV, although we can be fairly confident that Lake Farm lies in the territory of the Durotriges. They say 'If the II Augusta legion were somewhat conservative in fortress nomenclature, it is perfectly possible that *Isca* was the designation that they gave not only to Exeter and Caerleon, but also to Lake Farm before.' My own feeling is that this might be one *Isca* too many.

Tamara (Ptolemy II, 3.3 [15°, 52°15]; *RC* 108_{26})

Tamara/us is once again a *polis*/estuary pairing. Ptolemy's coordinates put the *polis* of *Tamara* (R and S: 144) well north of the site of 'mouth of river *Tamarus*', which is given at 15°40', 52°10' (R and S: 135 – although see below on discrepancies between coastal and inland coordinates), and so we appear to have records of both the river mouth – Plymouth Sound – and a *polis* presumably located upstream but adjacent to the river. This appears to make the suggestion that the *polis* of *Tamara* might be the Roman trading site of Mount Batten, on the eastern side of Plymouth Sound, demonstrated by Cunliffe (1988) to be a Roman port, a little unlikely.

The general belief has been that *Tamara* is a place located at a bridging point considerably further up the Tamar. Possible locations that have been suggested are at somewhere east of Launceston, around Polson Bridge (SX 356 848), which surely must be a probable location for a fort on topographical grounds, where the major route from *Isca* into Cornwall crosses the river, although no sign of a fort or settlement has yet been found, or at Greystone Bridge, Pallastreet (what a promising placename, though no Roman road is yet known; the name is recorded as *Pillestrete* in 1281: Gover *et al.* 1931: 173) at SX 368 804. The possibility that the hillfort of Carthamartha, above the Tamar at SX 377 782 may preserve entangled forms of the names *caer* ('fort') and Tamar has been suggested by Henderson and Coates (1928: 58) among others. However, by far the most substantial Roman site so far known in the Tamar valley is that at Calstock, where geophysical survey and excavation by Chris Smart (2014) have demonstrated the presence of a Roman fort and associated large polygonal enclosure. So far little material dating from beyond the 1st century has been identified, but a fairly small proportion of the whole site has yet been excavated. The fort at Calstock occupies the summit of a tight loop of the Tamar, and we can observe that vessels of seagoing size can still penetrate the river up to Calstock. At present this remains our best candidate for *Tamara.*

Nemetotacio/statio (*RC* 105_{47})

This name is not mentioned by Ptolemy and is found only in *RC.* The emendation of *Nemeto-tacio* to *Nemetostatio* was proposed by Richmond and Crawford (1949: 42) and this was accepted by R and S (424). Its identification as being the Roman fort at North Tawton, first identified on vertical air photographs by the Ordnance Survey (Fox 1953: 174; Wright 1953: 124) and subsequently photographed by St Joseph (1958: 98), was first suggested by Lady Fox (1959: 174-5). The site lies on the Roman road from Exeter to Okehampton (Salvatore *et al.* 2019) at its crossing of the river Taw. Subsequently, our understanding of the scale and complexity of the monuments at North Tawton has been expanded considerably by photography both by David Wilson of CUCAP and by the writer (St Joseph 1977: 125; Griffith 1984a: 20-5; 1997: 362) and by recent large-scale geophysical survey by Chris Smart and Joao Fonte (Smart and Fonte *in prep*.). The results of all of these studies suggest that at North Tawton we have a possible fort, two possible temporary camps, a short-lived vexillation fortress or possibly a large 'short-term base' (Bidwell 2021: 151), a fortlet, a road, and extensive geophysical evidence for a substantial complex of buildings around several roads or streets (Smart and Fonte in Salvatore 2021: 426-7). The complexity of the cropmark evidence (e.g. Griffith 1984a: figs 4-6) suggests multiple episodes of re-use and reconstruction, while sufficient material of post-1st-century date has been recovered in sundry small-scale rescue excavations to confirm continuing use post-dating the 1st-century military operations.

The identification of **Nemetostatio* with North Tawton has subsequently been challenged by Todd, who put forward a claim for the fort at Bury Barton, Lapford, another site discovered by St Joseph in 1976 (Todd 1985). However, the argument for this identification, as well as that for North Tawton, was based on the profusion of placenames containing the element 'nymet' in the area (Figure 3), and it does indeed seem probable that this would be the source - or the product - of the Roman placename. 'Nymet' is taken to derive from the Celtic root **nemet-* and is a word that is found extensively in Roman placenames - 'a widespread and fundamental word of the early Celtic world' (R and S: 254). While its meaning is often suggested to be 'sacred wood' (e.g. Stevens 1976), I would suggest that this interpretation may be too coloured by the cognate Latin *nemus*, and that **nemet* can in fact be suggested to be more specifically a religious centre, or *sacellum* (see Vendryes 1960: *s.v.*). I have elsewhere expanded this argument in greater detail (Griffith 1985a), but suffice it to say here that there are numerous examples of Roman **nemet* placenames (for example, *Aqua Arnemetiae* and *Vernemeton* in Britain*, *Seno-nemeton* (Senantes) and *Nemetocenna* (Arras) in Gaul and *Rostrum Nemaviae* (Goldberg, Bavaria)) where a major nearby upstanding prehistoric monument can very plausibly be suggested to be the *nemet/sacellum* in question. We also have the name Lanivet in Cornwall, which arguably refers to the surviving henge at Castilly (Thomas 1964). Piggott (1965: 71; 1968: 233) and others have discussed

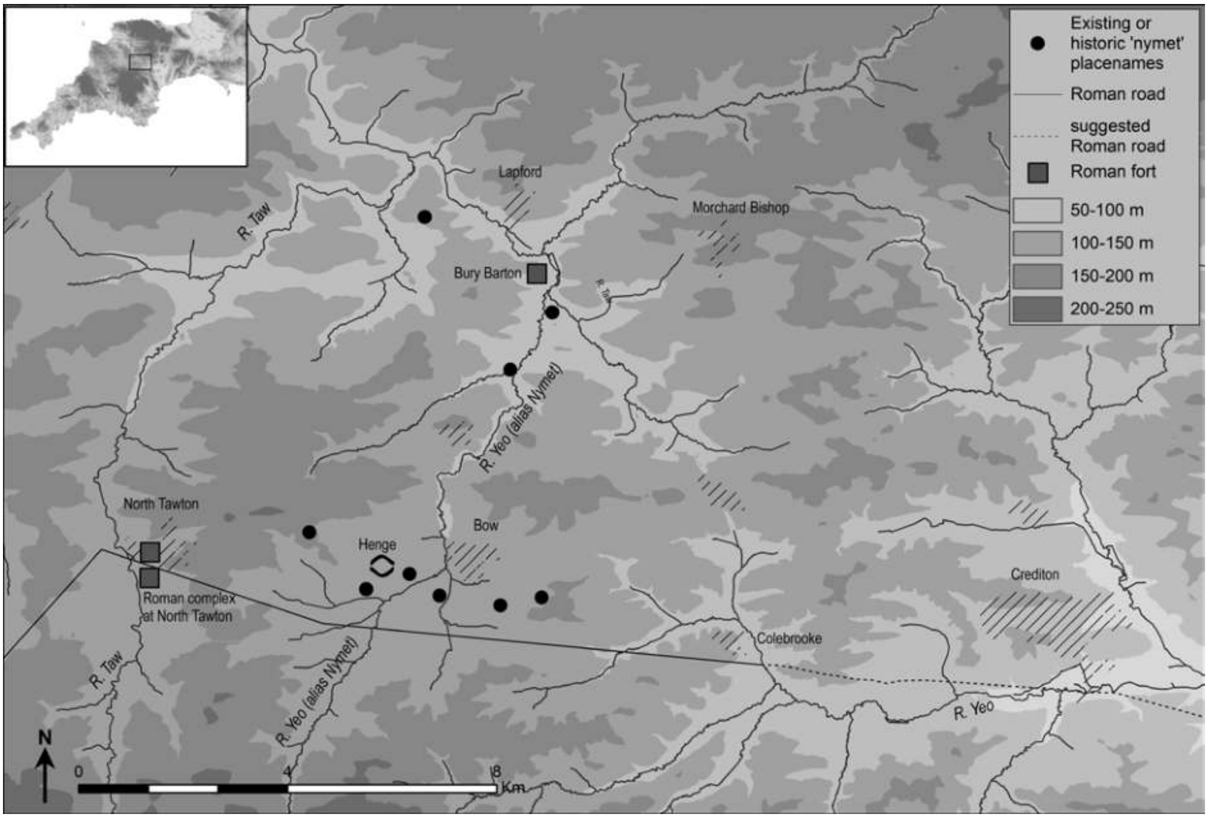


Figure 3. Roman military sites, the henge at Bow, and placenames incorporating the element 'nymet'.

the resemblances between henges and Iron Age and Romano-Celtic shrines. I have proposed (Griffith 1985a: 122) that the focus for the Nymet placenames can be seen as the henge discovered from the air in 1984 at Bow (Figures 3 and 4; Griffith 1985b), less than 5 km east of the military complex at North Tawton and 6 km south of Bury Barton. While the henge was discovered as a cropmark, faint traces of its earthwork form survived at least until the 1980s, and it would formerly have been an imposing monument. This is not to assert that it was necessarily a currently active religious centre at the time of the establishment of the Roman fort, but rather that it was something that was recognised either by the locals or the Romans as what a religious site should look like, and thus it might well be recognised as a **nemet.* In this case, I suggest that the henge at Bow was known as a **nemet,* was the source for the name *Nemetostatio* (Gelling 1988: 243), and that perhaps as a result of the naming of the nearby river (formerly known as Nymet but now the Yeo) the name informed many placenames in the area. Whether it was applied to the site at North Tawton, or at Bury Barton, or the possible fort at Colebrooke (Figure 3; Stevens 1976: 242; Griffith 1988: 56, pl. 41; but see now Salvatore *et al.* 2019: 315) or indeed to the suspected but as yet undiscovered fort at Crediton further along the Roman road to Exeter cannot with confidence be decided. The position of the name in the *RC* list seems to allow little help in this.

Uxela (Ptolemy II, 3, 2 (estuary: 16° 53°30'); II 3, 13 (*polis*: 15° 52°45')

Before leaving North Tawton, I should like to consider another possibility for its identification. The position of the place *Uxel(l)a* (R and S: 144, 482-3) is given by Ptolemy, who describes it as one the four *poleis* of the Dumnonians, on the same latitude as *Isca* (i.e. due west of Exeter), with coordinates that fit North Tawton very well in relation to *Isca*, and the relative distance from London also seems reasonable (R and S: 119). As discussed above, the scale and date range of Roman activity at North Tawton would be appropriate for a *statio* or a *polis,* so this is a genuine possibility for *Uxela*. There is another possible argument that can be adduced in favour of this identification. Of Ptolemy's four *poleis,* the two whose general location we can identify with some certainty, *Isca* and *Tamara*, are also the names of the rivers on which they sit, whose estuaries are given in Ptolemy's coastal section, II, 3, 2-3. *Uxela,* as well as being a *polis,* is also a major estuary in Ptolemy. It has been observed already that the coordinates given for the estuaries do not generally accord closely with those given for the *poleis* of *Isca* and *Tamara*, and R and S (116-7, 131) suggest that in fact the data sets for the list of coastal locations and the lists of inland places derive from two different sources and therefore do not tie together well. The site at North Tawton lies next to the

Figure 4. Is it a nemeton*? The henge at Bow. Photo F.M. Griffith, Devon County Council, 6 July 1984.*

From this we can see that the list only covers really major landmarks and estuaries, and its maritime perspective suggests that the putative survey might well not have penetrated very far up the *Sabrina*/ Severn Estuary before crossing toward the Exmoor coast when it came into view from off the coast of south Wales. The latitude given for the two river mouths in south Wales and that of the Severn is the same, again suggesting that whoever mapped this may not have gone very far up the Severn Estuary. However, we do of course know that the Roman base at Sea Mills was in operation quite early after the Conquest (Ellis 1987: 99-102), and that the Parrett was certainly functioning for seaborne trade to the port of Crandon Bridge at least from the 2nd century (Rippon 2008). All the other rivers and estuaries recorded in the list are major watercourses, and the Taw/Torridge estuary is the only major estuary on the north coast east of Hartland Point, and if we view Ptolemy's list as a navigational tool, it is a more substantial landscape feature than the mouths of either the Axe or the Parrett in Somerset suggested by R and S, or indeed any of the other small estuaries on the north coast. The **uxo*- root of the river's name is certainly better suited to the high moorland origin of the Taw than the lowlands of west Dorset where the Parrett rises. While the coordinates that have come down to us from Ptolemy do place the mouth of the *Uxela* further east than the Taw/Torridge Estuary, if we can assume some internal consistency in the coordinates of the coastal list, we can see from the above table that its longitude gives its relative position as approximately opposite to a point between the mouths of the Towy and the Taff, which would suit the Taw very much better than the Axe or the Parrett far to the east on the Somerset coast (on this subject we may also note that *RC* 105_{46} mentions *Eltabo*, which R and S (205) tentatively reconstruct as **Fl Tavo* (i.e. *flumen Tavo*), which might possibly be the Taw by its present name - if indeed it is not the Tavy, in south Devon. It is however not unknown either in antiquity or the present day for a river to go by more than one name, and so the two may not be mutually exclusive).

river Taw, which reaches the sea at one of the principal estuaries of the north Devon coast. Furthermore, the name *Uxela* derives from British *uxo*- meaning 'high' (R and S: 482), and this could well refer to the Taw's source, rising as it does close to the highest point on Dartmoor before flowing north. Ptolemy's coordinates give the location of the estuary as due north of North Tawton: north is good but the estuary is in fact north-west of North Tawton while Ptolemy's coordinates put it rather further east.

My suggestion that the pairing of *Uxela,* estuary and *polis*, may equate to the pairing of the Taw/Torridge estuary and North Tawton is strengthened by looking at the estuary in the list of coastal features given by Ptolemy in II, 3, 2. On R and S's interpretation, this list, from St David's Head to Land's End (R and S: 134), runs:

Ptolemy's coastal list	**Coordinates**	**R & S attribution**
Octapitarum promontory	14°20', 54°30'	St David's Head
Mouth of *Tubius*	15°30', 54°30'	Tywi/Towy[2]
Mouth of *Ratostathybius*	16°30', 54°30'	Taff
Sabrina estuary	17°20', 54°30'	Severn
Uxela estuary	16° 0, 53°30'	R & S propose the Axe or the Parrett
Promontory of *Heracles*	14° 0, 52°45'	Hartland Point
Promontory of *Antivestaeum/ Bolerium*	11°30', 52°30'	Land's End

[2] Oddly, R and S do not discuss Tubius further in their alphabetical gazetteer. For a detailed discussion of Ptolemy's rivers in South Wales see Sims-Williams 2000: 7-8.

Voliba (Ptolemy II, 3, 13 [14°45 15°])

This is the last of Ptolemy's four *poleis*, and the only name among them that does not also appear in his list of rivers. R and S (508) seem particularly uncertain about both the reading and the etymology of the name. In terms of Ptolemy's coordinates (R and S: 144) and distance (R and S: 119) it is the furthest west and south of the *poleis* of the Dumnonians, considerably further away from London than Tamara (R and S: 119), and at present we have no particularly strong candidates for it. R and S (508), recognising the fact that new forts were even then being identified in Devon and Cornwall, proposed 'an unlocated early Roman fort in Devon or Cornwall'. Since we now suggest Calstock for *Tamara* it seems that it might be reasonable to look further into Cornwall for *Voliba*, which at present gives us the choice of the fort at Nanstallon (Fox and Ravenhill 1972), which lies roughly at the lowest crossing point of the river Camel, the probable military site at Carvossa (Carlyon 1987), or the newly recognised fort complex at Restormel (Nicholas and Hartgroves 2018) at the lowest crossing point of the Fowey, which curiously enough was suggested in 1586 as a location for *Uxela* by Camden. The date range for Restormel shows activity from the 1st to the 4th centuries, and for Carvossa into the 3rd century, whereas Nanstallon appears to have been quite short-lived. Holbrook (2001: 154) has suggested that the latter's location may be linked to control of the tin trade. I am very grateful to Oliver Padel (*pers. comm.*) for the tentative suggestion that the case for the impressive hillfort at Golden, only a mile from Carvossa, might be revisited, despite its dismissal by R and S (508). Its situation, at SW 924 468, above the river Fal, and its position as the westernmost of all the coordinates given by Ptolemy, make it an interesting possibility. Its former name of *Wolvedon*, first attested 1293, although as it stands perfectly explicable as an early English placename, might instead possibly contain a reinterpreted form of the name *Voliba* via an Old Cornish derivative of that, perhaps with added *din* (fort) (Phillimore 1890: 24-5, n. 4). A further potential candidate might be the Roman fort at Okehampton, in Devon, only 7 km from North Tawton, though this fits even less well with Ptolemy's coordinates. Here, recent rescue excavation beside the known fort has identified a substantial *vicus* of some 25 timber buildings aligned along a road, dated to *c*. 50-85, and so contemporary with the fort (Salvatore 2019: 449, fig. 30).

Moridunum (*AI Iter* XV $486_{16,}$ also probable duplication *Iter* XX, 483_{7}; *RC* $106_{2,}$ $106_{4,}$ 106_{9}, 106_{13}; also on *PT* truncated by damage, appearing as [*Mo*]*ridumo)*

This placename has perhaps drawn more debate than any other in the South West. The wide range of locations to which the name has been attributed, with greater or lesser degrees of confidence, is shown on Figure 5.

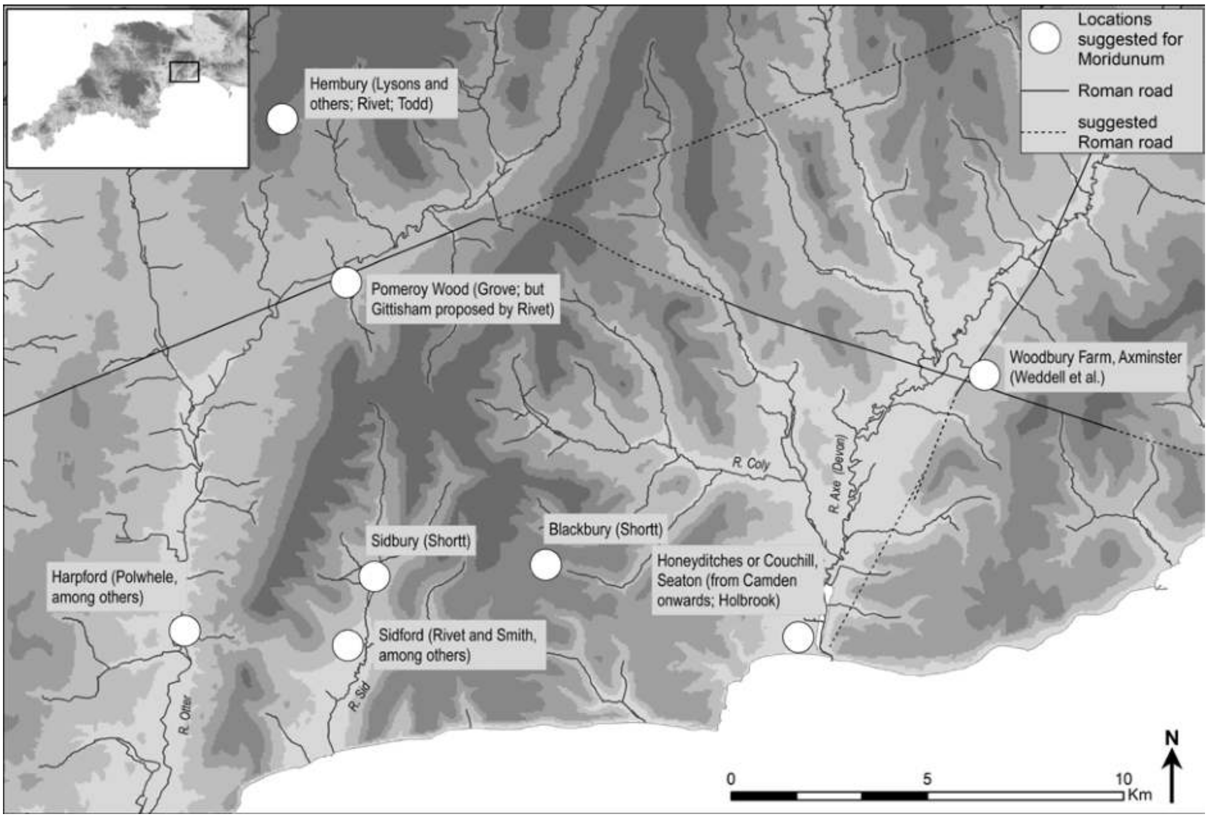


Figure 5. Some of the possible locations that have been suggested for Moridunum *in east Devon. (Elevation data as in Figure 3).*

Some of these do have the archaeological attributes to make a claim reasonable. Until recently, Woodbury, Axminster, was perhaps the front runner (Weddell *et al.* 1993: 78), lying as it does on the confirmed line of the *Isca-Durnovaria* (Exeter-Dorchester) road at its junction with the Fosse Way (Maxfield 1995), above the crossing point of the river Axe. Woodbury is a fort site providing evidence of later use, including the presence of stone buildings suggestive of a *mansio* (Silvester and Bidwell, 1984; Griffith 1984b; Weddell *et al.* 1993; Cole and Linford 1993). The 'natural' interpretation of the name is as 'sea fort' (R and S: 421), and therefore the first place to look for it is by the sea, despite the fact that the *Peutinger Table* does not show the name actually on the coast. Seaton, at the mouth of the Axe, at the probable terminus of the Fosse Way, has often been suggested. Seaton has produced quite a lot of somewhat difficult evidence for much Roman activity, both military and civilian, including a possible villa and a possible fort site at Couchill, beside the mouth of the river, whose harbour was more usable in antiquity than it is today (Miles 1977; Silvester 1981; Holbrook 1987; Parkinson 1985). Sidford has produced little evidence of Roman activity though it does possess a hillfort, and seems to have been suggested on geographical grounds alone (R and S: 422). Hembury, a site on the tip of the Blackdown Hills overlooking the valley of the river Otter, has been proposed as another possible site at least since the time of Lysons, long before the discovery of the Roman fort within the hillfort there. When the early Roman fort was discovered (Todd 1984) Leo Rivet revived the very attractive idea (albeit one that had previously been rejected by Jackson (1970: 77)) of an alternative interpretation of the name as 'bramble-grown hillfort', *mora-dunum*, in view of the fact that the Roman fort was constructed in a hillfort that we know had been abandoned by its Iron Age occupants well before then (Professor Rivet told me at a conference in 1986 that it was he who had suggested this to Malcolm Todd, although he is not credited with the revival of the attribution in Todd's paper).

However, it appears that we now have a new and very strong candidate for *Moridunum*. R and S (180) observe that the presence of *Moridunum* on both the Peutinger Table and *Iter* XV of the Antonine Itinerary indicates that it is a road station, and, Rivet (1970: 61) makes the essential point that *RC* sites it also on the *Isca-Lindinis* (Exeter-Ilchester) road, in addition to its position in Antonine *Iter* XV (and XII, which appears to be a duplication of the same passage) between *Durnovaria* and *Isca.* In that paper, Rivet (1970) prophetically identified Gittisham as a likely location for *Moridunum* on the grounds both of location and the actual distances given in *RC.* We now have a fort and a later Roman roadside settlement at almost exactly this place, discovered in rescue work in advance of road construction close to the crossing of the river Otter at Pomeroy Wood, Gittisham (Fitzpatrick *et al.* 1999; Salvatore 2011). Given the good fit with the other geographical details, and especially the distances in *RC,* this must now be the prime contender for the site of *Moridunum* (Grove 1999). The location adjacent to the marshy land of the Otter valley might allow the interpretation of the '*mor*' element of the name as a place of inland dampness (R and S: 421), although it is still conceivable that the name might have migrated down from the 'brambly' early fort at Hembury, overlooking the Otter Valley, only some 4 km away as the crow flies (we can also observe that the 'other' *Moridunum* has been confidently located at Carmarthen since at least the time of Camden (R and S: 422; James 2003: 7; Morgan forthcoming), and that, although accessible by water, that can hardly be described as a coastal location either).

Vectis/ Ictis (Ptolemy VIII, 3, 14; *RC* 105$_{29;}$ Pliny *Natural History*, IV, 103; Diodorus Siculus V, 22 (other references in R and S: 487)

Finally, in a south-western context, I should add another perennial topic: that of *Ictis.* This has been a subject of debate for many years. There seems general agreement that *Vectis* is the Isle of Wight, but whether *Ictis* is a separate place, and if so, where it is, is not the subject of any consensus. The sources suggest it is of particular importance because of its apparent link to the export of tin from the British Isles in the ancient world. Tin, tin islands and so on are mentioned by many ancient authors, among them Herodotus, Strabo, Pomponius Mela, and Pliny (R and S: 43). The principal source is however Diodorus Siculus, whose account is usually thought to have been drawn from a lost work of 'Pytheas the Greek', a sea captain from Massalia of the 4th century BC. Diodorus gives a fairly detailed account of the extraction, smelting and trading of tin: '...Then they hammer it into the form of astragali and convey it to an island near *Prettanike* called *Ictis*; for the area being dry at ebb tide, they convey the tin in large quantities to it in wagons....at flood tide the passage is full... at ebb tide the sea flows back...they [the islands] are seen as peninsulas. From there the merchants buy the tin from the natives...' (translation in R and S: 63).

Assuming that *Ictis* is indeed a separate place from the Isle of Wight (not known for its tin), it is one whose location has been hotly contested. Until relatively recently, the front runner was definitely St Michael's Mount in West Cornwall, which fits the geographical description well, is a place that is imposing and highly recognisable from the sea, and at the heart of a major area of tin extraction. In more recent years, Barry Cunliffe has made a vigorous case for Mount Batten (Cunliffe 2001: 75-9), on Plymouth harbour, at the mouth of several rivers from the tin areas of both Dartmoor and eastern Cornwall, where his excavations of the 1980s, following on work by Cynthia Gaskell Brown of Plymouth Museum, revealed a site which functioned as a 'port of trade' from the Bronze Age into the Roman period (Cunliffe 1988). However, this is not a tidal island as described by Diodorus.

More recently, another site which might fit Diodorus' description has been suggested at Burgh Island (Wilkes 2004: 230; Griffith and Wilkes 2006: 78-9), at the mouth of the river Avon, another river flowing down from Dartmoor's tin-working areas. The island here again would be eminently suitable for Diodorus' description. Little prehistoric or Roman evidence of any kind is known from the island itself, but at both sides of the river mouth, at Mount Folly, Bigbury, on the west (Wilkes 2004: 232-47) and at Bantham on the east (Fox 1955: 322; Griffith 1986; Griffith and Reed 1998; Reed *et al.* 2011), sites demonstrating active continental trade since at least the Iron Age until the post-Roman period are known, while tin ingots of probable Roman date have been recovered from the mouth of the river Erme less than ten miles to the west (Fox 1995)[3]. Clearly, we have a proliferation or even an embarrassment of candidates for a South Western *Ictis*. One solution for this may be in Peter Herring's (2000: 116-9) imaginative suggestion that, rather than being a specific place, *ictis* might be a generic term for an identifiable, probably physically distinctive, trading place or port of trade where foreign merchants would know that tin could be obtained. Eileen Wilkes (2004) has analysed the recurring characteristics of coastal sites for continental trade on the south coast in the Later Iron Age and Roman periods, and the use of a plural at one point in Diodorus' account of *Ictis* does support Herring's suggestion that this could describe multiple locations.

Conclusions

The names I have discussed above can be related with varying degrees of confidence to Roman sites currently known in the peninsula. It has proved possible to suggest firmer identifications for some than was formerly the case, although there are for example at least two further *stationes* mentioned in *RC – Devionisso statio* and **Derventio statio* (R and S: 205), which both look as though they should be in South West England (the latter conceivably on the river Dart?), and the site of *Purocornovium*, or perhaps *Durocornovium* (R and S: 350), whose name may contain a reference to the Cornovii or Cornish, for all of which we have no compelling candidates at present. It should be observed that even now the recognition of further Roman military sites in the peninsula is running at about one a year, and so there should be more opportunities to refine the picture further. However, the identification of a considerable number of previously unknown Roman and Roman military sites since 1979 has provided the opportunity to consider afresh our understanding of some of the early sources, and to expand the range of possible attributions that was available to Rivet and Smith at the time of their ground-breaking work.

Acknowledgements

I am very grateful to Heather James, Oliver Padel, John Pamment Salvatore and Eileen Wilkes for reading and commenting on drafts of this paper, and for their helpful suggestions. Figure 4 is reproduced by courtesy of Devon County Council, and the other Figures were drawn by Harry Manley.

Bibliography

Bidwell, P.T. 1979. *The Legionary Bath-House and Basilica and Forum at Exeter*. Exeter: Exeter City Council.

Bidwell, P.T. 1980. *Roman Exeter: Fortress and Town*. Exeter: Exeter City Council.

Bidwell, P. 2021. The legionary fortress in its landscape context, in S. Rippon and N. Holbrook (eds) *Roman and Medieval Exeter and their Hinterlands: from* Isca *to Exeter* (Exeter Archaeological Report 7): 127-166. Oxford: Oxbow.

Carlyon, P.M. 1987. Finds from the earthwork at Carvossa, Probus. *Cornish Archaeology* 26: 103–144.

Cole, M.A. and N.T. Linford 1993. The geophysical survey at Woodbury, Axminster. *Proceedings of Devon Archaeological Society* 51: 135–48.

Cunliffe, B. 1988. *Mount Batten: a Prehistoric and Roman Port* (Oxford University Committee for Archaeology Monograph 26). Oxford: Oxford University Press.

Cunliffe, B. 2001. *The Extraordinary Voyage of Pytheas the Greek*. London: Allen Lane.

Ekwall, E. 1928. *English River Names.* Oxford: Clarendon Press.

Ellis, P. 1987. Sea Mills, Bristol: the 1965-68 excavations in the Roman town of Abonae. *Transactions of the Bristol and Gloucester Archaeological Society* 105: 15–108.

Field, N.H. 1968. Ptolemy's Isca. *Antiquity* 42: 309–311.

Fitzpatrick A.P., C.A. Butterworth and J. Grove 1999. *Prehistoric and Roman Sites in East Devon: the A30 Honiton to Exeter Improvement DBFO Scheme, 1996-9* (Wessex Archaeology Report 16, Volumes 1-2.). Salisbury: Wessex Archaeology.

Fox, A. 1953. Archaeology and early history, 20th report. *Report and Transactions of the Devonshire Association* 85: 166–175.

[3] Despite the paucity of archaeological finds, the sense of 'specialness' of Burgh Island is perhaps reinforced by the fact that the entrance to the coastal promontory fort of Bolt Tail, some five miles to the east, is sited in an unusual position in the rampart, facing uphill, to present a 'reveal' of the view of the island as one enters the fort (Griffith and Wilkes 2006: illus. 7).

Fox, A. 1955. Archaeology and early history, 22nd report. *Report and Transactions of the Devonshire Association* 87: 319–326.

Fox, A. 1959. Archaeology and early history, 25th report. *Report and Transactions of the Devonshire Association* 91: 168–177.

Fox, A. 1968. Excavations at the South Gate, Exeter, 1964-5. *Proceedings of Devon Archaeological Society* 26: 1–20.

Fox, A. 1995. Tin ingots from Bigbury Bay. *Proceedings of Devon Archaeological Society* 53: 11–24.

Fox, A. and W. Ravenhill 1972. The Roman fort at Nanstallon, Cornwall. *Britannia* 3: 56–111.

Gelling, M. 1988. *Signposts to the Past* (2nd edition). Chichester: Phillimore.

Gover, J.E.B., A. Mawer and F.M. Stenton 1931. *The Place-names of Devon, Part 1.* Cambridge: Cambridge University Press.

Griffith, F.M. 1984a. 'Aerial reconnaissance in Devon in 1984: a preliminary report and the discovery of a hillfort' *Proceedings of Devon Archaeological Society* 42: 7–10.

Griffith, F.M. 1984b. Addendum, in R.J. Silvester and P. T. Bidwell, A Roman site at Woodbury, Axminster: 54-56. *Proceedings of Devon Archaeological Society* 42: 33–58.

Griffith, F.M. 1985a. A *Nemeton* in Devon? *Antiquity* 59: 121–4.

Griffith, F.M. 1985b. Some newly-discovered ritual monuments in mid Devon. *Proceedings of the Prehistoric Society* 51: 310–315.

Griffith, F.M. 1986. Salvage observations at the Dark Age site at Bantham Ham, Thurlestone, in 1982. *Proceedings of Devon Archaeological Society* 44: 39–58.

Griffith, F.M. 1988. *Devon's Past: an Aerial View*. Exeter: Devon Books.

Griffith, F.M. 1997. Developments in the study of Roman military sites in South West England, in W. Groenman-Van Waateringe, B.L. van Beek, W.J.H. Willems and S.L. Wynia (eds) *Roman Frontier Studies 1995: Proceedings of the XVIth International Congress of Roman Frontier Studies* (Oxbow Monograph 91): 361-369. Oxford: Oxbow.

Griffith, F.M. and S.J. Reed 1998. Rescue recording at Bantham Ham, South Devon, in 1997. *Proceedings of Devon Archaeological Society* 56: 109–132.

Griffith, F.M. and E.M. Wilkes 2006. The land named from the sea? Coastal Archaeology and place-names of Bigbury Bay, Devon. *Archaeological Journal* 163, 67–91.

Grove, J. 1999. *Moridunum,* in A.P. Fitzpatrick, C.A. Butterworth and J. Grove 1999. *Prehistoric and Roman Sites in East Devon: the A30 Honiton to Exeter Improvement DBFO Scheme, 1996-9* (Wessex Archaeology Report 16, Volumes 1-2.): 403. Salisbury: Wessex Archaeology.

Henderson, C.G. 2001. The development of the South Gate of Exeter and its role in the city's defences. *Proceedings of Devon Archaeological Society* 59: 45–124.

Henderson, C. and H. Coates 1928. *Old Cornish Bridges and Streams*. Exeter: University College of the South West.

Herring, P. 2000. *St Michael's Mount, Cornwall: Reports on Archaeological Works, 1995-1998.* Truro: Cornwall County Council.

Holbrook, N. 1987. Trial excavations at Honeyditches and the nature of the Roman occupation at Seaton. *Proceedings of Devon Archaeological Society* 69: 59–74.

Holbrook, N. 2001. Coastal trade around the south-west peninsula of Britain in the later Roman period: a summary of the evidence. *Proceedings of Devon Archaeological Society* 59: 149–158.

Jackson, K. 1970. Appendix II: Romano-British names in the Antonine Itinerary: 68-82, in A.L.F. Rivet, 1970. The British section of the Antonine Itinerary. *Britannia* 1: 34–82.

James, H. 2003. *Roman Carmarthen* (Britannia Monograph 20). London: Society for the Promotion of Roman Studies.

Maxfield, V.A. 1995. Devon and the end of the Fosse frontier. *Proceedings of Devon Archaeological Society* 44: 1–8.

Maxfield, V.A. (ed.) forthcoming. *Exeter Beyond The Ramparts: Roman Military Activity Outside the Legionary Fortress* (Devon Archaeological Society Occasional Papers 22). Exeter: Devon Archaeological Society.

Miles, H. 1977. The Honeyditches Roman villa, Seaton, Devon. *Britannia* 8: 107–143.

Morgan, R. forthcoming. *Placenames of Carmarthenshire.*

Nicholas, P. and S. Hartgroves 2018. The Roman fort at Restormel: geophysical surveys 2007-2009. *Cornish Archaeology* 57: 169–188.

Parkinson, M. 1985. The Axe estuary and its marshes. *Report and Transactions of the Devonshire Association* 117: 19–62.

Phillimore, E. 1890. Editorial footnote (pp 24-5) in J. E. Lloyd, Welsh place-names: a study of some common name-elements. *Y Cymmrodor* 11: 15–60.

Piggott, S. 1965. *Ancient Europe*. Edinburgh: Edinburgh University Press.

Piggott, S. 1968. *The Druids*. London: Thames and Hudson.

Reed, S., P. Bidwell and J. Allan 2011. Excavation at Bantham, South Devon, and post-Roman trade in South-West Britain. *Medieval Archaeology* 55: 81–137.

Richmond, I.A. and Crawford, O.G.S. 1949. The British Section of the Ravenna Cosmography. *Archaeologia* 93: 1–50.

Rippon, S. 2008. Coastal trade in Roman Britain: the investigation of Crandon Bridge, Somerset, a Roman trans-shipment port beside the Severn Estuary. *Britannia* 39: 85–144.

Rippon, S. and N. Holbrook (eds) 2021a. *Roman and Medieval Exeter and their Hinterlands: from* Isca *to Exeter* (Exeter Archaeological Report 7). Oxford: Oxbow.

Rippon, S. and N. Holbrook (eds) 2021b. *Studies in the Roman and Medieval Archaeology of Exeter* (Exeter Archaeological Report 8). Oxford: Oxbow.

Rivet, A.L.F. 1970. The British section of the Antonine Itinerary. *Britannia* 1: 34–82.

Rivet, A.L.F. and C. Smith 1979. *The Place-names of Roman Britain.* London, Batsford.

Russell, M., P. Cheetham, D. Stewart and D. John, 2020. In the footsteps of Vespasian: rethinking the Roman legionary fortress at Lake Farm, Wimborne Minster. *Proceedings of Dorset Archaeological and Natural History Society* 141: 111–20.

St Joseph, J.K. 1958. Air reconnaissance in Britain 1955-7. *Journal of Roman Studies* 48: 86–101.

St Joseph, J.K. 1977. Air reconnaissance in Britain 1973-6. *Journal of Roman Studies*. 67: 125–161.

Salvatore J.P. 2011. The Roman military base at Pomeroy Wood: further comment arising from the archaeological investigations north of the A30. *Proceedings of Devon Archaeological Society* 69: 113–123.

Salvatore, J.P. 2019. Roman Britain in 2018: South-western counties. *Britannia* 50: 447–452.

Salvatore, J.P. 2021. Roman Britain in 2020: South-western counties. *Britannia* 52: 424–28.

Salvatore, J.P., S. Kaye, S. Stocker, and H. Toller 2019. Observations on the Roman road between Exeter, North Tawton and Okehampton. *Proceedings of Devon Archaeological Society* 77: 297–320.

Silvester, R.J. 1981. Excavations at Honeyditches Roman villa, Seaton, in 1978. *Proceedings of Devon Archaeological Society* 39: 37–87.

Silvester, R.J. and P.T. Bidwell 1984. A Roman site at Woodbury, Axminster. *Proceedings of Devon Archaeological Society* 42: 33–58.

Sims-Williams, P. 2000. Degrees of Celticity in Ptolemy's names: examples from Wales, in D. Parsons and P. Sims-Williams (eds) *Ptolemy: Towards a Linguistic Atlas of the Earliest Celtic Place-names in Europe*: 1-17. Aberystwyth: CMCS Publications.

Smart, C. 2014. *A Roman Military Complex and Medieval Settlement on Church Hill, Calstock: Survey and Excavation 2007-10* (British Archaeological Reports British Series 603). Oxford: Archaeopress.

Smart, C. and J. Fonte *in prep*. The disposition of the Roman army west of Exeter: a reassessment of evidence from the Taw Valley, Devon. To be submitted to *Britannia*.

Stevens, C.E. 1976. The sacred wood, in J.V.S. Megaw (ed.) *To Illustrate the Monuments: Essays on Archaeology Presented to Stuart Piggott on the Occasion of his Sixty-fifth Birthday,* 240–244. London: Thames and Hudson.

Thomas, C. 1964. The Society's 1962 excavations: the Henge at Castilly, Lanivet. *Cornish Archaeology* 3: 3–14.

Todd, M. 1984. Hembury (Devon): Roman troops in a hillfort. *Antiquity* 58: 171–174.

Todd, M. 1985. The Roman fort at Bury Barton, Devonshire. *Britannia* 16: 49–55.

Vendryes, J. 1960. *Lexique Etymologique de l'Irlandais Ancien volume 7.* Dublin: Dublin Institute for Advanced Studies.

Weddell, P. J., S.J. Reed and S.J. Simpson 1993. Excavation of the Exeter-Dorchester Roman road at the River Yarty and the Roman fort ditch and settlement site at Woodbury, near Axminster. *Proceedings of Devon Archaeological Society* 51: 33–134.

Wilkes, E.M. 2004. Iron Age Maritime Nodes on the English Channel Coast. An Investigation into the Location, Nature and Context of Early Ports and Harbours. PhD dissertation, Bournemouth University, viewed 18. October 2021, http://eprints.bournemouth.ac.uk/290/2/Wilkes,Eileen_Ph.D._2004_Vol.2.pdf&sa=U&ved=2ahUKEwj1xbrm29PzAhUI_7slHdrlBrgQFnoECAkQAg&usg=AOvVaw209iipzlGck7RfnviN2l03.

Wright, R.P. 1953. Roman Britain in 1952. I: sites explored. *Journal of Roman Studies* 43: 101–128.

Research on the effects of relative sea-level change on the River Exe estuary in the mid-1st century: implications for the location of Roman sea-port and barge-quay facilities serving the Neronian fortress of *Legio II Augusta* at Exeter

Stephen J. Kaye and John Pamment Salvatore

Preamble

I first met Paul Bidwell in April 1972 when he was leading the excavation of the newly discovered Roman military bath-house in the Cathedral Close at Exeter. As a novice excavator of the then fledgling Exeter Museums Archaeological Field Unit (EMAFU) I was assigned first to Paul's bath-house excavation and thence, shortly thereafter, to the Exeter Guildhall site directed by the late Christopher Henderson. The combined excavations (revealing respectively a military bath-house and a series of legionary cohort barracks) proved beyond doubt that Exeter had been the site of a Roman legionary fortress. Following these excavations, Paul went on to publish the very first volume of the Exeter Archaeological Reports series dealing with the legionary bath-house and its evolution into a town basilica (Bidwell 1979). Subsequently, he published the first written account of the development of Roman Exeter from fortress to town (Bidwell 1980). Although Paul left Exeter to pursue a highly successful archaeological career in the north, notably on Hadrian's Wall, at South Shields (*Arbeia*) and at Wallsend (*Segedunum*), Paul's interest in the Roman pottery of the South West remained undiminished and in the early 1990s, together with Neil Holbrook, he published *Roman Finds from Exeter* (Holbrook and Bidwell 1991). In addition to all of his many other projects, Paul has continued to work extensively on Roman military pottery supply to the legionary fortress at Exeter and its satellite sites, most recently, in 2021, publishing a number of significant contributions within the volumes produced for the *Exeter: a Place in Time Project* (Bidwell 2021).

It was a privilege therefore, nearly 50 years after my first encounter with Paul, to be asked to contribute to this Festschrift, along with my colleague Dr Stephen Kaye. In doing so, we have chosen a subject which builds upon something of Paul's work at Exeter and I am greatly indebted to Stephen Kaye for bringing his special expertise to bear in the pages below. Indeed, the greater part of the paper and the arguments which have subsequently evolved are his.

John Pamment Salvatore
(*Isca Dumnoniorum MMXXI*).

Introduction

The present-day River Exe and its tidal estuary are very different in comparison to the 1st century Roman era equivalents. Two thousand years ago the River Exe, the valley it flowed through, and the estuary were still in a near-natural state. Certainly, anthropogenic changes had occurred, for example the development of farmland since the Bronze Age had increased land erosion and the consequential increase in siltation of the river system. However, the river and estuary had not yet been considerably changed by weirs, traps, leats, canals, dredging, reclamation of salt-marsh, the draining of land and the latter-day hemming in of the estuary by rail and road embankments. These man-made changes have greatly altered the more natural fluvial and tidal regimes of the 1st century.

In addition, there is one planetary scale phenomenon that has caused significant change to the River Exe and estuary: Glacial Isostatic Adjustments (GIA) following the removal of the last ice sheets from the British Isles *c.* 11,000 years ago. These on-going topographic elevation adjustments may have had a significant impact on the location of Roman military-period infrastructure, especially supply-chain elements such as sea-ports and barge-quays.[1]

This paper will attempt to unravel two millennia of such changes in order to re-create a picture of the estuary and the tidal regime of the River Exe as it might have appeared when the Roman military *agrimensores* surveyed the area in preparation for the siting of the fortress at Exeter and its contemporary ancillary civilian sites and the associated road system which connected them. Crucially, the paper attempts to demonstrate that the mid-1st century topography and the tidal regime of the period would have placed limitations on the Roman military with regard to their choice of the location for both barge-quay and sea-port facilities.

[1] For the purposes of this paper the Roman military period is taken as being the currently accepted occupation period of the Roman army in the far south-west of Britain (*c.* 55 – *c.* 85). Note however that the Second Augustan Legion is believed to have transferred from Exeter to Caerleon in *c.* 75.

Previous work

The archaeologist C.A. Ralegh Radford postulated a Roman military port and supply base on the River Exe as early as the 1930s based on the recovery of imported pottery from the Exeter Road area of Topsham at the head of the Exe Estuary (1937: 7-11); this was before any Roman military sites in the Exeter area had been discovered. Some 50 years later, Christopher Henderson (the then director of the Archaeological Field Unit) had produced a ground plan of the Exeter legionary fortress based on the excavations of the 1970s and 1980s (Henderson 1991: 74). In order to understand how the fortress might have been supplied with the samian ware, fine wares and other imported ceramic and glassware discovered during the course of these excavations, he went on to study the question of the navigability of the River Exe before the creation of weirs blocked the channel in the 13th century. Henderson concluded that the difficulty of the passage caused by changing mud banks and the frequency of delays in times of drought or spate would have made river transport above Topsham (some 6 km south of the fortress) very unreliable; he went on to state that: 'There must therefore have been an early Roman port on the estuary to handle supplies destined for the fortress at Exeter and the forts in its hinterland' (Henderson 1988: 92). Another commentator, publishing in the same year, suggested that: 'At Exeter, it seems logical to assume that the bulk of the *prata legionum* (essentially, that territory surrounding the legionary base which was specifically required for the needs and resources of the legion) lay in the valley of the Exe, almost certainly extending as far as Topsham' (Mason 1988: 168).

The matter did not receive much further attention until the excavation in 2000 of Roman military-style defensive ditches of what was thought to be a possible Roman fort or fortlet sited on a projecting piece of land on the east bank of the River Exe at Topsham School, just north of the modern town of Topsham (Sage and Allan 2004). Subsequent excavation at the same site has made the fort interpretation less likely (Brown and Hughes 2018). Nevertheless, one of the authors of the first report (Allan) drew attention to the previous recovery, in relative significant quantities, of imported 1st-century Roman pottery from the limited scale excavations carried out in the 1930s in and around Exeter Road at Topsham (this was the material which had aroused the suspicions of Radford). In addition, Allan noted that the material from another site further to the north-west (where a Roman building complex occupied from the period *c.* 50-55 to 70-75 was discovered) contained more imports and unusual wares than contemporary groups from the fortress. He observed that such finds assemblages are a typical feature of ports; the implication being that the pottery had travelled not far from its point of arrival. Allan went on to suggest that the unloading of shipments of supplies in the Roman military period could have taken place at a site about 50 m north-west of Topsham School. Allan stated that 'a Roman settlement may have grown around a quayside upstream from the modern Topsham Quay. If so, it is possible that the old river channel, conceivably with evidence of port facilities, survives...' (Sage and Allan 2004: 17-20).

Glacial isostatic adjustment, eustacy and relative sea-level change in the Exe estuary

The Last Glacial Period, known in the UK as the Devensian, lasted from about 27,000 to 11,300 years ago. During this time the Celtic Ice Sheet covered most of the British Isles, excluding southern England and the South West peninsula, extending southwards to the northern border of the Bristol Channel. This weight of ice bore down on the *c.* 30-35 km of semi-rigid crust which, in turn, caused the underlying, more mobile mantle to flow away from under the weighted crust. The result was that the Earth surface (both land and seabed) under the ice sheet was lowered, while the surface beyond the periphery of the ice sheet rose. The South West was part of this forebulge such that, for example, approximately 10,000 years ago the land surface was *c.* 25 m higher, relative to the present Ordnance Survey Datum (OD), than it is today. Once the Celtic Ice Sheet retreated the process reversed: the land formerly under ice rose and the forebulge began to sink. These movements are on-going with the land surface of the South West peninsula still sinking as the forebulge collapses.

Another significant variable during and after the Devensian was the eustatic sea-level which is a measure of the total mass, or volume, of the oceans. When the Celtic Ice Sheet was at its greatest extent and thickness the eustatic sea-level was *c.* 130 m OD lower than it is today. As the ice sheet melted the volume of sea-water increased which, in turn, raised the sea-level – first rapidly and then more slowly, such that for the last 10,000 years the sea-level rise has been low at *c.* 1.0 mm per year, or less. It is only in the modern era that the rise has accelerated to about 4 mm per year, largely due to thermal expansion of the oceans.

The combination of the eustatic sea-level values and GIA through time is accomplished by the study of Relative Sea Level (RSL), which is the sea-level observed, in the cases discussed here by excavation stratigraphy, with respect to the land surface. The values of RSL can change due to both eustatic sea-level change and GIA. For the British Isles there exists a database of over 2100 data points of age and elevation that records RSL changes over the last 20,000 years (Shennan 2018), and which allows a vision of how the sea-level has changed since the Roman era in the River Exe valley and estuary.

Figure 1 shows the RSL for Devon from *c.* 10,000 B.P. to the Middle Ages and displays the forebulge collapse due to the removal of the Celtic Ice Sheet. The polynomial line through the data points shows that the RSL was approximately -25 m to -20 m OD some 12,000 years ago, meaning that the land surface was that much higher than the same point is today. By the 1st century the RSL is at *c.* -2.5 m OD and the land continues to subside through the remaining time period.

In summary, the topographic surface of the River Exe valley and estuary was *c.* 2.5 m OD higher during the 1st century than it is today. The possible consequences for the fluvial and tidal regimes are considerable, with concomitant effects on the navigability of the Exe and the placement of a sea-port and/or barge-quay that might have served the fortress of *Legio II Augusta* at Exeter.

The River Exe: historical evidence of tidal regimes

Determining the tidal regime at any point in time is important because it is the tide that enhances the depth of rivers and provides a motive force to vessels moving upstream. In the River Exe valley and estuary these two factors, coupled to the natural topography of the river bed, places limits on how goods were moved upstream, for example by sea-vessels with deep draughts, or by flat-bottomed barges. This section will provide a generalised description of the Exe and also note historical references, or inferences, of the tidal regime.

From the Bronze Age through to the present-day the River Exe (which may have been split into a number of main channels in the early period) has migrated west to east across the floodplain (Bennett *et al.* 2014). There are no historical records of changes to, or the use of, the lower River Exe during the Roman period. However, a single legion arriving at Exeter, in excess of 5000 legionaries and accompanied by significant numbers of pack animals, might have required in the region of 110,000 litres of water per day during the summer months which would have necessitated a flow rate of about 0.0012 cubic metres per second (cumecs) from a nearby source.[2] Prior to the construction of the legionary fortress and its aqueduct, only the River Exe with a calculated, natural flow of *c.* 1.95 cumecs could

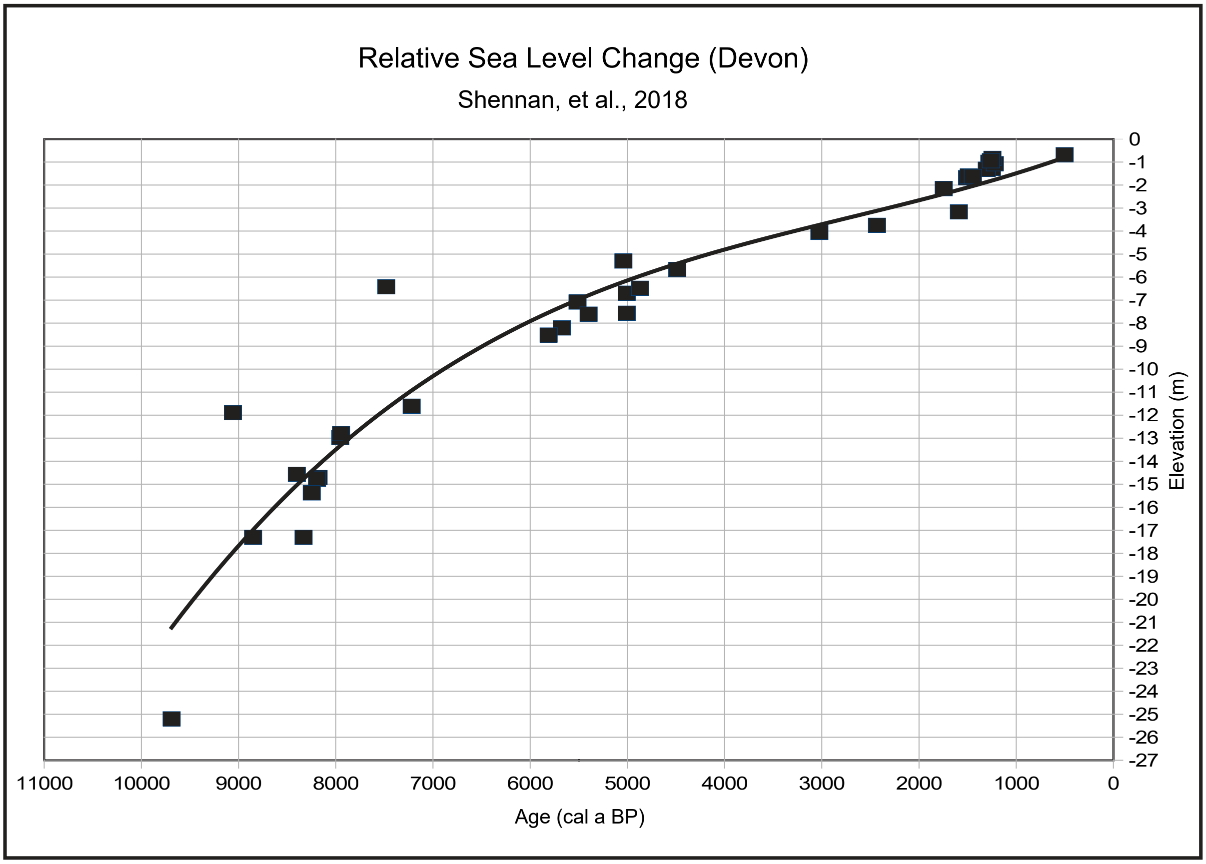


Figure 1. Age – elevation plot for the South-West (Devon) of sea-level index points taken from Shennan et al. *2018.*

[2] Roth (1991) suggests that the number of men in a legion should be increased by up to 25% to allow for non-combatants. He also estimated about 900 mules and 400 oxen for a full-strength legion.

have guaranteed such quantities.[3] Furthermore, the need to cross the River Exe upstream of muddy, daily twice-tidal banks might also have been an important consideration in placing the fortress. Therefore, it is reasonable to conclude that the Exeter fortress was probably situated upstream of the then tidal limit.

Following the Roman era there are no known, clear references to the tidal regime until the end of the reign of Edward I (1272-1307) as found in a letter written in 1838 (Delagarde 1840), who made use of John Hooker's (or Hoker, also known as Vowell, 1526?–1601) writings on the 'Haven of Exeter' from a set of manuscripts in the possession of the Corporation of Exeter. Delagarde reports:

> The river Exe is naturally only navigable for large vessels as far as Topsham, on the left bank of the river, four miles below Exeter. Smaller craft, however, and large barges, could with the tide ascend to the water-gate of the city, in sufficient numbers to supply the wants of the inhabitants. Thus, stood matters in the reign of Edward the First.
>
> At that time the Lady Isabella de Fortibus, Countess of Aumerle and of Holdernesse, of the Isle of Wight and of Devon, who owned the village and port of Topsham, as well as lands on both sides of the Exe, erected Countess-weir.

Therefore, in about 1300 the sea-port that served Exeter may have been located adjacent to the Medieval urban core near Fore Street in Topsham, some 6 km downstream from the city. The inference from the report is that cargo was off-loaded from sea-vessels onto barges and then transported upstream on the tide to a barge-quay at the Water Gate, Exeter. It is noteworthy that, even though Exeter and Topsham had been joined by a road since at least the Roman era, the more favourable economics of barge transportation still prevailed over cart and horse even for such a relatively short distance. Unfortunately, the wording of the report does not explicitly say that the tide progressed all the way to the Water Gate, but it is probably safe to assume it did. Furthermore, either due to natural and/or man-made obstacle(s), the tide seems not to have progressed beyond the Water Gate in the following centuries. Evidence for this claim arises from the tenter racks (drying frames) for cloth, the production of which requires fresh-water, on the floodplain adjacent to Exeter and upstream of the Water Gate shown on maps from 1587, 1625, 1709 and 1805 (Bennett *et al.* 2014). Figure 1 shows that the RSL in 1300 was *c.* -1.0 m OD; that is an approximately -1.5 m difference compared to the 1st century figure, i.e., the land surface was *c.* 1.5 m higher during the latter, which adds further weight to the idea that the Roman fortress was located upstream of the furthest tidal reach.

In conclusion, the positions of the *c.* 1300 sea-port and barge-quay are crucial data points in the RSL calculations that might help place limits on the 1st century Roman equivalents.

The 1st century River Exe and estuary

The 1st century River Exe and estuary were yet to be significantly altered by embankments, weirs, traps, diversions, leats, reclamation of salt-marshes, and the Exeter Ship Canal. Today the Exe is artificially deepened in places, as water is held back for the ship canal and flood-relief purposes, and elsewhere flows at very restricted rates; for example, adjacent to Topsham the fluvial flow depth, i.e., non-tidal, is approximately 0.1 to 0.2 m deep. In addition, the substantial changes to the margins of the natural flood-plain, especially the railway embankments on both sides of the estuary (Figure 3, grey lines) and the ship canal, have hemmed in the tidal influx causing it to be unnaturally deeper and, in theory if not in reality due to various weirs etc., to be capable of reaching further upstream.

In contrast, calculations of the near-natural, fluvial state in the 1st century indicate that the bankfull depth (the river would overflow its banks beyond this depth) was *c.* 2.0 m and that the normal flow depth was closer to 0.5 m from Exeter downstream to beyond Topsham. Clearly this was not a great depth of water; sufficient for barges but not so for Roman sea-vessels of 1.0 to 2.0 m draught (Marsden 1976; Boris Rankov *pers. comm.*). Furthermore, and as alluded to in the previous paragraph, the near-natural tidal flux occupied an estuary *c.* 2.5 m OD higher and was unconstrained by human activity. Therefore, the present-day depth of the River Exe and the extent of the tidal flow are probably not directly applicable to the 1st century, especially when examining the question of where a Roman sea-port may have been located.

Positioning of a Roman barge-quay and sea-port by calculations of slope and RSL

There are many complex, natural, interactions that occur between a body of tidal-water and an estuary, all of which alter the state of the tidal flow and, for example, how far upstream the tidal head will reach. As mentioned, the tidal head in 1300 was probably at the Exeter Water Gate which implies that, due to the continuing submergence of the land, that the present-day, natural tidal head might be north of Exeter, i.e., further upstream and inland. That it is, instead, located just north of the M5 bridge is a result of man-made

[3] The actual water requirement for the fully operating fortress would have been much higher. Once the bath-house had been constructed this building alone was estimated to require 320,000 litres per day – brought into the fortress by way of an aqueduct (Bidwell 1979: 43).

interventions, most of which occurred post-1300, i.e., the river and estuary were in a semi-natural state between the Roman era and 1300. From the 1st century to 1300 the land has submerged, shown by the *c.* -1.5 m RSL change, which implies that the tidal head in the Roman era was further south, further downstream and by a distance controlled by the differential RSL value and a slope up which the tidal wave ingresses. The measurement and use of this slope will now be described.

To reiterate, the RSL changes are in part a consequence of the forebulge collapse since the end of the Devensian. This submergence has affected the slope of the underlying bedrock surface in the River Exe valley and estuary. The British Geological Survey (BGS) maintains a database of boreholes (Figure 3 for locations) from which the Permian bedrock elevation was calculated and gridded to provide a surface along which slope values were measured (Figure 2). This gave a slope value of 0.01 degrees (from the mouth of the estuary northwards). It might be thought this slope value should be preferred when calculating the location of barge-quays and sea-ports in the 1st century. However, it does not reflect the slope generated by the river and tides that are flowing over, and interacting with, the overburden deposits. Plus, where the river does, or has, acted directly on the bedrock the resultant slopes are usually greater than 0.01 degrees. That is, the 0.01 degree value is not applicable to the dynamics of river and tide. Nevertheless, the 0.01 slope angle was retained in the following calculations because it placed a lower limit on the range of possibilities.

The *c.* -2.5 m collapse of the forebulge since the 1st century has resulted in the sinking of the ria that the estuary occupies. In doing so it has filled with detritus, the overburden shown in Figure 2, from erosional products brought downstream by the river and those imported through the mouth of the estuary by the tide. Essentially the river and tide have flowed across their own, ever growing product, reworking it and producing a slope within the confines of the estuary and river valley. Utilising LiDAR and multibeam sonar profiling along a number of transects provided topographic slopes within the river valley and estuary that fall within 0.02 to 0.03 degrees (again, from the mouth of the estuary northwards). Similar measurements along

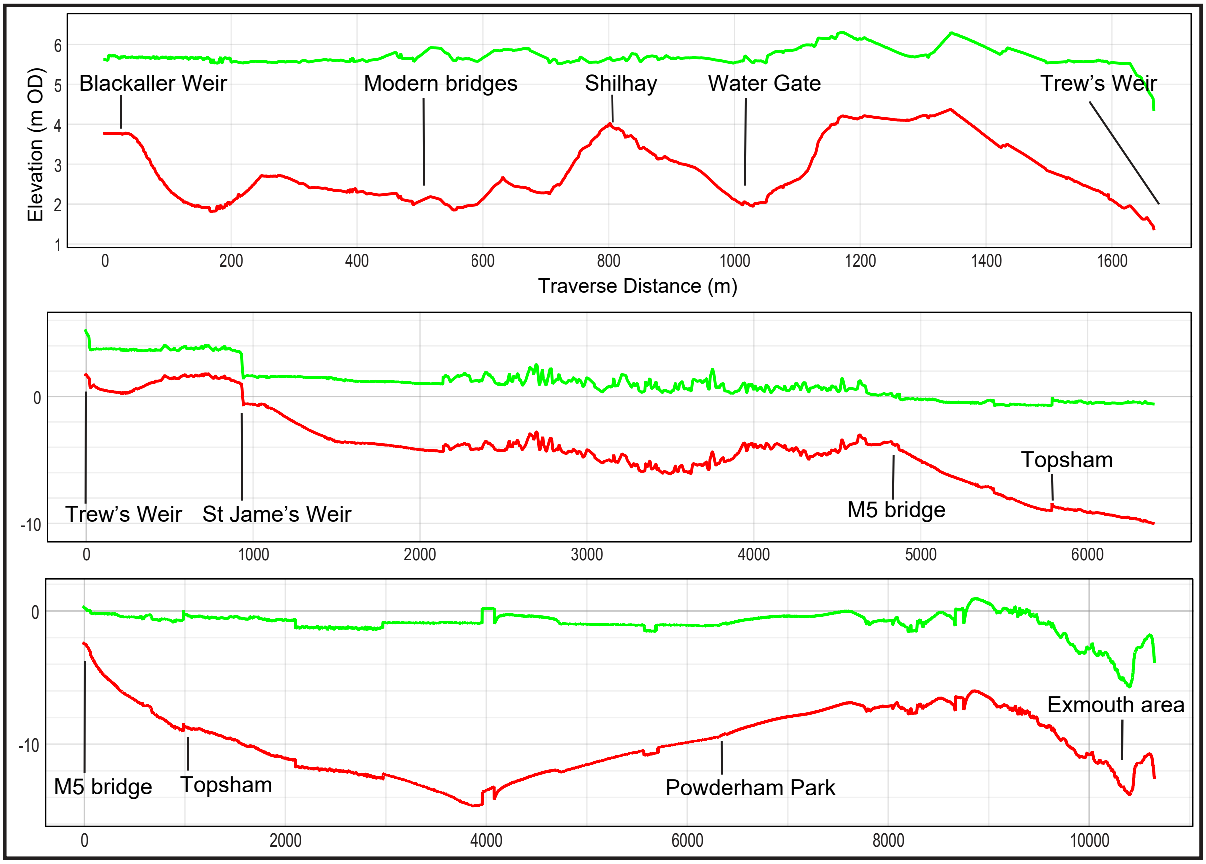


Figure 2. Present-day bedrock (red line) and overburden top surface (green) profiles along a North to South transect of the River Exe valley and estuary. The Exe estuary is a ria, an unglaciated river valley which starts in the north at the M5 bridge. Elevation values (left margin; note the variable scales) and distances are in metres OD. The bedrock profiles are derived from a British Geological Survey (BGS) borehole database. The overburden surface is of LiDAR and multibeam sonar topography.

the River Clyst valley, to the east of the Exe and tidal and flowing into the River Exe estuary, also produced slope values of 0.02 – 0.03 degrees.

Further slope information was derived from the High-Water Mark (HWM) data, supplied by the Ordnance Survey, along the east bank of the estuary and river from Exmouth to Topsham (note: the HWM upstream of Topsham and the west bank of the estuary are very unnatural being greatly influenced by man-made structures). These data were digitised, topographic elevations assigned from LiDAR data and then graphed to derive a slope of 0.02 degrees, a value common to the topographic measurements of slope.

Therefore, 0.02 degrees appeared to be a reasonable slope value to apply to the reconstruction of positions along the river and estuary going back through time. Nevertheless, a range of slope values, i.e., 0.01, 0.02 and 0.03, were used in this study to better apply plausible limits to the modelling of the 1st-century river and estuary.

The other parameter to be discussed in this section is the RSL. As already described, the best estimate of the RSL change since the 1st century was -2.5 m (Figure 1), however, there are a number of measurement uncertainties associated with these data which suggested that plausible limits to the modelling should also be applied. Hence, RSL values of -1.5 to -3.0 m, in 0.5 m intervals, were used in the following modelling.

The aim of the modelling was to use the slope ranges associated with the influx and ebb of the tide to calculate the fall distance of tidal locations, for example the head, due to the RSL changes since the 1st century, i.e., starting from the present-day topographic elevations, how far has the tidal body fallen down the slope as time retrogressed to the Roman era? For any tidal point Table 1 shows these fall distances for the range of slope and RSL values under consideration. Taking the best estimates of slope and RSL, 0.02 degrees and -2.5 m respectively, the fall distance was 7,161.97 m, that is, any present-day tidal location might have been over seven kilometres further south in the 1st century.

Table 1. Fall distances (in metres), from the present-day to the 1st century for RSL values of -1.5 to -3.0 m, in -0.5 intervals, and slope values of 0.01, 0.02 and 0.03 degrees.

RSL values 1st century	-1.5 m	-2.0 m	-2.5 m	-3.0 m
Slope 0.01	8,594.37	11,459.16	14,323.94	17,188.73
Slope 0.02	4,297.18	5,729.58	7,161.97	8,594.37
Slope 0.03	2,864.79	3,819.72	4,774.65	5,729.58

The calculation method used to produce Table 1 was then applied to the *c.* 1300 historical locations of the barge-quay at the Water Gate, Exeter and the sea-port at Topsham to give Table 2, the differential fall distances for those locations between 1300 and the 1st century. For 1300 the RSL change is *c.* -1.0 m (Figure 1) which gave a difference of -0.5, -1.0, -1.5 and -2.0 m to the selected 1st century values; slope values were maintained at 0.01, 0.02 and 0.03 degrees.

For example, for a differential RSL of -1.5 m and slope of 0.02 – the best estimate values – for both the barge-quay and sea-port locations the likely fall distance was 4297.18 m further south in the river valley and estuary. Assuming that the tidal head was at the Water Gate in 1300 then, under all combinations of RSL and slope, there probably was no barge-quay at Exeter in the 1st century because the tide did not reach that far upstream. Instead, the calculations indicate that the most northerly point for a 1st century barge-quay was located just north of the M5 bridge. Furthermore, and with the assumption that the 1300 sea-port at Topsham was located as far upstream as practical, a Roman-era sea-port may only have been located south of the line Powderham – Lympstone for the same RSL and slope values (Figure 3).

Figure 4 displays the indicative, most upstream, or northerly, locations for a Roman barge-quay and sea-port, and for all the differential RSL and slope combinations previously described. The use of the extended limits, in this example a RSL of -3.0 m and slope of 0.01 degrees, places the barge-quay and sea-ports in locations that might seem unlikely, with the seaport being approximately five kilometres south of Exmouth in the English Channel. However, the form of the estuary and shoreline in the 1st century is poorly understood in this area; it may be possible that it was similar to the coast between Bognor Regis and Worthing where the shoreline is thought to have been three to four kilometres further offshore of the present-day equivalent (Beaches at Risk (BAR) Project 2008).

Table 2: differential fall distances (in metres), from 1300 to the 1st century for RSL values of -1.5 to -3.0 m, in -0.5 intervals, and slope values of 0.01, 0.02 and 0.03 degrees.

RSL differentials	-0.5 m (1st c. -1.5)	-1.0. m (1st c. -2.0)	-1.5 m (1st c. -2.5)	-2.0 m (1st c. -3.0)
Slope 0.01	2,864.79	5,729.58	8,594.37	11,459.16
Slope 0.02	1,432.39	2,864.79	4,297.18	5,729.58
Slope 0.03	954.93	1,909.86	2,864.79	3,819.72

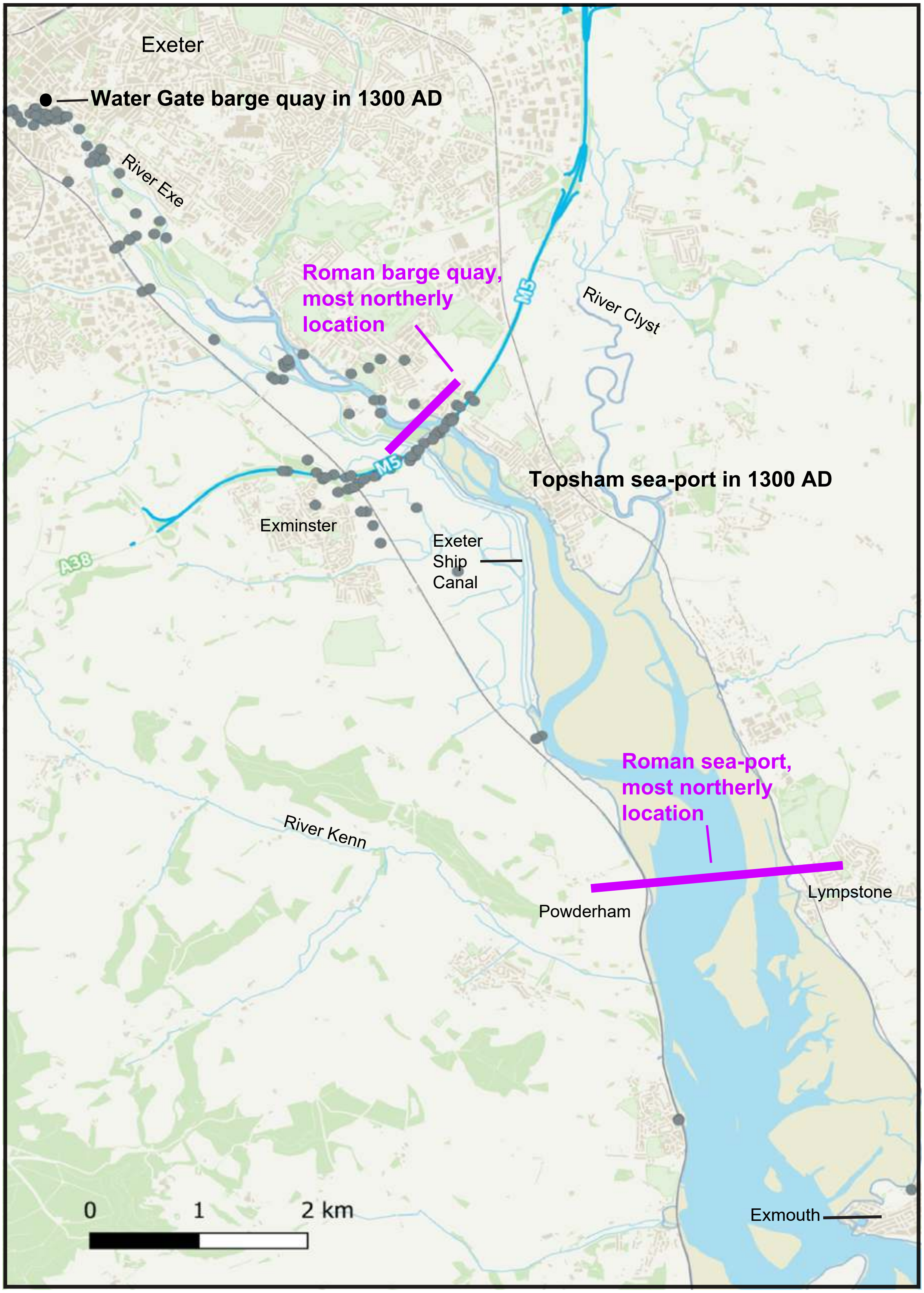


Figure 3. Map of differential fall distances to the most northerly, or upstream, locations in the 1st century AD for the AD 1300 barge-quay located at Exeter and the sea-port at Topsham. The differential RSL and slope values used were the best estimates at -1.5 m and 0.02 degrees, respectively, and resulted in a differential fall distance of 4,297 m. Grey dots are BGS boreholes. See Figure 4 for the locations of all the differential RSL and slope values.

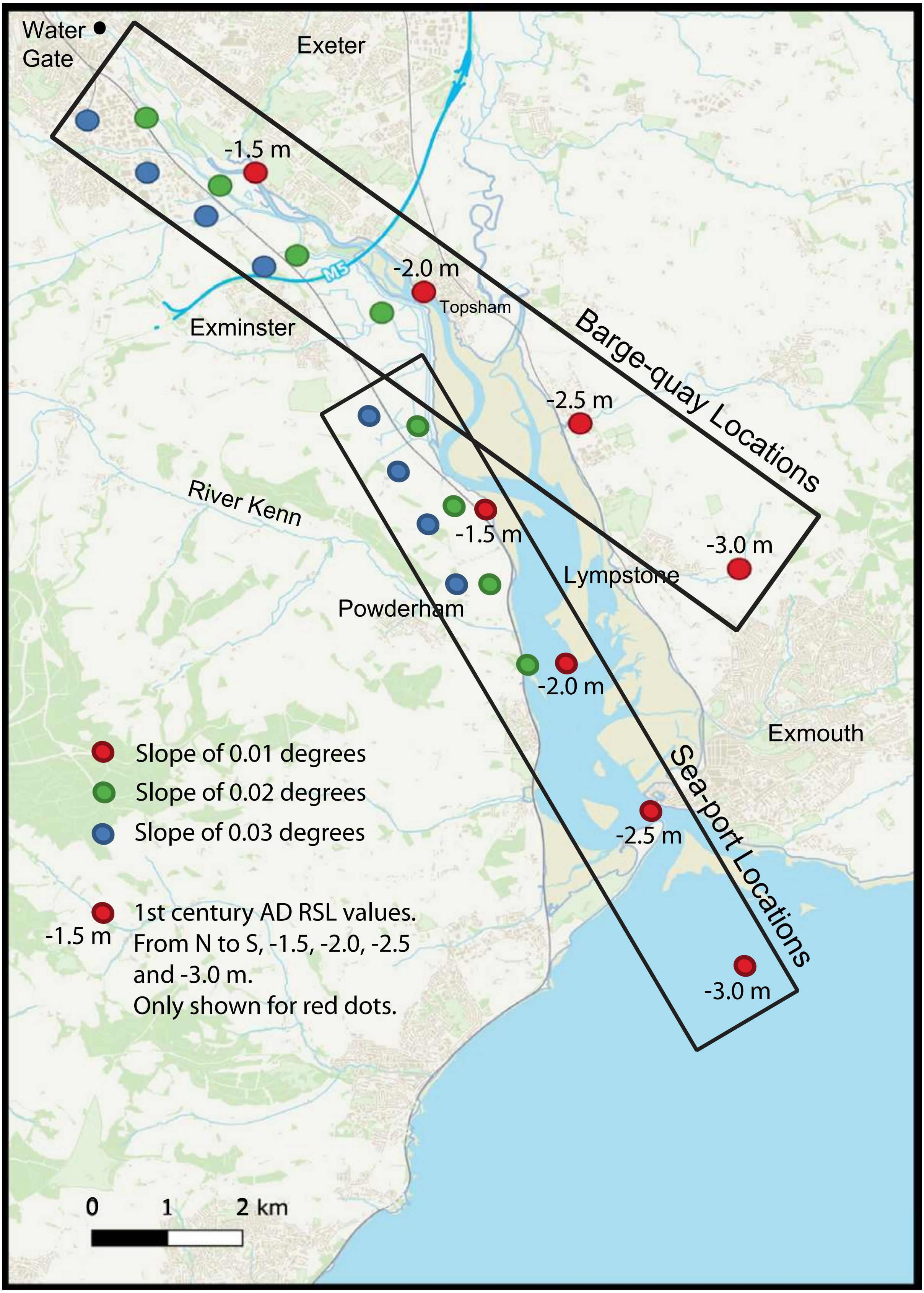


Figure 4. Map of most northerly, or upstream, limits of 1st century AD barge-quays and sea-ports. Differential fall data, from AD 1300 to the 1st century AD, taken from Table 2. For any combination of slope and RSL value the barge-quay or sea-port could not be placed further upstream than the relevant coloured dot.

Positioning of a Roman barge-quay and sea-port by simulation of the tidal inflow

The following simple methodology simulated a tidal inflow into the Exe estuary and river valley; it further supported the findings of the previous section by way of generating an additional set of limits on the positioning of the 1st century barge-quay and/or sea-port.

In preparing for the modelling the present-day elevations (LiDAR) of the Ordnance Survey HWM were extracted, i.e., at a water depth of 0.0 m, at four, approximately equally distanced points, along the estuary from Exmouth northwards to a point north of Topsham. Note that the present-day HWMs are not natural – the tide could encroach further inland if not for the flood defences, rail lines, the Exeter Ship Canal and many other man-made structures, or alterations, to the natural environment. Hence, the water depth at each point was conservatively increased to 0.1 m to mimic a more natural tidal influx and, to aid a more natural flow regime, the topographic surface of the estuary and river valley was filtered to diminish and breach the man-made structures.

The modelling consisted of running a lake flooding algorithm at the four HWM points, a method which effectively simulated the upstream influx of a tidal wave. The resulting map (Figure 5A) shows that many areas would be tidally inundated today if not for the anthropogenic structures. Even without a complete breaching of existing structures, e.g. rail lines and the Exeter Ship Canal, the model tide extended into the River Kenn valley south of Powderham, covered much of the Exe river plain between Topsham and Exminster and likely would have reached the Water Gate at Exeter but was checked in the calculations by weirs.

The modelled tide depth at Topsham was *c.* 2.4 m which matched the tide gauge data and corresponded with reports of modern vessels of 2.0 m draught reaching the port on the highest of tides, but then being tied to a quay to stop them "falling over in the mud" once the tide recedes. Assuming that the naturalised River Exe did have a normal flow depth of *c.* 0.5 m suggested that Topsham had always been a difficult seaport for large vessels; a quay, or wharf, would probably have always been required. Of course, this is the case today when the natural tidal range is the highest it has ever been.

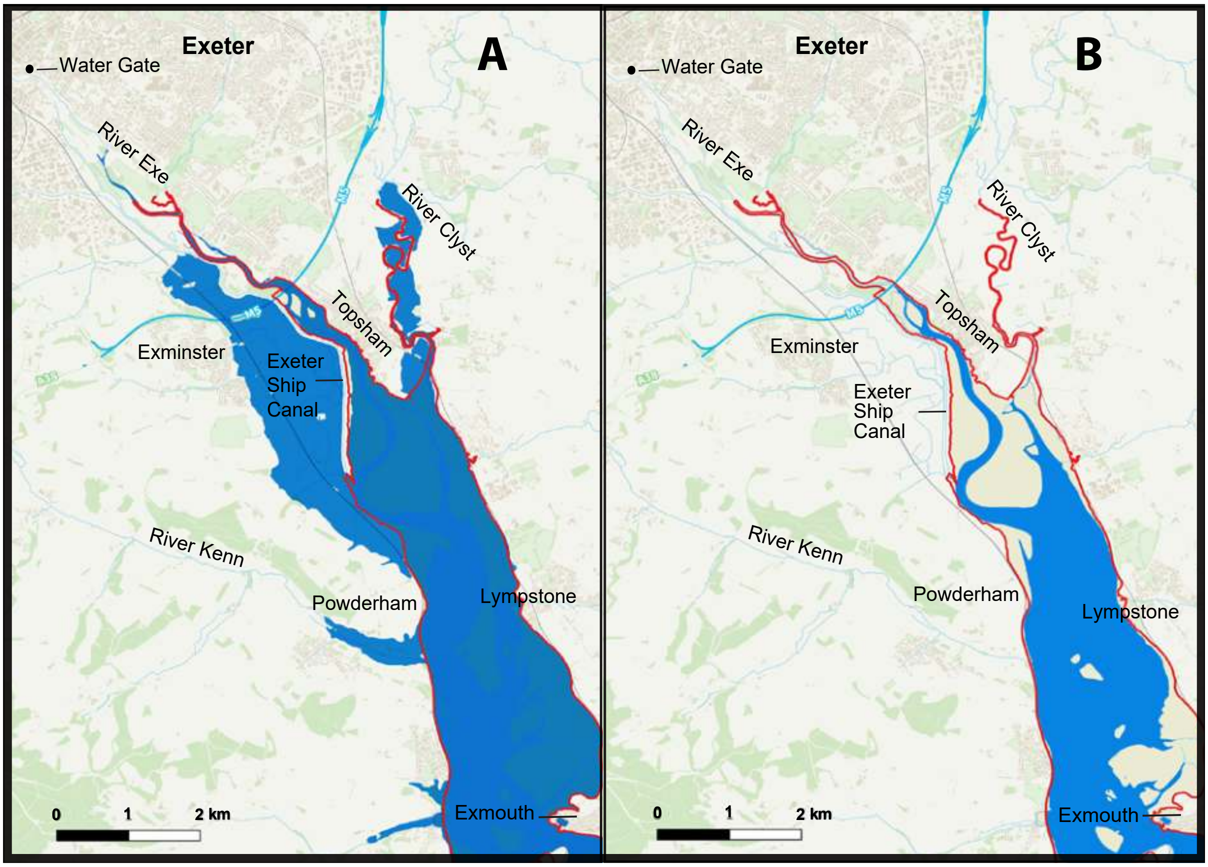


Figure 5. A) simulated tidal influx for the present-day after the partial removal and breaching of anthropogenic structures. Red line is the Ordnance Survey HWM. Grey lines are of the railways.

B) simulated tidal influx for the 1st century AD. RSL -2.0 m. Note that the modern anthropogenic structures have been partially removed and breached and may still restrict the 1st century AD flow, e.g., the River Kenn may have been tidal in its lower reaches.

However, as previously mentioned, the river channel and estuary have silted over time which may restrict the inflow of even this greater tidal range.

The tidal situation in 1300 was modelled by raising the topography by 1.0 m to reflect the -1.0 m RSL value for that time. In which case the tide depth at Topsham was *c.* 1.5 m; combining this with the natural flow of the Exe of 0.5 m gave a total water depth of *c.* 2.0 m which supported the account of Topsham being a sea-port at this time.

Retrogressing the tidal model back to the 1st century and a RSL of -2.0 m, rather than the best estimate of -2.5 m, required a further 1.0 m of topographic elevation. The resulting map (Figure 5B) shows that the tidal head did not reach the M5 bridge and at Topsham the tidal water depth was only *c.* 0.5 m deep (note: a RSL of -2.5 m, the best estimate, would result in lower depths).

Even allowing for less siltation in the 1st century, and the addition of the 0.5 m River Exe water depth, Topsham probably would not have had the tidal range to allow sea-vessels to reach this far upstream, i.e., this modelling does not support the idea that Topsham was a sea-port in the 1st century. At the latitude of Powderham the tidal water depth had increased to *c.*1.0 m and by the Dawlish – Exmouth area there was enough depth for sea-vessels.

In summary, this simple modelling of tidal depths, extents and ranges of the past from the present-day HWM produced results which broadly corresponded with the earlier examinations of RSL change and slopes.

Discussion

Summary of the tidal and topographical research

The modelling methods described in this paper were entirely desk-based and constrained by a lack of present-day data; for example, most Exe estuary tidal gauges usually do not record a Low Water Mark because the water depth at low tide is below the gauge. The exception is the Exmouth gauge where the measured tidal range is c. 1.5 to 3.0 m. Additional modelling constraints arose from anthropogenic changes and the present-day hydrological management regime. Siltation over time was also a variable that could not be confidently modelled, and which may alter the probability of a 1st century sea-port being at Topsham, for example, siltation may have in-filled a deeper thalweg, or pool of deeper water, sited at Topsham in the Roman era. This is thought unlikely, but cannot be dismissed. The essence of the modelling problem was that the sparse, present-day, discrete parameters, and human-controlled form of the river valley and estuary, precluded the direct production of a model of the 1st-century equivalents. Of necessity, the simple methods described earlier which make use of bulk parameter sets, for example the Ordnance Survey HWM and slope values derived from the gross topography, did allow the production of plausible, limited locations for the 1st-century barge- and sea-ports.

The volume of the tidal bulge in the English Channel that gives rise to the tidal prism that flows into the Exe estuary has probably not changed significantly since the 1st century. However, the *c.* -2.5 m RSL value suggests that the mouth was further south than it is today and may have contained more sand banks and restrictions to the tidal influx (SCOPAC 2004). How these differences might have altered the tidal prism are not known, but they might suggest that the total volume of the tide inflowing to the inner estuary was limited which, of course, might lower the depth of available tidal water for sea-vessels. Conversely, the River Exe was not then restricted in volume, and would possibly have been deeper throughout its length to the estuary mouth. In conclusion, there are many unknowns concerning the mouth of the estuary which are beyond the scope of this paper to resolve.

The simple, limited modelling of RSL values, slopes and tidal ranges produced results which can plausibly question the concept of a Roman sea-port at Topsham. That is, the total water depth required, for Roman sea-going cargo vessels of *c.* 1.5 m draught, was probably insufficient. Furthermore, a 1st-century sea-port was more likely to have existed in the Exe estuary somewhere south of the Powderham – Lympstone line. No archaeological evidence has yet been found to support this concept.

The modelling also suggested that the fortress site at Exeter was significantly above the tidal limit during the 1st century; hence, no barges could reach the fortress on the tide, instead, goods from the Continent may have been transported on the Exeter to Topsham road. However, as described, Topsham was probably tidal and, instead of being the site of a sea-port, may have been the location of a barge-quay, or barge-port. In this case sea-vessels from the Continent may have berthed somewhere south of the Powderham – Lympstone line, off-loaded their cargoes to barges that then travelled up the tidal estuary to the Topsham barge-quay and hence onwards by road to Exeter.

Another plausible scenario is that there was no sea-port in the estuary but, instead, sea-vessels used the protected waters as a haven, simply anchoring within the estuary and from there off-loaded to barges before they travelled on the tide to Topsham. This may partially explain the lack of archaeological evidence of any Roman structures within and alongside the estuary.

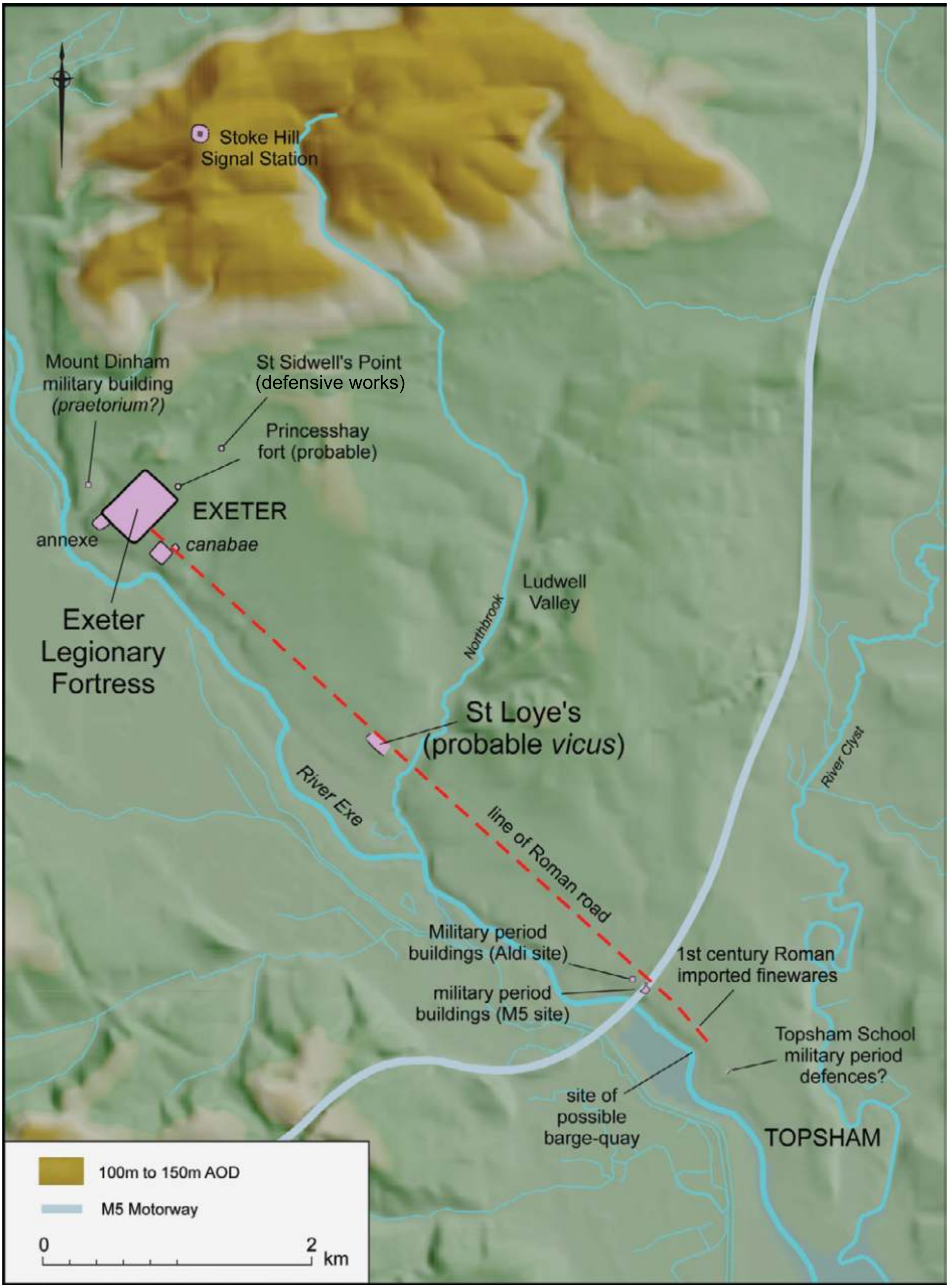


Figure 6. Roman military period sites located between the legionary fortress at Exeter and the Topsham School site showing approximate suspected site of barge-quay (T. Ives Illustrations).

It is noteworthy that both the Exe and Clyst were found to be tidal in the 1st century to a latitude between Topsham and the M5 bridge (Figure 6). This might explain why there are no Roman archaeological findings on the Topsham peninsula south of the Topsham area, there being no adequate supply of fresh water for large infrastructures and may, possibly, have negatively influenced the positioning of a Roman sea-port at Topsham.

Implications for the Roman military period sites at Exeter and Topsham

A generally accepted date for the construction of the fortress at Exeter is *c.* 55-60 with occupation lasting until around 75 at which time the legion departed for a new base at Caerleon in South Wales. The demolition of the fortress buildings, with the exception of the converted bath-house, is thought to be complete by *c.* 80 (Holbrook and Bidwell 1991: 7). Significantly, for the purposes of this paper, Henderson demonstrated that the known Roman road from Topsham to Exeter was aligned directly with one of the main streets of the fortress – the *via principalis,* and that the two must have been planned and constructed contemporaneously – i.e. *c.* 55-60 (Henderson 2001: 49-56). This observation confirmed the early importance of the road and its role in facilitating the transport of supplies to the fortress from a suspected port facility in the Topsham area. Almost certainly contemporary with the construction of the fortress were a number of Roman establishments either adjacent to or astride the aforementioned road (Figure 6). Those which have been investigated include two extra-mural compounds which were constructed beyond the south gate (*porta principalis sinistra*) of the fortress; these sites are believed by Bidwell (2021) to represent elements of the civilian *canabae* (Figure 6). The so-called upper compound sits on the slightly higher ground to the north-east of the road whilst on the opposite side, the lower compound occupies a gentle slope leading down towards the River Exe; the extent of both compounds is unknown. On current evidence, they are likely to have fulfilled very different functions. The upper compound had a series of well-constructed buildings which may be described as domestic in nature and well-appointed, some with small individual courtyards, whilst the lower compound (at least within the area excavated) appeared to contain only workshops and open areas (Salvatore 2021: 177-81). Further down the road from the *canabae* and some 2.5 km from the fortress was a site excavated at the former St Loye's College (Figure 6). This site was originally interpreted as a Roman military supply base (Salvatore and Steinmetzer 2018). Subsequent research undertaken by Bidwell (2021) has determined that the site is more likely to be a civilian town (*vicus).* This may have seen the site functioning primarily as a commercial trading base with certain types of imported supplies under civilian rather than direct military control. Such transactions between the inhabitants of the settlement and the military authorities would have been conducted by merchant *negotiatores.* Bidwell has pointed out that the significant amounts of *amphorae* sherds associated with the occupation of the site might indicate that part of the function of the site was as a distribution centre for imported liquids, presumably goods such as olive oil and wine in particular, whilst *defrutum* (wine sweetener) and *garum* (fish sauce) as well as fruits and olives could also have featured (Salvatore *et al.* forthcoming). The St. Loye's settlement may then have been receiving all manner of goods from the Continent for onward distribution to the fortress and presumably to those inland forts connected by the road network to Exeter.[4] Closer to the Topsham end of the road was a rectangular house of timber construction located about 1.5 km to the north-west of the modern town of Topsham and *c.* 5.2 km from the fortress. The site was excavated in advance of the construction of the M5 motorway crossing of the River Exe and is identified as the M5 site on Figure 6. The excavators suggested that the remains displayed the characteristics of an early Roman settlement occupied from *c.* 50-55 to 70-75 at which time it was abandoned (Jarvis and Maxfield 1975: 228). This site may have been part of a larger complex, another part of which was excavated at the Aldi site in 2015-16, where four open-ended strip-buildings were excavated just north of the M5 crossing of the Exe (Figure 6). The buildings were interpreted as warehouses forming part of a small storage complex. They lay some 50 m to the south-west of the modern Exeter Road which has long been thought of as reflecting the line of the Roman road from Topsham to the fortress. However, if the open-fronted buildings were designed for loading carts then it might be expected that they would be located closer to the road. No evidence for road metaling was discovered immediately to the north-east of the buildings but an alignment for the road which would see it deviate from the modern road-line, pass close to the warehouses, and head towards the suspected quay facility in The Retreat area becomes an attractive possibility.[5] Significantly, the excavators of the Aldi site went on to state that: '... the structures, and possibly those found in adjoining sites to the south-east, were built by the Roman military but controlled or run by civilian traders who

[4] Elsewhere in Britain, Anderson has argued most forcefully that the forts of North-East England were supplied primarily by road: '...most supplies with production sites long distances away would have been shipped in by sea...these materials would then have been carted or transported by pack animals over the Roman road system to each fort' (1992: 88).

[5] The modern road from Exeter to Topsham, whilst mirroring the Roman road for the greater part of its route, is unlikely to do be doing so when it approaches Topsham itself given the latter's medieval origins.

attached themselves to the legion in order to provide goods via trade' (Garland and Orellana 2018: 103-10). If this is correct, the site would have functioned in exactly the same way as that suggested for St. Loye's, with the difference being that it would have been much closer to any barge-quay facility if this had existed north-west of Topsham School (Figure 6).

Conclusion

All of the archaeological evidence so far recovered points to a port location somewhere in the area north-west of modern Topsham. The concept of a port facility at Topsham in the early Roman period was first mentioned in the 1930s by Radford (see above) who postulated a military sea-port. The arguments presented in relation to the tidal reach and depth of the River Exe in the mid-1st century in this paper have clearly demonstrated that, rather than a sea-port, the greater likelihood is that any facility in the Topsham area would have seen a barge-quay operating in tandem with a sea-port further down river. Such a barge-quay could have seen the off-loading of supplies which had been transferred onto barges at a sea-port located south of an imaginary line across the estuary between Powderham and Lympstone (see Figure 3) or, just conceivably, by direct ship to barge transfer, and then assisted by tide upriver. Whilst the site of a Roman barge-quay could lie anywhere south of the most northerly limit (illustrated on Figure 3 and the tidal limit on Figure 5B), the area around The Retreat just to the south-east of the modern M5 motorway (at NGR SX 95808877) may be seen as a strong candidate for such a facility (see Figure 6). This argument is supported by the findings of more imported and 'exotic' mid-1st-century pottery in this area than is found at the legionary fortress further upriver, and by the Roman military period buildings and sites located at the M5/Aldi sites just to the north-west of The Retreat. Whilst no quayside remains have yet come to light in this area, this could be due to the Relative Sea-level change, meaning that they may be *c.* 2.5 m below the present-day HWM, and to river-bank erosion which has demonstrably removed significant amounts of the cliff-face at the Topsham School site.

Acknowledgements

The authors would like to thank Nick Hodgson and Bill Griffiths for the invitation to contribute to this festschrift. Thanks to Tony Ives for the Figure 6 illustration.

Bibliography

Anderson, J.D. 1992. *Roman Military Supply in North-East England* (British Archaeological Reports British Series 224). Oxford: British Archaeological Reports.

Bennett, J.A., A.G. Brown and S.J. Reed 2014. Holocene fluvial geomorphology of the River Exe (UK) from archaeological and historical data and implications for urban form. *Proceedings of Geologists' Association* 125: 639–648.

Bidwell, P.T. 1979. *The Legionary Bath-house and Basilica and Forum at Exeter with a Summary Account of the Legionary Fortress* (Exeter Archaeological Report 1). Exeter: Exeter City Council and the University of Exeter.

Bidwell, P.T. 1980. *Roman Exeter: Fortress and Town*. Exeter: Exeter City Council.

Bidwell, P.T. 2021 The legionary fortress in its landscape context, in S. Rippon and N. Holbrook (eds) *Roman and Medieval Exeter and their Hinterlands: from Isca to Esanceaster* (Exeter: a Place in Time Volume 1/Exeter Archaeological Report 7): 127-166. Exeter: Oxbow.

Brown, A. and S. Hughes 2018. 2 The Mede, Topsham, Exeter, Devon: Results of Archaeological Monitoring and Excavation and Recording. Unpublished client report AC Archaeology Doc. No. ACD1717/2/1.

Delagarde, P.C. 1840. On the antiquity and invention of the lock canal of Exeter; in a letter from

Philip Chilwell de la Garde, esq. to Sir Henry Ellis, K.H. F.R.S. Secretary'. *Archaeologia* 28.1: 7–26.

Garland, N. and J. Orellana 2018. Prehistoric and Roman occupation along the river Exe: archaeological investigations at the Aldi Site, Exeter Road, Topsham, Devon. *Proceedings of the Devon Archaeological Society* 76: 97–114.

Henderson, C.G. 1988. Exeter (*Isca Dumnoniorum*), in G. Webster (ed.) *Fortress into City: the Consolidation of Roman Britain, First Century AD*: 91–119. London: Batsford.

Henderson, C.G. 1991. Aspects of the planning of the Neronian fortress of *Legio II Augusta* at Exeter, in V.A. Maxfield and M.J. Dobson (eds) *Roman Frontier Studies 1989*: 73-83. Exeter: Exter University Press.

Henderson, C.G. 2001. The development of the South Gate of Exeter and its role in the city's defences. *Proceedings of the Devon Archaeological Society* 59: 45–123.

Holbrook, N. and P.T. Bidwell 1991. *Roman Finds from Exeter* (Exeter Archaeological Reports Volume 4). Exeter: Exeter City Council and the University of Exeter.

Jarvis, K. and V. Maxfield 1975. The excavation of a first-century Roman farmstead and a late Neolithic settlement, Topsham, Devon. *Proceedings of the Devon Archaeological Society* 33: 209–265.

Marsden, P. 1976. A boat of the Roman period found at Bruges, Belgium, in 1899, and related types. *The International Journal of Nautical Archaeology and Underwater Exploration* 5.1: 23–55.

Mason, D.J.P. 1988. *Prata Legionis* in Britain. *Britannia* 19: 163–189.

Radford, C.A.R. 1937. Report of the Exeter Excavation Committee: the Roman site at Topsham. *Proceedings of the Devon Archaeological Exploration Society* 3 part 1: 4–23.

Roth, J. 1991. The Logistics of the Roman Army in the Jewish War. Unpublished PhD dissertation, Columbia University.

Sage, A. and J. Allan 2004. The early Roman military defences, late Roman burials and later features at the Topsham School, Topsham. *Proceedings of the Devon Archaeological Society* 62: 1–39.

Salvatore, J.P. 2021. Roman military period activity beyond the south gate (*porta principalis sinistra*) of the legionary fortress at Exeter. *Proceedings of the Devon Archaeological Society* 79: 143-87.

Salvatore, J.P. and M. Steinmetzer 2018. The recently discovered Roman military supply-base at St. Loye's College, Exeter, Devon, South-West Britain: interpretation and significance, in C.S. Sommer and S. Matešić (eds) Limes *XXIII: Proceedings of the 23rd International Congress of Roman Frontier Studies, Ingolstadt 2015*: 793-800. Mainz: Bayerisches Landesamt für Denkmalpflege.

Salvatore, J.P., M. Steinmetzer and H. Quinnell forthcoming. Prehistoric settlement remains, mid-1st century AD Roman settlement, Romano-British occupation and late Roman burials at the former St. Loye's College, Topsham Road, Exeter. *Proceedings of the Devon Archaeological Society* Occasional Paper.

Shennan, I., S.L. Bradley and R. Edwards 2018. Relative sea-level changes and crustal movements in Britain and Ireland since the Last Glacial Maximum. *Quaternary Science Reviews* 188: 143–159.

Other Sources

Beaches at Risk (BAR) project, University of Sussex. 2008, viewed on 16 January 2020, <http://www.sussex.ac.uk/geography/researchprojects/BAR/home.html>

BGS, 2020. British Geological Survey, Geoindex (onshore), viewed on 16 January 2020, <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ >

LiDAR, data from Environment Agency (UK). 2020, viewed on 16 January 2020, <https://environment.data.gov.uk/DefraDataDownload/?Mode=survey>

SCOPAC 2004. Coastal Sediment Transport Study, viewed on 16 January 2020, <https://southerncoastalgroup-scopac.org.uk/scopac-research-original/sts-2004/>

Antiquarian matters

Death by quarrying: damage to Hadrian's Wall at Walltown and the artists who recorded its earlier life

David J. Breeze

'A little to the west of Walltown... there is a part of the wall, which is in the greatest perfection of any now remaining in the whole track'

John Horsley, *Britannia Romana*, London 1732: 151

Introduction

Tastes change. Today the iconic views of Hadrian's Wall tend to be Cuddy's Crag looking east towards Housesteads or Kevin Costner's tree in Sycamore Gap made famous in the film *Robin Hood, Prince of Thieves*. But in the 19th century the iconic view was Walltown looking east towards the Nine Nicks of Thirlwall. In the 20th century Alan Sorrell chose Walltown to be the location of his visualisation of Hadrian's Wall (Sorrell and Sorrell 2018: 195). To be sure, Walltown still features in many photographs, but they are generally looking west along the high standing section of Wall twisting through the rocks. No doubt the power of the cinema has had an important influence; and so probably does accessibility – the 5 km between Housesteads and Steel Rigg must be the most visited section of Hadrian's Wall. Walltown, today, is somewhat remote, in spite of the near proximity of the Roman Army Museum at Carvoran; but perhaps more crucially it was badly damaged by quarrying undertaken from 1876 to 1976 so that today there are no longer Nine Nicks of Thirlwall, but only six. Nevertheless, the Walltown sector of Hadrian's Wall is still magical, a stretch of Wall still standing above head height as it turns and twist around the rocky outcrops. In 2019, the painting of Walltown Crags looking east by Judith Yarrow was chosen as the subject of a postcard issued to all Pilgrims of Hadrian's Wall and displayed on the back cover of the Pilgrimage handbook (Collins and Symonds 2019) (Figure 1).

Paul Bidwell has long been interested in the survival – and destruction – of Hadrian's Wall, as well as paintings and similar records of it. I trust therefore that this study of the modern life of a short section of the frontier will be of interest to him.

The Nine Nicks of Thirlwall

After passing over a brief comment by John Leland on Hadrian's Wall at Walltown, John Hodgson noted that 'Camden, Gibson, Gordon, Horsley, and Brand, were all attracted to the Roman remains on the Walltown Crags' (Hodgson 1840: 293). Hodgson recites the records of his predecessors: Camden that the Wall was 15 feet high and nine feet broad [Horsley suggested that Camden guessed at the height by counting the number of facing stones still standing]; Gibson in 1708 three yards high; Gordon 14 courses and 9½ feet high; Horsley three yards high and 14 courses, at one point 16; Brand 13 courses. Hodgson's 1832 sketch of the Wall at Walltown records it nine courses high (Hodgson 1840: 294) (Figure 2).

In 1858 Henry MacLauchlan published his survey of Hadrian's Wall (MacLauchlan 1858). On his map he marked 'Nine Nicks of Thirlwall' along the north side of the Wall from the Painsdale Burn in the west, beside the minor road leading north to the farms of Low Old Shields, High Old Shields and Low Tipalt, eastwards to MC 44 (Allolee). The name 'Walltown Crags' does not appear on the map. In his text, MacLauchlan provided no description of the Wall over these two Roman miles (3 km).

The 6-inch OS map of the Walltown area, surveyed in 1861 and published in 1865, gives prominence to 'Walltown Crags', the lettering running north of the crags from MC 45 (Walltown) to the western edge of Walltown Nick, the gap immediately to the west of Mucklebank Crag. The lettering 'Nine Nicks of Thirlwall' is smaller, squeezed between the crags and the marked line of the Wall, and extending some metres to the west of the milecastle.

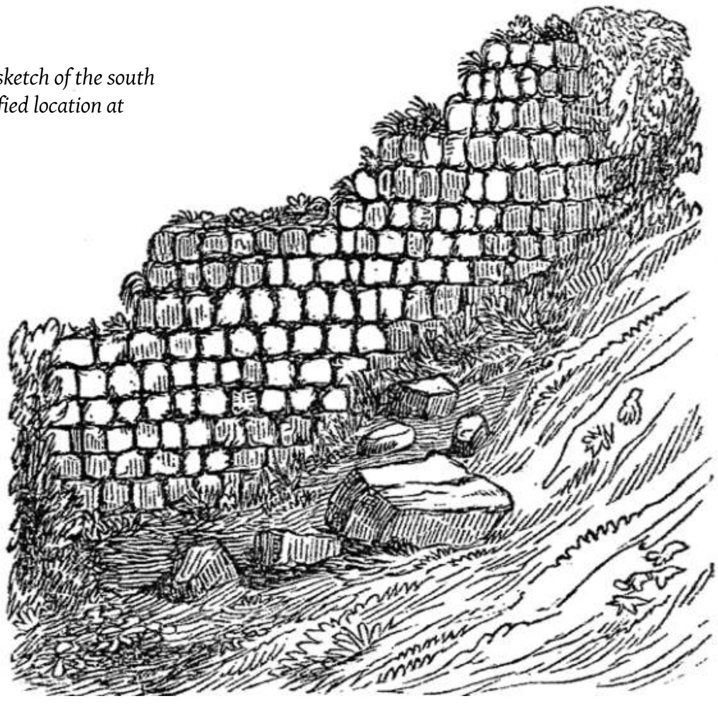
In the 2nd edition of the 25-inch map, revised in 1895 and published in 1898, and its 1921 successor, 'Nine Nicks of Thirlwall' is restricted to the straight stretch of Wall eastwards from the milecastle. The term Carvoran, or Caervoran, Crags, which had sometimes been used instead of Walltown Crags prior to MacLauchlan and the first edition of the OS map, disappeared.

Artists at Walltown

In the 19th century, Walltown was a favourite location for artists. From the publication of John Hodgson's *History of Northumberland* volume 4 in 1840, through to C. J. Spence in the 1880s, the Walltown Crags sector of the Nine Nicks of Thirlwall was drawn or painted by

Figure 1. Walltown Crags today, looking east, by Judith Yarrow.

Figure 2. John Hodgson's 1832 sketch of the south side of the Wall at an unidentified location at Walltown (Hodgson 1840: 294).



at least five artists. Comparison of these illustrations with each other and the landscape today allow us to determine what we have lost through quarrying over the 100 years from 1876 to 1976.

William Collard (1792-1847)

Collard created several illustrations for John Hodgson's publications (Hall 2005: 84). These included 'three views of the murus ... made on the spot by Mr. Collard, in 1837, under the guidance of memory sketches by myself, in 1832 ... They are all from specimens on the Walltown Crags, west of the old mansion-house of that name' (Hodgson 1840: 293). These, however, do not appear to depict the areas of the crags later quarried. The present farmhouse at Walltown is the early 19th-century successor of 'the old mansion-house', the former seat of the Ridley family.

Henry Burdon Richardson (1826-1874) and John Storey (1828-1888)

Born in Newcastle in 1826, Henry Burdon Richardson was the eldest son of the second marriage of Thomas Miles Richardson senior, a well-known water colourist in that city (Hall 2005: 279-80; Breeze 2016: 15-17). Henry was drawing master at the Percy Street Academy, where John Collingwood Bruce was the headmaster. In 1848, Bruce took Henry and his brother Charles with him on his celebrated tour of Hadrian's Wall, the precursor to the first Pilgrimage of Hadrian's Wall held in the following summer. Henry 'made sketches at the most important points of view' (Bruce 1905: 112). The catalogue for the 1906 exhibition of Bruce's collection of paintings of Hadrian's Wall, gifted by his son Gainsford to the Laing Art Gallery in Newcastle, stated that, 'Most of the drawings were in the first instance executed on the spot in sepia, as a rapid means of effectually delineating the features of the Wall, and of the country through which it passed. The artist (Henry Burdon Richardson) afterwards added slight washes of colour to the sketches, and this was carried out so skilfully that they have the appearance of completed drawings in colour'. The 'drawings are remarkable for their combination of realistic truth and artistic charm ..., are conspicuous by their originality and careful realism, and have a simple beauty of their own' (Anon. 1906). The quotations are given at length as they demonstrate that the drawing of Walltown by Richardson should be accurate and not an artistic representation.

Richardson's paintings provided the illustrations for the lectures on Hadrian's Wall that Bruce gave in Newcastle in the autumn of 1848 and which led on to the Pilgrimage the following year and the first edition of his *The Roman Wall* two years after that (Bruce 1851). The engravings which appear in this book were based on Richardson's drawings, but were actually created for the publication by John Storey, a pupil of Thomas Miles Richardson senior. Both names, Henry Burdon Richardson and John Storey, occur at the bottom of each engraving in the book. There are clear differences between several of the original paintings and the engravings and it would appear that Bruce selected the illustrations which he wished to use and sent Storey into the field to prepare the engravings, as was implied by a review of the 2nd edition in the *Newcastle Courant* for 17 December 1852 and confirmed by Bruce's own comment in the 3rd edition of *The Roman Wall* (Bruce 1867: 96). Richardson's painting of Walltown was not one that Bruce selected for publication in any of his books (Figure 3). However, he did use it as the basis for a woodcut of the Wall at Walltown Crags looking eastwards (Bruce 1851: 265; 1853: 231). It may be noted that there was some criticism of the woodcuts which were described as 'heavy and too dense' in a review in the *Journal of the Belle Lettres* of 26 April 1851 (quoted in Breeze 2016: 22).

Bruce used woodcuts as well as engravings to illustrate the topography of the Wall in his several publications. Some were taken from Richardson's 1848 'sketches' (the apple tree at East Denton, the north-west corner of Birdoswald fort and the Edward I monument at Burgh-by-Sands). The Birdoswald woodcut is signed by J. Storey, as is the strong-room at Chesters, but others are not. These include the minor west gate at Birdoswald which was not cleared of its rubble and 'restored' until September 1850, that is after the visit of Bruce and Richardson in 1848; the woodcut is therefore likely to have been prepared by Storey when he visited the site to prepare the main engraving of the fort for the first edition of Bruce's *The Roman Wall* (Breeze 2016: 150). In some instances, drawings similar to the woodcuts survive interleaved in Bruce's own copy of his 3rd edition of *The Roman Wall* which is in the care of Tyne and Wear Archives and Museums. These include depictions of Busy Gap, the hypocaust at Chesters and Chesters strong-room (two different drawings). The archive does not include the original of the woodcut of Walltown used in Bruce's 1st and 2nd editions.

It is unfortunate that Bruce was lax in his acknowledgments of the sources of his illustrations, but in the case of the Walltown woodcut we can make an educated guess (Figure 4). First, Bruce did not have Richardson's drawing of Walltown turned into an engraving; second, a woodcut of a similar view was used; third, Bruce sent Storey into the field to create the illustrations (engravings and woodcuts) used in his books; fourth, Storey's engravings are all very similar to Richardson's paintings but the Walltown woodcut is not. It seems likely, therefore, that the Walltown woodcut was created by John Storey in 1849/50.

Figure 3. Henry Burdon Richardson's painting of 1848.

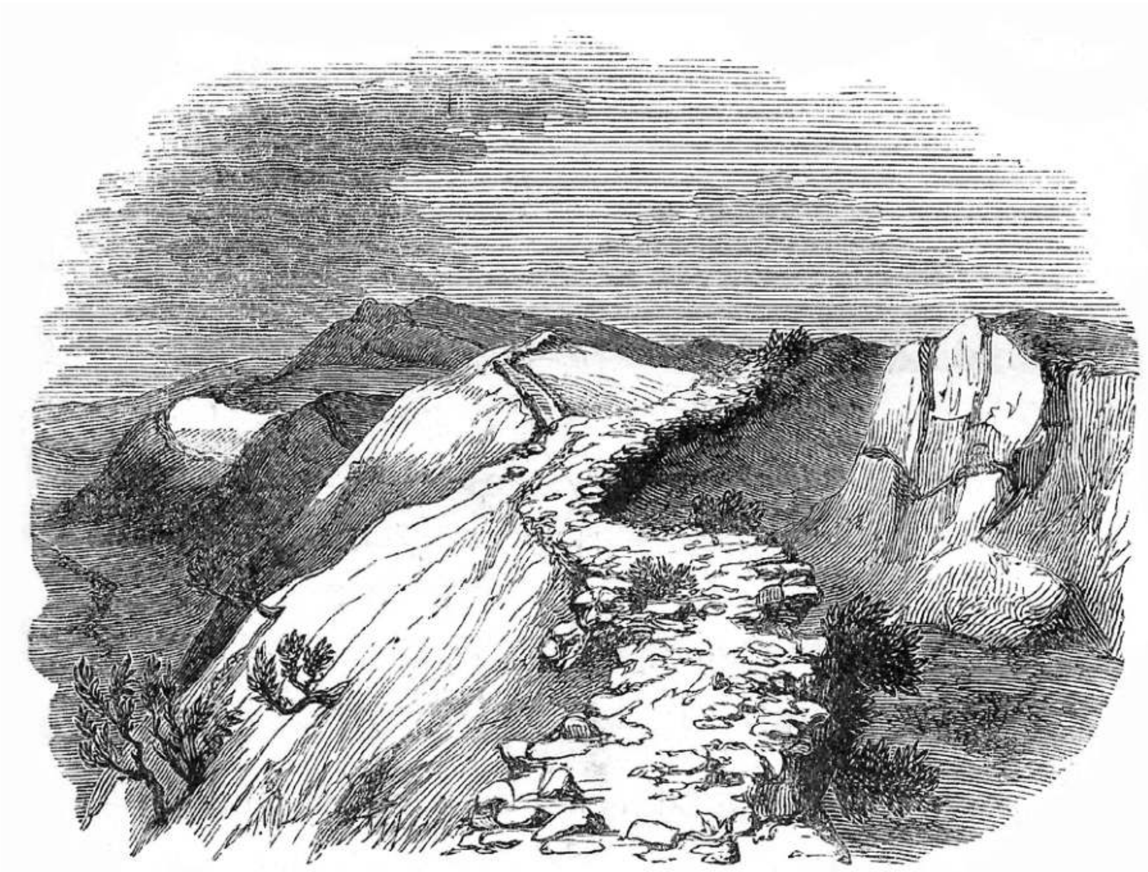


Figure 4. The woodcut of Walltown Crag, probably the work of John Storey.

The anonymous artist of 1851

A notebook of about 1851 in the ownership of the Society of Antiquaries of Newcastle upon Tyne contains several copies of illustrations in Bruce's publications, including the woodcut of Walltown published in the first edition of *The Roman Wall* (Breeze 2015). It also includes one of Walltown Crags looking east dated to 6 Sept. 1851 which appears to be an original drawing (Figure 5).

David Mossman (1825-1901)

The authoritative *The Artists of Northumberland* states that David Mossman was born in Newcastle in 1825 (Hall 2005: 238). While the date is correct, there is evidence to indicate that the place is not. It is obvious why Marshall Hall made the statement. Mossman is recorded in the Electoral Registers and Directories as living in Newcastle from 1849 to 1858. In *Ward's Northumberland and Durham Directory* for 1850, David Mossman is recorded as a stationer, etc, at 21 Grey Street with a residence at St James' Street. The Electoral Register records him at St James' Street in 1852, but then three other abodes intervene before he is at 18 Northumberland Court from 1856. The *Post Office Directory of Northumberland and Durham* recorded him as an artist living at this address in 1858, which, according to the Electoral Register, was also his house.

Later census records, however, state that he was born in Scotland (1861; 1891) and more specifically Edinburgh (1881). The 1841 census records him living with his mother, Isabella, and siblings at Trinity Villa in Leith. In 1846 Mossman married Elizabeth Cockburn in Carlisle and his eldest child, Catherine, was born in Newcastle the following year, followed by Isabella in 1850 and David junior in 1853 (David became a tea merchant and died in 1916). The marriage certificate

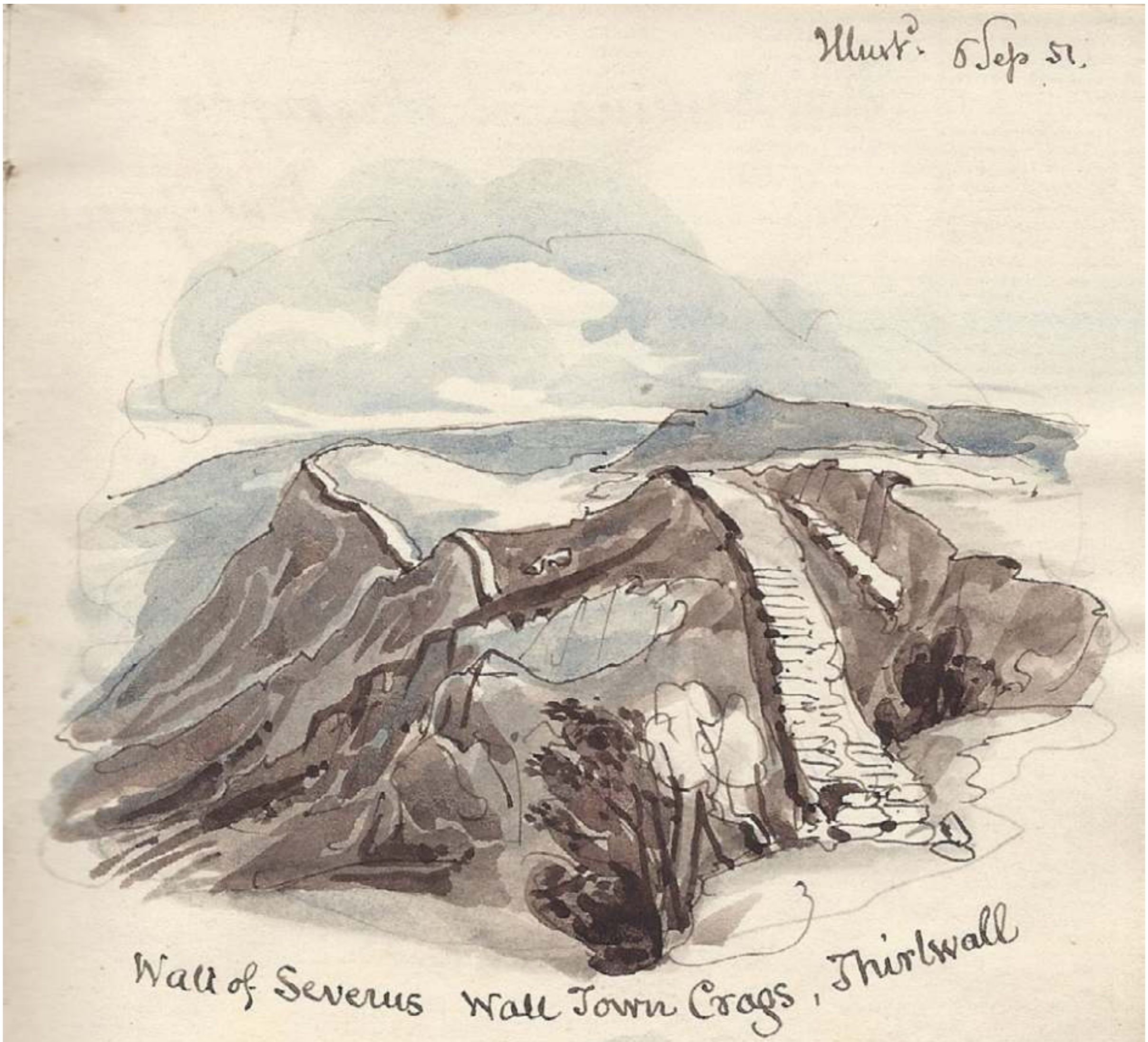


Figure 5. 'Wall Town Crags' dated '6 Sep 51'.

states that David senior was the son of Adam Mossman, silversmith. Edinburgh City records reveal that Adam (1785-1833) was a jeweller and goldsmith living at 20 South Street with his business premises on the High Street. He died in 1833 and was interred in the New Calton Cemetery where his wife, Isabella Mossman, née Carson, was buried in 1868, together with several of their descendants. Isabella had been born in Ayr in 1789.

The *Post Office Directory of London* for 1860 and the 1861 census both list David Mossman living at 11 Bernard Street in the St Pancras area of London, his occupation being an artist and miniature painter. By 1878 he was living at 8 Belsize Road in Hampstead, successful enough to employ three live-in servants in 1891.

Before he moved to London, sometime between 1858 and 1860, Mossman painted Wallsend, Birdoswald, Bewcastle and the 'Watch Tower on the Maiden Way' in 1857. He appears to have returned frequently to the north, creating several paintings of Hadrian's Wall. In June 1869 he was at Chesters recording the excavations (Bruce 1905: 155). In 1873 he painted the newly discovered T 29a (Blackcarts). The date assigned to his painting of Walltown in Tullie House, Carlisle, is 1880-90. The inscription on the mount states: 'The Roman Wall – The Nine Nicks of Thirlwall. Presented by the Artist – David Mossman 1893.' (Figure 6).

Charles James Spence (1848-1905)

C.J. Spence, as he signed his drawings, was a businessman in Newcastle and an amateur artist. The 2nd edition of *The Hand-book to the Roman Wall* contained 'several plates depicting various scenes met with on the Wall ... for which the writer is indebted to the artistic skill and kindness of his friend Mr. C. J. Spence' (Bruce 1884: iv). The new drawings include one of Walltown Crags looking east (Figure 7) and another of T 45b (Walltown West) sitting on top of a spectacular crag before its destruction in advance of quarrying in 1883 (Figure 8). The veracity of the drawing of the turret is confirmed by a photograph (Symonds and Breeze 2016: 14, Fig. 6).

The quarries

There are two quarries at Walltown. The larger and better-known quarry is Walltown Quarry, now a 'recreational site'. To its east is the smaller Greenhead Quarry, sometimes known as Walltown East Quarry. Quarrying took place at the former from 1876 to 1976, closing when workable reserves of stone were exhausted (British Geological Survey 2006: 40). In 1943 an extension of Greenhead Quarry eastwards was prevented through a preservation order. The history of Greenhead Quarry is not so clear but work there appears to have ended by 1950 (Christopher Evans, *pers. comm.*).

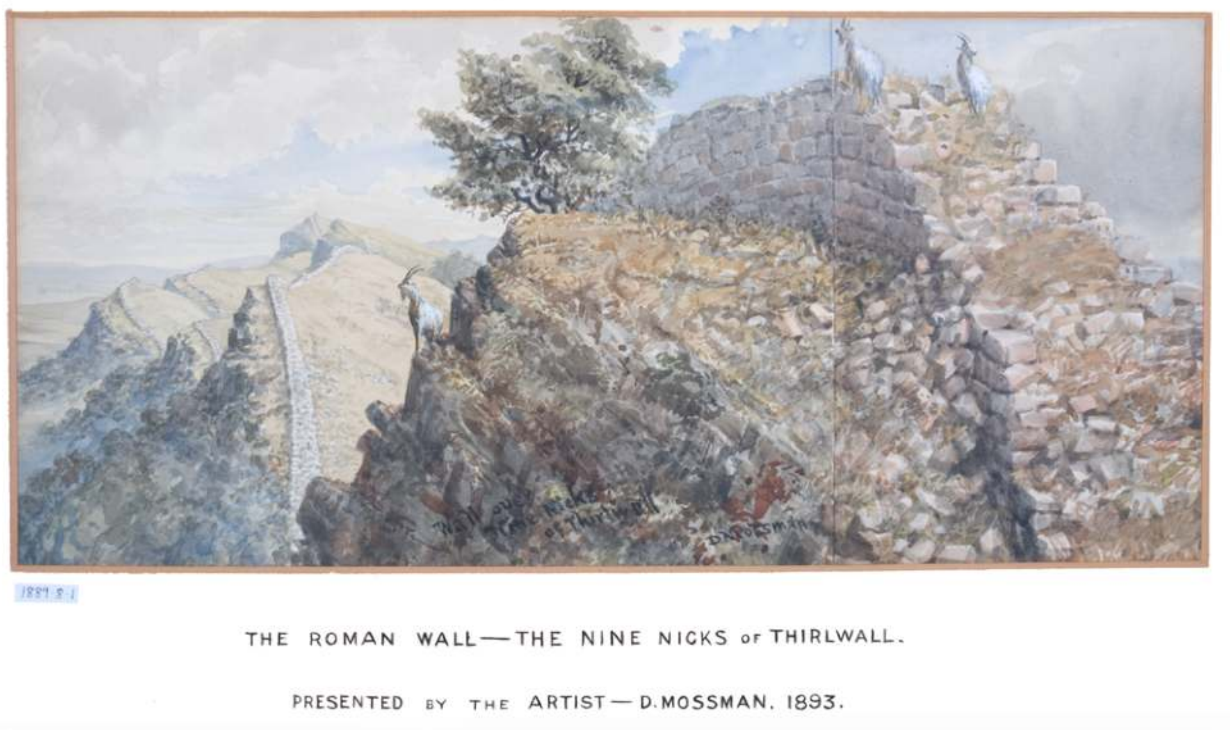


Figure 6. David Mossman's painting of Walltown looking east. The Tullie House catalogue entry for Mossman's painting is: 'The Roman Wall; The Nine Nicks of Thirlwall *by David Mossman, between 1880-1890. Watercolour on paper'.*

Figure 7. C. J. Spence's view of Walltown published in Bruce's 2nd edition of the Hand-book to the Roman Wall *in 1884.*

The extent of the two quarries at Walltown have been marked on MacLauchlan's 1858 map on the basis of their depiction on modern OS maps and distinguished by the use of slightly different colours (Figure 9).

Walltown Quarry was the scene of an unfortunate incident in the 1880s. In August 1883 John Collingwood Bruce learnt that a turret (45b) had been discovered in the vicinity of Greenhead and within the week was examining it (Bruce 1883). He recorded that 'this new turret stands on the top of the cliff which forms the western extremity of the great basaltic dyke over which the Wall runs for about ten miles in the central part of its course. The cliff is about 100 feet above the plain to the north, and as it descends rapidly to the west, a most extensive view is obtained to the north, the south, and the west. It must have formed a good look-out station'. Bruce provided measurements for the turret which were slightly amended in his later report on the turret (Bruce 1885: 57). Bruce went on to say that the 'cliff is now being quarried … Should the quarryman proceed right on, the turret will soon be undermined and disappear; already its north-west angle has fallen. It is probably not too much to suppose that upon a proper representation being made to them, the lessees of the quarry will, out of regard to the interests of antiquarian science and respect to the labours of men whose arms have been nerveless these seventeen centuries and more, spare the turret and direct their operations to other quarters' (Bruce 1883: 235). Alas, his plea fell on deaf ears and the turret was quickly destroyed together with the crag on which it sat (Figure 8).

The discovery of this turret, however, led John Clayton to send his foreman, William Tailford to Walltown which led to two further turrets, 45a (Walltown) and 44b (Mucklebank), being located and to the statement that 'Horsley thought that there were four of these turrets … between each milecastle. So far as we can at present see there were but two' (Bruce 1885: 58). This suggestion was to be confirmed by Percival Ross (cf. Birley 1961: 104-106 for an account of the discovery of the spacing of turrets).

The drawing by Spence, a contemporary photograph and the description of Bruce are all invaluable in aiding our understanding of the location of the turret and its spectacular position on the summit of the crags with an extensive view to the west, similar to that of T 44b still visible on Mucklebank Crags. This has led, together with other evidence, to the suggestion that this was one of the last sectors of Hadrian's Wall to have been completed (Symonds and Breeze 2016). What has survived of the Wall on Walltown Crags has therefore a special value. Here, alone on the original stone part of Hadrian's Wall can we see today a length of the later Narrow Wall with no underlying earlier Broad Foundation, and surviving to a good height, thankfully saved from destruction by quarrying.

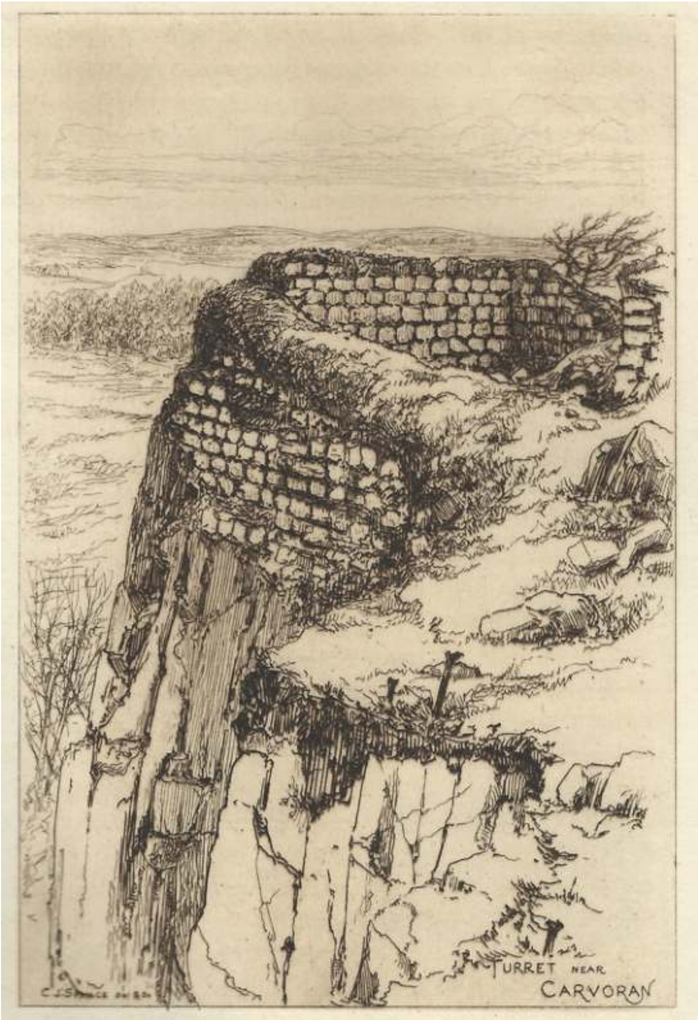


Figure 8. T 45b as recorded by C. J. Spence before its destruction.

The paintings

The part of Walltown Crags which was favoured by the artists of the second half of the 19th century lay between T 45a (Walltown) and Walltown Nick, with the views always to the east towards Mucklebank Crag. This is the view depicted by Henry Burdon Richardson (Figure 3). His stance is from a spot on top of the crag and just north of the Wall which is visible to the right. This is the frame also favoured by C. J. Spence and by David Mossman. The latter's painting exaggerates the landscape features. In a second group of illustrations, the artist would appear to be standing on top of the Wall. This group includes the 1851 woodcut probably by John Storey and the anonymous one of the same year.

Of these various depictions of Walltown Crags, the woodcut and C.J. Spence's drawing are the clearest in depicting the tongue of land, low down and jutting northwards beyond the third nick eastwards from the artist's stance; the tongue of land is also visible on Richardson's 1848 painting. It also appears on the drawing by the anonymous artist of 1851, though standing up prouder than on the woodcut and Spence's drawing. It is this tongue of land that has been removed by Greenhead Quarry. It is difficult today to take a photograph that is exactly the same as any one of these drawings and paintings as a stand of trees obscures the view (Figure 10).

It is this perspective of Walltown Crags and Mucklebank Crags which, in 1959, Alan Sorrell took for his own artist's impression of 'Hadrian's Wall at Walltown Crags, looking east, as it might have appeared in the 2nd century AD' (Sorrell 1981: 46; Sorrell and Sorrell 2018, 195). His daughter Julia has commented that, no doubt, 'being a romantic, I assumed that he was largely thinking of it in terms of dramatic effect and the composition' (Julia Sorrell, *pers. comm.*). In this depiction, he accepted the landscape as it was at the date he observed it and ran his Wall along the top of the quarry rather than along the disappeared tongue of land below it (Figure 11). This is hardly surprising. The quarry had been closed for about a decade by then and would have lost its rawness, while some considerable research would have had to be undertaken to understand the history of that particular stretch of Walltown Crags. Twenty-five years later, Ronald Embleton copied Sorrell's painting for his 'The Roman Wall near Carvoran'. He changed some details but still followed the original fairly faithfully though simplifying several aspects (Embleton and Graham 1984: 185).

Conclusion

Charles Anderson, the Ministry of Works foreman, remarked that 'Walltown is one of the best and most interesting of all the sections of the Wall I have had the pleasure to expose' (Leach and Whitworth 2011: 97). For Anderson, this was because the Wall was in an excellent state of preservation, standing up to 14 courses high, while it had not been tampered with by John Clayton's workmen. To this aspect we can add the aesthetics of this stretch. The Wall here is most attractive as it winds sinuously around the rocky outcrops. But, alas, it has lost its iconic status and for this the two major bites of the Nine Nicks of Thirlwall must take a share of the blame. In addition to the loss of the archaeological remains, the splendid views of the Wall looking eastwards to Mucklebank Crag have been irredeemably compromised.

Figure 9. MacLauchlan's 1858 map showing the extent of quarrying at Walltown.

Figure 10. Walltown Crags today looking east.

Figure 11. Alan Sorrell's visualisation of Hadrian's Wall at Walltown.

Acknowledgements

I am grateful to the following for permission to reproduce the illustrations: Judith Yarrow (Figure 1); Tyne and Wear Archives and Museums, per Sarah Richardson (Figure 3); the Society of Antiquaries of Newcastle upon Tyne (Figure 5); Tullie House Museum and Art Gallery, Carlisle per Claire Sleightholm (Figure 6); and Historic England per Lucinda Walker (Figure 11). I am also grateful to Julia Sorrell for discussion about the impression of the Wall at Walltown by her father, Alan Sorrell, and to Christopher Evans of Northumberland National Park and Paul Frodsham for help in understanding the history of the quarries.

Bibliography

Anon 1906. *Collection of Water Colour Drawings of the Roman Wall by Henry Burdon Richardson. Given by the Right Hon. Sir Gainsford Bruce D.C.L., to mark his appreciation of the Special Loan Exhibition of Works by T.N. Richardson, Senr., and Members of the Richardson family, held at the Laing Art Gallery in 1906.* Newcastle upon Tyne: privately printed.

Birley, E., 1961. *Research on Hadrian's Wall*. Kendal: Titus Wilson.

Breeze, D.J. 2015. Some nineteenth-century watercolours of Hadrian's Wall. *Archaeologia Aeliana* 5th series 44: 225-39.

Breeze, D.J. 2016. *Hadrian's Wall. The Paintings by the Richardson Family.* Edinburgh: Birlinn.

British Geological Survey 2006. *Hadrian's Wall.* Nottingham: British Geological Survey.

Bruce, G. 1905. *The Life and Letters of John Collingwood Bruce*. Edinburgh: William Blackwood and Sons.

Bruce, J.C. 1851. *The Roman Wall.* London: John Russell Smith; Newcastle: William Sang and G. Bouchier Richardson.

Bruce, J.C. 1853. *The Roman Wall.* 2nd edition. London: John Russell Smith.

Bruce, J.C. 1867. *The Roman Wall.* 3rd edition. London: Longmans; Newcastle: Andrew Reid.

Bruce, J.C. 1883. An exploratory turret on the Roman Wall. *Archaeologia Aeliana* 2nd series 9: 234-5.

Bruce, J.C. 1884. *The Hand-book to the Roman Wall.* 2nd edition. London: Alfred Smith; Newcastle: Andrew Reid.

Bruce, J.C. 1885. Notes on the recently discovered turrets on the Walltown Crags. *Archaeologia Aeliana* 2nd series 10: 57-8.

Collins, R. and Symonds, M. 2019. *Hadrian's Wall 2009-2019.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Embleton, R. and Graham, F. 1984. *Hadrian's Wall in the Days of the Romans.* Newcastle upon Tyne: Frank Graham.

Hall, M. 2005. *The Artists of Northumberland*. Bristol: Art Dictionaries Ltd.

Hodgson, J. 1840. *History of Northumberland. Volume 1, Part 2*. Newcastle: privately printed.

Leach, S. and Whitworth, A. 2011. *Saving the Wall. The Conservation of Hadrian's Wall 1746 – 1986.* Stroud: Amberley.

MacLauchlan, H. 1858. *Memoir Written During a Survey of the Roman Wall Through the Counties of Northumberland and Cumberland, in the Years 1852-1854.* London: privately printed.

Sorrell, M. (ed.) 1981. *Reconstructing the Past*. London: Batsford.

Sorrell, J. and Sorrell, M. 2018. *Alan Sorrell. The Man who Created Roman Britain*. Oxford: Oxbow.

Symonds, M.F.A. and D.J. Breeze 2016. The building of Hadrian's Wall: a reconsideration. Part 2. *Archaeologia Aeliana* 5th series 45: 1-15.

'A most interesting and valuable piece of workmanship': John Collingwood Bruce's 'cabinet' and its treasurised bindings

Roger Miket

'Dr Bruce was able to secure a portion of the piles of the Roman bridge and a portion of the piles of the medieval bridge, and he had a cabinet made of this old oak in which he kept a folio copy of 'The Roman Wall' and his copy of 'Hodgson's Northumberland,' and other choice books which he specially prized.'

(Sir Gainsford Bruce. *The Life and Letters of John Collingwood Bruce. LL.D., DCL., FSA*. 1905: 157).

Rediscovery

In 1974 Tyne and Wear Museums Service was created to oversee management of collections dispersed across some 13 museums within the newly created Tyne and Wear Metropolitan Authority. It was in 1975, as Keeper of Archaeology with responsibility for appraisal and management of the archaeological collections, that I first encountered this bookcase in the basement of the Laing Art Gallery, Newcastle upon Tyne. Though an item under the curatorial care of the Keeper for Decorative Arts, the Roman iconography in relief adorning the surfaces of this striking late-Victorian piece of furniture raised it above the commonplace and marked it out as an item of considerable archaeological interest (Figure 1). The inscriptions it carried, its contents and the Accessions Record of its gift to the Laing Art Gallery by Bruce's grandson, John Clayton Collingwood Bruce in 1948, identified it as the bookcase made in 1875 for his grandfather, John Collingwood Bruce.[1] It was created to house those books he especially prized, as well as his collection of coins, photographs, prints and manuscripts.[2] While its rediscovery promised new insight into the life of both its owner and Roman Wall studies in the late 19th century, here in the dimly-lit basement it appeared adrift – sadly neglected and bereft of purpose.

Yet this had not always been the case. When new it had been displayed in the Central Exchange Art Gallery established in September 1870 by Alderman T.P. Barkas and T.H. Tweedy near the junction of Grainger Street and Market Street.[3] At first sight a somewhat unusual subject for display in an art gallery, it nevertheless proved a popular exhibit that excited considerable public curiosity. The essence of its appeal lay in its materials, ancient wood recently raised from the bed of the Tyne that offered intimate connection to key moments in the history of the city across two thousand years. Displayed alongside other items of furniture fashioned of wood from the same source, capturing it for display must have been particularly gratifying for the gallery owners - one a successful bookseller and the other the proprietor of the city's most celebrated wood-carving business.

At the time of its first public outing it had stood empty; now, exactly 100 years later, brimful of books and manuscripts, many of which were central to the archaeological life of its owner, there was an opportunity to bring this emblem of local pride to wider public attention once more and open its contents to scholarly access. With the agreement of Mr Collingwood Stevenson, then Director of the Laing Art Gallery, the bookcase was placed on temporary loan to Arbeia South Shields Roman Fort (Figure 2, A B and C).

[1] On his death the bookcase passed to John Collingwood Bruce's younger son, John Bruce, and thence to his son, John Clayton Collingwood Bruce, of 22 Victoria Parade, Torquay, Devon. In 1948 J.C.C. Bruce gifted this to the Laing Art Gallery (LAG). (Accn No. TWCMS : J2867.1: old Accn No. LAG 48-151), together with 509 Roman coins (old Accn No. LAG 48–152), an oil painting of Collingwood Bruce (1877) by Rudolph Lehmann (Accn No. TWCMS : G1739: old Accn No. LAG 48–153), an album of photographs on old Newcastle (Accn No. TWCMS : 2013.2087), 62 post-Roman coins, two tokens and 26 watercolours of old Newcastle, five books on old Newcastle, and handwritten notes on lectures (all old Accn No. LAG 48–154). The painting is currently on loan from Tyne and Wear Archives and Museums to Lumley Castle Hotel, Chester-le-Street, County Durham (Waterford Suite).

[2] See above quote. An oblique reference to this bookcase within two years of its production and some three decades earlier than Gainsford's record of it occurs in a letter from Bruce to Gainsford, written on 5 October 1877. In this Bruce thanks Gainsford for the copy of *Castles of Alnwick and Warkworth* (Percy 1824) given by Florentia the Duchess of Northumberland, to his wife, noting, 'I think that is a book which ought to be in *the cabinet* [my italics], and so, as you kindly authorised me to do, I brought it away. ... I shall have it full bound in morocco' (Bruce, G. 1905: 307). '*Castles...*' remains in his bookcase to this day (old Accn No. LAG 48-154 (75)).

[3] *Alnwick Mercury* 25 September 1875; Welford 1895: I.184; Kelly 1887; Bulmer 1887: 111. The bookcase was displayed flanked by two library chairs made also from wood recovered from the Tyne and 'decorated with a grotesque head (Roman) and a lion's head; and are covered with crimson morocco.' Each bore a silver plate stating its source (*Alnwick Mercury* 25 September 1875).

Figure 1. The bookcase digitally restored, as it would have appeared in Bruce's home after 1880 with the eagle addition (© Tyne and Wear Archives and Museums).

A B C

Figure 2. A, B, and C. Front and side views of Bruce's bookcase today (© Tyne and Wear Archives and Museums).

This bookcase is by far the largest and most imposing of all in the long list of the objects claimed to have been fashioned of wood from the bridge Hadrian built across the Tyne in AD 122 and both myself and Paul have spent many years working in its numinous presence. Today it is indeed better known and its unique contribution to scholarship through the rich insight of its contents into the field of Roman Wall studies continues undiminished.

Sourcing the materials

By the second quarter of the 19th century it was clear that economic expansion in the North-East depended largely upon improving the Tyne's capability to accommodate vessels of increased tonnage and in greater number. In 1850 river management passed from the Corporation of Newcastle into the hands of the Tyne Improvement Commission. Over the following 25 years the Commission invested some three million pounds in the construction of piers and dredging works, so turning a shallow and dangerous river into a highway accessible to vessels in greater number and of upwards of 500-600 tons. Improved dredging methods had achieved much between the mouth of the river and Newcastle but the extension of industries upriver from the old Georgian bridge were finding themselves disadvantaged through differences in water-level of several feet above and below the bridge that imposed restrictions of passage on keel draught and vessel-size. In 1868 the Georgian bridge on the site of its medieval predecessors, and – some believed, that of the first bridge built across the Tyne by the Emperor Hadrian – was demolished as work began to replace it with a hydraulically-operated swing-bridge. Built and paid for by W.G. Armstrong it opened in June 1876 and was the largest swing-bridge of its day (Figures 3 and 4).[4]

The story of John Collingwood Bruce's search amidst the remains of the third pier of the Georgian stone bridge in March 1872 for tangible evidence on the site of the original *Pons Aelii* is well-known.[5] For our

[4] The story of the walking stick made of 'Roman' wood recovered from the site of the bridge in 1771 and gifted to Bruce in by John Reid Wilson in 1849, 'in supporting you in your arduous undertaking' (the first Pilgrimage), has been told elsewhere (Miket 1984: 247–8). This long-held belief in the considerable antiquity of the site was referenced by James Clephan on the 17 July 1876 when the swing-bridge opened to admit its first ship, the Italian vessel '*Europa*', sailing upriver to Armstrong's Elswick Works to take on board the 100-ton gun purchased by the Italian Government: 'What could be more appropriate than that the engineering victory over this impediment should be celebrated by a ship of Rome? ...coming to the Tyne from the country of the Emperor who first gave it a bridge' (Guthrie 1880: 146).

[5] *Newcastle Daily Journal*, Thursday 2 May 1872: 3, cols. 3-4 (report of

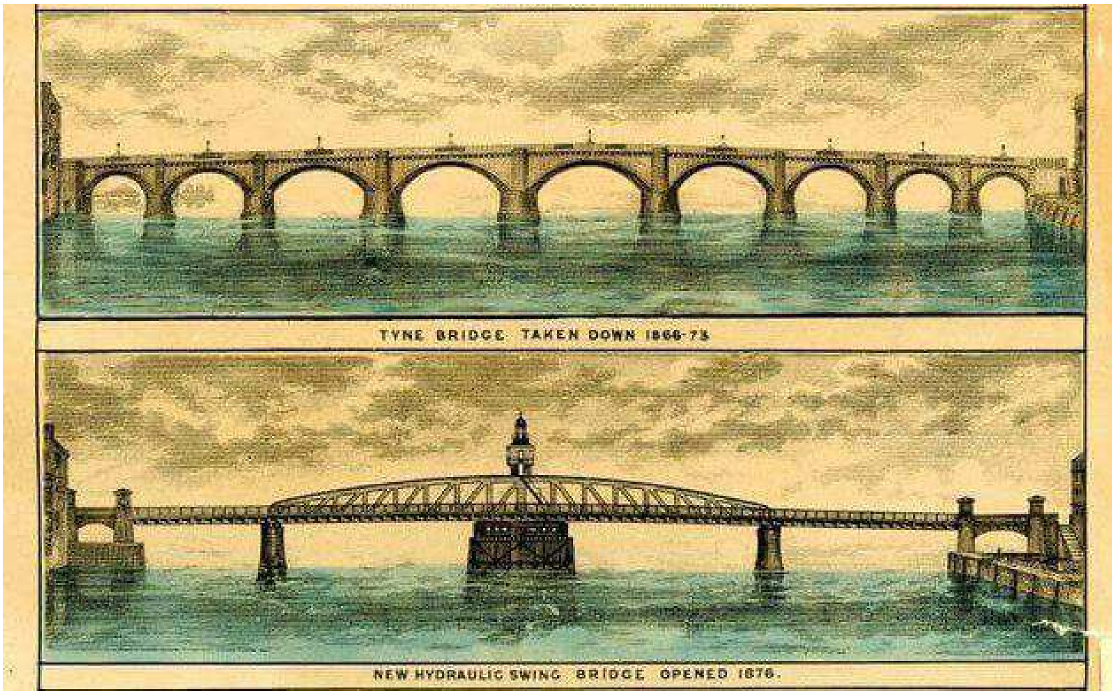


Figure 3. The Georgian Bridge (1773–1866) and the Swing-Bridge (1876) (author's collection).

Figure 4. The Georgian bridge during demolition to make way for the Swing-Bridge,1871–2. As viewed from Gateshead looking north towards the Castle and St. Nicholas's Cathedral. Peeping through the thicket of scaffolding and machinery is perhaps the very ladder Bruce descended to reach the bed of the river. To the left is the gas-lit temporary bridge built in 1866. Removing the debris of the Georgian Bridge has left the soot-stained building facades behind coated with wind-blown sandstone dust (© Newcastle City Library, Local Studies Collections Accn No. 046776).

purpose however, the interest of the pier is as a source of timber, and Bruce's interpretations are important only in as much as to how he would deploy the different coloured woods within his bookcase design. He had been fortunate in securing permission for access to the workings, and standing within the pier, 'in a manner high and dry upon what for ages had been the bed of the river'[6] he believed he could discern a succession of three piers: black oak piles with a fibrous heart of the Roman bridge built across the Tyne by Hadrian in 122; a solid brown oak of the medieval bridge built in the 13th century and swept away in the great flood of 1771; and a lighter brown oak from its Georgian successor of 1775–1873 (Figure 5).[7]

It was an interpretation that caught the Victorian public's imagination and invested the reclaimed timber with a potency that would ultimately draw them in some numbers to view a range of objects made from, 'oak...growing on the banks of the Tyne in the year (AD) 120 ... the sap ...flowing in its veins when throughout the Holy Land there 'walked those blessed feet...'.[8]

The comment is unmistakably Bruce's and one that must cause momentary pause in our regard of the bookcase as an artefact of archaeological interest, to reflect that in the eyes of its creator and owner it represented so very much more than this. It is also a reminder that behind the antiquary who took great personal delight in the pursuit of the past, and the exceptionally gifted teacher passionately committed to awakening interest, understanding and a shared joy of this in others, Bruce was ever and foremost a devout Presbyterian whose main driver, heart, body and soul throughout his long and industrious life was to regard everything as an example of the works and goodness of God.[9] And now he possessed in his own home the tangible physical presence of something from that actual brief moment of the time on earth of his Redeemer and Saviour. This is not to cast the bookcase in his mind as a relic – a notion that would have sat oddly with a Presbyterian minister, but rather as illustrative of deeper complexities within traditional modes of characterising attitudes within groups and classes in 19th century society.[10]

Design and construction

Bruce was alert to the historical value of all the timber and its potential for turning into objects, including furniture. Soon after its discovery he was able to secure a substantial amount which he had stored in damp conditions as the first stage of the drying-out process.[11] Optimistically, he thought this might take only twelve months but it would be three years before it would become suitable for use.[12] The larger pieces he reserved for making into furniture, at least one item of which he intended as a gift.[13] For himself he fastened upon the idea of a bookcase to house his most precious works. He had seen in the different colours of oak its potential for a design of contrast, and approached Carnegie and Gullachsen, furniture makers, Newcastle upon Tyne, with a commission to make the bookcase and some chairs.[14] The reputation of the firm rested primarily upon its designs and the quality of its workmanship, although the company was also an accomplished upholsterer, shop and office fitter and cabinet maker, as well as having a rather off-the-wall side-line in making stalls for markets, bazaars and decorative panels for public events and celebrations. So began a collaboration to produce a visually striking bookcase manufactured wholly from materials obtained from the city's historical succession of bridges, elaborately decorated with relief-moulded carvings to designs prepared by Bruce himself, 'of figures and heads, and other ornamentations ...copied from Roman pottery,

Bruce's lecture to the Society of Antiquaries given the previous evening); Bruce, J. C. 1885: 1–11; Bidwell and Holbrook 1989: 99–101. In the latter Paul cogently argues that what Bruce believed to have been Roman work was part of the medieval construction, and that although the numerous finds of Roman date discovered at various times may indicate its presence hereabouts its precise location remains unestablished.

6 Bruce, G. 1905: 156.

7 In 1879 with the addition of the eagle and plinth this colour sequence would later be revised to incorporate a dark black oak from Newburn and the original three would be lightened.

8 A phrase Bruce repeats several times; e.g. inscribed on the silver plate attached to the library chairs (Croom *et al.* forthcoming); on his plan of the third pier of the bridge at Newcastle (Bidwell and Holbrook 1989: fig 72); in a letter to his son, Gainsford (Bruce, G. 1905: 334).

9 Miket and Welfare 2021, 1-21.

10 Amongst antiquaries in particular objects represented a particularly potent vehicle connecting them with the past. Coins especially, both as a circulating currency intimately connected to all aspects of everyday life at that moment in time as well as through the physical representation of the ruler of the day they were struck. Bruce lectured on Roman coins and amassed a substantial collection of his own, supplementing more exotic types through purchase from the Revd Samuel Savage Lewis (1836-1891), Fellow of Corpus Christi, Cambridge and noted collector of antiquities: "I have bought (through Mr Lewis of Cambridge) a nice set of Scripture coins for the Duchess of Northumberland" (letter from J C Bruce to Gainsford Bruce, 28 September 1878; Bruce G. 1905: 309). Bruce's bookcase preserves two copies of his own MS of '*On Bible Coins*' with indications of the position for the coins (Old Accn Nos. LAG 48–154(3) A and B).

11 *Alnwick Mercury*, 25 September 1875; "I have got some more black oak taken out of the foundations of Hadrian's bridge over the Tyne. ...The timber, however, must be dried very gradually; it will not be ready for working up into furniture for a twelvemonth. We shall have plenty of time, therefore, to fix upon designs." (Letter to Gainsford Bruce, 4 April, 1872; Bruce, G. 1905: 158).

12 In some confusion, the *Alnwick Mercury,* 25 September 1875 reports that the timber had lain in damp conditions for two years and then taken a further three to dry before it was suitable for working on. The interval between recovery and completion of the bookcase was however, only three years in total.

13 Bruce had a chair made from this oak by Carnegie and Gullachsen's and in late May 1875 sent it to Gainsford as a 40th birthday gift (Bruce, G. 1905: 334).

14 Lorenz Herman Gullachsen, a Norwegian, was at the heart of the furniture enterprise continued by his sons after his death in 1912. At the time the cabinet was in production their shop was at 6 Ridley Place, though they later removed to 58 Northumberland Street; their workshop was on Sandyford Road. The firm went into liquidation in 1929 (*London Gazette*, 17 August 1929; *London Gazette,* 18 September 1931).

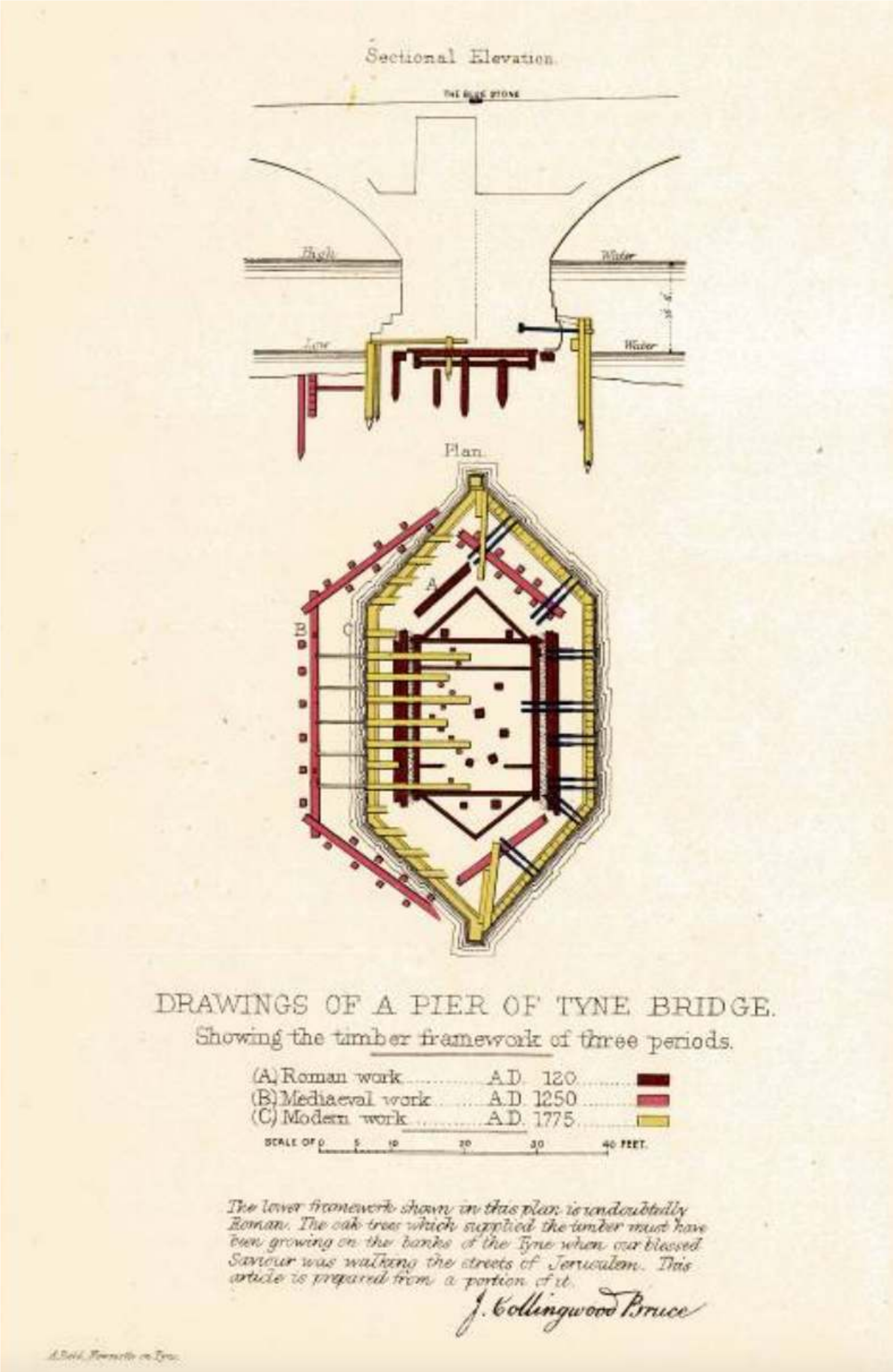


Figure 5. Bruce's plan of the pier foundations (© Tyne and Wear Archives and Museums).

coins and other antiquities....' (Figure 6).[15] The bookcase was completed and French-polished by late summer 1875. Following its short period of display in the Central Exchange Art Gallery (Figure 7) in September, it became a fixture in the library of his home in the recently built elegant terrace at Framlington Place just off Claremont Road, Newcastle.

The framework of the bookcase is made from the light oak of the Georgian bridge. The other two woods are reserved to the decorative embellishments carved in relief; the black oak for the major figurative reliefs and the darker brown oak for the subordinate running design and roundel infill. The whole measured originally 2.00 m in height, 2.00 m in width (lower half) and 1.880 m (upper half), and 0.585 in depth. The design is in a typically heavy ornate Victorian style. Below a projecting cornice carrying running open plant scroll, the upper two-thirds of the bookcase is composed of a central three-shelved bay accessed by two glass-fronted doors framed by rosettes. These are flanked to either side by shelved cupboards, their projection given emphasis through the addition of slim barley-twist columns (now detached and not at South Shields) and loosely referenced as altars by the surmounting *pulvini.* Their panelled oak doors each bear a large framed winged Victory (titled 'VICTORIA' above and 'AVGUSTA' below) based upon the figure found at Housesteads.[16] The frames are surmounted by an owl within an arch and beneath, an eagle with wings outspread sits enclosed within a wreath. Below the thick ornate base of the upper shelving is a central bank of four drawers embellished with openwork running grape-laden vines between terminal roundels. The central bank of drawers is flanked by projecting square cupboards with panelled oak doors bearing framed profiles of Hadrian.

The sides are similarly, decorated. Those to the upper cupboards have two framed fielded panels; the upper figuring the trident and dolphin in relief is taken from the altar fragment to Neptune dredged from the River Tyne in 1875.[17] The lower is from the *Genius* found at Netherby in 1725, a cloaked figure with mural crown, cornucopia cradled in his left arm while the right pours a libation from a *patera* over an altar.[18] This has been gently adapted by Bruce and – by an almost imperceptible hitching up of the cloak and having the altar inscribed in gold lettering, 'GENIO VALLI' – speaks

Figure 6. John Collingwood Bruce on the steps of the castle at Newcastle circa *1870, with the figure of Victory from Housesteads he used as the model for the figures on the side doors of his bookcase (colourised from photo in the J.P. Gibson Collection, Society of Antiquaries of Newcastle upon Tyne).*

volumes as to both his Presbyterian sensibilities and wry sense of humour.

The sides to the lower cupboards carry framed fielded panels bearing heads in relief. That to the right is the head of Hadrian and similar to those on the door fronts; that to the left is the head of Septimius Severus. The whole is carried on a heavy base supported by eight lion-claw feet, one at each corner of the projecting side-bays.

Later embellishment

Bruce lived with the bookcase four years before he had occasion to add one further notable embellishment. This took the form of a cast copper-alloy statuette of an eagle in the round with outspread wings facing to its left and standing with its claws clasping rocks (Figure 8, A and B). The surface has been lacquered, perhaps over gold paint and there are traces of red paint on the rocks. The reverse of the right wing has the following engraved inscription:

15 *Alnwick Mercury* 25 September 1875.
16 Bruce, J. C. 1875: 118. no. 235.
17 *RIB* 1319; The altar had been broken into three fragments in antiquity. The first fragment was recovered in 1875 during dredging for the Swing-Bridge and just in time to reprise its dolphin and trident on the side of the cabinet. It was discovered too late to be included in his *Lapidarium Septentrionale*.]
18 Coulston and Phillips 1988: 1.6. No. 27.

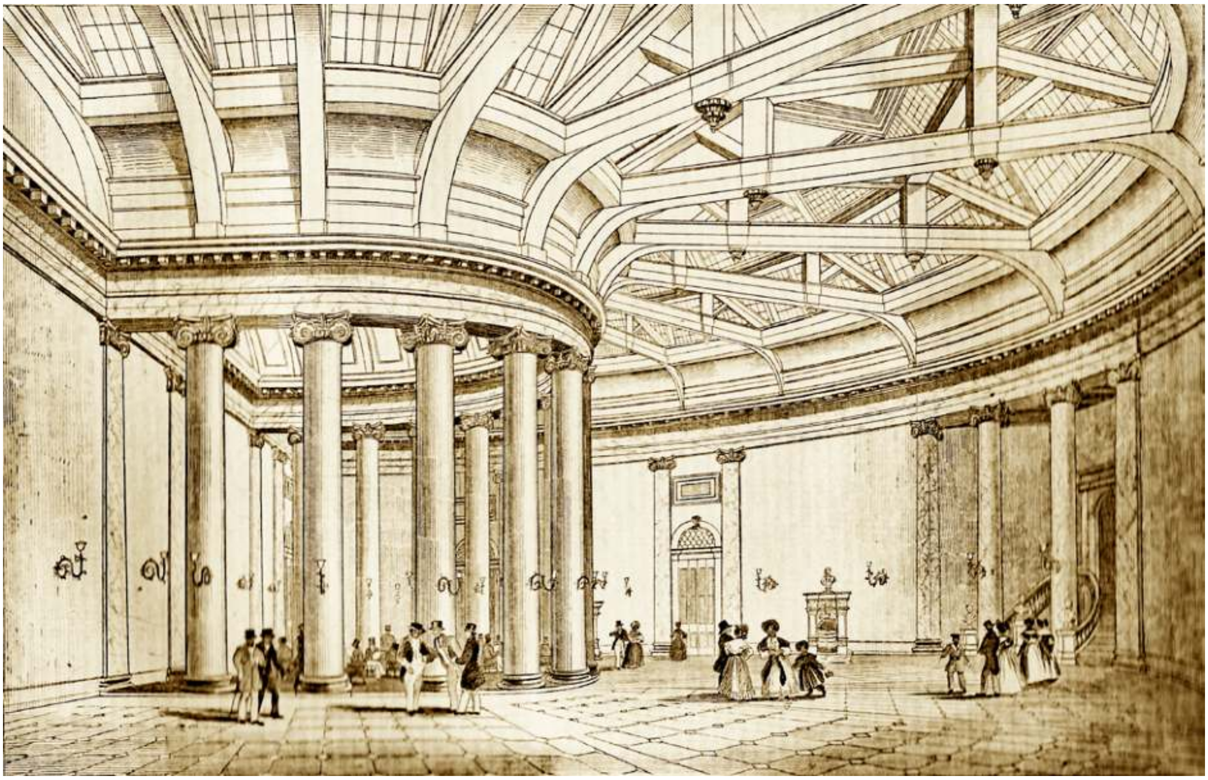


Figure 7. Central Exchange. Built by R. Grainger as a Corn Exchange, in 1839 it became a News Room (shown here) before conversion to the Central Exchange Art Gallery in 1870.

Figure 8. A and B. Eagle with inscription on right wing: 'THIS EAGLE cast from defaced Roman coins from the Well of Procolitia for Dr Bruce Newcastle on Tyne Dec'r 1879' (© Tyne and Wear Archives and Museums).

'THIS "EAGLE" | cast from defaced Roman coins from | the Well of Procolitia for Dr Bruce | Newcastle Upon Tyne Dec'r 1879.'[19]

The coins from which it was cast were part of an accumulated deposition of perhaps as many as 16,000 that had been found three years earlier in late

[19] The eagle is Accn No. TWCMS : J2867.2 and the plinth is TWCMS : J2867.3. The shield has a label on a modern plastic bag reading: 'Bog oak armorial plaque South Shields' but no further details. It is currently stored in the Bruce bookcase.

Figure 9. Oak plaque, revealing position of screw-holes for attachment to the former horizontal bar of the upright to the rear, and the central screw-hole for attaching through the eagle (© Tyne and Wear Archives and Museums).

1876 at a shrine dedicated to the goddess Coventina immediately west of the Roman Wall fort of Procolitia (Carrawburgh).[20] The manner by which Bruce obtained sufficient quantity of the illegible coins from their owner, John Clayton, from which to cast his eagle is unknown but we may presume Clayton was aware of Bruce's intentions for them.[21]

Figure 10. Copper-alloy plate on plinth recording the introduction of black oak from Newburn into the construction (© Tyne and Wear Archives and Museums).

To add emphasis the eagle stood against an oval plaque in dark brown wood decorated with a wreath flanked above with lobate flowers (Figure 9). Both eagle and plaque were mounted on a decorated plinth of dark brown and light brown wood carrying a copper-alloy plate (Figure 10) inscribed:

> 'Made of | Black Oak from Roman ford at Newburn | Dark Brown from Roman Bridge at Newcastle | Light Brown from the Mediaeval Bridge d[itt]o | Modern Oak from the bridge 1775 d[itt]o | Eagle and this plate from Roman Coins from | the well at Procolitia.'

When assembled it undoubtedly added a focal-point of unique character and striking effect (Figure 11).[22] While there is nothing to indicate that anything had occupied this position prior to this addition, its absence leaves the centre unsatisfactorily bare and it is conceivable that this space may have been occupied by something freestanding.

The book covers

Of the many, 'choice books' housed within his cabinet three stand apart on account of the Treasure Binding Bruce accorded them. In dark red leather slip cases, they are boarded front and back in a dark brown oak with relief decoration in classical style within sunken fields. Electrotypes of Roman coins are set into sunken roundels at each corner (some are missing) covering the screwheads by which the boards are fastened to the book covers, and each volume is closed by a pair of inscribed copper-alloy clasps.

[20] See Allason-Jones and Mackay 1985: 50-76 for details and references. As with the timber, the archaeological context of the coins is here important only as the source of Roman copper-alloy obtained from around 2000 illegible coins. After Clayton's note of them these were passed to Charles Roach-Smith, assisted by Robert Blair, Canon Greenwell and Bruce himself, for identification and analysis. It was presumably only following their studies that Bruce had access to the residue for the eagle.

[21] It has been suggested that the eagle was cast as a gift from Clayton to Bruce but there is no evidence for this. (Retrieved from the internet, 3rd March 2021; www//imperium,romanum.edu.pl/en/curiosities/eagle-made-from-three-thousand-roman-coins.) Certainly the use of third person in '...for Dr Bruce' is odd, and we have no precedent for Bruce referring to himself in this way elsewhere.

[22] Today it is disassembled and the individual pieces are kept in one of the cupboards. Markings on the reverse of the individual pieces reveal the method of assembly and attachment (see Figure 11). The upper plinth carrying the copper-alloy plate fastened to the lower base by means of two screws. Impressions at the rear of the plinth evidence the former presence of a vertical timber or metal support that, by means of a single horizontal screw held the plaque and eagle standing on the plinth in position, assisted by a cross-arm on the upright that prevented any rotational movement of the plaque.

A B

Figure 11. The eagle addition. A. Assembled, from the front. B. The rear, showing imprint and screw-holes of vertical support and screw-holes for attachment of cross-arm to the oval shield (© Tyne and Wear Archives and Museums).

Two of these ‘books’ are in reality Parts I (Old Accn No. 48-154 (126)) and II (Old Accn No. 48-154 (127)) of the one work, Bruce’s large folio *The Roman Wall* (3rd edition, 1867; Figures 12-13). Boarded they measure 380 mm in height, 250 mm in width and some 97 mm in thickness. The boards of each are treated differently, with Part 1 carrying Bruce’s name in relief below a figure of the deity ‘ROMA’ with head-dress, trident and shield. Part 2 portrays a similar figure but without the lettering.

The clasps of these are similarly inscribed (Figure 14):

Upper: ‘The boards of these volumes consist of oak used in the foundation of the Roman bridge over the Tyne at Newcastle, built by Hadrian, AD CXX.’

Lower: ‘The timber was brought away from its ancient bed by J. Collingwood Bruce in March 1872.’

Interleaved with letters, drawings, watercolours and press-cuttings, this is the very book his son, Gainsford, tells us was housed in the bookcase, although he fails to mention its outstanding decoration.

A third volume, ‘THE ROMAN WALL. JC BRUCE PART III SURVEY MAPS. MDCCCLVII’ contains a gathering of the maps presented by the 6th Duke of Northumberland to Bruce in 1874 (Figure 15). This includes MacLauchlan’s surveys and a handsome set of the Ordnance Survey’s coverage for Northumberland. At 415 mm in height by

Figure 12. The Roman Wall *(3rd edn) Part 1. Note ill-fitting electrotypes (© Tyne and Wear Archives and Museums).*

Figure 13. The Roman Wall *(3rd edn) Part 2 (© Tyne and Wear Archives and Museums).*

305 mm in width by 53 mm in thickness it is slightly larger than *The Roman Wall* volumes, a matter clearly not communicated to those making the book boards. Central on the cover is the coat of arms he cast for himself; a shield surmounted by a Great Bascinet with the Gainsford arms (through Charlotte, his wife) set central against the St Andrews Cross, referencing his own Scottish (Lothian?) origins. Top left, his antiquarian interest is signalled in the lamp of the Society of Antiquaries of Newcastle, with 'PERGAMUSI' ribboned below the shield, loosely translating as the motto of Bruce's Academy –'ONWARD'. The clasps of this book are inscribed:

Upper: 'These Maps Presented to J Collingwood Bruce.'

Lower: 'by the Duke of Northumberland 1874.'

Production

The idea of adding a carved wood binding to a book was not a new device to Bruce. In Alnwick Castle is a copy of *The Roman Wall* (1st edition, 1851), his gift some twenty years earlier to Algernon Percy, 4th Duke of Northumberland, that he had boarded in '*ancient*' oak recovered from the bed of the Tyne and finely carved with the Percy Lion and motto, '*En Dieu*' - 'Hope in God' (Figure 16).[23] Bruce now had timber in sufficiency and of the right date to reprise this idea and similarly embellish his most prestigious Roman works. However, unlike the bookcase, there was nothing in the record to suggest when and by what means Bruce's vision for these elaborately designed and wonderfully-executed carved covers had been realised. They were plainly created at his behest, bore his name and were intended to adorn his personal books. It might be presumed that, as with his bookcase, while the overall design may not have been his own, he would have been instrumental in identifying the individual elements to be worked up from his extensive collection of classical Roman

A

B

Figure 14. A & B. Copper-alloy clasps of The Roman Wall, *Parts 1 and 2 (© Tyne and Wear Archives and Museums).*

[23] Tipped into this volume is a letter from Bruce to the Duke of Northumberland dated 27 June 1851 thanking the Duke and the Duchess for their support. It describes the binding of this volume as being boarded in oak which had been found under the bed of the River Tyne and supposed to belong to the prehistoric period. (Alnwick Castle DNC 52159.)

Figure 15. The maps (© Tyne and Wear Archives and Museums).

Figure 16. The Roman Wall*, 1st edn, 1851. Given to the Duke of Northumberland by Bruce (in Alnwick Castle © Collection of the Duke of Northumberland).*

imagery. But the unanswered question was, where, and by whom had they been made? Though undoubtedly both accomplished and versatile at wood-carving in relief, the furniture-style of Carnegie and Gullachsen seemed an unlikely source for their classical imagery, purity of design or quality of execution. Though drawing upon similar motifs, in the contrast between the applied adornment of the bookcase and the more restrained classical elegance of the boards, their styles could not be more different. As to when they were made, one could say no more than that they could not have been made before 1874, the date of the volume containing the 6th Duke’s gift of maps.

So matters stood until March 2019 when a previously unknown copy of Bruce’s *Lapidarium Septentrionale* (1875) appeared at auction at Bonhams in London (Figure 17, A, B and C).[24] It had been bound in oak boards virtually identical to those in Bruce’s bookcase though with silver clasps bearing foliate decoration within sunken panels and carrying a Birmingham 1877 hallmark (Figure 18, A and B). It is housed in a box of felt-lined red leather similar to the slip-cases of those in his bookcase at South Shields. Its apparent isolation from the other treasurised volumes raised the possibility that it might have been intended by Bruce as a gift of the kind he had previously made to the 4th Duke of Northumberland when presenting him with a copy of the 1851 edition of *The Roman Wall.* However, those recipients he favoured most, Algernon, 6th Duke of Northumberland and John Clayton, had less elaborate copies that were simply inscribed by the author.[25] The Bonhams volume bears no such inscription. Notwithstanding the slight differences to those in his bookcase, it seems most reasonable to conclude that this had been Bruce’s personal copy and one of four treasurised volumes housed within his bookcase. It seems therefore likely that at some point in the half century between Bruce’s death in 1892 and 1948

[24] Retrieved from the internet, 3 March 2021, www.bonhams.com/auctions/25354/lot/8/?category=list&length=10&page=1. The Sale was held on the 19 March 2019 and the volume was Lot No. 8. The Catalogue entry reads: [BRUCE (JOHN COLLINGWOOD, *editor*)] Lapidarium Septentrionale: Or, a Description of the Monuments of Roman Rule in the North of England. Published by The Society of Antiquaries of Newcastle-Upon-Tyne, FIRST EDITION, *15 plates and maps (one large folding in pocket at end as issued, several chromolithographed), numerous illustrations in the text, additional hand-coloured diagram of “A Pier of Tyne Bridge” pasted onto the front free endpaper, 4-page manuscript note by Collingwood Bruce loosely inserted, contemporary binding made of carved wooden sides (see footnote), the upper cover with the figure of a standing Britannia with a border of flowers and ornamental decorations, 3 Roman coins (Hadrian; Sabina; Faustina) mounted in 3 corners (one missing), lower cover with ornamental border, and one Roman coin (of 4) in corner, morocco spine elaborately tooled in gilt, brown morocco gilt paste-downs and endpapers, g.e., one (of 2) silver clasp (Birmingham, 1877 mark, loose), preserved in original felt-lined box, folio (365 x 230 mm.),* Bernard Quaritch, 1875. REMARKABLE BINDING “FORMED OF WOOD USED IN THE FOUNDATIONS OF THE ROMAN BRIDGE BUILT OVER THE TYNE AT NEWCASTLE... BY THE EMPEROR HADRIAN A.D.120”, made at Alnwick Castle. (It sold for £6,937 incl. Premium.) Attempts to contact the consignees through Bonhams to discover something of its history before it had been put to auction have proved unfruitful.

[25] Gainsford records that Bruce ‘had two large copies of the book handsomely bound for presentation to Algernon, 6th Duke of Northumberland and Mr Clayton.’ Bruce personally presented the Duke’s copy on 2 October 1875, and was asked to write his name in it, ‘which I did.’ Gainsford also notes that on 4 October Bruce intended visiting Clayton that evening to present him with his copy, and that he had, ‘just finished writing the inscription in it’ (Bruce, G. 1905: 160–1.) The boarded copy is uninscribed.

Figure 17. A, B, and C. Lapidarium Septentrionale *sold at Bonham's in 2019. The coins have become detached over time and not reattached according in the sequence as set out in Bruce's letter (e.g. Hadrian's position front board top right is now occupied by a coin of Severus).*

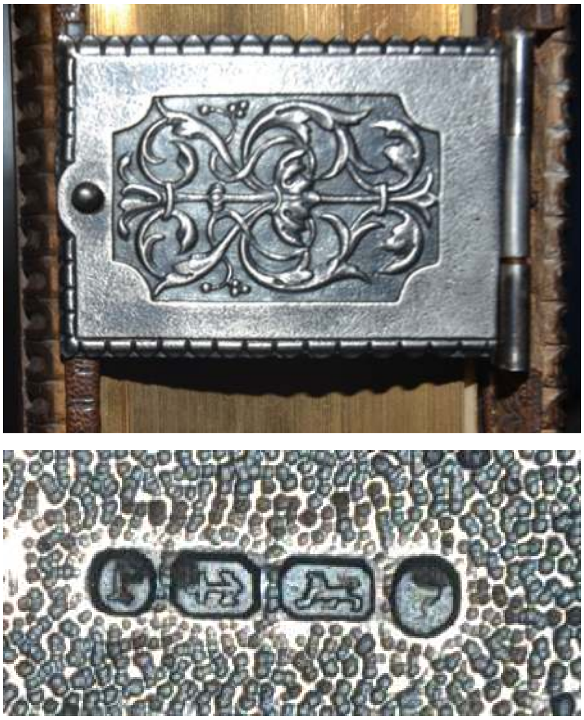


Figure 18. A and B. The silver clasps. Hallmarked Birmingham 1877 (© A. Boutiette).

when the bookcase had been deposited at the Laing, the *Lapidarium* had become detached in the drift of books in and out of the bookcase –a process that would see its original contents diluted by volumes that had not even appeared in his lifetime.[26]

Loosely inserted within the *Lapidarium* was a four-page manuscript in Bruce's own hand dated 19 March 1878 (Figure 19). This not only records coins missing from the boards, but together with the clasps suggested several new strands of enquiry. It is transcribed in full below:

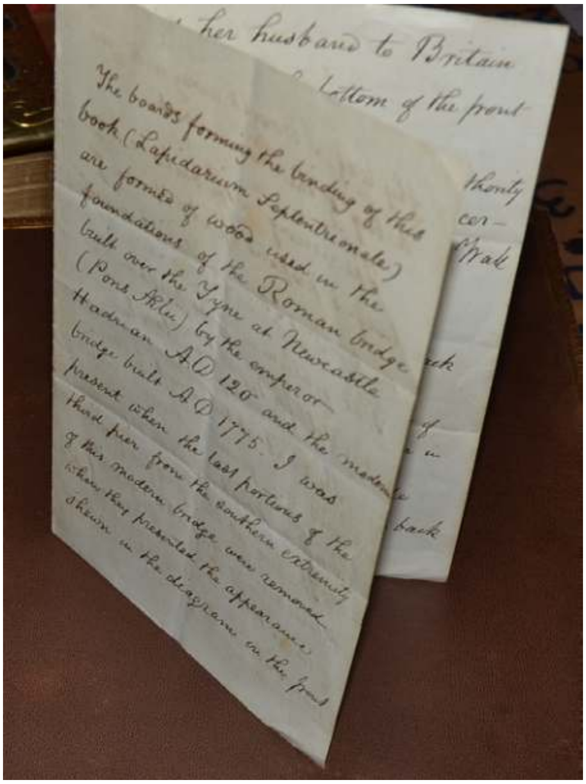


Figure 19. Handwritten manuscript by John Collingwood Bruce inserted within Lapidarium Septentrionale *(© A. Boutiette).*

> 'The boards forming the binding of this book (*Lapidarium Septentrionale*) are formed of wood used in the foundations of the Roman bridge built over the Tyne at Newcastle (Pons Aelii*)* by the emperor Hadrian A.D. 120 and the modern bridge built AD 1775. I was present when the last portions of the third pier from the southern extremity of this modern bridge were removed when they presented the appearance shewn in the diagram on the front fly leaf. I brought away with me a log of the Roman oak.
>
> The carving on the backs is from designs prepared by Mr Brown of the Carving Studio, Alnwick Castle. That gentleman also prepared the model for the silver clasps.
>
> The coins at the corner of the boards are genuine second brass Roman Coins. The two at the top of the front board are –Hadrian the builder of the Bridge and of the Roman Wall and Sabina his wife who accompanied her husband to Britain. The coins at the bottom of the front board are those of Antoninus Pius by whose authority the Scotch Wall was built and certain reparations in the Southern Wall effected; and Faustina, the elder, his wife.
>
> The coins at the top of the back board are those of Marcus Aurelius the successor of Antoninus Pius who carried on war in Britain; and Faustina, the younger, his wife.
>
> The coins at the bottom of the back board are those of Septimius Severus and his wife Julia Domna. Severus came to Britain at the close of the year AD 207; he repaired the Wall and carried on wars with the Caledonians, dying in York AD. 211. His wife accompanied him to Britain. She starved herself to death AD. 217.
>
> [signed] J. Collingwood Bruce
> Newcastle upon Tyne
> 19 March 1878

[26] See https://cumbriapast.com/cwaas/pdf/archive/archive_section3_7.pdf (Allan 2020) for Adrian Allan's most informative catalogue of the full archive of the John Clayton Collingwood Bruce bequest to the Laing Art Gallery, Newcastle upon Tyne. This includes a list of the books currently within the bookcase.

The first question arising concerns the date when the boards and clasps were added to the *Lapidarium Septentrionale* so turning it into a Treasure Binding. As we can now deduce from the silver claps hallmarked 1877 and his letter of March 1878, this embellishment was carried out sometime between these two dates.

The second question is to better understand the milieu that Brown was working in at Alnwick, with at its heart Algernon Percy, 4th Duke of Northumberland's vision to decorate the castle interiors throughout in late 16th century Italianate style. With a passion for art, architecture and archaeology, his home was always open to the wide circle of well-educated enlightened minds he drew around him. His support and patronage with many of the leading antiquarians of the day was well-known and amongst them he counted Dr Bruce, a fellow antiquary, whose ripening knowledge of local Roman matters would support his own projects. Concurrent with these interests, the Duke's plans to redecorate the castle's interiors in a sumptuous *seicento* style had led to the founding of a school of carving at Alnwick in August 1855. Here from a Carving Studio within the castle coach yard, the accomplished Florentine, Anton Leon Bulletti instructed twenty-one carvers and six apprentices in the Italianate style, so, 'breathing a new purpose into the restoration work'.[27] That in this small northern market town, birthplace of John Bruce, Bruce's father, an artisan class was established, which was instructed in the principles of composition, elements of beauty and techniques of carving by the most skilful of masters in the finest of the Roman styles of decoration was a remarkable achievement. This Italian's chief carver and first assistant was John Brown (1824 –1899; Figure 20), a talented young Glaswegian whose 'love of beauty, true conception of art' and 'genius and skill' would be fostered under Bulletti's tutelage.[28] At Bulletti's departure after 1860 to set up business on his own in Newcastle, John Brown stayed on at the castle as Head Carver and Foreman to oversee completion of the work there. As we now learn from Bruce's manuscript slipped inside the *Lapidarium* it was to Brown that Bruce came with his request to design and produce the boards and design the clasps. His failure to explicitly credit Brown as carver is entirely understandable were this work executed by the hands of his assistants. Armed with this hindsight, the Italianate model behind the composition, which Brown would draw upon as inspiration for his design, becomes startlingly apparent. There are echoes of the ovolo around the edge of the library table in the castle library (Figure 21) in the edges of the book boards and the book-clasps, as well as in the ornamentation on the 6th Duke's Coin Cabinet that was also made of oak from the 'Roman' bridge. It is recorded as having been carved at the Alnwick Studio in the same year as the book boards.[29]

Figure 20. John Brown (1824 –1899), Head Carver, Alnwick Castle (From Alnwick Guardian*, 21 January 1899).*

In a lightly-expressed aside in a letter written by Bruce from Alnwick Castle on 2 December 1872, he casually remarks, 'The old oak has arrived all safe; I have written a line to our son-in-law to thank him for sending it off so carefully. It has not been inspected yet'.[30] In light of what we now know, here is Bruce, within nine months of obtaining the timber from the bed of the Tyne, transferring some of it into storage at Alnwick to be curated until the carvers there might begin work in producing the Duke's Coin Cabinet and Bruce's book boards.

[27] Allwood 1989: 250-256; Hartshorne 1865: 73–7.

[28] Obituary in *Alnwick Guardian*, 21 January 1899.

[29] The Coin Cabinet was made for Algernon Percy, 6th Duke of Northumberland in 1878 and also a generously decorated casket from the same timber. The Coin Cabinet is undoubtedly the most sumptuous and elegant of all the furniture carved by the Studio at Alnwick from the timber supplied by Bruce. (Alnwick Castle. DNC 00180)

[30] Bruce, G. 1905: 301.

Figure 21. Ovolo around the edge of the library table in Alnwick Castle.

Evolution

Although appearing at first glance very much a set, the four treasurised volumes exhibit differences that belie their apparent unity. The difference between the materials of the clasps and the coins used, as well as the more decoratively gilded spine on the *Lapidarium* cannot be easily overlooked and require explanation. One possibility is as follows. The international acclaim that greeted the appearance of his *Lapidarium Septentrionale* in 1875 had brought home to Bruce the scale of his achievement. He determined to make a treasure binding for this work and so reprise in more elaborate form his embellishment of his gift to the 4th Duke of Northumberland made some twenty-five years earlier.[31] As the manuscript inside the book reveals, he approached John Brown to design the covers and clasps for it, and presumably also with instruction to oversee the carving. With the designs completed, work began on carving the boards and producing the clasps as Bruce set about gathering together eight original Roman coins, chosen to represent emperors most appropriate to its subject matter. He pointedly lists these in his letter.[32] An untitled felt-lined box of red leather was made to contain it by which it would be distinguished within the cabinet that also contained a separate working copy of the *Lapidarium* for daily use. On the evidence of the date of the manuscript within the book, it was probably sometime after March 1878 that Bruce decided to extend the commission to include the treasurising of two earlier works, *The Roman Wall* (3rd edition, 1867) and the map surveys gifted to him by the 6th Duke of Northumberland. It was a decision that would result in a number of alterations to the design.

The first of these was that instead of boxes, Bruce had slip-cases made in similar felt-lined red leather that their titles might be visible through the glass doors. This small change addressed difficulties in identifying the contents had all been boxed. These were his working books, grangerised with letters and other material he would doubtless have wished to refer to from time to time.

The second arose from the unexpected availability of a source of original Roman copper-alloy in the form of 2000 illegible coins recovered from the shrine at Carrawburgh in autumn 1876. Bruce's decision to have three of the volumes now fastened with clasps cast from this lesser-value copper-alloy had clearly been a conscious one that he knew would have visually differentiated the set. Although the source of the copper-alloy of the clasps is not recorded on them, as it was for the timber of the boards, the most reasonable explanation for this is that he privileged clasps cast from Roman coins over the intrinsically more valuable silver. The copper-alloy plate to accompany his eagle dated December 1879 was certainly cast from these coins, and presumably adding the eagle to the bookcase and treasurising the books were decisions made around the same time. Support for this sequence can be found in the manuscript Bruce included within the *Lapidarium,* which was evidently written to record for posterity the origins of the materials he had used. He might easily have had this information more enduringly inscribed upon the silver clasps, as he would later have done on the copper-alloy clasps; that he did not do so suggests that the idea only came to him after the *Lapidarium* had already been boarded and clasped.

The third alteration in design was the contrast in coin type used on the boards of the later treasurising from those of the *Lapidarium*. All the boards included sunken roundels to accommodate Roman coins the size of *sestertii*. This worked well with the boards on the *Lapidarium* where both the diameter of the roundels and the coins deployed united in a pleasing and balanced harmony. Today the receptacles of those housed in the Bruce bookcase contain disproportionately smaller, brighter electrotypes that sit uneasily within the larger roundels and notwithstanding a corona infill of pricked decoration as in the other sunken fields, disfigure the design (Figure 22).

[31] A cover design that included roundels at the corners of the boards was one that he had earlier used in his gift of 1851 (see n. 23).

[32] Bruce's own substantial collection has been noted in Fn. 1 above. He occasionally also exchanged coins with his friend, John Clayton.

Figure 22. Electrotype from The Roman Wall. *Part 1, top left corner (© Tyne and Wear Archives and Museums).*

It was certainly possible for electrotypes to have been used at the time the volumes were boarded. By the 1860s the process that had been invented in 1838 was becoming increasingly popular, with the leading electrotype company in the world, Elkington Mason and Co. of Birmingham under licence to both the British Museum and West Kensington Museum (later the Victoria and Albert Museum) for the reproduction of antiquities. In 1860 the 4th Duke of Northumberland had three copies of the large Roman silver plate known as the Corbridge Lanx made using this process; and with contacts such as the Duke, Charles Roach Smith and Sir Augustus Franks of the British Museum, it would not have been difficult for Bruce to obtain such electrotypes 15 years later. However we have already noted Bruce's preference for the authentic even at the price of introducing minor differences, and with easy access to the 24 original *sestertii* required through exchange with his friends, it is difficult to believe that he would inflict such violence upon what he was committed to render exceptional. It is not inconceivable that these recesses may once have indeed housed Roman coins, but that at some period after his death in 1892 and before it was gifted to the Laing Art Gallery the original 24 *sestertii* were removed, the roundels modified and replaced with electrotypes.

But is it Roman?

In 1989 Paul Bidwell advanced a compelling argument that Bruce had been mistaken in his interpretation of having found the remains of three bridges in the River Tyne in 1872; rather what he had observed were two piers and an outwork ('starling') that related to the medieval and Georgian bridges alone; and that no trace of a Roman structure was found thereby leaving the site of the Roman bridge still unknown.[33] Twenty–five years later ostensible support for this proposition was obtained from a sample of timber taken from a book board binding Bruce's *The Roman Wall* (3rd edition, 1867; Old Accn No. 48-154 (126)). This returned a radiocarbon date of *c.* AD 1000, clearly conflicting with Bruce's claim – expressed on the clasps, that this had been the, 'oak used in the foundation of the Roman bridge over the Tyne at Newcastle, built by Hadrian, AD CXX'.[34] While entirely consonant with the proposition that Bruce had found nothing of Roman date, the argument cannot however be reversed to claim the radiocarbon date as proof of a medieval date for the earliest bridge at the site. It establishes only the medieval date of the timber of the book board sampled (and perhaps also that of the other boards), with any wider implications dependent upon a better understanding of the place of this particular dark brown oak in our story.

Bruce's description of the timber colours of the three elements he identified in 1872 was at the time unequivocal; black oak piles with a fibrous heart he identified as Roman; solid brown oak coming from the medieval bridge; lighter brown oak from the Georgian bridge. It is a palette unambiguously visible today in the three colours of the original bookcase, of which the almost bog-oak blackness of the Bruce's 'Roman' timber stands out. The oak of the book boards is however very different from this, and in colour approximating very closely to the dark brown oak he claimed as medieval (as evidenced for example on the drawer fronts). But as we have seen, the book boards were produced several years after the bookcase had been made in 1875. The *Lapidarium* was boarded probably in early 1878, and *The Roman Wall* and *Maps* rebound no earlier than 1878/9 on the evidence of their clasps cast from the Roman coins from Carrawburgh.

By this time Bruce had obtained an additional source of what he believed to be 'Roman' timber that he would use in mounting his newly-acquired eagle (1879). The copper-alloy plate mounted on the wooden stand supporting the eagle proclaimed this to be of timber from, 'the Roman ford at Newburn'. It was a startling claim. The suddenness of its appearance and ready adoption alongside the well-documented lineage of the oak from the Newcastle bridges would result in an unsettling revision of Bruce's earlier very succinct attribution of timber colour to specific periods. Henceforth the term 'black oak' was restricted to the 'Roman' wood from Newburn, with the colour-sequence of that from the River Tyne at Newcastle progressively lightened in various shades of brown.

[33] Bidwell and Holbrook 1989: 99–100.

[34] SUERC-60277 (GU36818; 1071±29 BP) Cal AD 890-930 (71.4% confidence) or 940-1025 (24% confidence). From oak timber (with thanks to Alex Croom for sharing this date in advance of her own publication.)

What little we can learn of the source of this Newburn timber and the basis of Bruce's belief that it was indeed Roman is revealed as a tailpiece to his account of the discovery sometime shortly before 1887 of a centurial stone built into a pele tower at Newburn.[35] Almost as an afterthought to this account he casually remarks that, on the road leading from West Denton down to the river at Newburn ('no doubt, originally a Roman one') where a Mr Brooks, formerly river engineer (1842-1858) to the Newcastle Corporation, had apparently recently discovered indications a stone platform across the river, 'a quantity of black oak … [was] found at this spot'. 'All this' Bruce concluded, 'could only have been done by the Romans'. On such slight reasoning then was a fourth timber type also believed to have been of Roman date now introduced into the bookcase. More disconcertingly, with the formerly clear-cut distinction between what the colour of the timbers represented up-ended at a stroke so too would forever be thrown into question the place of all timber (including unfortunately also the book boards) within the original sequence proposed by Bruce. The purity of Bruce's original belief would be preserved only in the colours of the original bookcase construction, with the jet-black timber of the major decorative figures alone able to substantiate the age of the timber used. In April 2021 a new sample was obtained by the author from the rear of the figure of Victory on the door panel. This produced the somewhat startling date of *c.* 1300-1200 cal. BC and disappointingly unhelpful in resolving the issue as to the date of earliest bridge observed by Bruce.[36] It would however be remiss to simply disregard it and move on for, while it certainly further complicates the story of the bookcases' composition, it contributes to our understanding in two respects.

The first arises from the significance of so early a date as to, surprisingly, clarify rather than further muddy the issue. Had the date obtained from such a long-lived species been somewhat younger – say of later prehistoric age – its use in a bridge of early Roman date might yet have remained a possibility, while proving correspondingly unlikely for one of later medieval date. However, timber of the second millennium BC can plainly have played no part in any of the bridges under consideration here, and explanations for its presence as part of the original bookcase must lie elsewhere.[37]

This leads on to the second consideration, which is to significantly widen the chronological range of the timbers used in the bookcase. While the science points to the feet of Moses rather than those of Bruce's '*Redeemer*' as active when the sap of this particular piece of timber was flowing, it also introduces some uncertainties concerning the contexts of the timber of the bookcase claimed by Bruce. Notwithstanding the elegant clarity of the plan in distinguishing the sequence of bridge foundation structures, Bruce was not personally retrieving the timbers, and may not even have been present when the additional 'black oak' he acquired later that year was being lifted by those charged to do so on his behalf.

Adding such doubts regarding actual context to that of questions concerning the colouring, one can only conclude the bookcase to be a far more complex amalgam of timbers of different ages than we have been led to believe, and one clearly requiring a more extensive and targeted dating programme to disentangle.

If only…

There can be little doubt that had the book boards been made at the same time as the bookcase – as well as the mounted eagle – all in the one workshop, there would have been a closer agreement in colour of its differently-dated parts and our story would have been a far less complicated albeit a somewhat less interesting one. Unfortunately, it was all a 'work in progress', representing four separate stages of production across a minimum of eight years, executed in three different workshops, and within a year or two of beginning the project would incorporate additional timber of questionable origin from an entirely separate source. And the discordance was not to be confined to only the timber or its various colours, but to extend back to the different sources of inspiration and design. This would result in such a striking contrast of style between the bookcase and the boarded covers of the books within; the ponderously heavy typically Victorian ornateness of the one, and the more gracefully restrained classical elegance of the other. Had only all been conceived of by Bruce as the one project in his mind he might have thought to engage Signor Bulletti himself for making both the bookcase *and* the covers, for by 1865 Bulletti had left the Duke's employ and arrived in Newcastle to set up his own business on Grey Street, advertising his skills as a 'designing artist and wood-carver' until his departure for London in 1878. But by the time Bruce thought to treasurise his books, the bookcase had been built, assembled by the workmen at the furniture shop and for several years had stood, doubtless bulging with books, in his study – and the opportunity to have had a companion of the stature, elegance and unity of that gracing the library of his friend at Alnwick Castle within his own home at No. 2 Framlington Place had been lost.

[35] Bruce 1889: 192–6; Croom *et al.* forthcoming, no. 27.

[36] SUERC-98586 (GU57978); 3019±27 BP) Cal 1320-1196 BC [95% confidence]. The wood was obtained from the rear of the orb of the right-hand figure of VICTORY. The point of origin of the sample within the girth of such a long-lived species is unknown.

[37] That the bridge-builders may have purposefully sourced ancient bog-oak in the construction has been considered and rejected as unlikely. While such usage is evidenced in superstructural situations - as is found in buildings, the softness of submersed bog-oak may be thought inappropriate for load-bearing situations, such as the foundation cradle-work – the context Bruce claimed for his timbers.

Acknowledgements

Paul Bidwell. For first drawing my attention to the Bonham copy of *Lapidarium Septentrionale* and so unwittingly determining my gift to him here.

Lindsay Allason-Jones. For the companionship in revisiting old haunts and providing material detail towards the story.

Anthony Boutiette, of Boutiette's Antiquarian, Arkansas, USA whose genial correspondence was an encouragement, for graciously sharing access to the information on his copy of *Lapidarium Septentrionale* and allowing reproduction of his images here.

Alex Croom. For so generously sharing her own extensive knowledge and research on the background of the timber from the Tyne, for consent to refer to the radiocarbon date obtained on the book board timber, allowing me to obtain the additional date from the bookcase itself and making available her own as yet unpublished article *Furniture and souvenirs made from the 'Roman' bridge at Newcastle* (Croom *et al.*, forthcoming). Also for the excellent photographs she has taken for Tyne and Wear Archives and Museums.

Christopher Hunwick, Archivist to the Duke of Northumberland. A very knowledgeable source of information relating to the Duke's Collection and the Craft Studio in particular. I am also grateful to him for providing photographs of their work as well as his forbearance in answering many questions.

Sarah Richardson, Keeper of Art, Laing Art Gallery, for providing information from the record archive held at the Laing art Gallery, Newcastle Upon Tyne.

Adam Welfare, for his close reading of the finished text, insightfulness regarding the possible removal of original coins from Bruce's *The Roman Wall* and *Maps* volume, and how the book sequence might be best unravelled.

Thanks are due to the following institutions and individuals for permission to reproduce illustrations in their copyright: Tyne and Wear Archives and Museums, Figures 1, 2, 5, 8, 9, 10, 11, 12, 13, 14, 15 and 22; Sarah Mulligan and Newcastle City Libraries, Local Studies Collections; Figure 4; Gateshead Council, Figure 3; Graeme Stobbs and the Society of Antiquaries of Newcastle, Figure 6; Chris Hunwick and The Duke of Northumberland, Figures 16 and 21; Anthony Boutiette, Arkansas, USA., Figures 17, 18 and 19.

Bibliography

Allan, A. 2020. Archives of members of CWAAS (in alphabetical order) in Cumbria Past: https://cumbriapast.com/cwaas/pdf/archive/archive_section3_7.pdf (accessed 20 January 2022).

Allason-Jones, L. and B. Mackay 1985. *Coventina's Well: a Shrine on Hadrian's Wall.* Chesters: The Trustees of the Clayton Museum, Chesters.

Allwood, R. 1989. The Eminent Italian artist, Signor Bulletti. *Furniture History* 25: 250-256.

Bidwell, P.T. and N. Holbrook 1989. *Hadrian's Wall Bridges.* London: English Heritage Archaeological Report No. 9.

Bruce, G. 1905. *The Life and Letters of John Collingwood Bruce*. Edinburgh and London: Blackwood.

Bruce, J.C. 1851. *The Roman Wall: a Historical, Topographical, and Descriptive Account of the Barrier of the Lower Isthmus, Extending from the Tyne to the Solway.* London: John Russell Smith; Newcastle: William Sang and G. Bouchier Richardson.

Bruce, J.C. 1875. *Lapidarium Septentrionale: or, a Description of the Monuments of Roman Rule in the North of England.* London and Newcastle: Society of Antiquaries of Newcastle upon Tyne.

Bruce, J.C. 1885. The Three Bridges over the Tyne at Newcastle. *Archaeologia Aeliana* 2nd series 10: 1–11.

Bruce, J.C. 1889. An Inscribed Slab Found at Newburn. *Archaeologia Aeliana* 2nd series 13: 192–6.

Bulmer, T.F. 1887. *History, Topography, and Directory of Northumberland (Tyneside, Wansbeck and Berwick Divisions).* Preston and Newcastle.

Coulston, J.C. and E.J. Philips 1988 *Corpus Signorum Imperii Romani. Great Britain*: *Vol 1, Fascicule 6. Hadrian's Wall West of the River North Tyne, and Carlisle*. Oxford: British Academy.

Croom, A.T., A. Wood and A. Wightman. forthcoming Furniture and souvenirs made from the 'Roman' bridge at Newcastle. Unpublished report, Arbeia South Shields Roman Fort and Museum.

Guthrie, J. 1880 *The River Tyne, its History and Resources.* Newcastle upon Tyne.

Hartshorne, C. H. 1865. *A Guide to Alnwick Castle*. London and Newcastle.

Kelly 1887. *Directory for Northumberland*. London.

Miket, R. 1984. John Collingwood Bruce and the Roman Wall Controversy: the Formative Years, 1848–1858, in R. Miket and C. Burgess (eds) *Between and Beyond the Walls: Essays on the Prehistory and History of North Britain in Honour of George Jobey*: 243-263. Edinburgh: John Donald.

Miket, R. and A. Welfare 2021. A Pilgrim's Garland; the Poetry and Song of the first Pilgrimage along Hadrian's Wall in 1849. *Archaeologia Aeliana* 5th series 50, 1-21.

Percy, C.F. 1824. *Castles of Alnwick and Warkworth etc. From sketches by Charlotte Florentia, Duchess of Northumberland.* London.

Welford, R. 1895. *Men of Mark 'Twixt Tyne and Tweed.* London and Newcastle upon Tyne.

Hadrian's Wall in 1801: The accounts of William Hutton and John Skinner

Tony Wilmott

In 1801 two very different men travelled the length of Hadrian's Wall within a few weeks of each other; William Hutton and John Skinner. Both wrote diaries of their journeys; Hutton for immediate publication (Hutton 1802) and Skinner in a private diary which was left, with his other papers, to the British Museum (BM Add. MS. 33638), and which was not published until the later 20th century (Painter 1973; Coombs and Coombs 1978). In 1961 Eric Birley mentioned both, opining that Hutton's volume was readable in large part because of his remarks on contemporary life, and hoping for the future publication of Skinner's work (Birley 1961: 19).

Both men walked the Wall, but their journeys north were very different. Hutton, at the age of 78, walked from Birmingham. His daughter rode with a servant, and they met in the evenings at various inns. He left home on July 4th, arriving in Carlisle fourteen days later. He walked the length of the Wall to Wallsend in five days, then retracing his steps along the Wall to Carlisle and arriving home in Birmingham 'by easy marches' on August 7th having walked an astonishing 601 miles in total. Hutton briefly described some of the places along his route, but he appears to have been obsessed with reaching the Wall. In her preface to the second edition of his book his daughter, Catherine, wrote that her

> Father was such an enthusiast with regard to the wall, that he turned neither to the right nor to the left, except to gratify me with a sight of Liverpool. Winander Mere [sic] he saw, and Ullswater he saw; because they lay under his feet; but nothing could detain him from his great object (Hutton 1813: xvii-xviii).

On August 19th, twelve days after Hutton had arrived at his Birmingham home, John Skinner, the 29-year-old newly appointed vicar of Camerton in Somerset, and a keen antiquarian, boarded a Newcastle trader in the Pool of London, bound for North Shields. He observed 'thousands of merchant ships of all nations... ranged in lines on each side of the shore'. In his first diary entry he showed the wide-ranging interests which characterise his account, for

> It is not the charms of nature alone that should interest the eye of the traveller. Works of industry and art, where the powers of the human mind are exhibited are no less worthy of his notice, and the busy scenes of commercial enterprise form no unpleasing contrast to the serene tranquillity of a remote and uncultivated country.

Winds were contrary in the Thames Estuary, and the ship took three days to reach the Lower Hope point. On August 23rd they anchored off Southend-on-Sea, then sailing north Skinner viewed Lowestoft and Orford Castle, Yarmouth and Scarborough, finally taking on the Shields pilot and entering the Tyne past Tynemouth Castle at 05:30 on August 28th. At 08:00 he disembarked at North Shields. Unlike Hutton, Skinner was in no hurry to begin his Wall pilgrimage, and spent a pleasant fortnight based at Shields. From here he made side-excursions including trips to see the iron bridge at Sunderland, the abbeys of Tynemouth and Brinkburn, and Warkworth Castle. He began his walk along the Wall on September 11th and left the area on 27th.

In this paper, offered to Paul Bidwell with thanks for many years of friendly discussions on aspects of the archaeology of the monument, I will follow their route, picking out the two men's complementary observations of the Wall, and omitting largely the detail of the hospitality (or lack thereof) which they met on their travels, details of side-trips to later structures, digressions upon agriculture, and the various philosophical reflections on the transitory nature of life to which Skinner in particular was prone. Where I have quoted one diarist or the other it is mostly clear who is quoted. Where this is not the case I have labelled the quotations (H) or (S).

Both men relate their observations to the locations of the milestones on the turnpike road (now called the Military Road, the B6318). These are marked on Andrew Armstrong's 1769 map of Northumberland (Lawson 1971). During his walk, at the inn in Chollerford, Skinner copied 'the track of the Roman wall from a large map of Northumberland I found hanging in the dining room, which seems to be very correctly surveyed'. On his copy he marked the milestone locations (Painter 1973: pl. xix), and it seems likely that what he saw hanging was a copy of Armstrong's map. They had done their preliminary reading. Skinner was familiar with Horsley (1732), and picked up books, like Hutchinson's (1794) *History of Cumberland* along the way. Hutton relied upon Warburton's (1753) *Vallum Romanum* (for which see Birley 1961: 18-19). The received view of the time was that the Vallum was the work of Hadrian, and the stone Wall that of Severus, and this is unquestioned, while Hutton includes the idea that the Vallum was a combination of frontier works created first by Agricola and subsequently enlarged by Hadrian. He refers to the Vallum frequently as a personification, in such phrases as 'the Emperor and the General are forty yards on my left'. Although there had been visitors to the Wall before, these had been serious antiquaries; the tone of Hutton's and Skinner's diaries mark them out as a relatively new type of visitor, the antiquarian tourist.

Both men began at Wallsend, and their descriptions are similar. Skinner arrived at Wallsend, 'a small place consisting of a few houses inhabited by colliers', on foot from Shields on September 11th. He found the

> visible traces of a regular square inclosure, measuring about an hundred and thirty yards [118.87 m] each way. This formerly was thickly covered with buildings as it is scarcely possible to dig any where in this area without coming to the foundations.

The branch wall between the south-east corner of the fort and the river had recently been visible, but 'many of the foundation stones were removed on account of their being obstructive to vessels coming to the colliery' (S), and Hutton confirms this, noting that the Branch Wall 'must have entered the water at what they call a trunk, or high timber bridge': presumably the spur was removed in order to install this facility. Skinner was introduced to 'Mr Buddle', probably John Buddle Snr, whose more celebrated son succeeded his father as colliery manager in 1806 (Heesom 2004). Buddle told Skinner that:

> not a long time since, whilst making an addition to [his] dwelling house, they discovered a circular hole sunk in the ground neatly paved at the sides and at the bottom. It was nine feet [2.74 m] in diameter above, the same in depth, but only two feet and a half [0.76 m] wide at bottom. The inside nearly filled with burnt earth or ashes and the bones of animals, out of which they have preserved the antlers of a stag above two feet [0.60 m] in length, also the skull of a goat, and that of a small cow or ox, with several other parts of animals used in sacrifice.

In 1807 this feature was described by Mrs Buddle to John Lingard, whose description is less detailed (Bosanquet 1929: 140). Buddle also showed Skinner some sherds of decorated samian ware, which he sketched.

Hutton mentions passing the house 'late Cousen's, now belonging to John Buddle Esq.' as he left Wallsend, 'the Wall under the very path we tread, the ditch twelve yards [11 m] wide'. At Byker Hill he notes that:

> a hedge now runs in the Ditch, a part of which this year, for the first time is levelled, and converted into a bed of potatoes, which the proprietors will allow gratis, during three years, to anyone who will level and improve the ground.

Such works were in progress when Skinner passed the spot, as he 'observed some labourers employed in digging up the Wall to clear the ground'. He took the opportunity of examining the foundation

> for hitherto I had observed a kind of earth mound. Here I could trace the position of the stones at the bottom. Some of them of considerable dimensions were apparently taken from quarries on the spot.

He did not appear to understand the relevance of the Wall ditch at this point, observing only that 'a kind of trench is remaining'. Hutton followed the Wall ditch down into 'Ewsburn' [the Ouseburn] and over Shield-Field, where he speculated that the name might indicate the presence of a milecastle. Milecastle 3, however had previously been identified on the east side of the Ouseburn (Stukeley 1776: 66).

Neither did more than speculate on the route of the Wall through the city of Newcastle, and both left the city via Westgate. Skinner took a wrong turn, taking 'the Banwel [sic] road to the left instead of following the turnpike, which runs on the very foundation of the Wall'. Hutton made no such error, arriving at the site of Benwell fort, and observing the 'foundation of the Wall, as part of the turnpike road; its bare stones under my feet are frequently distinguishable from those used in mending the road'. The fort itself appeared as a 'roughness on the ground ... Very large. The corners, rather canted off, had four entrances answering to the four Cardinal points' (H).

Skinner 'regained the turnpike' just before reaching Denton Burn. Here the Military Road 'veered into Severus' Ditch' (H), and both men achieved their first view of standing Wall fabric with an apple tree growing upon it, and both drew the fragment. Hutton records it as 'thirty-six feet [10.98 m] long, has three courses of facing stones on one side and four on the other, and is exactly nine feet [2.74 m] thick'. Skinner adds that the facing stones were 'squared with the tool, those in the middle rough, and thrown in without order'. Beyond Denton, the 'Wall again becomes round' (H), i.e. becomes an earthwork:

> the mound and trench higher and deeper..., the road running close to them; but after a few hundred yards they almost totally disappeared, the farmers

> having levelled the ground, and are still busily occupied in grubbing up the foundation stones, so soon every trace will be lost. (S)

Hutton recognised the site of Milecastle 9 (Chapel House).

Skinner had walked from Shields to Denton in a single day on September 11th and was due to spend the night at Harlow Hill. The evening closing in, he 'marched forward with as much speed as possible'. As night fell, he stopped at Heddon-on-the Wall to ask directions. Here he was 'insulted by a drunken fellow who declared to his companion I was a spy'. Skinner left him drinking in the inn, but sometime later the man overtook him and behaved threateningly before riding off. On arriving at the inn at Harlow Hill, Skinner was received with suspicion and believed either that the man had reported him to the people, or that the people in the inn were in any case of a suspicious nature. The latter may be the truth, as Hutton also was received with suspicion there, one man telling him that when he first entered, he took him 'for a spy employed by Government'.

Hutton took the opportunity to observe the Wall at Heddon-on-the Wall, where the road deviated from the Wall line 'as is usual at a village', leaving the Wall 'a yard high, but in a confused heap. There must have been here a milecastle' (H). Skinner doubled back to examine it, and his description is thorough. Though robbed it was about four feet (1.21 m) high 'still of great thickness and the cement remarkable hard'. The foundation stones were dressed, but the stones of the 'superstructure', by which he seems to have meant upstanding core-work from which facing stones had been removed, 'were of various shapes and sizes apparently thrown into quick lines'. Along the turnpike, the foundation stones of the Wall were to be seen in the surfacing 'sometimes for twenty feet [6.09 m] together' (S). As Birley observed, Skinner's account of Rudchester is thorough, noting the 'strong walls' of the fort, of which 'about sixty yards [54.86 m] of the square seems to project beyond the boundary of the Roman wall to the north, and a much greater extent was included within it'. The proprietor, Mr Bargus [correctly Barkas] was a friendlier host to Skinner than to Hutton (Bruce 1851: 153), and provided much information, though the coins Skinner had hoped to see had been dispersed, as had a hoard of gold and silver found nearby. He was shown the rock-cut trough or cistern, later called the 'Giant's Grave' (Bosanquet 1929: 143) which had been found, apparently by Barkas, in 1766 (*Annual Register* 1766), and which contained bones and a tripod candlestick. Barkas was an enthusiastic stone robber; when he had acquired the property the whole area had been 'covered with stones and foundations of houses, many of great magnitude', and though he had cleared much to repair roads and walls, 'still thousands of cart loads might be procured'. Six years later Lingard saw 'great heaps of stones' on the site (Bosanquet 1929: 143); evidently Barkas was still busy. Taking a side road to Welton, Skinner was the first to note a building stone of *legio II Augusta* (*RIB* 1419) being used as a mounting block. It had been 'taken from a small fort to the south of the Wall'; clearly Milecastle 17.

From Wallhouses, where Hutton notes the traces of a milecastle (MC18) the Wall ditch was 'quite perfect, forty or fifty feet [36-45 m] wide, shelving towards the bottom which is about eight feet [7.31 m] wide' (S). Both observe that the fact that the ditch here was occupied by 'a young grove' (H) would tend to protect it from levelling for cultivation. The impressive remains of the Vallum are also noted. Skinner was extremely confused by the appearance of Down Hill, mistaking the remains of later quarrying for 'the site of a strong castle or fortress' (S). Halton Chesters fort was 'covered with standing corn' (H), and Hutton 'passed through the centre of this station without knowing it, until an intelligent gentleman set me right' (H). Similarly, Skinner's host, Mr. Bates showed him a 'square inclosure near the road... at least an hundred yards [91.44 m] in breadth and an hundred and fifty [137.16 m] in length with four entrances' from which stones with inscriptions had been recovered. Clearly this was the fort. Bates and Skinner then walked to Portgate where Skinner noted 'another station not so large or so visible as the former', implying that some visible remains survived. Beyond Portgate both Skinner and Hutton again observed the stones of the Wall within the metalling of the turnpike road. While Skinner noted 'Adrian's Vallum' as being more distinct than elsewhere, Hutton was astonished and enraptured by the condition of it, 'even hunger and fatigue were lost in the grandeur before [him]'.

The most celebrated incident in Hutton's account occurred at Planetrees in Wall Mile 26. Here,

> at the twentieth-mile stone, I should have seen a piece of Severus's Wall seven feet and a half [2.86 m] high, and two hundred and twenty-four yards [205 m] long: a sight not to be found in the whole line. But the proprietor, Henry Tulip, Esq. is now taking it down, to erect a farm-house with the materials. Ninety-five yards [86.86 m] are already destroyed, and the stones, fit for building removed, then we come to thirteen yards [11.88 m] which are standing and overgrown on the top with brambles, the next forty yards [36.57 m] were just demolished; and the stones, of all sizes, from one pound [0.45 kg] to two hundred-weight [101.6 kg] lying in one continual heap, none removed.

Famously Hutton sent a message to Tulip to 'request him to desist, or he would wound the whole body of Antiquaries'. Hutton's remonstration took place on July

24th. What effect it had on Tulip is unknown, though the piece of Wall was allowed to survive. It is of interest that Skinner records the owner of the land as Nathaniel Clayton of Chesters, Tulip's brother-in-law (Bosanquet 1929: 147, fn. 27). It is possible that by Skinner's visit on September 14th the ownership of the land had passed to Clayton, who intended 'to permit this interesting memorial to remain, though from what I hear he has no superabundant veneration for the antique' (S). Skinner reports no evidence for stone robbing, but saw a piece of Wall 'nearly an hundred feet [30.48 m] in length and from three to four feet [0.9-1.21 m] in height'. The stone piles noted by Hutton had been removed.

At Chesters fort (then called Walwick Chesters), Hutton merely noted the extent of the fort and the fact that the ground was uneven 'owing to former use'. Skinner sought out Clayton, who was not at home, though he was given permission to copy an inscription, a dedication to Elagabalus, in the coach house (*RIB* 1465). He illustrated two further inscriptions, one fragmentary, the other an altar (*RIB* 1455, 1468). He was guided around the 'prodigious heaps of ruins' by Clayton's son, noticing 'a well finished column' and also 'the mutilated figure of a woman standing on the back of an animal, lately placed by Mr Clayton in a wall round his plantations (Painter 1973: pl. xviii). Skinner's is the earliest mention of this statue of Juno Regina (Coulston and Phillips 1988: no. 117). He mentioned to Clayton's son that it 'deserved a better situation'. Clayton had three sons of an age to have been Skinner's guide (McIntosh 2019: 18), but it is irresistible to imagine this to have been his third son, John, then nine years of age, and later the founder of the Clayton Collection, and the owner of five Wall forts.

Beyond Chesters Skinner paused to draw a fragmentary inscription that had been built into a wall, noting ruefully that 'others have been employed in the same work without even the common attention of placing the letters on the outside'. Beyond Walwick he noted the Wall running parallel to the road, two or three feet [0.6-0.9 m] high but comprising core work only. This was probably at Tower Tye, where Hutton notes the Wall 'with two or three courses of facing stones, but generally with only the rude stones lying upon the foundation'. A little further on, by the 23rd milestone Skinner notes 'a square inclosure adjoining the Roman wall on the south side, extending sixteen yards [14.63 m] each way', which was certainly the still-prominent earthwork of Milecastle 29. From here the Wall continued 'pretty perfect for nearly two hundred yards [183 m], being three feet [0.9 m] in height and breadth and facing entire' (S), which is the stretch which includes the Black Carts turret (T 29a). On the rise towards Limestone Corner, Skinner notes that:

> Adrian's vallum runs quite close to Severus's wall and in one place for about an hundred yards [91 m] is cut very deep in the rock. This laborious operation seems to have been considered as sufficiently strong by the latter engineers, as no second trench is here visible.

Given his understanding of the chronology of the works this interpretation is inevitable, though he is clearly remarking on the contrast between the rock-cut Vallum and the virtual absence of the Wall ditch in this area (Wilmott 2009: 89). Skinner passed over Carrawburgh fort with virtually no comment, Hutton however noticed that 'by the roughness of the ground it seemed to have had a suburb to the west, where a well, or rather a Roman bath has been found seven feet square, quoined with stone'. This description of Coventina's Well, which was missed by Allason-Jones and Mackay (1985: 2), seems to have been one of the last before the structure became robbed and overgrown. In a now-vanished farmhouse on the site Hutton saw a Roman stone; 'a man's chubby face, ten inches [254 mm] square, without inscription, but ornamented with drapery'.

At the point where the Military Road and the Wall part, both travellers took the line of the Wall over the crags. Hutton recorded it six feet (1.82 m) high but 'divested of facing stones, and recorded the platform of a milecastle, possibly that of Milecastle 34. As Skinner followed the Wall, leaving the Military Road and heading for the crags, he remarked upon several of what he called 'castellets' or small forts. Though these can be generally identified as turrets or milecastles, it is possible that in some cases he was observing post-medieval shielings. The first, seven yards (6.40 m) square was probably a turret (Skinner's measurement suggests this was T34a), the next, the same size, lay half a mile further, then a third, ten yards (9.14 m) square lay two hundred yards (182.88 m) further on. Both narratives are too lacking in detail to identify which installations are being referenced. Skinner was confused by the different distances between the structures he observed, doubting the idea that there 'were stated measured positions as mentioned by Camden'. He considered that such spacing would surely 'have been discovered where the Wall still continues so perfect, it being in some places four feet high [1.21 m] and seven [2.13 m] wide and continues in this state for many hundred feet together'. Hutton describes this section as 'six or seven feet [1.8-2.1 m] high, but miserably broken, and continues in the same style six or seven miles, a heap of rubbish. In some parts only three feet [0.91 m] high and occasionally shews five or six courses of facing stones' Interestingly Hutton, looking down upon the Vallum in the valley below saw 'a large fort, sixty yards [54.86 m] square'. If this was, as seems very likely, one of the Coesike camps (Breeze 2006: 227), it is the only example of either antiquary identifying a camp and shows Hutton's excellent eye for the ground.

Both men were excited by their visits to Housesteads; to Hutton the 'grandest station'. Skinner was gratified by the traces which 'shew the extent of the buildings and the prodigious thickness of the outer walls, which enclosed many acres on the south side of the hills'. He fancied he could 'trace the four principal streets meeting in the centre'. Beyond this he comments only that there were 'other remains which sufficiently prove the magnificence of the buildings and the progress of the arts among the inhabitants'. He singled out for notice, and drew several of these (Painter 1973: pls. xx-xxiii): a seated figure, doubtless one of the known single seated *Matres* from the site (Coulston and Phillips 1988: nos. 166-169, 170), a group of the *Tres Matres* (Coulston and Phillips 1988: no. 173), fragments of two standing male figures, one clad in a tunic and leaning on a shield, and neither identifiable with known extant sculptures, and two altars, one uninscribed (probably Coulston and Phillips 1988: no. 294), while the other, though the worn inscription was not recorded, seems to have been a known dedication to Mars (*RIB* 1591, Coulston and Phillips 1988: no. 63). An altar which both he and Hutton saw 'forming the 'jamb which supports the mantle-tree' in 'the farmhouse down in the valley' (H) (*RIB* 1586) is drawn in context with a pair of architectural stones; a column base and the 'square base of a large pillar, with a circular shaft preceeding from it' (H) (Painter 1973: pl. xx). As well as the fort, Hutton commented on the extramural settlement; 'a very large Suburb seems to have been attached to this populous City... The whole about fifteen acres [6.07 ha]. The curious observer I believe may count twenty streets'.

From Housesteads, Hutton continued past Crag Lough, where he saw the Wall 'eleven courses high on one side, and from three to five on the other; and for sixty yards [54.86 m] it is eight feet [2.43 m] high'. He then took a side-trip to Vindolanda, then known as Little Chesters. He speculated correctly that this fort was pre-Hadrianic, and in a brief digression on the Roman road system recognised the stretch of the Stanegate running between Vindolanda and Carvoran, which he also understood as pre-Hadrianic. This road he attributed to the work of Agricola, and traced from Chesters to Walby taking 'a course like the string of a bow for twenty-six miles'. Skinner continued along the line of the Wall, and 'about three miles from the lake [Crag Lough]' traced another of the square forts, twenty yards [18.28 m] each way'. The distance, and the description Skinner gives of the country between this point and Great Chesters, make it certain that this 'square fort' was Milecastle 42 (Cawfields). It appears that some traces of the internal buildings remained, as the milecastle 'seems to have been divided towards the outer or Roman wall, though the apartments seem to be two small for dwelling rooms, three of them being only three yards [2.74 m], the fourth, five yards [4.57 m] along'.

Great Chesters was described by Skinner as enclosing 'about three acres [1.21 ha] of ground adjoining the Roman wall to the north, having the other sides defended by a deep trench... There appear to have been three entrances, two on the east and west sides... the third to the south-east, foundations of buildings cover the whole of the area'. Previously it has been assumed that Lingard's 1807 description of the strongroom arch in the centre of the fort was the earliest (Birley 1961: 189), but Skinner pre-empts him by six years, describing the discovery of:

> an underground archway, about four feet [1.21 m] wide and four high and as many in depth. When discovered by the farmer who occupies the ground, it was filled with burnt wood and ashes; but he had the curiosity to empty it 'til he came to a pavement at the bottom formed of flat stones.

Hutton's description contains no such detail, but as at Housesteads recognised 'by the ground, that the buildings have swelled into a Suburb', and noted one of the tumuli or barrows which mark the site of the fort cemetery to the south (Breeze 2006: 274). Skinner deviated from his route to view some stones dug up 'a few months ago' by a local miller clearing a watercourse. These were the torso of a statue of Victory and an inscription dedicated to the same deity. The statue, which was also seen and drawn by Lingard (Bosanquet 1929: 143) appears to have been destroyed, but the inscription survives (Painter 1973, pl. xxiii(b); Coulston and Phillips 1988: no. 102, *RIB* 1731). A little further on, beyond the fort at Walltown, Skinner saw and recorded an inscription commemorating the repair of a *horreum* (*RIB* 1738; Painter 1973: pl. xxiv (a)) and considered that a building with a wall 'twelve feet [3.65 m] high and six [1.82 m] in thickness' might have been this granary. It is however unlikely that this structure was Roman, and neither Hutton nor Lingard mention it. In the same vicinity he also notes and illustrates 'an awkward little figure' recognisable from his sketch (Painter 1973, pl xxv(a)) as the gravestone of Pervica (Coulston and Phillips 1988: no. 216). Moving on, he saw

> two flat stones with inscriptions let into the wall of a stable which I passed on my way to the turnpike just by Glenwalt. One above the hay loft window with the assistance of a ladder I was able to copy; it may be read Claudius with the numeral eighty below.

Although the reading differs slightly, this was probably *RIB* 1813, as it matches Hutchinson's (1778: 18) earlier description of the location and text. On each side of the door of the house at Walltown Hutton saw 'a Roman altar, used for washing hands, kettles, dishes etc'. Ever dedicated he climbed to Walltown Crag, finding the 'ascent so difficult that [he] sometimes was obliged to crawl on all fours'. The labour was rewarded by seeing the Wall with facing stones on both sides, allowing him to take an accurate measurement. He 'found the thickness barely nine feet [2.74 m]. In one place for about two yards, and that upon a sharp declivity, there are eight courses of facing stones'.

Hutton recognised the fact that Carvoran pre-dated the Wall, and though he inevitably associated it with the Vallum, also noted its relationship to Vindolanda by virtue of his observation of the route of the Stanegate between the two as noted above. He had little more to say on the subject, continuing on his way to view Thirlwall castle. Skinner paused briefly at the site, having followed the line of the Maiden Way from Blenkinsopp Castle to the south, and recognised its Roman origin. He drew one of the two inscriptions by the *Civitas Dumnoniorum* in this sector, most probably *RIB* 1843, which had been noticed previously. This was 'placed in the garden wall of Glenwelt'. He also found the altar to the nymphs (*RIB* 1789) 'lying at the north side of the inn' at Glenwelt. Lingard saw the same altar 'on a gatepost near the road' (Bosanquet 1929: 156), but it was first noticed much earlier at Blenkinsopp castle (Thoresby 1697). It had moved some distance in the intervening years.

Between Carvoran and Birdoswald Hutton again showed his appreciation of landscape topography, pointing out that:

> the intermediate space of three miles between the North Tyne, aided by the Tippal on the left, and the Irthing feeding the Eden on the right, became a fine opening for plunder.

The importance of this point of strategic weakness, the Tipalt-Irthing Gap, in the planning of the Roman frontier installations has recently been stressed by Symonds (2021: 45-7; 69). Skinner,

> on making enquiry about three quarters of a mile beyond Thirlwall respecting some ruins I observed to the south of this wall, a man informed me that a few years since he remembered a building there called the chapel (I should rather suppose the castle). This was inclosed by walls of a prodigious thickness. On destroying them to build his farmhouse they discovered underground some wrought stones which he blew up with gunpowder in order to employ them in his works.

This was Milecastle 47 (Chapel House), and the size of the stones recorded suggest that it was one of the gates that was blown up (Wilmott 2006). A mile beyond this Skinner came to the 'steep banks of a picturesque valley watered by a shallow stream', and lost all traces of the Wall, imagining that it 'must have crossed the water somewhere near this place'. Indeed, it did, as this can only have been the Poltross Burn. Hutton crossed the stream, and continued along the line of the Wall, which he found 'about a yard high, in confusion, has a hedge growing upon it till it reaches the East bank of the Irthing, where it stops'. Undeterred, he forded the river and climbed Harrows Scar:

> I effected a passage over the river by the assistance of stones as large as myself, sometimes inside and sometimes out; but with difficulty reached the summit of the precipice by a zig-zag line, through the brambles, with a few scratches. At the top I had a view of the Wall where it was broken off to the foundation. It measured seven feet [2.13 m] exactly.

Having made this ascent, Hutton visited the fort at Birdoswald, commenting that it 'contains five or six acres, joins the Wall, like other Stations, on the North. All the Roman buildings are down, but the marks of many appear'. 'The whole station is surrounded by a foss. All the entrances are plain'. Skinner, having missed his way at Poltross Burn misses the site, and did not back-track to see it. Instead, he was guided to the Written Rock of Gelt. Now mostly viewed from below, Skinner accessed the rock perilously from above, finding the 'approach to this place difficult of access and the footing very insecure, on the brink of a precipice forty or fifty feet above the stream'.

Following the line from Birdoswald, Hutton witnessed more evidence for stone robbing, as 'the Wall [had] recently been taken down and [lay] in heaps, as if the country could not produce one soul to protect Antiquity'. Between Birdoswald and the Banks there were, however, 'forty yards [36.57 m] of facing stones from five to seven courses high', and at Banks, eight. Hare Hill, then as now was the highest surviving part of the Wall 'ten feet [3.05 m] high and five feet [1.52 m] long, but the front stones are gone. Near this place the Wall is five feet [1.52 m] high with the foundation of a Castle twenty yards [18.28 m] square'. Between Hare Hill and Walton there was a stretch of Wall ten yards [9.14 m] long with three courses of facing, and one 200 yards [183 m] long where the Wall was four feet [1.21 m] high with a hedge growing on the top, but these cannot be precisely located. One puzzling observation is that 'Severus' Wall is built upon the soil thrown out of his own ditch, as is perceptible in many other places'. Hutton is here surely interpreting the slighted remnant of the turf Wall as the upcast from the Wall ditch and is noticing this remnant underlying the stone Wall. As such this may be the earliest observation of the turf Wall.

The fort at Castlesteads was levelled only a decade before the two men visited, and Hutton pronounced it 'the first which has been sacrificed to modern taste'. He was unwilling to see it as a Wall fort, grouping it with

Vindolanda and Carvoran as an earlier construction. Skinner records that 'a Mr Johnson, then residing there whilst clearing the ground to enlarge his house discovered many stone altars and inscriptions, with a large excavation underground supposed to be a bath'. The last mentioned is otherwise unrecorded. At Bleatarn, in Wall-mile 60 Hutton had expected to see timber piles, though none were in evidence. Between there and Walby he was again walking on the Wall line, now under the 'common highway' and the footpath. Between Walby and Drawdikes he passed a mill where he was shown 'the line of the Wall, with the stones hacked up. The field was in tillage. Here the sight is gone forever'. Skinner travelled the whole way to Carlisle by the turnpike road, finding the country through which he passed 'not very interesting'. Hutton found no sign of the fort at Stanwix except for a mounting block in the street, three steps high, with the figure of a man in a recess 18 inches (457 mm) high. This relief appears to be lost.

On his final day and 'anxiously wishing to conclude [his] observations on the Wall', Skinner set out for Bowness. He found no trace of the works through Burgh-by-Sands and all the way to Drumburgh where he was shown an altar to 'Belutucader' (*RIB* 2039, Painter 1973: pl. xxx(a)), and also the dedication to Hercules and the *Numini Augusti* (*RIB* 2040), which he was the first to record (Painter 1973: pl. xxxi). Hutton perceived the ditch at Burgh, and further evidence of stone robbing, where the Wall was 'recently stocked up and the stones laid on heaps for future use'. Just before Bowness both men described a 'considerable piece of wall',

> In parts six feet high, but not above three or four thick, the facing stones being removed. Yet such is the strength of the cement, that this monument of Roman masonry bids fair to remain for ages if it has nothing but the elements to contend with. The middle stones here seem more methodically arranged than what I have before noticed, the inside being arranged in a zig-zag pattern. (S)

Skinner's drawing depicts a curious herringbone effect to the core he describes (Painter 1973: pl. xxix(b)). At the western end of Bowness he observed the western wall and ditch of the fort 'above one hundred and thirty paces'. 'With the assistance of a ladder' he copied the much-noticed *RIB* 2057, an altar built into a farm wall within the village, which has recently been removed and replaced by a replica, and he also copied *RIB* 2059, 'in the garden of a person who found it while digging on the spot' (Painter 1973: pl. xxx). Hutton saw nothing at Bowness 'but the spot that marks it, upon a rock on the Solway Frith [sic]'.

Although each diary is valuable in itself, I hope I have shown that combining the two provides a slightly more rounded snapshot of Hadrian's Wall in 1801.

Bibliography

Allason-Jones, L. and B. Mackay 1985. *Coventina's Well.* Gloucester: Alan Sutton.

Annual Register 1766. *The Annual Register, or a View of the History, Politics and Literature for the Year 1766.* London 1779.

Birley, E. 1961. *Research on Hadrian's Wall.* Kendal: Titus Wilson.

Bosanquet, R.C. 1929. Dr. John Lingard's Notes on the Roman Wall. *Archaeologia Aeliana* 4th series 6: 130–62.

Breeze, D.J. 2006. *J. Collingwood Bruce's Handbook to the Roman Wall* (14th ed.). Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Bruce, J. C. 1851. *The Roman Wall.* London: John Russell Smith; Newcastle: William Sang and G. Bouchier Richardson.

Coombs, H. and P. Coombs (eds) 1978. *Hadrian's Wall in 1801: Observations on the Roman Wall by Rev John Skinner FSA.* Bath: Kingsmead Press.

Coulston, J.C. and E.J. Phillips 1988. Corpus Signorum Imperii Romani. *Corpus of Sculpture of the Roman World, Great Britain, Volume 1, Fascicule 6, Hadrian's Wall West of the North Tyne and Carlisle*. Oxford: Oxford University Press.

Heesom, A.J. 2004. Buddle, John (1773–1843). *Oxford Dictionary of National Biography*. Oxford: Oxford University Press.

Horsley, J. 1732. *Britannia Romana*. London.

Hutchinson, W. 1778. *A View of Northumberland with an Excursion to the Abbey of Mailross in Scotland, Volume 1.* Newcastle.

Hutchinson, W. 1794. *The History of the County of Cumberland: and Some Places Adjacent, from the Earliest Accounts to the Present Time.* Carlisle.

Hutton, W. 1802. *The History of the Roman Wall which Crosses the Island of Britain from the German Ocean to the Irish Sea, Describing its Ancient State and its Appearance in the Year 1801.* London: Nichols and Son.

Hutton, W. 1813. *The History of the Roman Wall which Crosses the Island of Britain from the German Ocean to the Irish Sea, Describing its Ancient State and its Appearance in the Year 1801.* 2nd edition. London: Nichols, Sons and Bentley.

Lawson, W. 1971. The construction of the military road from Newcastle to Carlisle 1751 – 1758. Durham University dissertation. Available at Durham E-Theses Online, viewed 14.2.2022, < http://etheses.dur.ac.uk/9544/>.

McIntosh, F. C. 2019. *The Clayton Collection: an Archaeological Appraisal of a 19th Century Collection of Roman Artefacts from Hadrian's Wall* (British Archaeological Reports British Series 646). Oxford: British Archaeological Reports.

Painter, K. S. 1973. John Skinner's observations on Hadrian's Wall in 1801. *British Museum Quarterly* 37-1/2: 18-70.

Stukeley, W. 1776. Iter Boreale, in *Itinerarium Curiosum* (2nd edn) vol. 2: 17-77. London.

Symonds, M. 2021. *Hadrian's Wall: Creating Division*. London: Bloomsbury.

Thoresby, R. 1697. VI. Part of a letter from Mr. Thoresby, dated Leeds, July 10. 1697. to Dr. Martin Lister, Fellow of the College of Physicians and Royal Society; concerning two Roman altars lately found in the North of England: with notes on the same, by Tho. Gale, D.D. and F.R.S. *Philosophical Transactions* 19: 662.

Warburton, J. 1753. Vallum Romanum*: or, the History and Antiquities of the Roman Wall, Commonly Called the Picts Wall, in Cumberland and Northumberland*. London.

Wilmott, T. 2006. A Milecastle exploded. *Archaeologia Aeliana* 5th series 35: 109-11.

Wilmott, T. 2009. The linear elements of the Hadrian's Wall complex; four investigations, 1983-2000. in T. Wilmott (ed.) *Hadrian's Wall: Archaeological Research by English Heritage 1976 – 2000*: 72-136. Swindon: English Heritage.

The Roman military north

The culture of command in the 4th and 5th centuries in northern *Britannia*

Rob Collins

Introduction

Who were the commanders of the units that garrisoned Hadrian's Wall and other installations in northern *Britannia* in the 4th and 5th centuries? In contrast to these same sites in the 1st to 3rd centuries, we have no confirmed commanders named. This absence of basic biographical evidence for the late Roman frontier commanders is quite stark in contrast to the early and middle imperial periods, and has significant implications for our understanding of the socio-political environment in late Roman Britain. While the question of 'who' cannot be answered with any definitive certainty here, the problem can be assessed in a broader contextual pattern, reviewing what is known and understood of the command culture of the Roman army from the 1st-3rd centuries, and comparing that with the differing evidence of the 4th-5th centuries. While textual evidence for the 4th-6th centuries elsewhere in the empire surpasses that available for the same period in Britain, the more relict survival of traditional *praetoria* (commanding officers' houses) provides an archaeological benefit in understanding late Roman military command culture.

Sources of authority and the materiality of command, *c.* 120-500

The structure of the Roman army in the early and middle imperial periods (*c.* 27 BC-284) is generally well understood, drawing on a substantial body of inscriptions, 'histories', and other Roman textual sources, often substantiated and/or corrected by archaeological fieldwork. The hierarchical organisation of the Roman army codified the authority of its officers and commanders, who exercised authority within the army not only in terms of social hierarchy, but also in judicial and economic matters. Unit commanders of legions or auxiliary units, regardless of their citizenship status, would report to the governor of the province they were based in, with the governor in direct contact with the emperor.

Significantly, the tradition of elite participation in the command structure of the Roman army is clearly borne out in textual accounts and narratives and confirmed with epigraphic evidence, especially from tombstones and altars. Men of senatorial status (and thus Roman citizens) would often begin their *cursus honorum* as a tribune in a Roman legion, subsequently flip-flopping between military and civilian posts up the socio-political hierarchy; a minority would achieve the office of provincial governor, establishing themselves as the ultimate civil and military authority within their given province and answering only to the emperor (Fischer 2019: xxiv). This career structure and the drawing on men of senatorial status was important in that their social superiority was already enshrined in law, and these men were also well-positioned to access economic and political resources within the imperial network, both of which underscored their roles as commanders of auxiliary infantry and cavalry units, as well as legions, in the Roman army.

Auxiliary units – initially composed by non-citizen men (*peregrini*) of the Roman Empire but increasingly drawing on citizen recruitment from the 3rd century – were typically commanded by men of equestrian status (Fischer 2019: xxxii), who may or may not have been culturally 'external' to the soldiers he commanded. As with commanders of the senatorial class, equestrian officers benefitted from a superior legal status and (generally) an elevated economic background, which again underscored the authority wielded as an army officer. They, too, would follow the *cursus honorum*, though they were excluded from a number of the highest offices reserved for men of the senatorial order.

The socio-economic background of equestrian and senatorial men was fundamental to their perceived ability to act as appropriate and successful officers in the Roman army for a number of reasons, and these are worth identifying. First, being raised from childhood as socially superior to the men that would be commanded enshrined a practice and likely a belief in their social superiority. Second, equestrian and senatorial families, even those with relatively low incomes, would have a sizeable estate and household, which would include domestic staff and slaves; this provided precocious (or otherwise) equestrian and senatorial children experience of 'command' from a young age, namely the expectation that their orders would be carried out. Third, men of those classes would also be educated, and literacy and numeracy were fundamental to the needs of an army officer on a practical, daily basis. Fourth, such men were likely to have awareness if not experience of the principles of managing an estate and staff, such that these duties and oversights as an officer would not be entirely alien concepts. Finally, their elevated social and financial background allowed these men to act as patrons for the soldiers under their command, as well as participate in client relations with men that were their own social superiors. In principle, any unit commander was only separated from direct contact with the Roman emperor by one degree, via the provincial governor. Outside of military hierarchy, the social network of a commander's birth could provide access to the imperial court and Senate in a myriad of ways, all of which could also be brought to bear upon military matters. These were significant advantages of socio-economic class that served equestrian and senatorial men well as army officers, even if their personal and cultural experience was quite varied across the vast territories encompassed by the Roman Empire.

Regardless of their origins, the status and prestige of commanding officers can be very clearly observed in the archaeological record. Unit commanders were provided with space inside forts and legionary fortresses befitting of their status. For the early and middle imperial periods, auxiliary forts were typically built in a playing-card shape, with the *principia* or headquarters building located in the centre of the fort, and the commanding officer's house, the *praetorium*, placed adjacent to the *principia*, both of which were fronted by the *via principalis*, the main road crossing the fort laterally. Legionary fortresses had a similar arrangement, though the increased scale of the installation saw greater variation in the placement of the *praetorium*, which was still typically adjacent to the *principia* even if not on the *via principalis* (Bishop 2013).

Praetoria are immediately identifiable as elite houses following the urban Mediterranean model that the Roman Empire was so successful in exporting. *Praetoria* consisted of a square or rectangular four-wing house bearing an open, central courtyard. As accommodation, the *praetorium* very sharply contrasts with that of all the other soldiers in the fort due to its central location and access to the *principia* as well as the considerable amount of space given over to the commander and his household. On average, the *praetorium* was given at least 10% of the internal space of the fort. The purpose of the structure was to house the commanding officer and his household, which may have included his direct family (wife and children and other familial dependants) and any number of servants and slaves. As such, it was a high-status private residence within a fort that did not strictly have any military function. Rather, it was a 'perk' of the job and status that came with an equestrian- or senatorial-class military career. As the home of the commanding officer, it can be reasonably argued that the space and resources at his disposal allowed him to act appropriately for his social status in relation to both the soldiers under his command and other well-to-dos in the area as a colleague or friend, host, and/or patron, as evidenced by both the 1st-century Vindolanda writing tablets and letters from the mid-4th century Abinnaeus archive from Egypt (*Vindolanda Tablets Online*; Bell *et al.* 1962). The *praetorium* underscored the status of the commander for soldier and civilian alike, and thus can be understood as a traditional urban elite *domus* firmly located in a military environment. The reconstruction of the early 4th-century courtyard house in the Roman fort at South Shields, based on the archaeological excavation of the house, provides a striking testament for modern visitors of the opulence and comforts enjoyed by commanders and their families (Figure 1). In addition to higher status housing, it is also reasonable to assume that commanders and their households also enjoyed or benefitted from more high quality and high-status goods, though discard and depositional patterns do not always allow for a direct connection between such objects and the household. However, funerary and religious inscriptions often name commanding officers of a given unit, and sometimes provide further information, such as age or geographic origins.

The confidence with which we can approach the culture of command in the Roman army, however, changes through the course of the 3rd century, with marked variation in the evidence available in the 4th-6th centuries. Caracalla's extension of citizenship in 212 made the distinction between citizen and non-citizen somewhat redundant, such that citizen-soldiers could increasingly be found in the auxiliary units as well as the legions. The emperors Diocletian and Constantine formalised further changes in the structure and composition of the army that had arisen through the course of the 3rd century in two key ways.

First, professional advancement was now strictly separated such that a man would embark on a career in the army or the civil service; moving from a civilian to a military post or vice versa was no longer allowed. Supporting the notion of career advancement of an officer class in the army, units known as the *protectores* and the *domestici* appear to have functioned like a staff officer training college through most of the 4th century (Elton 1997: 101; Jones 1964: 636-639). Men were granted membership into these units by imperial approval through military merit, skills, accomplishment, or influence, and appointed to various tasks. There is some evidence that unit commands were granted to a member after about five years in the *protectores* or *domestici*, and this would have encouraged regular changes in membership and reasonable training of an officer class, while also inducting them into the more centralised patronage network of the Roman army high command. Army officers were still drawn from the provincial and imperial aristocracy, but also included men that had

Figure 1. The reconstructed courtyard house at South Shields: A. the entrance foyer; B. the northeast corner from the central courtyard; C. the interior of the dining room. © Rob Collins.

risen through the ranks and were distinguished by their service. In 364, the emperor Valentinian made membership in the *domestici* inheritable, and the heirs of officers could therefore begin their military careers at a potentially higher rank than previously due to the achievements of their fathers/grandfathers; Ammianus Marcellinus seems to refer to this group or social class as *commendabiles* (Frank 1967). This can be observed in one example; Gratian, 'the elder' and father of the emperors Valentinian and Valens, established a reputation as a skilled wrestler and soldier of great strength, was promoted to the *protectores*, and served subsequently as a tribune and *comes rei militaris* in Africa and Britain (AM 30.7.2-3). Though this arrangement of 'officer training' is vaguely understood, it had ceased to function by the early 5th century, and there is not enough evidence from across the Roman Empire to determine the frequency and regularity of commanders appointed from the *protectores* or *domestici*, or if such appointments were consistent chronologically or geographically. It is likely, for example, that periods of usurpation would be disruptive to this system. That said, the separation of civilian and military careers almost certainly succeeded in creating a dynastic officer class, such that there is evidence from the 4th-6th centuries across the Western and Eastern empires of multiple sons across generations of a family serving as army officers (Parnell 2017: 133-147).

No doubt, dynastic families of military officers were feasible due to the advantages and opportunities available through imperial service. Incorporation into army hierarchy – even for a brief period – provided an individual with privileged access to key offices and individuals in both the military and civilian bureaucracy and to develop 'insider' experience and understanding of the imperial system. As a result, a commander could use the resources of his office to gain access and build up a number of different resources for himself and his family, including land and monetary wealth alongside the expanded social networks that the post provided.

The second fundamental change in army organisation in the later empire was the distinction of three branches that all units (including naval) were placed within, identified by their roles as palatine armies (*palatini*) that remained in the presence of the emperor, field armies (*comitatenses*) that were used as mobile forces for proactive campaigning, and frontier armies (*limitanei*) who were fixed to their frontiers as a regular defence force (Nicasie 1998: 43-81). All three branches consisted of infantry and cavalry units, but units had generally decreased in size relative to their 2nd-century predecessors. Legions, for example, were approximately 3000 or 1000 men strong, down from approximately 5500 men. Field armies and frontier armies each had their own general, a *comes* (count) or *dux* (duke) respectively, that reported directly to a *magister militum* (master of soldiers) and thence the emperor.

The archaeological implications of these changes to late Roman army organisation should also be noted. From the mid-later 3rd century, military installations took on a greater variety of forms that frequently broke with earlier military planning and architecture (Elton 1997: 155-167). Forts and legionary fortresses were smaller (in keeping with smaller unit sizes) and tended to incorporate more functionally defensive architecture. As a result, specialised buildings like *principia* (headquarters) and *praetoria* (commanding officers' houses) are not always readily identifiable. This is not to claim that forts and fortresses did not have such specialised spaces, but that they cannot always be identified archaeologically. Unit commanders almost certainly enjoyed more space than their soldiers, which was probably built and furnished to a higher quality, but the exact position or dimensions of such structures are not as consistent or visible relative to forts of the 1st-3rd centuries.

Another significant change is the decline in the habit of inscription from the later 3rd century. This decline is generally universal across the Roman Empire, but it is more marked in some regions than others. Inscriptions attributed to late Roman soldiers and officers can be found along the Danube, in Gaul, and in North Africa, for example, though there are almost none found in Britain, resulting in a greater absence of direct biographical data. In contrast, there is an increasing amount of furnished burials attributed to soldiers through the course of the 4th and 5th centuries, notably through the Rhine and Danube frontiers, though these too are far fewer in Britain (Hamm 2021; Collins 2017a). Given the discrepancy of British evidence, it is instructional to review the evidence of 4th- and 5th-century commanders from elsewhere in the empire first through two focused case studies.

Flavius Abinnaeus

The archive of Flavius Abinnaeus reveals the life of an army commander in the eastern half of the empire for the years 342-351. Likely to be of Syrian origin, Abinnaeus was approximately 51 or 52 years old when he was appointed as the commander of the garrison at Dionysias in the southern Fayyûm of Egypt (Bell *et al.* 1962: 7-9). The archive is revealing not only of Abinnaeus' actions to achieve his command, but also reveals the commander as a more socially-rounded individual, and also in terms of what the *praepositus* of a late Roman frontier unit was expected to do.

Abinnaeus was probably born around 286 and entered the Roman army after 305, serving for 33 years in a vexillation of Parthian archers based at Diopolis (Luxor) in the Thebaid (Upper Egypt). As a *ducenarius*, he was appointed to escort and conduct a delegation of Blemmyes with the *comes* Senecio to Constantine and Constantius II in Constantinople. This event is argued to have occurred in 336, and his service was awarded by appointment to the *protectores* (Barnes 1985: 369-370). He was then directed to conduct the Blemmyes home, where he remained for three years as an imperial agent / representative. In 339, Abinnaeus raised and delivered a corps of recruits from the Thebaid to Hierapolis, in advance of anticipated action against the Sasanians under Shapur II, followed by another visit to the court of Constantius II. As a reward for services rendered, Abinnaeus was granted a period of leave and appointed as prefect of the *Ala V Praelectorum* at Dionysias by the emperor Constantius II himself. On reporting to his new commander, the *comes* Valacius, Abinnaeus was told he could not actually take up command of the *ala* at Dionysias as others had been appointed to the post with the same letters. Though it is uncertain exactly who recommended these other commanders, Abinnaeus was able to employ the hierarchy of Roman culture through a process of petition, arguing that his direct appointment by the emperor superseded other appointments that he argued were *ex suffragio*. Abinnaeus took up command of the *ala* from 342-344, when he was dismissed by Valacius on grounds of having served his term; his successor is unknown, but Abinnaeus petitioned again and was back in command of the *ala* by May 346 until his retirement in 351. Abinnaeus' experience in his appointment and actual taking of command is insightful. The occurrence of multiple candidates with imperial letters of appointment can be interpreted as evidence of corruption in the imperial court, and Abinnaeus' success at reinstatement has been linked to the death of Valacius (Barnes 1985: 371-373). However, what is more likely indicated through these scant facts are the complexities of imperial bureaucracy and the competitive nature of patronage in appointments of military officers. While Abinnaeus was appointed command directly at the behest of the emperor, the other candidates were probably recommended or petitioned for the post, with an official in the imperial bureau signing off on the appointment. It could even be surmised that one of the patrons or petitioners of the other candidates was Valacius. Abinnaeus' claim to direct imperial appointment trumped that of Valacius or any other individual below that of the emperor himself, and may have even won him the ire of Valacius. This cannot be known for certain, but the entire palaver of appointment as prefect of the *ala* supports a view of appointment of unit commanders in which there were competing influences and forces within the bureaucratic process.

Abinnaeus was married to a woman of substance, Aurelia Nonna, and she owned properties in Alexandria and Philadelphia. They had at least three children, and the archive indicated a household that was composed of at least eight other individuals. A number of documents in the archive reveal that Abinnaeus' close correspondents included military men, at least two ecclesiastical figures, and civilian men and women. In their writing some of the lower ranking officers 'express themselves in a way that reveals a certain intimacy between them and Abinnaeus' family, such that they knew and understood their commander not just as a superior officer, but also as a person' (Bell *et al.* 1962: 29). Significantly, the correspondence underscores the social relationships of a garrison commander beyond mere military matters, such that his social background and network was fundamental to his military duties during his command at Dionysias.

As a prefect of a cavalry unit of *limitanei*, Abinnaeus was responsible for a number of military duties, including the provisions of soldiers to escort tax collectors or other imperial officials, recruitment of new soldiers, and upkeep of his fort. These were conducted alongside matters of general security and peace of his sector of the frontier, including anti-smuggling activities and what can be understood in modern terms as policing. There are letters that hold official requests for leave from soldiers, others pertaining to disciplinary issues, and the collection and allocation of rations and other provisions pertaining to the *annona* (Bell *et al.* 1962: 16). The majority of records relate to the inspection, collection and distribution of various resources relating to the *annona*, in which Abinnaeus was often negotiating as much as commanding individuals and local communities. A number of petitions speak to the role and limitations of the commander as a patron; 'Whatever the circumstances, one turns to an officer and counts on his credit to obtain what one wants' (Bell *et al.* 1962: 30). The role of military officer patronage is not unique to Abinnaeus, and again points to the convergence of military authority with broader social and economic powers in the 4th and 5th centuries (MacMullen 1963: 113; Whittaker 1993).

African '*gentiles*'

Like all the other late Roman frontiers, North Africa was garrisoned with professional soldiers of the *limitanei* that were distinct from those more irregular or *foederati* forces composed of nomadic or semi-nomadic peoples living within and bordering the Roman Empire (Rushworth 2017). However, evidence from 3rd-5th century North Africa also points to the integration of the elite of these native and segmented societies with the Roman army. A series of funerary inscriptions dating to the 3rd and 4th centuries from the cemetery at Bir ed-Dreder, Libya, provide insights to a segment of frontier society in North Africa, namely the integration of native elite with the military elite.

Many of the graves are attributed to tribal elites of the Scedua Basin, many of which bear funerary stelae. There are nine Latin-Punic inscriptions that incorporate the title *tribunus*, with Elmayer (1983) identifying four dynastic lineages belonging to at least three clans. While a number of interpretations have been put forward over the past 70 years that argue the degree to which the position of *tribunus* was an honorific or testimony to genuine military service (summarised by Rushworth 1992: 201-204), inscriptions and literary evidence from other provinces and frontiers of North Africa testify the convergence of native elite with military offices, not least the House of Nubel. No special pleading is needed to envision the elite men buried at Dreder as having at some point served as the commander of a local or regional frontier unit. Significantly, not all the men with inscriptions make this claim, and those that do fit within particular lineages and can be found across multiple generations. Taking up a command post in the Roman army, then, was an expectation or privilege that fell to particular elite frontier families of Libya.

In this regard, the emergence of tribal elite integrated into Roman military command positions at the level of a local unit up to that of *dux* or *comes* fits within the broader pattern of Roman incorporation of elite provincial families into the service of imperial hierarchy. An elite man of the frontier could be both a 'chief' or civilian authority on the basis of his lineage while also taking up the mantle of military authority in direct service to the Roman state. As seen with localised peer-polity competition in the *civitates*, incorporation of local elite into dynastic military families fostered and reinforced continued local investment of those families while also ensuring participation in the imperial hierarchy. There are further benefits to such a system. First, the officers would be 'known' to local populations, and this might provide reassurance to the communities the officers were intended to defend. Such officers were not only fulfilling their legal responsibilities as commanders, but were defending their homelands (with altruistic motivations) or further ensconcing themselves in the power-structures and networks of their native territories (with more self-serving motivations). It is reasonable to also expect that such officers would have reasonable knowledge of the physical, economic, and social landscapes they operated in. All this insider-knowledge could be considerably beneficial to frontier commanders. The downside, however, is that such commanders probably did not have the experience of serving in other roles and geographies of the empire, and may not have developed a more zoomed-out, strategic perspective or understanding of the empire. In other words, the development of local elites as dynastic officer-classes of the *limitanei* would generally perpetuate a more regional-localised orientation and perspective amongst such officers. The timing of this development, by the later 3rd century, can be seen relative to the barbarian threats and crises of Roman imperial succession and attention to Roman North Africa, but these circumstances are not unique to North Africa.

The archaeology of frontier commanders in late Roman northern *Britannia*

The frontier of northern *Britannia* in the 4th and 5th centuries that was occupied by the Roman army stretched from the northern midlands up to Hadrian's Wall, with a document of the early 5th-century known as the *Notitia Dignitatum* ascribing the army of *limitanei* to the command of the *dux Britanniarum*. Though the exact number varied at any given time, there were approximately 20 forts in the Wall corridor, with a further 20-30 forts to the south of the Wall within the area of the *dux*'s command, resulting in an average of 40-50 unit commanders. The *dux* is presumed to have been based in York, the political capital of the north of *Britannia* as well as the headquarters of the 6th legion (Collins 2012).

Prior to the 4th century, there are approximately 180 equestrian officers known from inscriptions across the whole of Britain, with the vast majority of these men attested from Hadrian's Wall and other forts in the northern frontier (Birley 1980: 58). These posts were filled by appointment of the governor, and as such can be understood to have been occupied through the governor's network of patronage, both directly and indirectly. Governors generally served for three to four years, and within that time could expect to appoint a significant number of officers, though a governor's tenure does not simply equate with that of an officer; commanding officers appear to have served for periods of three to five years, though longer periods cannot be conclusively dismissed (examples in Collins 2017b: 129). The geographic origins and/or ethnic affiliations of these officers can be observed from inscriptions. Aulus Cluentius Habitus, prefect of the I Cohort of Batavians at Carrawburgh in the 3rd century, records his home as Larinum, of the Voltinian tribe in Italy (*RIB* 1545). Quintus Petronius Urbicus, prefect of the IV Cohort of Gauls at Vindolanda in the 3rd century, records his home as Brixia (Brescia), in Italy, as well as belonging to the Fabian voting-tribe (*RIB* 1686). Inscriptions from the frontier zone of Britain itself, as well as dedications and tombstones elsewhere in the empire attest to the presence of Africans, Spaniards, Gauls, and men from Dalmatia, and Pannonia (Birley 1980: 68-69).

The Italian municipal elite continued to contribute officers into the 3rd century, as exemplified by Habitus above; but through the course of the 2nd century, provincial elites became increasingly common among the officer class, and in the Western provinces, this was further exaggerated by restricted candidate pool brought about by the formation of the Gallic Empire in the mid-late 3rd century. More significant, however, is the trend in the 3rd century that saw the ascension of the centurionate and men of similar standing – that is to say from classes below the equestrians – rising into command positions (Birley 1980: 70-71). This is amply illustrated by three inscriptions from the fort of Birdoswald, naming men that commanded the I Cohort *Aelia Dacorum*: Flavius Maximianus, tribune *c.* 235-238, notes that he had been a veteran on special service (*evocatus*) of the first cohort of the praetorian guard (*RIB* 1896); Aurelius Verinus, tribune under Probus (276-282), is the latest known officer of the equestrian class in Britain (AE 1962.263); and a building dedication of 297 records the name of centurion Flavius Martinus as the acting commander (*RIB* 1912).

The latest military inscription of Roman Britain was found at Ravenscar, on the coast of Yorkshire, south of Hadrian's Wall, and this provides the only known unit commander's name in the later 4th century (Figure 2). Justinianus is named as *praepositus* (commander), along with his *magister* (junior officer) Vindicianus (*RIB* 721). No further information is available for either Justinianus or Vindicianus, and the simple occurrence of the inscription at this late date is quite exceptional. This exceptionalism is probably due to the fact that the Yorkshire coastal fortlets were new constructions in the later 4th century rather than long-occupied installations built in previous centuries. Yet no similar inscriptions have been recovered from the other coastal fortlets, along the Yorkshire coast or elsewhere in Britain. Thus,

Figure 2. A dedication inscription from Ravenscar, recording the praepositus *Justinianus, dating to the second half of the 4th century. © Rob Collins.*

the inscription record serves us admirably for the 2nd and 3rd centuries, but provides almost no information for the commanders of the 4th century.

Excavation at Roman forts in the northern frontier of Britain has revealed a number of *praetoria*, though only four have been excavated to any great extent in the Wall corridor: South Shields (*Arbeia*); Chesters (*Cilurnum*), Housesteads (*Vercovicium*); and Vindolanda (Chesterholm). Only two of these, at South Shields and Vindolanda, have been excavated using modern methods and standards of investigation, and full publication of the courtyard house, a presumed *praetorium*, at South Shields is still in progress. The *praetorium* at Chesters was excavated primarily in the 19th century, with Housesteads excavated and published in the mid-20th century. South of the Wall, the *praetorium* at Binchester is the only one to have been excavated to any great extent, though here most of the excavation revealed the new bath-house rather than the *praetorium* itself. The individual histories of these *praetoria* need to be placed within the context of the fort and its occupation history. Along the Wall, it was typical for the *praetorium* to be built in stone during the original occupation of the fort. The *praetorium* at Housesteads, for example, was built in the Hadrianic period (*c*. 120-138), and over the following three centuries of occupation, it was necessary to refurbish the building on a number of occasions. Such long-term use and occupation will have had varied effects on the building. At Birdoswald, an inscription attests to the ruinous state of the *praetorium* in the later 3rd century, requiring restoration (*RIB* 1912), whereas the consolidated remains of the 19th-century excavations of the *praetorium* at Chesters demonstrate the *domus* was significantly modified and appears to have had a complex history of refurbishment and adaptation, with very significant changes in the 4th century (Figure 3). At Binchester, a new *praetorium* was

Figure 3. The consolidated remains of the praetorium at Chesters, with the expected size of the Hadrianic structure indicated by the white dashed lines. The late bath-house is visible at the top of the photograph, and the principia *is south of the* praetorium. *The 4th-century structure consists of at least the eight rooms in the centre of the image, possibly connected with further structures to the left and right of what is currently visible. © Newcastle University, modified by Rob Collins.*

built over earlier versions *c.* 330-335 at earliest, based on a coin found in a foundation deposit, and this incorporated a substantial bath-house to replace the extra-mural bath-house, as at Chesters (Ferris 2010). In contrast, the presumed *praetorium* at South Shields was built *de novo* in the late 3rd or early 4th century on the *via praetoria* in the corner of the fort, rather than adjacent to the *principia*, though the entire interior space of the fort seems to have been reorganised at this date (Hodgson 1996).

Courtyard houses in the later Roman empire are often associated with the elite of Italy, North Africa, and the Near East (Hodgson 1996: 145; Fleming 2021: 28), but a striking aspect of the forts of Hadrian's Wall and the frontier of northern *Britannia* more generally, is that the 2nd-century form and layout of the forts and their interior buildings were retained until the mid-4th to early 5th century. This is not to say there were no changes, as there were many, but the rather archaic form of the British frontier in the 4th and early 5th century contrasts with the military installations in other frontiers of the Roman Empire. While this conservative military architecture makes the northern frontier zone of *Britannia* appear out-of-touch or archaic relative to other late Roman frontiers, there is a considerable benefit. The dearth of information from inscriptions in the 4th century means that we are entirely reliant upon archaeology to inform us about the occupants of forts at that time – the fact that we can identify *praetoria* along the Wall enables us to continue to investigate the unit commanders at a time when they become archaeologically less visible elsewhere.

The Vindolanda *praetorium*

The 4th-century *praetorium* at *Vindolanda* was a substantial reconstruction of the 3rd-century structure occupying the same position. Rebuilt *c.* 300, the structure was a fairly standard four-wing courtyard house built to the east of the *principia* in the central range of the fort (Figure 4A). The *praetorium* was partially excavated in the 19th century, with more recent excavations undertaken by the Vindolanda Trust. A combination of post-Roman agriculture, stone-robbing, and antiquarian excavation have removed the uppermost strata (and sometimes lower strata), making dating of phases difficult, but a summary description of the remains and its sequence reveals interesting changes during the last century of Roman dominion of Britain. The following narrative is constructed, and partially reinterpreted, from the evidence reported by Birley *et al.* (1998; 1999; 2002).

Overall, four broad phases can be identified from the reported stratigraphy, dating to *c.* 300, *c.* 350, *c.* 370/5, and *c.* 400+. The entrance to the structure, facing north onto the *via principalis* of the fort had an enclosed 'yard' which may have been a fully enclosed and roofed corridor. The major reconstruction of *c.* 300 saw refurbishment of the east wing, in which a newly inserted corridor separated the rooms of this range from the central courtyard. A threshold stone at the southern end of the corridor suggested the placement of a staircase to an upper storey, evidence for which is further suggested by the addition of a series of large buttresses built along the exterior east wall of the *domus*. The east range was almost certainly the residential wing, in which all six rooms had raised floors and were provided with underfloor heating. The largest chamber, Room VI, was probably a reception and/or dining room and was the largest chamber in the entire *praetorium*. The west wing had been more considerably disturbed by post-Roman activities and previous excavations,

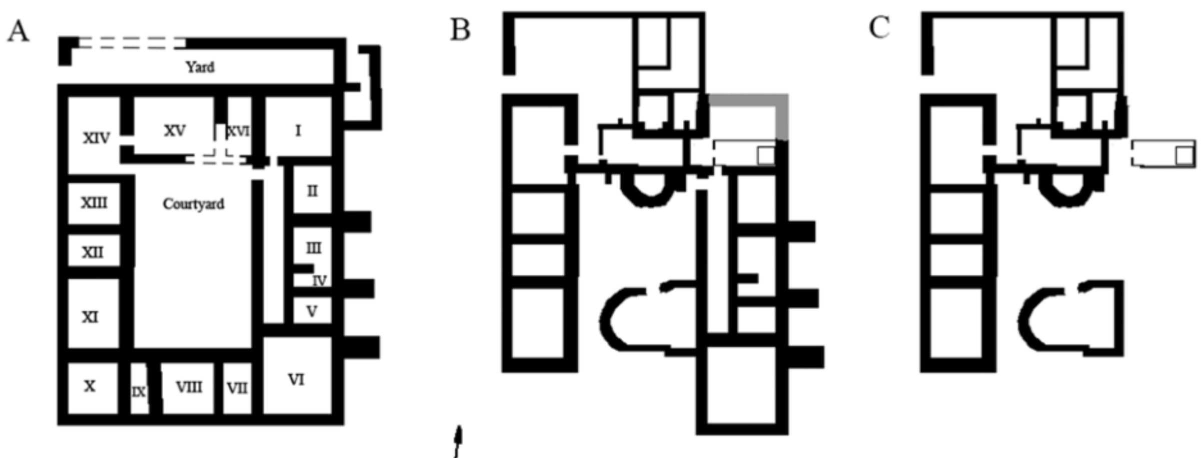


Figure 4. The plan of the praetorium *at Vindolanda: A. the structure* c. *300-370; B. the structure* c. *370-400 and possibly later; C. the excavators' preferred plan* c. *370 and later. © Rob Collins.*

leaving little evidence for a functional interpretation of the rooms, though this may have been a service wing. The south range may have been used in mixed service and domestic/hosting capacities; one room contained a clay floor with three ovens while another chamber, Room VIII, had a hypocaust that was fed from the adjacent room to its west

Evidence for further refurbishments in the 4th century are inconsistent, but suggest a phase of further alterations *c.* 350-360 on the basis of coins. The east range saw refloorings, and one chamber saw the insertion of a partition wall to create two new rooms. New floor surfaces were also added to chambers in the south and west ranges. In the north range, it may have been at this time that a new buttressed structure with a raised floor and furnace flue extending west was constructed. This structure, described as a 'heated internal hall' had an apse extension added to its southern wall at some later date. The heated hall, and the likely associated rooms to the north, appears to be a newly constructed bath suite. Flagging in the northern end of the central courtyard laid after the insertion of the apse-extension sealed a coin of Magnentius (350-353), providing a TPQ for this construction activity.

There is a likely third phase dating to the 4th century, *c.* 370-375, though this is limited to a few rooms rather than the structure as a whole and dating is piecemeal. The eastern range saw the insertion of new floor surfaces, including the infilling of some of the hypocaust/subfloors. Coin issues of the House of Valentinian were found, and Huntcliff-type wares dominated the ceramic assemblage. In the southern wing, an *opus signinum* floor was laid in one room, which was subsequently repaired at least three times. The southern wall of the *praetorium* at the southwest corner collapsed outward, and a rubbish deposit found on the latest floor contained a Valentinianic coin. The sequence in the western range is uncertain except in one room, where the subfloor was filled in and covered with *opus signinum*. The infill contained a coin of the House of Constantine and a Valentinianic coin was found on top of a demolished partition wall. Subsequently, there was a further reflooring with flagstones. Thus it remains uncertain if only a small portion of the *domus* collapsed, or if much of the western wing was demolished. In either case, the central courtyard would now have been accessible without going through the entrance of the house.

Changes post-dating *c.* 370-375 were also found, but evidence from the last quarter of the 4th century and early 5th century has suffered most from post-Roman disturbances. A rectangular wooden structure was erected within the southeast corner of the (ruinous?) walls of one room in the eastern range, in which the posts were fit into slots cut in the floor flags. In the southern part of the central courtyard, an apsidal-ended structure (with the apse to the west) was built against the internal wall of the east wing. The floor of this structure was 20 cm higher than the last layer of courtyard flags, and the stones used for its foundation were larger and more irregularly shaped than the stonework in other parts of the *praetorium*. The structure has been interpreted as a church by its excavators, and thought to have stood alone within the ruins of the *praetorium* in the 5th century.

The phasing is not entirely clear for the history of the *praetorium* in the 4th century, but it seems reasonable to suggest three basic phases, starting respectively *c.* 300, *c.* 350, and *c.* 370/5, with further structural activity in the 5th century in the form of the wooden structure and the church/reception room. The bath suite, which is dated to the second phase on the basis of the coin of Magnentius, is more likely to be associated with the phase beginning *c.* 370/5. The evidence for dating, at present, suggests the *praetorium* continued to exist as a standard courtyard house through most of the 4th century from its major refurbishments *c.* 300 up to the third phase of activity *c.* 370/5. The second phase, *c.* 350 saw the reflooring of most of the rooms and the rearrangement of underfloor heating systems. The most drastic changes, structurally-speaking, seem to be associated with the last quarter of the 4th century. The infilling of the subfloors is paralleled in various structures at other forts in the Wall corridor and usually dates to the second half of the 4th century or later. Room X, at the southwest corner of the *praetorium*, also seems to have suffered from the collapse of its south wall, and the discovery of the large stone slab above it suggests that the corner, perhaps the entire south range of the *praetorium* had been demolished or collapsed in the final decades of the 4th or early 5th century (Figure 4B). It is worth noting, however, some ceramic assemblages dominated by Huntcliff-type wares (rather than Crambeck wares) that were found in the sub-floor infills of the third phase have been attributed to being Theodosian or later (*c.* 378-410) at other sites, and excavation in recent years at Vindolanda with further 4th-5th century+ stratigraphic sequences may further modify the dating of the *praetorium* (Bidwell and Croom 2010).

The state of preservation of most rooms in the *praetorium* means that providing a terminal date for occupation is impossible. The excavators have suggested that in its final form, the *praetorium* consisted of its north range with the new bath suite and the west range, and the free-standing church in the courtyard (Figure 4C). However, it is curious that the east wing is demolished, given that this was the residential wing and probably also had a second storey, as well as the structural advantages provided by the large buttresses. Given the lack of clear, stratified evidence for final abandonment, it may be more reasonable to suggest the retention of the east wing in the final phase of *praetorium* occupation. The apsidal structure could feasibly have been added as an extension of the eastern wing into the courtyard and functioned as a reception room, replacing chambers lost with the dilapidation or collapse of the southwest corner of the *domus*.

Whether favouring my own interpretation of the sequence of the structure (Figure 4B) or the excavators' (Figure 4C), both sequences see a substantial loss of space for the commanding officer's household. This seeming loss of space to high-status domestic activity is also paralleled in the courtyard house at South Shields, where analysis of bone and antler remains indicate that the *domus* was the site of a furniture workshop in the opening decades of the 5th century or later, presumed to occur after the building ceased to be the residence of the commanding officer (Greep 2014: 134). It is difficult to be certain, but a similar loss of space probably also occurred in the *praetorium* at Chesters; a sizable bath suite was constructed in the largely demolished eastern wing of the *domus*, with most (perhaps all) of the central courtyard consisting of newly constructed rooms with hypocausts added to the *praetorium*.

A number of further features observed in the *praetorium* at Vindolanda have also been observed at the courtyard house in South Shields (N. Hodgson, *pers. comm.*). The latest use of high-status domestic chambers sees the infilling of the hypocaust systems, and subsequent refloorings are typically of poorer quality. More dramatically, dilapidation or modification of one wing provided new access to the central courtyard: the southwest corner, possibly much of the western range at Vindolanda; and through the demolition of the summer dining room in the eastern range at South Shields. It may be significant that at both locations, this new access to the courtyard shifts from the front of the *praetorium* to the back. Similar trends are seen in a more fragmentary manner at other *praetoria*, along the Wall and elsewhere in the northern frontier zone, for example in the infill of subfloors containing very late ceramics at Chesters and Housesteads (Crow 2004: 91) and possibly Rudchester, as well as Chester-le-Street (Rainbird 1971: 101-108). The *praetorium* at Rudchester, like that at Vindolanda, also had large buttresses built against the external face of the eastern wall of the structure, which were described as 'very rough masonry', a term regularly employed in the first half of the 20th century to characteristically describe remains of the later 4th century and later (Brewis 1925: 99; 102-103). At Binchester, the chambers and suites of the new bath-house adjacent to the *praetorium* were further subdivided and converted for industrial and craft use (Ferris 2010: 82-91); the dating varies for each room, but where available, this appears to occur in the later 4th century at the earliest and in some cases can be argued stratigraphically to continue into the 5th century.

Another curious feature of the courtyard house at South Shields is the occurrence of a large pit dug in the central courtyard that contained the disarticulated skeletons of two individuals and a dog. The individuals were radiocarbon dated to 1,720±60 BP (cal. 140–430) and 1,540±80 BP (cal. 340–660) (Grove 1994: 269). Both individuals were interred at the same time (their deposition is the same event, stratigraphically), reducing the date range to 340–430. Given the fact that the burial pit cuts through all the 4th-century pavings of the courtyard, the burial can be dated with confidence to *c*. 400–430. The osteological analysis of the remains suggested that the individuals suffered blows from sharp instruments to their skulls, and they were not buried rapidly after death – that the bodies may not have been interred for some days. The burial of the bodies inside the Roman fort, indeed, within the courtyard house is a striking deviation from the accepted 'normal' Roman mortuary practice of burial outside the settlement, but it also seems significant that the bodies were placed in a large pit rather than graves. Without further information, we can only speculate as to the identities of these individuals who appear to have suffered violent deaths.

Changes to *praetoria*, and the implications these have on the duties and performance of social superiority need to be considered alongside other changes found in late Roman military structures. The granary sequence at Birdoswald has been interpreted as a succession of feast halls, initially making use of the modified southern granary, followed by a timber-framed structure overlying the northern granary footprint, and ending with a new timber post-built structure off-set from the northern granary (Wilmott 1997). The earliest possible start for this sequence is *c*. 370, but assessment of the Crambeck parchment fineware and its proportion to Huncliff-type coarsewares indicate that a more likely start for this sequence is *c*. 400 (Bidwell 2005; Bidwell and Croom 2010). Prospective feasting evidence can also be found in the *principia* at Vindolanda where a large hearth or firepit was inserted at the front of the *aedes*, which is probably 5th-century+ but otherwise undated due to the period when it was excavated (Birley and Alberti 2020: 22); the legionary basilica at York, too, retained a substantial deposit of suckling pig bones known as the 'small pig horizon' that is suggestive of conspicuous consumption and feasting dating to the later 4th/5th century (Gerrard 2007). This culture of feasting, suggestive of greater social mixing between a commander and his soldiers and other occupants of the forts, in spaces other than the more exclusive and traditional *praetorium* dining room, is very indicative of the changing exercise and performance of power in the latest years of Roman military occupation.

Discussion

The combination of structural changes to the Roman army instituted by Diocletian and Constantine and the decline of the epigraphic habit by the later 3rd century has created a notable absence in the evidence for understanding the culture of command in late Roman frontiers. Significantly, there seems to be some retention of courtyard-style houses typical of *praetoria* from the early Roman Empire, though few enough have been excavated in full to be entirely certain of that conclusion. The modification of *praetoria* in the 4th century, often to include a bath-house (at Vindolanda, Chesters, and Binchester) would result in significant re-modelling of the existing *praetorium*. And in their latest phases, it is evident that the high status and luxury of these structures appears to have diminished, if not lost entirely, occurring perhaps as early as *c.* 370/375, though perhaps more likely from the early 5th century. What is uncertain is whether or not any portion of the more formerly grandiose *praetoria* were retained for use by the latest Roman commanders and their households, or whether they moved into other accommodation elsewhere in the fort, or perhaps were lost or disappeared entirely with 'the end' of Roman Britain.

We do not know where officers for northern *Britannia* were supplied from through the 4th century. As a matter of course, it would be prudent to consider that officers in Britain were supplied in the same fashion as they were elsewhere in the Roman Empire – that is to say via the *protectores* and/or *domestici*, perhaps with particular patronage, nominations, or requests coming from the *dux Britanniarum* when one of the *magisti militum* or the emperor did not have preferential candidates. Certainly, such a system could operate through the first half of the 4th century, and indeed can be seen in the specific case of Flavius Abinnaeus. However, various events, such as the usurpations of Magnentius in 350 and of Magnus Maximus in 378 may have disrupted such centralised appointments in favour of the new usurping emperor. These disruptions could be corrected by reassertion of central imperial control following these usurpations, and the disruption of the Barbarian Conspiracy of 367. However, these events and the supply of officers to Britain must also be considered in the broader context of imperial politics and military matters in other frontiers. Would sending new officers to northern *Britannia* have been a priority, given that there were other more pressing military theatres, particularly in the second half of the 4th century?

An alternative that should be considered is the system observed from inscriptions and textual evidence from North Africa, as described above. The local *gentiles*, chiefs and leaders of the pre-desert peoples, appear to have provided their high-status men to the Roman army to serve as *limitanei* commanders for a 'regular' term of service by the later 3rd century and through the 4th and into the 5th century. The advantages of this have been rehearsed above, but such a system could be the norm for all Roman frontiers; we simply lack the textual or inscriptional evidence for its practice.

While very significant positions could be filled by 'external' candidates appointed from the *protectores* or *domestici*, the majority of commanders could be drawn from high-status, local frontier families, and potentially this could be an easier bureaucratic and logistical means of managing the frontier by the *dux Britanniarum* than relying on long-distance supply of officers from far-flung provinces. Like the pre-desert frontiers of North Africa, northern *Britannia* had very few *civitates* and towns, and indeed, the men born in the families of urban *curiales* were legally obliged to succeed their fathers, legally prohibited from entering the military. On the other hand, a long series of laws and concessions shows that the *curiales* continually defied the ban on them serving in the military (Jones 1964: 744), and a far-flung province like *Britannia secunda* may have provided more opportunities to defy or ignore, and/or fewer enforcements of the law. So the councils of places like York, Aldborough, Brough-on-Humber, and Carlisle, or even towns in southern Britain could in principle have been a source of officers for the *limitanei*.

Dynastic military families, however, could also be wealthy and part of the villa-owning landed elite that was distinct from the *curiales*, either having become established locally 'below' the traditional *curiales* or as 'outsiders' that were not originally part of the native elite. Petts (2013: 327-28) has suggested that the owner of the villa at Ingleby Barwick may have been a highly placed military official on the basis of the rare type 6 crossbow brooch found there, further drawing attention to the name Vindicianus on the late 4th-century Ravenscar inscription above also being attested on much earlier inscription from East Ness, Rydale (*RIB* 720). Though the Vindicianus names cannot be directly connected to lineal descent, the general rarity of the name and geographic proximity are suggestive, while the high status of at least one resident of the Ingleby Barwick villa demonstrates a local of the Tees Valley with connections far outside the local area.

Another prospective source would be societies north of the Wall, and perhaps the putative 4th-5th-century Votadini chiefs bearing Brythonic-glosses of Roman names like Edern / Aeternus, Padarn / Paternus, and Tegyth / Tacitus are indicative of official participation as *limitanei* officers (examples in Harleian MS 3859 and Jesus College MS 20, both in Morris 1995: 42; 58). In the lands between the villas of Yorkshire and the Tees Valley, and the hillforts north of the Wall, however, there must have been other elite, rural families that also provided prospective officers, even if these are not readily detected in the archaeological record outside of Roman forts and occasional towns. Lacking the concentrated population centres provided by towns, whether large or small, service as a *limitanei* officer would provide rural-elite families not only with a means of sustaining their elite status in the Roman Empire via the army, but also a putative 'seat of power' that could be associated with a particular fort.

A further attraction of the model, as least for this author, is that local elite supply of officers agrees with arguments for increased regionalisation of the *limitanei*, and their evolution into more localised warbands in the decades following the end of Roman Britain in the 5th century (Collins 2012; 2017b; Wilmott 1997). Locally-based elite families would be less inclined to leave the area of their power-base, and the combination of local social-elite status and official military authority would facilitate continued occupation of any fort sites associated with a given family. In such circumstances, the uncertainty of which emperor was being served or when renewed contact with the imperial centre was something external to established practices of elite power within the frontier.

Though there is no direct evidence in support of the African *gentiles* model, it is one that warrants further consideration, and is perhaps one that can be further assessed going forward through more detailed study of artefact assemblages, and potentially, mortuary evidence.

Bibliography

Ancient sources

Ammianus Marcellinus, *Res Gestae*, trans. J.C. Rolfe 1963. *The Surviving Books of the History*, Cambridge: Loeb

Harleian MS 3895 and *Jesus College MS 20*, in Morris, J. 1995. *Arthurian Period Sources, Vol. 5 Genealogies and Texts*, Chichester: Phillimore.

Roman Inscriptions of Britain Online, 2017, Scott Vanderbilt / Latin Now, viewed 31 October 2021, <https://romaninscriptionsofbritain.org/>

Vindolanda Tablets Online, Centre for the Study of Ancient Documents / British Museum, viewed 31 October 2021, <http://vindolanda.csad.ox.ac.uk/>

Modern works

Barnes, T. 1985. The career of Abinnaeus. *Phoenix* 39.4: 368-374.

Bell, H., V. Martin, E. Turner and D. van Bercham 1962. *The Abinnaeus Archive: Papers of a Roman Officer in the Reign of Constantius II.* Oxford: Clarendon Press.

Bidwell, P. 2005. The dating of Crambeck parchment ware. *Journal of Roman Pottery Studies* 12: 15-21.

Bidwell, P. and A. Croom 2010. The supply and use of pottery on Hadrian's Wall in the 4th century AD, in R. Collins and L. Allason-Jones (eds) *Finds from the Frontier: Material Culture in the 4th-5th Centuries* (Council for British Archaeology research report 162): 20–36. York: Council for British Archaeology.

Birley, A. and M. Alberti 2020. *Vindolanda Excavation Research Report focusing on Post-Roman Vindolanda*, Chesterholm: Vindolanda Trust.

Birley, A.R. 1980. *The People of Roman Britain.* Los Angeles: University of California Press.

Birley, R., A. Birley and J. Blake 1998. *Vindolanda 1997 Excavations Praetorium Site Interim Report.* Greenhead: Roman Army Museum Publications.

Birley, R., A. Birley and J. Blake 1999. *The 1998 Excavations at Vindolanda the Praetorium Site Interim Report.* Greenhead: Roman Army Museum Publications.

Birley, R., A. Birley and J. Blake 2002. *All Vindolanda Excavation Reports 1997–2000* (CD-ROM produced December 2002). Chesterholm: Vindolanda Trust.

Bishop, M.C. 2013. *Handbook to Roman Legionary Fortresses*. Barnsley: Pen and Sword.

Brewis, P. 1925. Roman Rudchester: report on excavations, 1924. *Archaeologia Aeliana* 4th series 1: 93-120.

Collins, R. 2012. *Hadrian's Wall and the End of Empire: the Roman Frontier in the 4th–5th Centuries.* New York: Routledge.

Collins, R. 2017a. Soldiers in life and death: material culture, the military, and mortality, in A. van Oyen and M. Pitts (eds.) *Materialising Roman Histories. Beyond Instrumentalism and Representation*: 31-45. Oxford: Oxbow.

Collins, R. 2017b. Power at the periphery: military authority in transition in late Roman Britain, in R. Varga and V. Rusu-Bolindet (eds), *Official Power and Local Elites in the Roman Provinces*: 127-144. London: Routledge.

Collins, R. 2017c. Decline, collapse, or transformation? The case for the northern frontier of *Britannia*, in N. Roymans, S. Heeren, and W. Clerq (eds) *Social Dynamics in the Northwest Frontiers of the Late Roman Empire: Beyond Decline or Transformation*: 203-220. Amsterdam: University Press.

Crow, J. 2004. *Housesteads: a Fort and Garrison on Hadrian's Wall.* Stroud: Tempus.

Elmayer, A. F. 1983. The re-interpretation of Latino-Punic inscriptions from Roman Tripolitania. *Libyan Studies* 14: 86-95.

Elton, H. 1997. *Warfare in Roman Europe 350-425*. Oxford: Clarendon.

Ferris, I. 2010. *The Beautiful Rooms are Empty: Excavations at Binchester Roman Fort, County Durham 1976-1981 and 1986-1991.* Durham: Durham County Council.

Fischer, T. 2019. *Army of the Roman Emperors*. Trans. M.C. Bishop. Oxford: Oxbow.

Fleming, R. 2021. *The Material Fall of Roman Britain 300-525 CE*. Philadelphia: University of Pennsylvania Press.

Frank, R. 1967. *Commendabiles* in Ammianus. *American Journal of Philology* 88: 309-318.

Gerrard, J. 2007. Rethinking the small pig horizon at York Minster. *Oxford Journal of Archaeology* 26: 303-307.

Grove, R. 1994. The human remains, in P. Bidwell and S. Speak, *Excavations at South Shields Roman Fort, Volume 1*: 268–269. Newcastle: Society of Antiquaries of Newcastle upon Tyne.

Greep, S. 2014. A late fourth/early fifth century furniture-maker's workshop at the Roman fort of South Shields. *Arbeia Journal* 13: 129–148.

Hamm, B. 2021. Change of habit equals change of values? Burials of 'military men' between 300 and 500, in E. Bennett, G.M. Berndt, S. Esders and L. Sarti (eds) *Early Medieval Militarisation*: 231-252. Manchester: University Press.

Hodgson, N. 1996. A late Roman courtyard house at South Shields and its parallels, in P. Johnson (ed.) *Architecture in Roman Britain* (Council for British Archaeology research report 94): 135-151. York: Council for British Archaeology.

Jones, A.H.M. 1964. *The Later Roman Empire 284-602*. Oxford: University Press.

MacMullen, R. 1963. *Soldier and Civilian in the Later Roman Empire.* Cambridge: Harvard University Press.

Nicasie, M. 1998. *Twilight of Empire: the Roman Army from the Reign of Diocletian until the Battle of Adrianople*. Amsterdam: Gieben.

Parnell, D.A. 2017. *Justinian's Men: Careers and Relationships of Byzantine Army Officers, 518-610*. London: Palgrave MacMillan.

Petts, D. 2013. Military and civilian: reconfiguring the end of Roman Britain in the North. *European Journal of Archaeology* 16.2: 314-335.

Rainbird, J. 1971. Recent excavations at Chester-le-Street. *Archaeologia Aeliana* 4th series 49: 101–108.

Rushworth, A. 1992. Soldiers and Tribesmen: the Roman Army and Tribal Society in Late Imperial Africa. Unpublished PhD dissertation, Newcastle University.

Rushworth, A. 2017. Soldiers or tribesmen: who guarded the frontiers of late Roman Africa?, in N. Hodgson, P. Bidwell, and J. Schachtmann (eds) *Roman Frontier Studies 2009: Proceedings of the XXI International Congress of Roman Frontier Studies (Limes Congress) held at Newcastle upon Tyne in August 2009:* 151-159. Oxford: Archaeopress.

Whittaker, C.R. 1993. Landlords and warlords in the later Roman Empire, in J. Rich and G. Shipley (eds) *War and Society in the Roman World*: 277-302. London: Routledge.

Wilmott, T. 1997. *Birdoswald: Excavations of a Roman Fort on Hadrian's Wall and its Successor Settlements: 1987–92*. London: English Heritage.

Hadrian and the Ocean

Richard Hingley

Introduction

This paper is inspired by Paul's research on the 'Branch Wall' that formed the eastern terminal of Hadrian's Wall (Bidwell 2015). This article interpreted the discoveries made at Wallsend during the excavations in 1997 and 2000. Paul's ongoing research into the Roman bridges along the Wall forms another stimulus for the discussion below (cf. Bidwell and Holbrook 1989; Bidwell 2010). This article also draws upon the numinous quality of water, in all its forms, in the classical world to reflect upon Fabio Barry's stimulating claim that Hadrianic frontier-building around the Empire was as much a magical as a military process (Barry 2011: 23). Barry has argued for an intimate link between the actions of the emperor Hadrian in Britain and the earlier classical conceptions of the island's status as an Oceanic conquest. The military campaigns undertaken by Roman commanders in Britain, from the initial invasion of Claudius in 43 to Hadrian's visit in 122, and indeed beyond, involved the coordinated use of troops and the navy. To conquer new territory, or to establish a new frontier work, required divine support and part of the numinous character of the conquest was a developing conception of Britain's Oceanic status in the minds of the Roman élite (cf. Braund 1986a; Hingley 2022). Hadrian's Wall, including its location, form and monumentality, reflected the centrality of water to the symbolic and practical character of the physical frontier works.

David Braund and Brian Campbell have addressed the ways that Roman military commanders interacted with the gods of the major rivers of the frontier regions of the Empire (Braund 1996b; Campbell 2012: 377-8). One of the most visually compelling images of a complicit river god is that of the massive, bearded Danube, highly visible on the base of Trajan's Column in Rome (below). Oceanus, an ancestral Greek divinity whose waters surrounded the island of Britain, was an even more powerful ally, or potential enemy, for a campaigning commander aiming to conquer lands this side of the Channel than the god of the kilometre-wide River Danube. An early reference to the symbolic power of the Oceanic status of Britain is included in Suetonius' comment that Julius Caesar's triumph to celebrate his victories in Gaul was accompanied by golden images of the Rivers Rhine, Rhone and Ocean (*Julius Caesar*, 37.1). According to ancient legend, the Titan Oceanus of Greek religion was one of the first gods, and father of all water deities who inhabited sea foam, rivers, rainwater and wells (Barry 2011; Braund 1996a; Romm 1992). The Romans took onboard the Greek conception that the waters surrounding the inhabited world were endless and Caesar emphasized his claim to have been the first Roman to go beyond Ocean. Florus provided an adroit summary of Julius Caesar's achievement in Britain following his invasions in 55 and 54 BC by stating that 'Ocean became calmer and more settled, as though it confessed itself unequal to opposing him' (Florus 1. 45.16-9).

The conquest of Ocean

Contemporary mention of Roman campaigning in Britain prior to Hadrian's arrival is replete with Oceanic symbolism. Members of the Roman elite, from Caesar onward, were particularly attracted to the mysterious land of Britain. Claudius, in need of a victory, was next to invade in 43 and the propaganda of his reign at Rome was used to emphasise the location of Britain as beyond Ocean, that its lands and people were far distant and unknown, and that Claudius had subdued them (Roncaglia 2019: 68-9; Stewart 1995: 7-9; Tomlin 2018: 16). During a speech to the Senate in 48, on whether senators from the new provinces of Gaul should be admitted, Claudius observed that he had extended the empire beyond Ocean. The fragmentary inscription that crowned the triumphal arch erected in Rome to celebrate these conquests is thought to have included a statement to the effect that the emperor had brought the barbarian people living beyond Ocean under the authority of the Romans (Barrett 1991; Tomlin 2018: 17-8).

The gradual conquest of southern and south-western Britain continued under Nero and then under Vespasian, who had served as a legionary commander in Britain under Claudius. Vespasian revived the Roman ambition to conquer the entire mainland when he became emperor in 69, appointing experienced governors to complete the task. Western and central Britain were gradually subdued before the campaigns moved further north. During the campaigns of Agricola in Caledonia (the far north) in 83–4, Tacitus suggests that the soldiers and sailors would compare the ravines in the forests and mountains with the dangers of storm and tides at sea, while victories on land against the enemy were compared to the conquest of Ocean (Tacitus *Agricola*:

Roman Frontier Archaeology (Archaeopress 2022): 256–264

25).[1] Caledonia is seen by Tacitus, presumably drawing upon written reports, as an Oceanic realm:

> 'Nowhere is the dominance of the sea more extensive. There are many tidal currents flowing in different directions. They do not merely rise as far as the shoreline and recede. They flow far inland, wind about, pushing themselves into the highlands and mountains as it were their own realm' (Tacitus *Agricola*: 10).[2]

This casts an interesting light on comments by Tacitus about Agricola's motivation when he established a temporary *terminus* (frontier) at the line the Clyde–Forth two years earlier, in 81. The Roman military had been busy conquering western and central Britain for several decades, although when they reached this isthmus, at the southern limit of the lands that Tacitus addressed as Caledonia:

> 'If the spirit of the army and the glory of the Roman name had permitted it, the boundary (*terminus*) of Britain would have been found within itself. For the Firths of Clyde [*Clota*] and Forth [*Bodotria*], carried far inland by the tides of the opposing sea, are separated by a narrow neck of land. This was now being securely held by garrisons and the whole sweep of land on the nearer side was secured, the enemy had been pushed back, as if into a different island.' (Tacitus *Agricola*: 23).

The role of the sea and the inflowing of water in the Firths of Clyde and Forth is emphasised by Tacitus (or the source that he drew upon) as a natural element that was drawn upon by Agricola to assist with the creation of a *terminus* of the island. The garrison line stands in place of reaching the northern Ocean.

To interpret these comments, it is important to consider the attitudes of prominent Roman commanders to the rivers that they encountered which formed potential barriers to further conquest. The Romans often used rivers to form their boundaries and frontiers with other peoples. Commanders who bridged major rivers during campaigns on the imperial frontiers often sought the divine support of the gods of these watercourses (Braund 1996a: 19; Braund 1996b: 45-6; Campbell 2012: 377-8). Agricola is seen to draw upon the flow of water in these two rivers to supplement the waters of Ocean. Prior to the invasion of Claudius almost four decades previously, the entirety of Great Britain was considered an Oceanic realm, although conquest and the navigation of its coastal waters had made the coasts of south and central Britain well known (Clarke 2001). The Rivers Clyde and Forth are considered in Tacitus' narrative to supplement Oceanus' realm and to isolate the Caledonians to an Oceanic realm of barbaric islands – including Ireland, Orkney, Shetland (Thule?) – that still remained for Rome to conquer (Clarke 2001: 101; Woodman 2014: 220).

This temporary frontier was crossed again two years later when Agricola campaigned into Caledonia, resulting in the victory at *Mons Graupius* in 84, leading to Agricola's recall to Rome in 85. The next provincial governor, whose name we do not know with any certainty, led a retreat to the south, abandoning Caledonia after a further year, after the scale of the work still required to conquer the mountains of highland Scotland had been more fully appreciated. Rome had, however, found another frontier line well to the south of the Clyde–Forth isthmus.

During the later first century and the early second, a line of garrisons was established on the Tyne–Solway isthmus. This so-called 'Stanegate system' may have been established from the early second century as a fortified frontier line, intended to control movement into and out of the province (Hodgson 2000). Its relevance is that, in its central sector in particular, it seems to have controlled movement from south to north and north to south across the fords on the rivers that lay immediately behind its line (Symonds 2020). The riverine character of the Stanegate is reminiscent of Tacitus' comments about the securing of the lands to the rear through the construction of the garrisons built under Agricola's orders along the Clyde–Forth isthmus. The exact course of this frontier line required that the major rivers to the west of its course lay to the north, the Rivers Irthing and the Solway, although the Stanegate exploited the rivers to the south of its line wherever this made strategic sense.

At the time the Stanegate was being established, the emperor Trajan was focusing the force of the Roman military might on the conquest of Dacia, and the ambition to conquer northern Britain was abandoned. The Danube was a wide and highly notable river that needed to be crossed as the Roman military moved into Dacia (in 101–2 and 105–6). The monumental column that was erected in Rome in around 113 to celebrate the conquest of Dacia includes a striking example of a water deity. Highly visible at the base of Trajan's Column (Scenes III and IV) is the massive, bearded figure of the river god of the Danube, who is shown guiding the Roman troops across an elaborate bridge at the start of the First Dacian War in 101–2 (Campbell 2012: 377-8). Trajan had ordered the construction of this bridge, over half a Roman mile in length to carry his troops over the

[1] I have taken the dating of the events in Caledonia from Smith (2015). His chronology differs from earlier chronologies, including that of A. R. Birley (2005).

[2] I am very grateful to Tony Birley for discussing the translation of these passages of Latin with me and Woodman's commentary is also very informative (Woodman 2014).

river to victory in Dacia (Serban 2009). The Danube is portrayed as an immense and beneficent deity, tamed and harnessed in support of Trajan's military ambitions.

The rivers of the Clyde–Forth line and those to the south of the Stanegate line would have seemed far less imposing barriers to Roman commanders, but their role in supplying water for their father Oceanus will have highlighted the numinous character of their waters and emphasized their significance as potential frontier lines.

Hadrian and Britain, Hercules and Ocean

These earlier references to Ocean and Britain provide a context for understanding the symbolic significance of the Wall that Hadrian commanded should be constructed. Little in the way of textual information survives from the classical past to tell us about the emperor's motivation, although hints that link the frontier works to the god Oceanus survive in the fragmentary archaeological information from the Wall. This Wall was built just to the north of the course of the Stanegate and formed a monumental elaboration of the provincial frontier. Famously, Hadrian, in contrast to his predecessor Trajan, did not aim to conquer new lands beyond the imperial frontier. The scant literary texts suggest that he may have faced military trouble in Britain and elsewhere on the frontiers of the Empire when succeeding Trajan in 117 and he sought to re-establish control of these disputed lands. Fragmentary information is taken to indicate that Hadrian reinforced the military in Britain by sending an experienced governor to counter a significant uprising (Birley 1998; Hingley 2022: 200). It used to be supposed that the Ninth Legion was destroyed in northern Britain early in Hadrian's reign (Campbell 2018); this tale formed the theme for Rosemary Sutcliff's highly influential novel *The Eagle of the Ninth* (1954). This idea was abandoned several decades ago as a result of the hint from inscriptions that members of this Legion served in other areas of the Empire after the early 120s. Nick Hodgson's recent re-assessment of the available information has raised the possibility that the Ninth was lost in Britain, indicating the potential scale of trouble early in Hadrian's reign (Hodgson 2021).

Whatever the details of the military situation in Britain, Hadrian evidently decided to create far more clearly defined and monumental northern frontier work, while he also commanded the fortification of many of the Roman frontiers that surrounded the Empire. Hadrian also visited many of these frontier provinces, inspecting and reforming the military. Britain was one of the earliest of the provinces that he visited. He made substantial preparations for travelling to Germany, Britain and Gaul in 121 and an old idea has recently been revived that this involved the issuing of instructions to the provincial governors of Germany and Britain to start the work of constructing substantial frontier fortifications, an innovation in Roman terms (Graafstal 2018; Symonds 2021: 56-7). Commencing the construction work in 121 meant that the emperor could visit and inspect these works during construction when he visited the provinces the following year. Although no indication of the geography of his tour of Britain is provided in the surviving classical texts, he must surely have focused his attention on the northern frontier, since this is where most of the legionary and auxiliary troops will have been based in the summer of 122.

The earlier association of the mainland of Great Britain with the divinity Oceanus finds a reflection in the celebration of Hadrian's actions. Fabio Barry has argued that that the Bocca della Verità (Mouth of Truth), a Roman mask of Phrygian marble which stands against the left wall of the portico of the Santa Maria in Cosmedin church in Rome, features a likeness of Oceanus (Barry 2011). Oceanus may often have been portrayed in a manner comparable to a river god, but he is identified on mosaics, reliefs, gems and paintings across the Roman world by the crab's claws protruding from his head, as shown on the Bocca della Verità. Oceanus was featured on the reverse of several issues of coins produced during Hadrian's reign (Abdy 2019; Arnaldi 2001–2; Barry 2011: 22-3). There was only a single precedent for including this divinity on a Roman coin: a *sestertius* that had been issued by Nero in around the mid 60s that featured Neptune and Oceanus, probably referencing the opening up of new sea routes as a result of the conquest of Britain by Nero's adopted father Claudius (Arnaldi 2001–2). The coins of Hadrian that featured Oceanus are variable in character and some of this emperor's coins also featured Neptune, the Roman god of the sea and of rivers. Although the coins that feature Neptune need not refer to Hadrian's voyage to Britain, those that draw upon Oceanus surely do, since we have seen that this god had been central to the earlier celebrations of conquests in Britain.

One well-known issue of coin under Hadrian shows Oceanus, clearly depicted with crab's claws, reclining on a dolphin, or sea monster, with an anchor, or more rarely a trident, in his right hand (Abdy 2019: 50-1; Birley 1997: 131). This issue of coins has long been associated with the emperor's voyage over the sea to Britain. A second issue of coins that appears to have been minted at this time includes an image of a trireme, probably the ship that carried Hadrian over the sea to Britain (Abdy 2019: 161 n. 659). Barry has drawn attention to an additional series of coins that were issued in at least five versions during Hadrian's reign, all of which depict the semi-divine Hercules towering over the reclining figure of Oceanus. Although Abdy has recently identified some of these coins as showing a river god rather than Oceanus, these figures do seem from a close inspection to bear crab claws on top of their heads (Abdy 2019: 311; cf. Barry 2011: figures 34-7). Barry has taken the stance of Hercules, who is dominating Oceanus, to suggest that the coins symbolized imperial propaganda by calling upon the labours of the Hercules, which involved widespread travel, and that this consciously reflected upon Hadrian's ambitious programme of travelling to inspect the frontier provinces of the Roman Empire (2011: 23). Hercules was reputed to have travelled to the far eastern and western extremities of the Graeco-Roman world, including a voyage into the waters of the Atlantic. The domination of Oceanus by the figure of Hercules/Hadrian, as depicted on these coins, presumably reflected directly upon the emperor's voyage by sea to the distant island of Britannia.

Barry also suggests that the Bocca della Verità, which has several holes to drain water, started life as a drain cover in a monumental building dedicated to Hercules in the Forum Boarium (Barry 2011: 16-20). He suggests that such 'a horizontal Oceanus would have made whatsoever enclosure it once adorned a microcosm, across which water drained back into Ocean' (Barry 2011: 14). Oceanus is often featured alongside sea monsters on the floors of baths or in fountain basins across the Roman Empire and was also clearly highly significant to the propaganda of Hadrian's reign. Barry infers that the Bocca della Verità may have formed part of a monumental dedication to Hercules during the reign of either Trajan and Hadrian: these emperors came from Italica (Spain), close to the site of the sanctuary of Hercules Gaditanus, who they took as their patron (Barry 2011: 21). No wonder that Hadrian focused so much attention on the security of Britain, a land that even the legendary Hercules had not visited.

Convincing support for the identification of the coins that depict Oceanus as symbolizing Hadrian's visit to Britain is provided by the coins of several subsequent emperors, and a usurper, which featured the same divinity (Arnaldi 2001–2). Septimius Severus, who spent three years campaigning in northern Britain in 208–11, issued coins that featured Oceanus. The usurper Carausius who seized power over Britain and much of Gaul in 286 and reformed the navy to help control piracy in the Channel also featured the same divinity on his coins (Williams 1999). The emperor Maximian issues coins showing Oceanus in 293 to highlight his intention to recover Britain from Carausius' successor Allectus (Arnaldi 2001–2). The image of Oceanus was also included on coins issued under the emperor Constans who travelled to Britain in 343 where he is thought to have campaigned beyond the northern frontier (cf. Woudhuysen 2021). The close association drawn by classical writers between the conquest in Britain and the subduing of the ancient Greek god of the sea was materialized in the form of the image of Oceanus upon the imperial coinages of successive emperors.

Hadrian also travelled to other parts of the Empire by sea and major rivers, as indicated by the depiction of Neptune and other river gods on other issues of coins (Abdy 2019), although drawing upon Oceanus seems to have emphasized the renewed significance of Britain after the relative neglect of Trajan's reign. The symbolism of Hadrian's reign must have drawn upon his status as only the second emperor to have travelled to the island, following in the wake of his deified predecessors, Caesar and Claudius. Indeed, Hadrian had also travelled further north beyond the civilized lands of the Mediterranean than his eminent predecessors; Caesar, Claudius and Vespasian had reached only the southern parts of the island which were now very well known to the Romans and were developing a settled and urbanized society. Hadrian is believed to have toured the unsettled frontier when an uprising had recently been suppressed (Birley 1997: 131). Little in the way of classical text survives to provide information on Hadrian's visit to Britain, although it is surely significant that two inscriptions from along the line of Hadrian's new Wall link the physical remains of the frontier works to the divinity of Ocean.

Hadrian's Bridge at Newcastle-upon Tyne: Oceanus and Neptune

The Roman bridge at Newcastle was named *Pons Aelius* (Hadrian's Bridge). This has long been taken to suggest that Hadrian commanded the construction of the bridge and, perhaps, led the opening ceremony (Birley 1997: 130-1). There has been some debate about the exact location of this bridge and its character. The fullest account is included in Paul Bidwell's seminal joint monograph on the bridges of Hadrian's Wall (Bidwell and Holbrook 1989: 99-103). There have been at least three succeeding bridges at the location of the Swing Bridge since medieval times, with new crossings constructed during the 18th and 19th centuries. The Victorian Swing Bridge which survives today, was opened to traffic in 1876 and when the Georgian Bridge was being demolished to make way for this new crossing, two phases of timbers were recorded underneath the stonework which were thought to derive from the medieval and Roman bridges. Later research suggested that all the recorded remains related to the post-Roman bridges casting doubt on the exact location of the bridge recorded in the Latin placename for Newcastle (Bidwell and Holbrook 1989: 100).

Several Roman finds were made in the Tyne during the 19th century close to the site of Swing Bridge, including three inscriptions and two coins of Hadrian, including a very well-preserved coin that features the imperial trireme. It has been suggested that all three inscriptions may have been embedded in the masonry of the medieval bridge and, as a result, Bidwell and Holbrook observed that the location of the discovery of these objects provides no reliable clue to the location of the Roman bridge (1989: 101): The stones might have been removed from another location to be used in the medieval construction. We can now be rather more confident that Hadrian's Bridge lay close to the Swing Bridge, as the Victorians believed. Radiocarbon dating has been undertaken on three timbers collected during the 19th century from the old bridges and one, from a wooden pile, produced a Roman date (Hodgson 2019). This suggests that the Roman inscriptions and coins are derived from activities directly associated with Hadrian's Bridge. Coins were often cast into the river as ritual offerings which presumably explains how the well-preserved example with the imperial trireme found its way into the river (cf. Eckardt and Walton 2021: 20).

One of the inscriptions is dedicated to Antoninus Pius (*RIB* 1322) and the other two, with dedications respectively to Neptune and Oceanus, name the Sixth Legion (*RIB* 1319 and 1320). There is no definitive dating provided by the inscriptions on the Oceanus and Neptune altars and it has been proposed that these might even have been carved during the third century (Bidwell and Holbrook 1989: 101). The Sixth Legion is known, however, to have arrived in Britain around the time of Hadrian's expedition in 122 and it has been proposed that the altars mark a ceremony led by Hadrian at the location originally planned for the east end of the Wall (Birley 1997: 130-1). Roman commanders often made sacrifices to the gods of rivers on the Roman frontiers during campaigns (Braund 1986b). That the Newcastle bridge had a particular significance is indicated by the use of Hadrian's name, since it was an unusual practice to name bridges after the ruling emperor outside the city of Rome itself (Birley 1997: 131).

Little survives to indicate the character of Hadrian's Bridge, although much more is known about a second bridge, that also bore this emperor's name, which spanned the River Tiber in the city of Rome (Abdy 2019: 216; Bidwell and Holbrook 1989: 43-4, 99-103). This bridge, which has survived the ensuing centuries, is known today as the Ponte S. Angelo. Images of the Roman structure on bronze medallions indicate that the parapets supported tall columns surmounted by statues, four on each side of the carriageway. The parapets of other bridges across the Empire are known often to have supported columns, and in the case of one particularly well-preserved example over the river Cendere Çay (*Chabinas*, Turkey), the columns were accompanied by altars (Bidwell and Holbrook 1989: 43). The two inscribed altars from the Newcastle bridge may have been placed at the side of columns supported by the parapet, which may also, perhaps, have been surmounted by statues. To support their Hadrianic dating, it may be relevant that the Oceanus altar bears the symbol of an anchor, while the altar to Neptune has a trident and dolphin. These are exactly the three symbols marked on the issue of Hadrian's coins that shows Oceanus reclining on a dolphin (Hingley 2022: 212). The altar inscriptions make no reference to Hadrian, however, and the bridge will presumably have supported a dedicatory inscription in stone to honour the emperor. The Antonine inscription would then have been a dedication made a few decades later at the site of the pre-existing bridge.

One suggestion is that this bridge marked a significant location at which the emperor conducted an important sacrifice. Perhaps Hadrian visited the site of the bridge while it was under construction, or even to lead the opening ceremonies when it was completed. The offerings made to Oceanus and Neptune at the bridge appear to have been drawing on the exploits of Alexander the Great on campaign in India in 326 BCE (Birley 1997: 131; Caplan and Newman 1976: 173). An account of Alexander's conquests written by Hadrian's friend and colleague, Arrian, described how Alexander sacrificed to Poseidon, Amphitrite, the Nereids, Oceanus and the rivers Hydaspes, Acesines and Indus, before his fleet sailed from India to Persia (*Indica*, 18). Although *Indica* was probably written at least a decade after Hadrian's expedition to Britain, Arrian may have drawn upon texts that have since been lost (Atkinson 2013: xxxviii; Martin 2010: 46). Diodorus Silculus (17, 104), writing well over a century before Hadrian, for example, had described a sacrifice made by Alexander in India to Tethys and Oceanus which could also have inspired Hadrian's sacrifice at the far north-western frontier of Roman imperial space. Perhaps, as Tony Birley has suggested, Hadrian made a speech to assembled troops close to the site of the bridge during his inspection of the building work that was underway along the frontier, and the sacrifice formed part of this staged event.

A victory monument at the east end of the Wall: dominating Ocean

A second monument from the eastern end of the Wall is thought to have included an inscription that mentioned Ocean. Paul Bidwell has suggested that the two fragments from an inscription found during the rebuilding of the Saxon monastic church at Jarrow (Tyne and Wear) during the late 18th century were originally built into a victory monument that sat on a substantial masonry mole that projected into the River Tyne and formed the monumental east end of Hadrian's Wall (Bidwell 2015). Little else from this monument survives, although some of the other stones incorporated in the church at Jarrow may have derived from this structure. Bidwell makes a fully reasoned case to support this attractive suggestion. There is no clear evidence that this was the original location of the monument, however, and the two stones from the inscription could equally well have been brought by boat from some other location by the bank of the River Tyne along the eastern section of Hadrian's Wall. Perhaps these fragments originally formed the dedicatory inscription of a victory monument sited close to Hadrian's Bridge at Newcastle. Perhaps, indeed, it formed the dedication on a monumental gateway at the northern or southern entry to the bridge itself. We will probably never know.

It has been suggested that the original eastern end of the Wall was at Newcastle and that this explains the naming of the bridge after the emperor who commanded its construction (Rivet and Smith 1979: 441). The suggestion is that plans for the eastern end of the Wall were adapted quite soon in the building programme commenced to continue the curtain Wall another five kilometres to the east to a terminal on the mole at Wallsend. The form of the construction of the Wall east of Newcastle, which is narrower than the earlier foundations that had already been constructed, provides the evidence for this suggestion (cf. Breeze 2006: 57–8). This is not certain, however, and it may have originally been planned to terminate the Wall at the mole in the Tyne at Wallsend. Only further discoveries will answer this question.

The potential significance of this inscription, both parts of which are on display in the Great North Museum (Newcastle), was first recognized in 1943, although after a while it ceased to figure very much in discussions of the Wall, only to re-emerge as a significant topic recently. Richmond and Wright initially translated and discussed this inscription, suggesting that it came from a Hadrianic war memorial site somewhere toward the east end of the Wall (1943). Their translation of the Latin is still favoured by many commentators, although the inscription is fragmentary, and any reconstruction can be no more than tentative (*RIB* 1051a, 1051b). The text has been reconstructed to read:

> [Divorum] omnium fil[ius]
> [imp(erator) Caesar Traianus] Hadr[ianus]
> [Augustus imposit]a necessitat[e imperii]
> [intra fines conser]vati [div]ino pr[aecepto]
> [...c]o(n)s(ul) II[I]
> diffusis [barbaris et]
> provinc[ia reciperata]
> Britannia ad[didit limitem inter]
> utrumque O[ceani litus per m(ilia) p(assuum) LXXX]
> exercitus pr[ovinciae opus valli fecit]
> sub cur[a A(uli) Platori Nepotis leg(ati) Aug(usti) pr(o) pr(aetore)]

Or, in translation:

> Son of all the deified emperors, the Emperor Caesar Trajan Hadrian Augustus, after the necessity of keeping the empire within its limits had been laid upon him by divine precept ... thrice consul ... after the barbarians had been dispersed and the province of Britain recovered, he added a frontier-line between either shore of the Ocean for 80 miles. The army of the province built this defence-work under the charge of Aulus Platorius Nepos, emperor's pro-praetorian legate.

The surviving fragments of the inscription and the format of the lettering may indicate that the two surviving stones came from two distinct inscriptions, at least one of which may have been erected under Septimius Severus during the early third century, although this is not widely accepted (Bidwell 2015: 11-2; Birley 1961: 157-9; Birley 1997: 132-3; Graafstal 2018: 92-5; Hingley 2022: 214; Hodgson 2017: 66-7). Here it will be assumed that both fragments derive from a single lengthy text and that the words may have derived from a speech given by Hadrian to assembled troops at the east end of the Wall when the emperor visited Britain in 122 to inspect the work underway (Birley 1997: 132-3).

The statement on the inscription contains several key points, although the fragmentation means that any interpretation cannot be considered reliable. There is also a degree of circular thinking in the translation since Richmond and Wright filled gaps in the fragmentary surviving Latin lettering by drawing upon the historical context of events in Britain during the early 120s. No fragments that contain letters that can be used to identity the name of the provincial governor Aulus Platorius Nepos survive; his name was added to the translation since he is known from other inscriptions along the Wall to have superintended the construction work. The loss of this information and the fragmentary preservation of Hadrian's name and titles, indeed, provides one of the reasons that the exact dating of the inscription (or inscriptions) is contested.

Rather than focusing further upon the reliability of the translation, which is the best that we have, two points stand out. First, it is thought to mention the scattering of barbarians and the restoration of security, which is taken to refer to a serious uprising on or beyond the Stanegate in Britain at around the time Hadrian came to power in 117 (above). Second, it seems to refer to the adding of the frontier line, Hadrian's Wall, between the two shores of the Ocean. Of particular significance is the statement relating to the two shores of Ocean, much of which survives (although only including part of the letter 'O'). Ocean had featured prominently in earlier musings of the significance of imperial conquest in Britain, which makes this reconstructed text significant.

The fragmentary literary texts and monumental inscriptions that addressed the conquest and settlement of Britain by the Romans, as we have seen, place a particular emphasis on Ocean, addressing the status of the province as a land set within the sea. We do not know how many of the classical texts that referred to the actions of the Roman conquest of Britain have subsequently been lost and the inscription(s) from Jarrow seem from the fragments that survive to draw upon a common vocabulary that associated conquering in Britain with the ability to dominate Ocean through the crossing of the sea and the domination of land through successful military campaigning. Put another way, Ocean and the significant rivers on the northern frontier were being harnessed to the Roman cause of Empire-building (cf. Braund 1996b; Campbell 2012: 374-6). Hadrian's Wall, like Agricola's fortified line of garrisons on the southern border of Caledonia, and indeed the later Antonine Wall (built in the 140s), harnessed the divine spirit of Ocean by using the rivers that ran into the Ocean to the east and west to push the scattered barbarians back as if onto a different island.

Oceanus at Carlisle and Chesters

The Newcastle altar is the only example dedicated to Oceanus that is known from Britain, although a sculpture which may represent this god was found by Dorothy Charlesworth in the River Eden at Carlisle (*Luguvalium*, Cumbria), probably during the late 1960s (Caruana and Coulston 1987). This stone derived from a bridge which carried the Roman road that ran north from Carlisle over the Eden and cannot be more closely dated than the late first to third century. It has been suggested that this road crossed the line of Hadrian's Wall through a gate just west of the Wall fort at Stanwix (Breeze 2006: 346). Although not actually on the line of the Wall, this bridge formed part of the complex of Roman features that lay immediately behind the Roman frontier line.

Jon Coulston tentatively identified the small male carved face on this stone as a river god (Caruana and Coulston 1987: 45). The long hair and beard of this deity bares a reasonably close resemblance, however, to the figure identified by Barry as representing Oceanus on the sculpture of the river god from the Roman Wall fort at Chesters. The depiction of the Tyne as a god from the bath-house of the commanding officer's house within the fort at Chesters is shown reclining against the head of a larger god, which must symbolise Oceanus, the father of all waters (Barry 2011: 23, 36 n. 150). It has been suggested that this statue was originally housed in a shrine on the bridge that carried the Wall across the river North Tyne just to east of this fort and may have been moved to the baths in the commanding officer's house at a later date (Bidwell and Holbrook 1989: 7-14, 47).

The only other stones known to derive from the road bridge at Carlisle include three fragments of columns, which suggest that this, like the Chesters bridge, was a fairly elaborate structure (Bidwell and Holbrook 1989: 44, 109; Caruana and Coulston 1987: 49). Charlesworth's photograph of the findspot of the stone with the carved face indicate that additional stones from the bridge were visible in the river when she salvaged the Oceanus stone and a pier that may have been of Roman date was visible in 1986 (Caruana and Coulston 1987: pl. 1). The elaborate bridge at Chesters, which may have held a shrine to the river god, is thought to date to the mid-Antonine period and was preceded by a simpler river crossing that probably did not support columns or shrines (Bidwell and Holbrook 1989: 28). The bridge at Carlisle may also date to a period several decades after the construction of the Hadrian's Wall. If so, it indicates that the association of crossings on the Wall with Oceanus and river gods was not confined to the initial period of construction.

Hadrian's magical and military Wall

The fragmentary information from these several sites suggests that Hadrian's great frontier work in Britain drew upon earlier conceptions of the magical status of military campaigns that were staged on and beyond the major waterways on the frontier of the empire. The British rivers may have derived a special status from their context within the island of Britain set in the waters of Ocean. In the company of earlier (and later) military campaigns, the Wall was a magical as much as a military work. Published accounts of Hadrian's Wall invariably separate Roman religion off into a separate section or chapter from the military aspects of the monument. In fact, ritual and the acts of campaigning and building were, as Fabio Barry suggests, ritual as much as they were military (2011). The role of the Wall as a boundary that stood in place of the terminus of Ocean should make archaeologists particularly attentive to references to water and water spirits along the Wall - as indeed is the case along all Roman frontiers.

An important aspect of the archaeology of the Wall, as it was first constructed under Hadrian, and one that reflects one of Paul Bidwell's particular interests, is the provision of bath-houses, each of a similar plan, specially devised and unparalleled in the empire, at many (if not all) of the forts (Hodgson 2017: 86-7). Hadrian, or his senior advisors, was evidently deeply interested in ordering the construction of bathing facilities for the Wall soldiers. The regular occurrence of images of water deities and sea monsters at baths across the Roman world indicates the ritual and symbolic significance of water and bathing. Even the common auxiliary soldiers were to benefit from the gifts provided by Oceanus.

Not only the highest ranks of the imperial élite recognized the symbolic significance of this frontier work. Inscriptions along the Rhine and Danube frontiers demonstrate the existence of cults of the gods and spirits of these rivers, indicating worship by senior officers and other troops (Braund 1996b: 44). A significant find from a bath-house on the Wall is the statue of a river god from the commanding officer's house at Chesters, already discussed. Soldiers based along the two Roman frontier walls in Britain regularly made dedications to the gods and spirits and there are indications that the springs and rivers were particularly significant contexts. On that Stanegate we have the evidence for the worship of the spring goddess Ahvardua at Vindolanda, while on Hadrian's Wall we have the cult of Coventina at her temple at Carrawburgh (Allason-Jones and McKay 1985; Birley *et al.* 2013; Birley *et al.* 2016: 246-7). In addition to the inscriptions to Coventina and Ahvardua, dedications to the nymphs were also common across the northern frontier zone (Irby-Massie 1999: 270-1). Seven of the eight altars that have been found in Britain which are dedicated to Neptune occur at forts along the two Roman walls or at coastal ports (cf. Caplan and Newman 1976: 172; Irby-Massie 1999: 21-2, 269-70). Three are from Hadrian's Wall and the Stanegate, while another was found at the fort at Maryport, one of the forts that continued the line of the Wall southwards along the Cumbrian coast. One is from the fort at Castlecary on Rome's later and more northerly frontier line, the Antonine Wall. The two coastal dedications are from the Roman port at Lympne (Kent) and from Chichester (West Sussex), which was very close to another significant port. The only other dedication to Neptune is from the Roman fort at Birrens (Dumfries and Galloway). These dedications illustrate that military men of all ranks were aware of the numinous properties of the springs and rivers of the frontier line.

Explorations and conquests in Britain had harnessed the divinity of the ancestral god of the sea, Oceanus, and his watery offspring – Neptune, the river gods and nymphs of the frontier – to the Roman will. The Wall served as both a physical and a symbolic monument to the incorporation of the semi-barbaric and exotic lands of Britain into Hadrian's Empire (Hingley 2022: 231).

Acknowledgments

This article derives from research undertaken for a recent book, which also contains an assessment of the role of the Vallum in controlling and channeling water (Hingley 2022: 222-4). I am very grateful to Tony Birley for discussing some of the issues raised here, although I was unable to ask him to read the full text of either my book or the current article. I am also extremely grateful to Paul Bidwell for all the help and advice that he has provided for my research over the past two decades and for his friendship and for much of the inspiration for the arguments in this paper. Nick Hodgson provided some very helpful comments on an earlier draft of this article.

Bibiography

Ancient sources

Diodorus Silculus Florus, *Epitome of Roman History*. Translated by Seymour Forster, edited by J. Henderson (1984). Harvard: Loeb Classical Library.

Suetonius, *Lives of the Caesars*. Translated by C. Edwards (2000). Oxford: Oxford University Press.

Tacitus, *Agricola and Germany*. Translated by A. R. Birley (1999). Oxford: Oxford University Press.

Modern works

Abdy, R.A. 2019. *The Roman Imperial Coinage, Volume II–Part 3: from 117–38, Hadrian*. London: Spink.

Allason-Jones, L. and B. McKay 1985. *Coventina's Well*. Gloucester: Alan Sutton.

Arnaldi, A. 2001–2. Oceanus su monete ed epigrafi. *Scienze dell'Antichità: Storia, Archeologia, Antropologia* 11: 227–39.

Atkinson, J. 2013. Introduction and notes, in *Alexander the Great: the Anabasis and the Indica*: xiii–xxxi. Translated by M. Hammond. Oxford: Oxford University Press.

Barrett, A.A. 1991. Claudius' victory arch in Rome. *Britannia* 22: 1–19.

Barry, F. 2011. The mouth of truth and the Forum Boarium. *The Art Bulletin* 93(1): 7–37.

Bidwell, P. 2010. A survey of the Anglo-Saxon crypt at Hexham and its reused Roman Stonework. *Archaeologia Aeliana* 5th series 39: 53–149.

Bidwell, P. 2015. The Branch Wall at Wallsend. *Arbeia Journal* 10: 1–34.

Bidwell, P. and N. Holbrook 1989. *Hadrian's Wall Bridges*. London: English Heritage.

Birley, A., A. Meyer and E.M. Greene 2016. Recent discoveries in the fort and extramural settlement at Vindolanda. *Britannia* 47: 243–285.

Birley, A.R. 1997. *Hadrian: the Restless Emperor*. London: Routledge.

Birley, A.R. 1998. A new tombstone from Vindolanda. *Britannia* 29: 299–306.

Birley, A.R. 2005. *The Roman Government of Britain*. Oxford: Oxford University Press.

Birley, A.R., A. Birley and P. de Bernardo Stempel 2013. A dedication by the "Cohors I Tungrorum" at Vindolanda to a hither unknown goddess. *Zeitschrift für Papyrologie und Epigraphik* 186: 287–300.

Birley, E. 1961. *Research on Hadrian's Wall*. Kendal: Titus Wilson.

Braund, D. 1996a. *Ruling Roman Britain*. London: Routledge.
Braund, D. 1996b. River frontiers in the environmental psychology of the Roman world, in D.L. Kennedy (ed.) *The Roman Army in the East* (Journal of Roman Archaeology supplementary series 18): 43–7. Portsmouth, Rhode Island: Journal of Roman Archaeology.
Breeze, D.J. 2006. *J. Collingwood Bruce's Handbook to the Roman Wall 14th edition.* Newcastle upon Tyne: Bath Press.
Campbell, B. 2012. *Rivers and the Power of Ancient Rome*. Chapel Hill: University of North Carolina Press.
Campbell, D.B. 2018. *The Fate of the Ninth*. Glasgow: Bocca della Verità.
Caplan, C. and T.G. Newman 1976. Museum notes. *Archaeologia Aeliana* 5th series 4: 171–6.
Caruana, A.D. and J.C.N. Coulston 1987. A river bridge stone from the River Eden, Carlisle. *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* 2nd series 87: 43–52.
Clarke, K. 2001. An island nation: re-reading Tacitus' "*Agricola*". *Journal of Roman Studies* 91: 94–112.
Eckardt, H. and P. Walton 2021. *Bridge over Troubled Water: the Roman Finds from the River Tees at Piercebridge in Context*. (Britannia Monograph Series 34). London: Society for the Promotion of Roman Studies.
Graafstal, E. 2018. What happened in the summer of A.D. 122? *Britannia* 49: 79–111.
Hingley, R. 2022. *Conquering the Ocean: the Roman Invasion of Britain*. New York: Oxford University Press.
Hodgson, N. 2000. The Stanegate. *Britannia* 31: 11–22.
Hodgson, N. 2017. *Hadrian's Wall.* Malborough: Robert Hale.
Hodgson, N. 2019. Newcastle upon Tyne – Roman bridge, in R. Collins and M. Symonds (eds) *Hadrian's Wall 2009–2019*: 128. Kendal: Titus Wilson.
Hodgson, N. 2021. The end of the Ninth Legion, war in Britain and the building of Hadrian's Wall. *Britannia* 52: 97-118.
Irby-Massie, G. 1999. *Military Religion in Roman Britain.* Leiden: Brill.
Martin, T.R. 2010. *Alexander the Great*. Cambridge: Cambridge University Press.
Richmond, I.A. and R.P. Wright 1943. Stones from a Hadrianic war memorial on Tyneside. *Archaeologia Aeliana* 4th series 21: 93–120.
Rivet, A.L.F. and C. Smith 1979. *The Place-names of Roman Britain*. London: Batsford.
Romm, J.S. 1992. *The Edges of the Earth in Ancient Thought.* New Jersey: Princeton University Press.
Roncaglia, C. 2019. Claudius' houseboat. *Greece and Rome* 66(1): 61–70.
Serban, M. 2009. Trajan's Bridge over the Danube. *International Journal of Nautical Archaeology* 38(2): 331–42.
Smith, I.G. 2015. A chronology for Agricola. *Zeitschrift für Alte Geschichte* 64(2): 156–204.
Stewart, P.C.N. 1995. Inventing *Britannia. Britannia* 26: 1–10.
Symonds, M. 2020. Fords and the frontier: waging counter-mobility on Hadrian's Wall. *Antiquity* 94: 92–109.
Symonds, M. 2021. *Hadrian's Wall: Creating Divisions.* London: Bloomsbury.
Tomlin, R.S.O. 2018. *Britannia Romana: Roman Inscriptions and Roman Britain*. Philadelphia: Oxbow.
Williams, J.H.C. 1999. Septimius Severus and Sol, Carausius and Oceanus. *Numismatics Chronicle* 159: 227–39.
Woodman, A.J. (ed.) 2014. *Tacitus Agricola*. Cambridge: Cambridge University Press.
Woudhuysen, G. 2021. "A faraway land of which we know little"? Britain in the politics of fourth-century Empire, in B. Ward-Perkins, R. Miles and M. Hessérus (eds) *Roman Britain in the Roman Empire*: 63–74. Stockholm: Axel and Margaret Ax:son Johnson Foundation.

The art of the *mensores*: the design of the Roman forts at Wallsend and South Shields

Nick Hodgson

The purpose of this paper is to elucidate the intended measurements in Roman feet and the systems of proportion that underlie the original plans of the Roman forts at Wallsend and South Shields. In both plans it can be shown that recurrent dimensions and proportions related the parts to each other and to the whole, a deliberate seeking after harmonic beauty, the result of which might considered as art.[1] Once the principles of the designs are understood, it becomes possible to see how the designers must have gone about their task. The legionary surveyor responsible for these remarkable designs was a *mensor* (pl. *mensores*).[2] One of Paul Bidwell's outstanding achievements has been to use architectural analysis and a deep knowledge of the Roman world to allow us to visualise properly for the first time the scale of, and inspiration for, some of the great building projects of Roman Britain – the Exeter legionary baths, the graceful stone-arched bridges of Hadrian's Wall, the tower tomb at Shorden Brae. Before any building took place on a Roman military site there had to be a plan, but the process by which this was created has been obscure. I hope that Paul will find interest in this study of the castrametation of the two Hadrian's Wall forts with which he has been most concerned.

Both Wallsend and South Shields were occupied to the end of the Roman period and their buildings underwent much alteration and replacement. Understanding the principles on which a fort was first laid out naturally depends on being able to penetrate the later accretions to recover enough of the original plan to be confident about drawing conclusions. This becomes possible at these two extensively excavated sites. We start with Wallsend because its original internal arrangements are the most completely known of any of the Hadrianic Wall-forts, then move on to mid-Antonine South Shields, where there is less knowledge of the northern part of the fort interior in its primary state, but where a confident reconstruction can be made thanks to the discoveries at Wallsend, and where we have a greater knowledge of the primary ditches which constituted part of the overall design. In both cases the original barracks were of timber and it is the wall-lines of these, rather than the overlying stone replacements, that represent the ground plan as first devised.

At Wallsend the general disposition of the barracks has been known since the 1980s from the stone replacements, built some 40 years later, of the original timber barracks. However, examples of the underlying primary timber barracks (of the first Hadrianic build) were discovered and excavated in 1998, making it certain that the fort was built for a part-mounted cohort, with six infantry barracks in its front part (*praetentura*) and four cavalry barracks in the rear part (*retentura*). The results can be extrapolated to the barrack plots where the earliest layers have not been uncovered. From this, along with the primary central range stone buildings (granaries, *principia,* commanding officer's house), the dimensions of the original Hadrianic plan are reasonably clear.[3] Mid-Antonine (Period 4, *c.* 160) South Shields was built for an identical kind of unit and has the same disposition of buildings as at Wallsend. Here too, examples of the original timber barracks have been excavated.[4] In both cases the enclosing rampart, wall and external ditches, though not seen in their entirety, are well sampled and documented.

The width of the *contubernia* of the timber barracks at Hadrianic Wallsend and mid-Antonine South Shields, a dimension on average 3.6 m, almost certainly represents 12 feet of approximately 0.30 m. This suggests that the *pes Monetalis* (usually given as 0.296 m) rather than the *pes Drusianus* (usually given as 0.332 m) was used at both sites. At Wallsend and South Shields it is a foot of approximately 0.30 m which when divided into lengths of buildings and building plots measured in metres produces figures that can be understood in

[1] Vitruvius 3.1: 'Proportion is a correspondence among the measures of the members of an entire work, and of the whole to a certain part selected as standard'; 1.3: 'Beauty [is] when the appearance of a work is pleasing and in good taste, and when its members are in due proportion according to correct principles of symmetry' (trans. Morgan 1914).

[2] *Dig.* 50.6.7; Vegetius 2.7. There were both legionary and auxiliary *mensores*: *CIL* 8.2564 (legionary, 3rd century); *CIL* 13.6538 (auxiliary, after *c.* 160), but Wallsend and South Shields were built by legionaries. Literary sources also refer to a kind of military surveyor called a *metator*, whom Vegetius distinguishes from the *mensor.* The Digest of Justinian lists among the *immunes* of the legion *mensores* in the plural but *architectus* in the singular, perhaps implying that there was a team of surveyors but only a single master-builder, as we might expect.

[3] Hodgson 2003: 11, fig. 9; cf. Rushworth and Croom 2016: 16-17, fig. 2.01.

[4] The most up to date version of the original plan of the Period 4 fort at South Shields in its timber barrack phase on which this analysis is based is unpublished. For successive interim plans of the Period 4 fort showing the replacement stone barracks, see Bidwell and Speak 1994: 17, fig. 2.4 and Hodgson 2009: 63, fig. 5.

terms of multiples of the Roman surveying unit of 120 RF (the *actus*) or its various subdivisions. For this reason a Roman foot of 0.30 m is assumed in the calculations that follow, and is designated RF. This is very slightly greater that the theoretical 0.296 m of the *pes Monetalis* (4 mm difference or 0.40 m over a 100 m distance, or 0.40 mm on a 1:1000 plan). The variation from the usually given standard should not occasion alarm: a foot of 0.30 m has been demonstrated to lie behind the surveying of the Hadrianic baths at Chesters;[5] Roman measuring instruments are known to display considerable variation in the length of the foot. The use of measuring rods, even if accurate to 0.296 m, is likely to have led to cumulative upward error, as would long distance measurement over slightly sloping ground.[6]

That the same units of measurement lie behind both fort plans is immediately suggested by the occurrence of an identical length measured in modern units which occurs as a major dimension in both fort plans, although what is being measured is different in each case. The modern surveyed plans show that at Wallsend the distance across the fort *within* the ramparts is approximately 108 m.[7] This is interpreted as 360 feet @ 0.30 m, or 3 *actus* of 120 feet. The theoretical distance with a 0.296 m foot should be 106.45 m. At South Shields an identical dimension of 108 m occurs across the fort, but this time the 3 *actus* measurement *includes* the ramparts, i.e. it is the dimension within the fort walls rather than within the ramparts. Clearly an identical length has been measured, but not for the same elements of the fort plan. As will become apparent, although based on the same basic survey unit – the *actus*, or subdivisions thereof – each of the fort plans was developed quite differently.[8]

Wallsend (Figure 1)

In the analysis that follows it will be seen that almost every dimension of RF established or deduced in the original design of Wallsend fort is divisible by 3 and 6. It is almost certain, therefore, that the underlying module of which every dimension in the design was multiple, was 3 RF or 6 RF.

If a grid of 120 RF (1 *actus*) squares (assuming a RF foot of 0.30 m) is laid over the plan of the fort, certain elements of the plan can be seen to relate directly to it. The most important of these for understanding the overall design is the rectangle that encloses the *intervallum* street – the street that ran around the built-up area of the fort, behind the rampart – and the buildings; i.e. the area of the fort lying within the ramparts. The measurement on the modern survey plans is approximately 126 m by 108 m. This rectangle is therefore 420 by 360 RF = 3.5 by 3 *actus*.

Within this rectangle the plot occupied by the buildings (blue on Figure 1) measures approximately 115 by 97 m. This suggests that their overall plot was intended to measure 384 by 324 RF (a proportion of 32:27, or 64 x 54 modules of 6 RF). Adding 18 RF on each side for the width of the *intervallum* road produces the dimensions of 420 by 360 RF just discussed.

The 384 RF measure of the long axis of the building plot is also the distance between the east and west fort walls – 324 RF for the buildings and 30 RF for each of the *intervallum* and rampart areas. In other words, if the yellow rectangle on the plan (Figure 1) was extended east and west up to the fort wall, it would become an exact square. A relationship is therefore seen between the long axis of the building plot and the short axis dimension of the whole fort interior.

On all sides the *intervallum* was intended to be 18 feet (3 or 6 modules) wide = 5.40 m.[9] Observations at the west rampart suggest a theoretical width for east and west rampart of 12 RF, the combined *intervallum*/rampart therefore measuring 9 m or 30 RF.

Allowing 6 RF for the width of the fort wall, the measurements across the fort *over the walls* therefore run as follows: wall 6 – rampart 12 – *intervallum* 18 – buildings 324 – *intervallum* 18 – rampart 12 – wall 6 = 396 RF = 118.80 m (actual measured distance is approximately 119.78 m).

The rampart was wider at the north and south ends of the fort. This is a deliberate elongation of the fort to north and south that is visually apparent in all published plans where the greater distance between the buildings (in their stone replacement versions) and the fort wall at north and south ends is obvious. It is

[5] Gillam *et al.* 1993: 24-6.
[6] Cf. Evans 1994: 151-2.
[7] 'Approximately' is used in this paper in its true dictionary defined sense of 'very close to' or 'almost exactly' rather than in the popular sense of 'roughly'.
[8] Some previous attempts to elucidate the design principles of Roman fort plans include: Ward 1903: 20-24 and fig. 2 (an early and remarkable study of the measurements in RF evident in Gellygaer fort); Breeze 1983: 24 and fig. 12; cf. Breeze 2016: 330 and illus. 21.12 (superimposing a 5 by 4 *actus* grid on the plan of Bearsden fort); Scholz 2009: 42-3 and Anlage 20.1-2 (study of survey measurements underlying the plan of Heidenheim fort). Other studies such as Walthew 1981 and Bridger 1984 deal with standard units of measurement and individual buildings rather than searching for an overall principle of planning and proportion that explains the measurements of an entire site, as is done here. Henderson 1991 (attempt to reconstruct the surveyor's blueprint for the Exeter fortress) comes closest to this last, but on very fragmentary evidence. Evans 1994 is more concerned with the architects who designed and built after the surveyors had laid out the site.

[9] At one point on the west side of the fort, the street measured between 3.50 m and 5.50 m and the rampart some 4 m wide (Hodgson 2003: 156-7, fig. 108); elsewhere the west rampart has been recorded as 3.70-4.40 m wide (Rushworth and Croom 2016: 537).

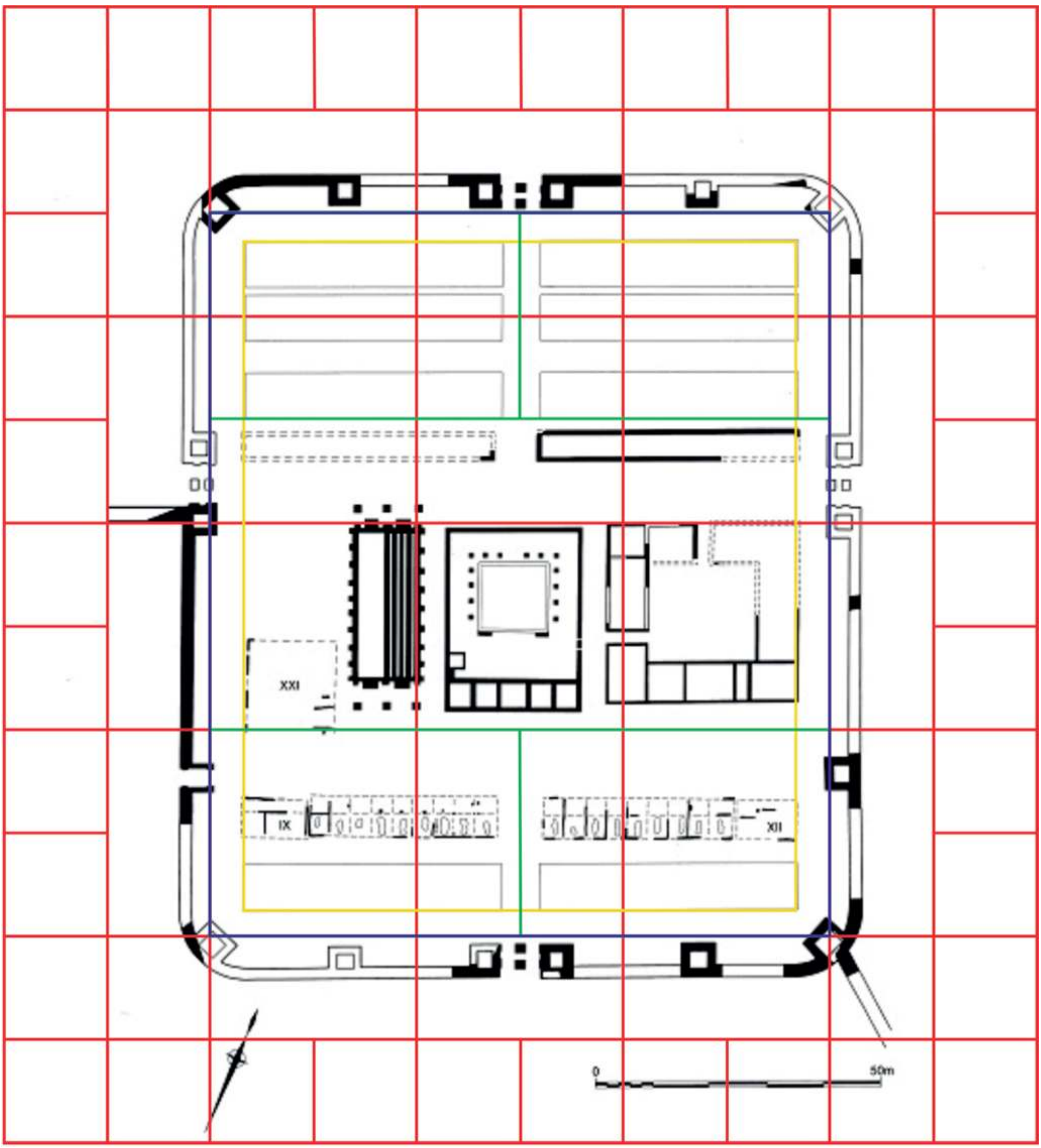


Figure 1. Plan of fort at Wallsend with survey grid of actus *squares (sides measured at 36 m = 120 RF) superimposed (red); outermost half* actus *strip shown divided into quarter* actus *squares (*climata*). Survey more possibly only comprised the inner 9:8 proportioned area of larger squares. Blue rectangle: area within ramparts = primary survey rectangle (7:6). Yellow rectangle: building plot. Green lines: survey areas within the blue rectangle. Illustration is diagrammatic and not suitable for precise scaling.*

impossible to be precise because the timber barracks at the north and south ends of the fort have not been precisely located beneath their stone successors, but from the stone phase plans it looks as if the distance between the fort wall and the original timber barracks, taken up by the *intervallum* and rampart, must have at least 10 m as opposed to some 9 m on the long sides.[10] The measured width of the north rampart suggests that the north and south ramparts were widened by 3 feet (1 module, of half a 6-foot module?) to a theoretical 15 RF rather than 12 RF, giving a distance between the buildings and the north and south fort walls of 33 RF.

Allowing 6 RF for the width of the fort wall, the measurements along the long axis of the fort therefore run as follows: wall 6 – rampart 15 – *intervallum* 18 – buildings 384 – *intervallum* 18 – rampart 15 – wall 6 = 462 RF = 138.60 m. The actual measured distance is approximately 138.07 m. The overall dimensions of the fort over its walls, at 462 by 396 RF, therefore have a ratio of 7:6.

The reason for the extension of the area within the fort walls by means of a wider rampart to north and south was so that the dimensions of the fort measured over the walls would have ideal proportions (7:6) identical to those of the area enclosed within the ramparts (buildings and *intervallum* street) (7:6). When a rectangle is enlarged by an equal distance on each side the resulting shape does not have the proportions of the original rectangle – to maintain these a greater distance must be added at the short ends of the rectangle, and this is precisely what has been allowed for in the design of the fort at Wallsend.

The rectangle within the ramparts therefore seems to be the *primary* design element: this was sited on a surveyed *actus* grid and in a secondary step the fort wall was measured out from this with the rampart width adjusted so that the fort wall had exactly the same proportions as the inner rectangle.

Within the primary inner rectangle the *intervallum* street and accommodation is arranged within blocks (in green on Figure 1) 3 *actus* wide between the east and west ramparts, i.e. including the *intervallum* streets. Each trio of barracks in the *praetentura*, and each pair facing each other in the *retentura*, should probably be visualised as occupying a single rectangle to either side of the central axis of the fort, each rectangle being 180 by 120 RF (3:2 proportion).

The edges of these surveyed areas do not always coincide with building walls, rather the building plots were located by measuring in from the outer edge of the rectangle. Thus measuring from its northern edge, the *praetentura* breaks down as: *intervallum* 18 – barrack 24 – alley 6 – barrack 24 – street 24 – barrack – 24 = 120 RF (1 *actus* or 20 x 6 RF modules). Across the fort the 3 *actus* (360 RF) distance between the ramparts is made up of *intervallum* 18 – barrack 150 – *via praetoria*/*decumana* 24 – barrack 150 – *intervallum* 18 = 360 RF.

The entire long dimension within the ramparts divides as follows: a block 1 *actus* deep for the *praetentura* barracks, a block 1.5 *actus* deep for the central range, including the *via principalis* and narrow buildings on its north side; and a block 1 *actus* deep for the *retentura* barracks. These blocks combine to give an overall length of 3.5 *actus* including the *intervallum* streets.

The central range rectangle, including the *via principalis* and the narrow buildings on its north side is 3 *actus* wide and 1.5 *actus* deep, a 2:1 proportion or double square.

The *via principalis* and narrow workshop buildings occupy a space 60 RF (10 modules) deep, the street itself 36 RF wide, the buildings 18 RF, alley to north of buildings, 6 RF.

The fronts of the central range buildings are aligned on the northern edge of their surveyed block 1 *actus* deep and 3 wide; the southern end of the recently discovered timber building (XXI) under the later stone hospital lies close to the southern edge of this 1 *actus* deep strip allotted to the central range.

The granaries are exactly 1 *actus* from portico to portico and 40 RF, one third of an *actus*, wide (proportions of 3:1). The 1 *actus* measurement from portico to portico is offset from the square *actus* in which the building lies, but the front and east walls of the granary are aligned exactly on the edges of this square.

At first sight the *principia* has irregular proportions of some 106 by 80 RF. However, if the aborted foundations of an uncompleted rear range beneath the completed building,[11] aligning with the south wall of the adjacent

[10] The width of the *intervallum* between the stone replacement barracks and the north rampart was some 5 m = 16.60 RF (Rushworth and Croom 2016: cf. figs 12.01 and 18.06). The north rampart was recorded as 5.50 m wide east of the north gate and 7 m to the west of the gate (Rushworth and Croom 2016: 549-554; 571). The combined rampart/*intervallum* in the timber barrack phase must therefore have been in excess of 10.50 m = 35 RF. The distance between outer face of stone barrack 1 and back of the north N gate tower was 6 m = 20 RF and the distance from barrack to fort wall 10 m = 33.30 RF (Rushworth and Croom 2016: cf. figs 12.01 and 18.06). The distance between outer face of stone barrack 11 and the back of interval tower on the south wall was some 5 m = 16.60 RF and the distance from barrack to fort wall 9 m (Rushworth and Croom 2016: cf. figs 15.16 and 19.01). The timber barrack will have been set within the stone footprint, so the distance will have been greater, at least 10 m = 33.30 RF. To check the narrower *intervallum*/rampart on the long sides, the distance between timber hospital and back of minor west gate on west wall was 5-5.50 m and distance from hospital to fort wall – 9-9.50 m = 30-31.50 RF (Hodgson 2003: 156, fig. 108).

[11] Rushworth and Croom 2016: 182.

praetorium, are taken as the original intention, the building will have been planned to be 100 by 80 RF (5:4 proportion: cf. the South Shields *principia*, below). The 80 RF taken up by its frontage left a 20 RF wide space to either side for the streets between *principia* and granaries and *praetorium* respectively.

The *principia* and granaries have dimensions (e.g. 80, 40 RF) that are not divisible by the 3 RF/6 RF module that works so well elsewhere in the design, notably in the defences and barracks. Perhaps this indicates that these more elaborate stone buildings were originated by the architect or master builder, who sited them in relation to the surveyed lines on the ground but introduced his own systems of measurement within the individual buildings.

The southernmost block of 3 square *actus* is occupied by the four cavalry barracks of the *retentura*. The northern part of the block was a wide *via quintana* which functioned as a space left empty for the movement of horses, probably 36 RF wide (cf. the *via principalis*). North to south the measurements are: *via quintana* 36 – barrack 24 – street 18 – barrack 24 – *intervallum* 18 = 120 RF.

All the barracks are 150 by 24 RF. The length is 18 x 6 RF modules, 108 RF (the 9 x 12 RF *contubernia*), plus 7 modules of 6 feet for the officer's house, (including the alley between *contubernia* and officers house found in the two examples excavated in 1997-8). At 42 RF the officer's house is exactly 3.5 times the width of a *contubernium*.

The same overall survey grid was almost certainly extended out over the defensive wall and the ditches sited in relation to this, as seems more certainly to have been the case at South Shields (below). On the west side of the fort, north of Hadrian's Wall, four ditches extended for some 31 m (103 RF) beyond the fort wall. If the inner three, which took up at least 26 m (86 RF), are regarded as primary, this might suggest that a whole *actus* was measured out from the line at the back of the rampart – once again illustrating the primacy of this rectangle in the design layout – to contain rampart, fort wall and ditches, and that the overall grid used for laying out the whole fort including its defensive ditches was 5.5 by 5 *actus* (11:10) or 660 by 600 RF (Figure 1). This would mean that the ditches extended over 96 RF beyond the north and south fort walls and 102 RF beyond east and west. However, at Wallsend it is uncertain which of the observed ditches are primary, and the situation on the north side of Hadrian's Wall may have been affected by the incorporation of the fort defences into the defensive system of the Wall itself. On the south side of the fort a second ditch lay between 12 m (inner lip) and 16 m (outer lip) from the fort wall. If this was a second, outermost, primary ditch it might suggest that the overall survey grid was 4.5 by 4 *actus*, with two ditches occupying a strip 39 RF wide beyond the fort wall (42 RF on the long sides), the outer edge of the ditches measured for a distance of 0.5 *actus* from the line at the back of the rampart. At Wallsend, then, there must remain uncertainty about the overall size of the survey grid to the outer edge of the ditches, either 5.5 by 5 or 4.5 by 4 *actus*. Either of these might be expressed in whole numbers as 11 by 10 or 9 by 8 *climata*, the *clima* being 60 RF squared, or a quarter of a square *actus*. Figure 1 shows the larger of the two possibilities (11 by 10 *climata*) with the outer half *actus* divided into these quarter of a square *actus* divisions, while the lesser (9 by 8) possibility is indicated by the area of the red grid divided into whole or half *actus*.

South Shields (Figure 2)

The Period 4 fort at South Shields offers an interesting comparison, some 35-40 years later in date. The first stone-walled fort built on the site (*c*. 160), like Wallsend, had timber barracks and stone central range buildings and was planned completely *a novo* – the preceding fort at South Shields was on a different site, as yet unlocated. The designers were specialists from *legio VI Victrix*. The new fort was designed for the same kind of unit as Wallsend, with an identical overall disposition of barracks, but although presumably the same methods were used, the survey scheme was quite different. It is based, like that at Wallsend, on a surveyed grid of square *actus* or subdivisions thereof, but the big difference at South Shields is that the inner face of the east and west fort wall (the long sides), not the back of the rampart, has been set on the lines of the *actus* grid. As a result the fort is narrower. The designers in this case seem to have established the position of the fort wall first, using the overall *actus* grid, and then measured inwards to create an inner rectangle containing the buildings, which has exactly the same 4:3 proportions as the rectangle used to lay out the fort wall.

At first sight the fort walls display no obvious proportional ratio: the measurements of 144 m[12] by 112 m over the walls do not give an exact ratio of 4:3. However, as already stated, the dimension across the fort within the walls is 108 m, which is 360 RF (assuming a foot of 0.30 m) and when a grid of square *actus* is laid over the plan it is immediately obvious that a grid has been laid out, and the fort wall marked out with its *inner* face on a line 1.5 *actus* measuring east-west from the centre of the fort and its *outer* face on the line 2 *actus* measuring north-south from the centre.

The underlying 4:3 proportion is therefore in the laying out lines situated on the survey grid (blue rectangle on Figure 2) rather than the walls themselves, which

[12] The length of 148 m given in Bidwell and Speak 1994: 17 is in error.

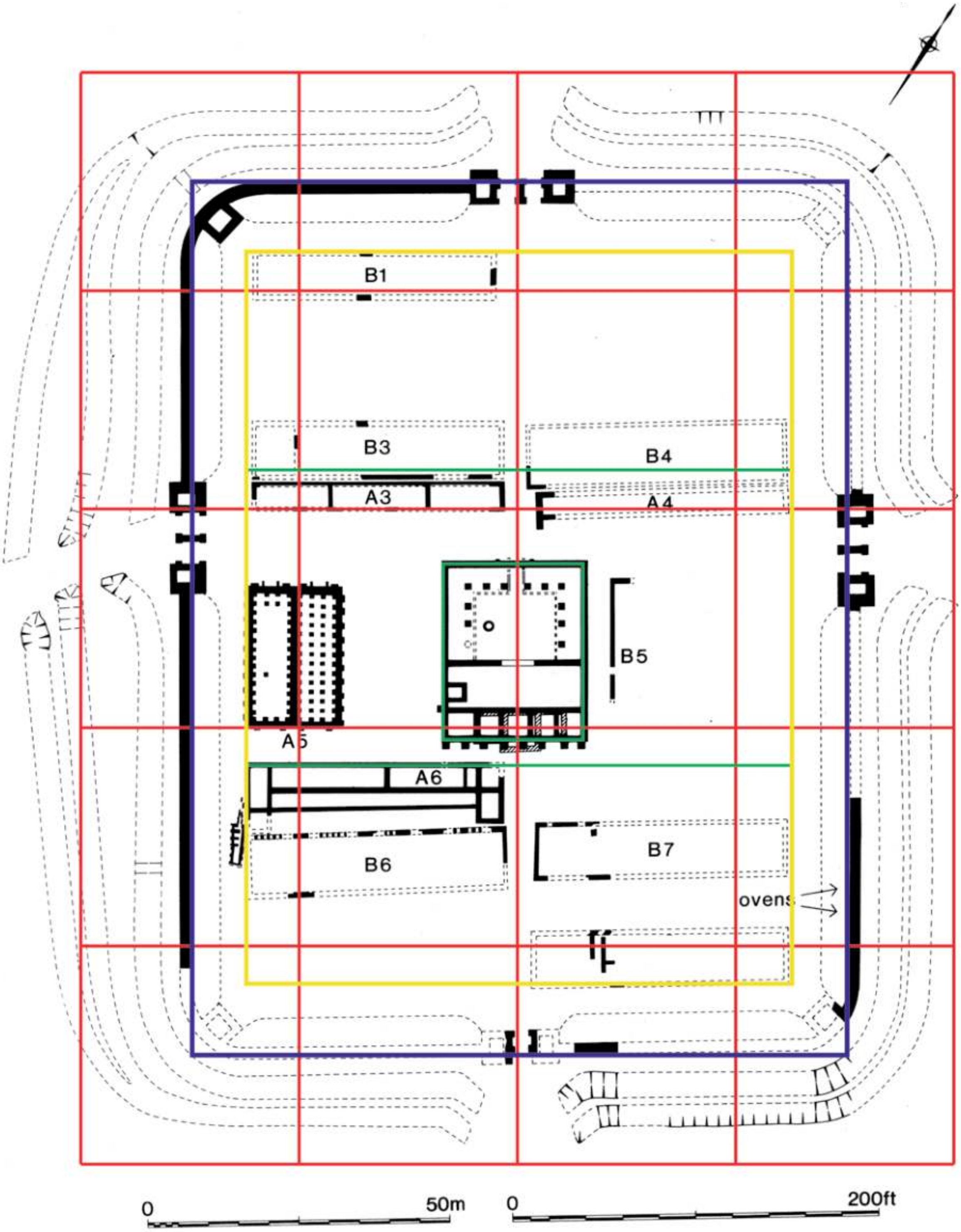


Figure 2. Plan of fort at South Shields with survey grid of 5:4 actus *squares (sides measured at 36 m = 120 RF) superimposed (red). Blue rectangle: primary survey rectangle (4:3) for fort wall. Yellow rectangle: building plot. Green lines: survey areas within the yellow rectangle. Illustration is diagrammatic and not suitable for precise scaling.*

have been placed in relation to the grid, but the north and south walls moved in so they sit inside the short ends of the ideal 4.3 rectangle. If the walls had been located so that the north and south inner face was at 4:3 proportion to the inner faces of the east and west walls, the north and south walls would have had to be moved out by 6 RF on each of the short sides, which would have necessitated a 40 RF *intervallum* and rampart space between the buildings and the fort wall. Conversely, if a 30 RF rampart/*intervallum* had been used at the north and south ends of the fort as well as at the long sides, the north and south fort walls would have to be moved 4 RF inwards at either end, moving them further away from the 4:3 proportion. The solution was to have a 34 RF rampart/*intervallum* (perhaps 18 RF for the road, 16 RF for the rampart) at the short ends of the fort which pushed the north and south fort walls out so that their outer faces were exactly 480 RF or 4 *actus* apart (as opposed to the 3 *actus* measurement between the *inner* faces of the fort walls on the short axis). The combined *intervallum* and rampart where excavated on the south-east side of the fort was approximately 34 RF, as opposed to the 30 RF established in excavation in the south-west gate. As at Wallsend the north and south rampart/*intervallum* has therefore been widened in order to situate the fort wall in a rectangle with similar proportions to those of an inner rectangle, in this case the rectangle containing the building plot (yellow rectangle on Figure 2). The fact that the *intervallum*/rampart space was 4 RF wider at the north and south ends may suggest that a 4 RF module rather than the 3/6 RF module evident at Wallsend was being used. All the major dimensions and several important building dimensions in the South Shields plan are divisible by 4 but not always by 3 or 6. The barracks, for example, with their length of 140 m (contrast 150 m at Wallsend), are better suited to a 4 RF than a 6 RF module.

This inner rectangle, the plot containing the buildings, measures 120 m x 90 m, that is 400 by 300 RF or three and third by 2.5 *actus*, an exact 4:3 proportion.

Along its short axis, the fort is 360 RF (3 *actus*) *within* the walls, made up of: rampart 15 – *intervallum* 15 – buildings 300 – *intervallum* 15 – rampart 15 = 360 RF

Along its long axis, the fort is 480 RF (4 *actus*) *over* the walls, made up of: wall 6 – rampart 16 – *intervallum* 18 – buildings 400 – *intervallum* 18 – rampart 16 – wall 6 = 480 RF

The basic idea behind the South Shields plan seems to be the setting out of four equal sized parcels of space, as at Wallsend, to accommodate the barracks. At Wallsend each of the four parcels was 180 by 120 RF (ratio of 3:2). At Shields each is 150 by 120 RF (5:4). Equal space is allotted to groups of three infantry and two cavalry barracks: as at Wallsend this is accounted for by the provision of space in the *via quintana* area for the movement of horses in an area adjacent to the cavalry barracks (half of this is occupied by Building A6, a temporary building in use during the construction of the fort). A deeper design block for the central range, including the *via principalis* and the narrow workshop buildings on its north side, is one and one third *actus* (160 RF) north-south.

The three and one third *actus* (400 RF) long building plot is thus divided 1 : 1 1/3 : 1. Widthways the design barrack design areas measure from the outer edge of the building plot rather than the outer edge of the *intervallum* street as at Wallsend. If each of the barrack design areas is regarded as divided east-west by the *via praetoria*/*via decumana*, then each of the resulting four sub-areas has a proportion of 5:4, with long axis east to west. The central range area, 160 RF deep, and 300 RF wide, has no such proportion; its width is one-and-seven-eights of its depth (15:8 proportion). Centrally within it is placed the *principia*, also displaying the 5:4 proportion (100 by 80 RF).

Where the infantry and cavalry design areas at Wallsend were 1 *actus* north-south (including the *intervallum*) at Shields these measure 1 *actus* north-south not including the *intervallum*. The streets between pairs of barracks are much wider at South Shields. But the two forts have very similar overall areas: 1.68 ha measuring over the walls at Wallsend, 1.62 ha at South Shields. This is because, as a result of the differing proportions of the two overall survey grids, South Shields (5:4 as opposed to 11:10 or 9:8 at Wallsend) is correspondingly narrower, shortening the barracks. At Wallsend the width of the building plot is 324 RF, at South Shields only 300. Yet the barracks in both cases have nine *contubernia* of equal width. The shortening at South Shields is achieved by having the officers' houses project, so that that they have a similar area but are square rather than rectangular in shape.

The one-and-a-third *actus* division for the central range is in contrast to Wallsend, where a full 1.5 *actus* was allotted to this. Where the design area at Wallsend combined to give an overall length of 3.5 (420 RF) *actus* including the *intervallum* streets, at South Shields it is three-and-a-third *actus* (400 RF) not including the *intervallum*.

If the *praetentura* was arranged as at Wallsend it would theoretically scale north to south: barrack 24 – alley 12 (wider than the Wallsend equivalent, but the streets at Shields are generally wider) – barrack 24 – street 36 – barrack 24 = 120. This is a hypothesis, as the buildings of this period in the *praetentura* have only been very fragmentarily seen and no confidence should be placed on the brave, but as the excavator admitted, speculative reconstruction offered by Dore and Gillam (1979). On the Wallsend analogy we can be confident that six infantry barracks of similar size and disposition to those in the *retentura* were accommodated.

The *via principalis* is the same as at Wallsend, a 60 foot strip consisting of *via principalis* 36 – narrow building 18 – alley north of narrow building 6. That at any rate was the design; Building A4 is awkwardly positioned in practice. The *principia* projects north into this space.

As we have seen, the depth of the actual central range buildings (granary, *principia* and *praetorium*), given a whole *actus* at Wallsend, is more compressed at Shields, at 100 RF, putting the southern edge along the north wall of building A6. The buildings exhibit ideal ratios. At 30 m x 24 m (surely 100 x 80 RF) the Period 4 *principia* reverts to the 5:4 ratio as that used for setting out the fort enclosure. Probably 100 x 50 RF (including porticos reconstructed at both ends), the granary has a 2:1 ratio.

Excavation of two of the *retentura* cavalry barracks in 1999-2001 established their dimensions as 140 by 24 RF (*contubernia* 24 RF deep), but a projecting officer's house (not a feature of the Wallsend design) brings the width out to 32 RF. Between the 24 RF deep *contubernia* the street separating barracks was 36 RF wide.

The *retentura* might then scale south-north as follows: barrack 24 – street 36 – barrack 24 – space north of barracks 36 = 120 RF. The east-west dimension of each plot is made up of 140 RF of barrack and 10 RF (half of the 20 RF wide *via decumana*) = 150 RF.

As Figure 2 makes clear, the 4:3 square *actus* grid used for setting out the fort wall was extended to include the strip occupied by the defensive ditch system, the original width of which has been recorded outside the south-west and south-east gates extending some 20 and 15 m respectively from the fort wall, although perhaps going irregularly rather further out than the theoretical line in the former case. This suggests that the ditches perhaps occupied a half *actus* (60 RF) strip beyond the lines used for setting out the fort walls. If this was the case the grid used to set out the whole fort, including the defensive ditches, would have measured 5 by 4 *actus* (600 by 480 RF), or 10 by 8 *climata*. The centre of this hypothetical complete survey grid of 5 by 4 *actus* lies exactly the centre of the forecourt of the *principia* – potentially the ceremonial point of origin for the survey? The *principia* itself was not built of course until a later stage.

Possibly the design of the fort is based on a regression of ideal proportional shapes, one within another, or, in Henderson's words, 'a hierarchical assemblage of interdependent design elements, the case for each of which is strengthened by the demonstration of consistent metrical features at every level of the hierarchy'.[13] The overall design grid, 5 *actus* from north to south, with overall proportions of 5:4, including the ditches, has an east-west dimension of 4 *actus*, 480 RF across. This 480 RF (4 *actus*) distance becomes the long axis of the fort, measuring over the walls, with its alignment now alternating to north-south; three quarters of this distance becomes the width of the fort within the walls (reversion to east-west), these dimensions having a 4:3 proportion. The overall plot of the buildings within echoes the 4:3 proportion, long axis north-south. Within that each of the four barrack design areas reverts to the 5:4 ratio, long alignment now east-west. This 5:4 proportion is shared by the *principia* (exactly 2/3 the size of the barrack design areas) and that building with its long axis alignment reverts to both the alignment and proportions of the outermost rectangle of the design, forming a microcosm of it at the centre of the fort.

Conclusions

Although it is doubtful whether every nuance and exact measurement of these designs has been correctly understood in this preliminary study, the basic underlying survey grid and certain of the principal dimensions and intended proportions seem beyond question. Certainly at South Shields, and in all probability at Wallsend, the design is laid out in relation to a surveyed grid which extends all the way to the outer edge of the defensive ditches. The dimensional layout of the plan does not originate with the fort walls, which are sited in relation to, but do not themselves constitute, an underlying primary design rectangle. Indeed, at South Shields the walls themselves, when measured from outer face to outer face in both dimensions, have no meaningful proportions; these are found in the underlying grid in relation to which the walls have been sited. It ought to be possible one day to recognise similar patterns in other fort plans of rectangular shape, but of course there are very few plans available where the original layout is established, and plans tend to be heavily restored on the assumption that the *intervallum* and rampart will be of equal width on all sides.

However, as a check on the principles proposed for Wallsend and South Shields we can turn to the nearly contemporary (*c.* 105-115) fort of Heidenheim in Raetia, for which a nicely measured plan is published. Scholz interprets its area in terms of Roman feet as measuring 900 by 600 RF (150 *climata* of 60 RF or quarter *actus* squares) over the buildings, 990 by 720 RF (198 *climata*) over the defences.[14] But his grid of quarter *actus* squares

[13] Henderson 1991: 73.
[14] Scholz 2009: 42.

does not fit comfortably over the plan; some of the defensive ditch seems to be left outside and the long dimension is not a whole or half *actus* multiple – 990 RF is 8.25 *actus*. From this Scholz concludes that as a rule the exact survey only covered the buildings area and that the *intervallum* and defences were sited with greater flexibility to suit the needs of individual forts.[15] The problem has arisen because the grid used assumes an exactly correct RF of 0.2958 m. If an *actus* grid based on a 0.30 m foot is laid over the plan (Figure 3), a much more rational picture emerges: the whole plan over the defensive ditch is 8 by 6 *actus*, 960 by 720 RF – 192 *climata* (proportion 4:3). The internal building plot is 7 by 5 *actus*, 840 by 600 RF (proportion 7:5). It can be broken down into praetentural, central range and retentural blocks as at Wallsend and South Shields. At Heidenheim the stone wall is not original, having replaced an earlier earthen rampart, but when it was built it seems to have been positioned in a way analogous to South Shields so that the *inner* face on the long axis and the *outer* on the short axis adhered to a rectangle measuring 904 by 678 RF with identical (4:3) proportions to the outer edge of the ditch. Clearly at Heidenheim, as at South Shields, the surveyed plan dictated the exact position of every element of the defences, right out to the outer edge of the (in this case single) ditch; interior buildings and defences are fully integrated in the same scheme. Reconsidered in this way Heidenheim shows that there was nothing unusual about the design principles that can be discerned at Wallsend and South Shields, and in fact suggests these principles were universally applied in Roman fort planning at this period.

The method of survey must have been to mark out on the ground the intended positions of internal buildings, and surrounding street, rampart, wall and ditches, in relation to a grid constructed using one or more *groma* instruments. The actual lines strung out along the ground were not necessarily the ones depicted in red on the illustrations here, but lines in these positions certainly existed in the theoretical grids whether or not all the lines were actually drawn on the ground. It can be seen from the illustrations that a grid with half *actus* (60 RF) intervals would have allowed all of the major elements – the outer edge of the *intervallum*, in the case of Wallsend, and the fort wall template at South Shields (the primary design rectangles) – to be rapidly delineated on the ground, as each lay directly on a grid with such intervals. From a central point of origin the measurement to these lines would always be 1.5 or 2 *actus*, in both of the plans. The centre point of the survey grid for both forts would lie in the *principia* courtyard.[16] In neither case does any archaeological feature suggest itself as the *groma* point.

Were these plans ever committed to paper or another medium? The fact that neither survey nor architectural plans drawn up by the *mensores* or architects of the Roman army survive is neither here nor there: except for very rare survivals, none of its day-to-day documentation is preserved, but the survivals show that it once existed. Although two-dimensional scaled architectural plans and three-dimensional architectural models are known to have existed in the ancient world,[17] there is in fact no necessity to believe that these were used in all building or that the measured plans of forts like Wallsend or South Shields were actually drawn up. The design could be expressed in words and numbers written on a page, or even with long experience, devised and retained in the head. The role of the designers was not dissimilar to that of the mason-architects of the medieval and early-modern periods, who raised complex multi-storey buildings but, in the cases where building contracts and records survive, measured architectural plans in the modern sense are never found. Those medieval measured architectural drawings that are known tend to be of complex details of elevations, mouldings, traceried windows, etc. There was no need to make a measured drawing of the ground plan if the building to be erected could be set out on the ground.[18] The architectural historian and practising architect T.G. Jackson commented on the extensive surviving building accounts of his own Oxford college, built in 1610-13:

> There is no trace of any drawings or plans having been made. In a… straightforward building such as this, and with a resident architect or director of works on the spot, very few drawings would be absolutely necessary…even in a contract no definite plans drawn to scale in our modern way would have been attached to the agreement. It was thought quite enough to bind the contractor to build so many sets of rooms of such a such a size… and of such materials. To this rough specification was sometimes attached a rough model in clay or plaster, or more often a rough sketch of the simplest kind…of no practical use whatsoever as a working drawing for the builders, but serving to explain and illustrate in a rudimentary way the accompanying specification. The workmen…were probably directed by word of mouth; the building

[15] Scholz 2009: 43.

[16] At Heidenheim, it will be noted (Figure 3), the centre of the survey is in front of the *principia*, within the forehall on the *via principalis.* But here the *via principalis* and long-side gates are centrally situated, unlike the Hadrian's Wall forts where the *via principalis* is offset towards the front of the fort.

[17] Haselberger 1997; Taylor 2003: 27-36. Cf. Aulus Gellius, *NA* 19.10.1-2: *adsistebant fabri aedium complures balneis novis moliendis adhibiti ostendebantque depictas in membranulis varias species balnearum*: 'By his side stood several builders [*fabri aedium*], who had been summoned to construct some new baths and were exhibiting different plans for baths, drawn on little pieces of parchment'. The word *species* here means 'likeness', so these could have been general views rather than measured plans.

[18] Salzman 1952: 16; cf. 17-24 for medieval architects' drawings.

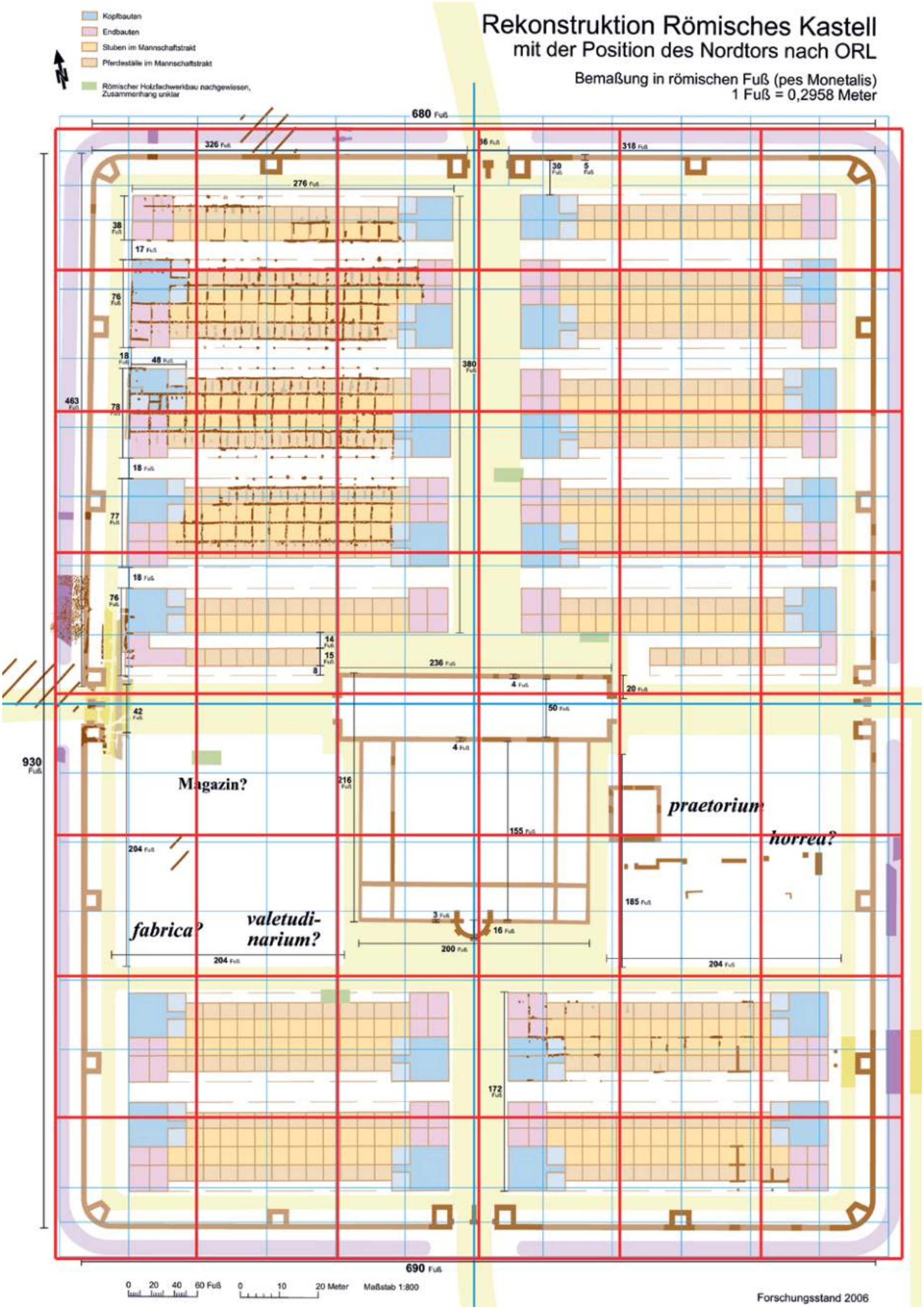


Figure 3. Plan of Heidenheim fort with 8:6 survey grid of actus *squares (sides measured at 36 m = 120 RF) superimposed (red). Buildings can be seen to occupy exact 7:5* actus *plot. Underlying blue grid is Scholz's suggestion based on* pes Monetalis *of 0.2958 m. Reproduced from Scholz 2009: Anlage 20.2 by kind permission of Markus Scholz.*

> was no doubt set out on the ground full size, instead of on paper to scale; the heights would be marked by the head workman for the masons on staff rods; and very likely there were never any drawings at all...the real design never existed at all on paper, but only in the intention of the designer, who being always on the spot explained to the workman at every step in the work how to proceed.[19]

The legionary *mensores* at Wallsend or South Shields would almost certainly have set out the design on the ground full size rather than on paper and may well have left the site before building began, handing over to building squads. These may have been under the supervision of a legionary *architectus*, equivalent to a late-medieval or early-modern master mason, and even they might only need to make drawings for the few of the fort buildings that had complex or unprecedented detail (gates; *principia*; *praetorium,* granaries?).

The most interesting conclusion to emerge from this analysis of two overall fort plans close together in time, and for the same kind of unit, is that although clearly similar general principles are at work, the plans are not identical and would seem to have been individually designed. At Wallsend, for example, the basis of the design is a proportional rectangle which includes the *intervallum* street, whereas at South Shields the determining shapes are found not at the back of the rampart but underlying the fort wall and the outer edge of the buildings. The proportions of the overall design grid are different in each case. A further variation, just as likely to be the result of original design, is seen in the treatment of the barracks, arranging identical numbers of *contubernia* into spaces of different lengths. A variation of the same, obviously familiar, trick is used in both plans – having a wider rampart/*intervallum* at the short ends to enable the inner design rectangle and the fort walls (or the grid lines on which the South Shields walls are based) to have the same proportions. A 4 RF module was probably used in one case, and 3 or 6 RF module in the other. The completely different underlying metrologies illustrated here should make it clear that each fort plan was an independent design exercise. The two forts were designed for the same kind of unit, and as Paul Bidwell wrote in 1994: ‘The close resemblance of their plans might have resulted from reference by their builders to the same text or drawing, describing or illustrating the ideal disposition of buildings in a fort’.[20] There may well have been prescriptive texts in circulation which said things like ‘the six centuries of a *cohors quingenaria equitata* should be disposed in the *praetentura* and the four cavalry *turmae* in the *retentura*’, and of course the size of the unit would determine the overall size of the fort in general terms. But the evident differences in design approach at the two forts belie the idea that the metrological detail of the designs was drawn from any pre-existing source rather than being generated on the spot.

The degree of forethought and care lavished by the surveyors in devising a fresh but perfectly harmonic layout each time is remarkable, the more so as none of this would have been visually apparent to the soldiers who went on to inhabit the fort. Only the surveyors were aware of the mathematical proportions and harmony of parts and whole that lay behind the utilitarian military buildings and defences, and the analysis of these plans demonstrates that a painstaking and original intellectual design effort preceded the construction of every Roman fortification, in a way that has an unmistakably ritual aspect. Well-understood principles of measurement and proportion were followed, but endless permutations were possible. The originality as well as the harmonic quality of the design was perhaps considered propitious in the foundation of a site, and this would help explain why no two Roman forts have ever been found to have an identical plan.[21] The extent to which the motivating force was indeed religious (in the sense that an originally devised and perfectly proportioned and harmonious plan would be pleasing to the gods and thus bring good fortune to the establishment), or aesthetic, cannot now be determined. But we can rule out mindless military conservatism – this was not the blind following of a blueprint. The *mensores* clearly felt strongly about what they were doing. Given the originality of each design, it is only by the meticulous excavation of Roman military sites that the contribution they have to make to the study of the principles of architectural design in the past can be fully appreciated.

Acknowledgements

I am most grateful to James Bruhn for help with the illustrations and to Markus Scholz for kindly supplying the base plan for Figure 3.

Bibliography

Bidwell, P. and S. Speak 1994. *Excavations at South Shields Roman Fort Volume 1.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Breeze, D.J. 1983. *Roman Forts in Britain.* Princes Risborough: Shire.

[19] Jackson 1893: 35-6.

[20] Bidwell and Speak 1994: 18.

[21] Cf. a recent assessment of Roman architecture in general: ‘The potency and effect of a building resided as much in its conception and construction as in its finished state...Within the Roman sphere we rarely find buildings perfectly replicated...outside a single, unified project of buildings constructed in serial. A large part of a building’s importance and signification resided in the process of its creation... even the putatively rigid and regimented architecture of military camps and fortifications was not uniform’ (Taylor 2003: 4-5; 12; 258, n. 30).

Breeze, D.J. 2016. *Bearsden: a Roman Fort on the Antonine Wall.* Edinburgh: Society of Antiquaries of Scotland.

Bridger, C. 1984. The Pes *Monetalis* and the Pes *Drusianus* in Xanten. *Britannia* 15: 85-98.

Dore, J.N. and J.P. Gillam 1979. *The Roman Fort at South Shields.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Evans, E. 1994. Military architects and building design in Roman Britain. *Britannia* 25: 143-164.

Gillam, J.P., I.M. Jobey and D.A. Welsby 1993. *The Roman Bath-house at Bewcastle, Cumbria* (Cumberland and Westmorland Antiquarian and Archaeological Society Research Series 7). Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society.

Haselberger, L. 1997. Architectural likenesses: models and plans of architecture in classical antiquity. *Journal of Roman Archaeology* 10: 77-94.

Henderson, C.G. 1991. Aspects of the planning of the Neronian fortress of *legio II Augusta* at Exeter, in V.A. Maxfield and M.J. Dobson (eds) *Roman Frontier Studies 1989*: 73-83. Exeter: University of Exeter Press.

Hodgson, N. 2003. *The Roman Fort at Wallsend: Excavations in 1997-8* (Tyne and Wear Museums Archaeological Monograph 2). Newcastle upon Tyne: Tyne and Wear Museums.

Hodgson, N. (ed.) 2009. *Hadrian's Wall 1999–2009: a Summary of Recent Excavation and Research.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Jackson, T.G. 1893. *Wadham College, Oxford: its Foundation, Architecture and History.* Oxford: Clarendon Press.

Morgan, M.H. 1914 (reprinted 1960). *Vitruvius, the Ten Books on Architecture.* Trans. M.H. Morgan. Harvard: Harvard University Press.

Rushworth, A. and A. Croom 2016. *Segedunum: Excavations by Charles Daniels in the Roman Fort at Wallsend (1975-84) Volume 1: the Structural Remains*. Oxford: Oxbow.

Salzman, L.F. 1952. *Building in England Down to 1540.* Oxford: Clarendon Press.

Scholz, M. 2009. *Das römische Reiterkastell Aquilea/ Heidenheim.* Stuttgart: Konrad Theiss.

Taylor, R. 2003. *Roman Builders: a Study in Architectural Process.* Cambridge: Cambridge University Press.

Walthew, C.V. 1981. Possible standard units of measurement in Roman military planning. *Britannia* 12: 15-35.

Ward, J. 1903. *The Roman Fort of Gellygaer*. London: Cardiff Naturalists' Society.

The present as epilogue: urban conflict and the 'Corbridge destruction deposit'

Alistair McCluskey

The interpretation of the archaeological evidence for a destructive fire in Roman Corbridge during the later 2nd century has generated significant debate. While these discussions have been expertly summarized elsewhere, this paper will analyse the evidence against the modern understanding of the nature and character of urban conflict in the 20th century. Here, the construction or targeting of culturally significant buildings and communal urban spaces has been a tactic commonly used by modern-day actors seeking to reinforce their own, or undermine their competitors', strategic objectives. Through this lens, the implications for the destruction deposit associated with Site XI will be re-interpreted, suggesting that the Roman army faced an adversary that possessed a deeply nuanced understanding of strategy with effective operational and tactical ways and means to achieve their goals.

Introduction

Excavations in Roman Corbridge have revealed evidence of destruction during the later 2nd century, as the site transitioned from being an auxiliary cohort fort to one of a more complex military and civil character. Interpretation of this destruction has followed the ebb and flow of debate about the wider chronology of the frontier, frequently being seen as evidence of the barbarian incursions in the 180s, attested by Dio as the most serious war of Commodus' reign, resulting in the death of a general and the loss his troops, presumably in a major battle (Dio, *Roman History* 73.8.1-2). However, this view has not been without challenge, and was vigorously contested in the 1970s when doubt was expressed that it represented evidence of deliberate destruction at all (Hodgson 2008: 59). The crux of the issue rested on the complex nature of the evidence and the absence of any direct stratigraphic links between key deposits. While similarities in the ceramic profile and the physical make-up of these contexts strongly suggested to John Gillam that they were linked and represented a deliberate destruction event, there was no conclusive proof that they were anything more than a random fire.

Although the complex character of these deposits always limits any direct inference that they were caused by a barbarian attack, other lines of analysis may provide corroboration. In particular, recent research into more modern urban conflict suggests that the relationship between the destruction evidence and the enigmatic building complex at Corbridge's Site XI is supportive of Gillam's conclusions. The targeting of culturally significant sites, buildings and infrastructure - such as that which may be represented at Site XI - is often used in urban conflicts to achieve strategic goals in the contemporary world. This approach has particular value when political entities are competing for legitimacy in the minds of wider populations. Furthermore, this analytical framework provides a plausible context to re-consider similar archaeological evidence, elsewhere in Corbridge and nearby, that could also reinforce Gillam's hypothesis. Finally, it also gives a potential insight into the exercise of strategy in the minds of Rome's Iron Age adversaries. Rather than being the uncivilized military cultures of classical literature, the Iron Age societies in North Britain may have had a highly attuned understanding of their Roman adversary and leaders able to calibrate their own military effort to develop strategic advantage.

The 'Corbridge destruction deposit'

The 20th century saw significant campaigns of excavation at the Roman site west of the modern town of Corbridge. Between 1906 and 1914 Leonard Woolley, R.H. Forster and W.H. Knowles explored the site to determine its extent and character. Although this work was halted by the outbreak of the First World War, excavations recommenced in 1934 when Durham University was engaged to expose and consolidate the remains for public display on behalf of H.M. Office of Works and the Ancient Monuments Department. Apart for an intermission during the Second World War, these resulted in an annual training excavation for the University until 1973, initially under the direction of Eric Birley and Ian Richmond, and later under Brian Dobson, John Gillam and John Mann (Bishop and Dore 1989: 1). Subsequently, in 2004, Tyne and Wear Museums examined the remains of the southern bridge abutment, threatened by erosion from the River Tyne (Hodgson 2009: 101).

The excavations in the central area of the site (Figure 1) frequently revealed stratigraphical evidence for burning during the transitional period between its occupation by a series of auxiliary forts built to a standard layout and its conversion to a more complex civil-military nature. This process has been summarized by Hodgson

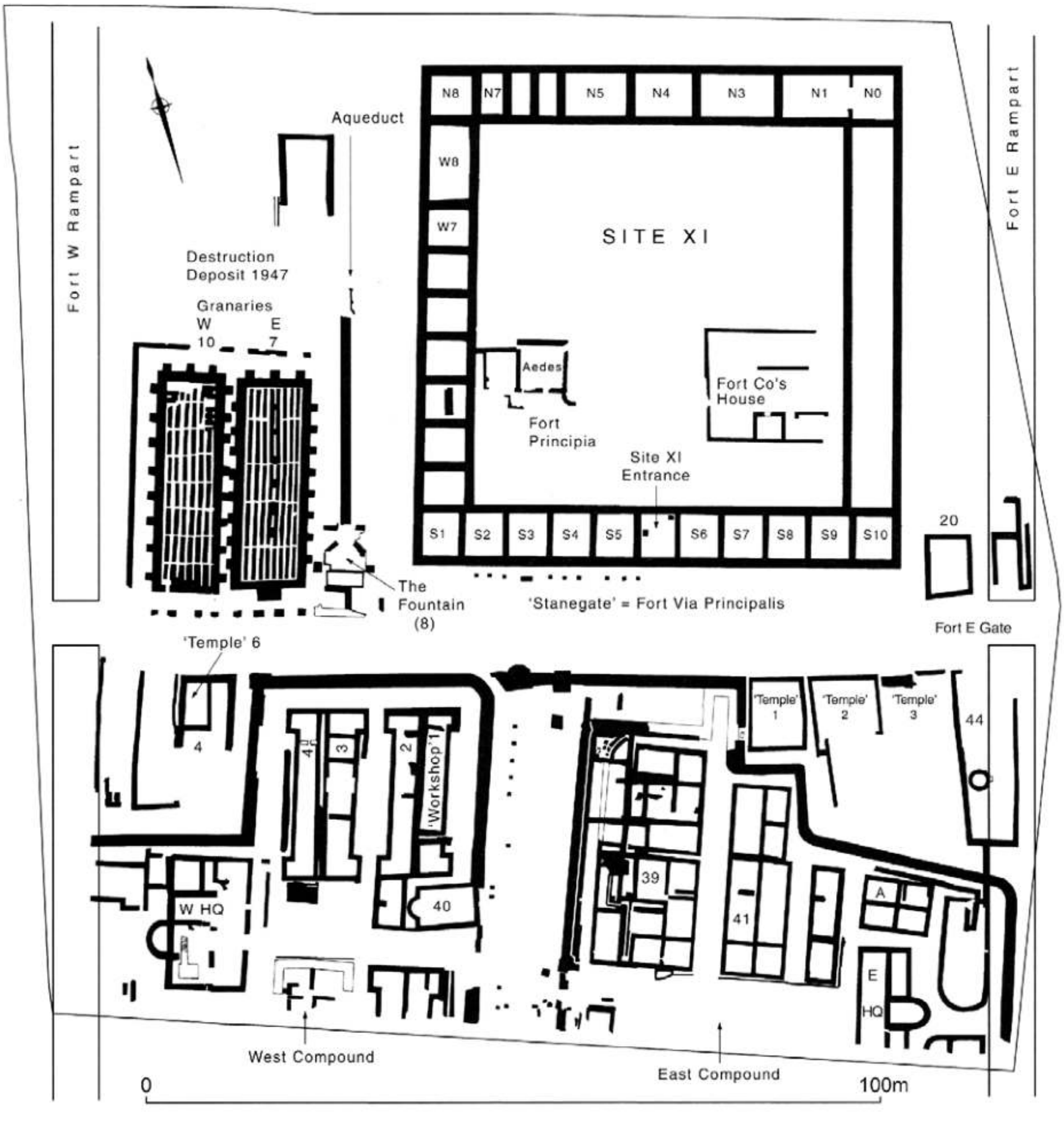


Figure 1. The area of consolidated remains at Corbridge showing Site XI and other key elements discussed in the text. Site XX is immediately south-east of Site XI, while Site XII lies to the west in the area immediately north of the later granaries. The 'pottery shop' at Site IV lies at the western edge of the guardianship area on the southern side of the 'Stanegate' opposite the granaries.

(2008) but will be briefly described here. The area that later became the centre of the Roman town, and is now the enclosed by the boundaries of the modern site on display, was initially occupied by the Roman army with a series of four auxiliary forts, each of which superseded the other on broadly the same site. The first was constructed *c.* 85 as the Flavians consolidated their occupation in the north: Fort I. It was adapted before being destroyed by fire and replaced by a second fort *c.* 105: Fort II. This in turn was replaced by a modified fort with some adjustment of the building layout within broadly the same defences around *c.* 122: Fort III. Finally, a further reconstruction and reconfiguring of the site saw a fourth fort constructed *c.* 139–140 as the Antonine occupation of Caledonia commenced, and continued with modification as the Romans withdrew from Caledonia under Verus in *c.* 158: Fort IV (Bishop and Dore 1989: 140; Hodgson 2008: 49-52).

The site began to change *c.* 163–164, as a new building programme was initiated under Calpernius Agricola. The new layout moved significantly away from that required by an auxiliary cohort, towards one of a more complex character. Although there are fragmentary remains for activity overlying the latest levels of Fort IV, including post pits, industrial activity and masonry buildings on different alignments, these were soon superseded by a massive courtyard building measuring 66 m x 68 m – known as Site XI by the Edwardian excavators who initially uncovered it - laid out on the northern side of what had been the *via principalis* of the old fort. This thoroughfare was retained as the main east-west street of the new civil complex and known from the Edwardian excavators onwards as 'the Stanegate' assuming that it now acted as an extension of the main Roman road linking Corbridge to Carlisle. To the west of Site XI, this construction programme also appears to have included a pair of massive stone granaries, replacing those of the earlier forts but built on an altogether larger scale.

From the very outset, modern excavations into the area on and around Site XI found graphic evidence of destruction. In 1908, two levels of burning were uncovered over the western area. Each was 50-75 mm thick, with the lower level only a few inches above the foundations of the western range of courtyard building which it covered. Although the southern range of Site XI along the Stanegate appears to have been completed, no superstructure had been constructed above foundation level in the western range north of court 7 prior to the destructive fire, nor was any subsequently built (Knowles and Forster 1909: 330-331). In the southern range, the drain under the entrance to the complex was found to have been unfinished and unused (Forster and Knowles 1911: 151). Like the western range, the upper courses of the walls in the eastern range were found unfinished, with work halted before the masons had smoothed the upper face of the topmost course in readiness to receive the next onto it. Furthermore, in addition to the destruction wrought by the fire, some of the eastern range masonry that the Roman builders had already put in place, including the heavy blocks of the finely moulded lower course, were apparently overturned with crowbars and the foundations beneath them cut through (Figure 2; Forster and Knowles 1911: 158). When the main courtyard area was explored during these - and later - excavations, the widespread burning deposit was found to extend right across the area, lying immediately above a gravel layer that marked the initial inner surface of the Site XI courtyard complex (Bishop and Dore 1989: 35; fig. 19, section 113, fig. 20, sections 127 and 128; Hodgson 2008: 61).

Evidence of similar destruction was also found elsewhere in Corbridge, to the south in Site IV, to the west at Site XII and to the east in Site XX (Bishop and Dore 1989; Brassington 1975: 62-75; Foster 1908: 247-258; Richmond and Gillam 1950: 177-201; Richmond and Gillam 1955). At Site IV, the remains of a wooden building containing a substantial amount of pottery - tentatively identified as a 'pottery shop' - was also destroyed by fire. This assemblage included late-Antonine samian and mortaria dated to the second half of the 2nd century (Brassington 1975: 73). At Site XII a layer of black earth 45 mm deep overlay the post-fort gravel layer. This black earth contained over 4000 fragments of pottery, estimated to represent over 500 separate vessels. At Site XX, a layer of burnt daub 30 mm thick overlay the floor of a building that had been built on the demolished remains of Fort IV rampart. This burnt layer contained pottery very similar in nature to that recovered at Site XII and was described by

Figure 2. The north-east corner of Site XI looking at the inner face of the outer wall as it was found when originally excavated. The architectural detail of the finely moulded plinth shows how the blocks have been deliberately overturned from their original positions.

Richmond and Gillam as 'thoroughly typical of the late 2nd-century destruction level at Corbridge' (Richmond and Gillam 1955: 240-242).

The interpretation of these destruction layers has been a point of significant debate ever since their discovery. Although they are located close to each other, their discovery in separate campaigns of excavation across a period of fifty years, meant that no proven stratigraphical relationship was established. Furthermore, they are not the only evidence of burning found in Roman Corbridge. Similar evidence was found elsewhere in the complex stratigraphy of the site, a fact acknowledged by Richmond and Gillam themselves, who interpreted a destructive fire in the early Antonine forts as resulting from the poor siting of a furnace or oven rather than evidence of enemy action. Nevertheless, given the consistency of the pottery evidence associated with layers of burnt material, Gillam maintained his opinion was that they did represent destruction from a barbarian incursion (Richmond and Gillam 1955: 235-238).

Acknowledging this uncertainty, understanding the full context of the Site XI complex could widen the scope of the debate and better inform its conclusions. By considering the possible function of the courtyard building, we can gain insight to its potential relevance within urban development of Roman Corbridge as a strategic objective for both the Romans and the indigenous British leaders. This is enhanced if we include evidence for destruction of a similar nature and other potential evidence of warfare from the same period in the wider Roman Corbridge region. We can then consider these results against the use of urban space and the nature of urban conflict in more modern historical contexts, to discern any repeated patterns of behaviour that may corroborate Gillam's hypothesis.

The function of Site XI

Understanding the function of the Site XI courtyard building is essential to the interpretation of its destruction. This remains a point of contention and as Hodgson notes, given that the original building was destroyed part-way through construction, we have no way of knowing that its original intended function was ever achieved, or that that the truncated elements of the building that survived were subsequently used to the same effect (Hodgson 2008: 63-65). Loosely identified as a civic forum by the original excavators, subsequent discussions swayed between it being a storehouse or an unfinished legionary headquarters. The case for the latter interpretation was based on the foundation blocks on the north-western and north-eastern corners being pre-positioned for a basilica to the north which was never built. This suggestion has been rejected on the basis that the foundations for the northern range of the courtyard building – laid out if never completed – would have obstructed access from the courtyard to the basilica of the would-be headquarters, a configuration unparalleled elsewhere in the empire. This objection also holds true against the argument that Site XI was intended to be a civic forum. Subsequent discussion highlighted the similarity in scale and structure of the Site XI courtyard building to the legionary storehouses found at *Carnuntum* and *Vindonissa*, and buildings found in Ostia and Rome, described as either granaries or having an associated retail function. The debate between a storage or retail function, is largely based on assessment of the width of the entrances to the rooms surrounding the courtyard. If security was the primary concern for goods in storage, the assumption has been that doors would tend to be narrow. Examples include those found at the *Horrea Piccolo Mercato* in Ostia – which ranged between 1.4 m and 1.7 m in width – which could be more easily provided with bolted doors. Wider entrances have been found in 'granary' complexes in Rome, but at 3 m width, these have been provided with slots for removable shuttering usually associated with a retail purpose in mind. The entrances that have survived in the rooms ranged around the courtyard building at Site XI are 4 m wide, which Hodgson suggests is far more appropriate for a combined storage and retail function associated with either a *macellum* (market) or an *emporium* paralleled by the *macellum magnum* built by Nero on the Caelian Hill in Rome (Hodgson 2008: 65).

Evidence of other 2nd-century destruction and warfare in the Corbridge area

While there is no direct evidence that the destruction deposits found in and around Site XI are the result of barbarian attack, the presence of similar destruction and other evidence of warfare with broadly the same chronology in the local area does lend credibility to the argument. In 1960–61, John Gillam's excavations at Halton Chesters fort, 4 km north of Corbridge on Hadrian's Wall, exposed layers of burnt daub and carbonised wood 0.36 m thick, above the remains of a courtyard building 16.5 m wide and 29.9 m long, tentatively identified as the commanding officer's house. The accurate dating of these destruction horizons is not without difficulty as pottery associated with them is much smaller in quantity than that recovered at Corbridge. However, it is noteworthy that the vast majority of the pottery types that were recovered at Halton Chesters were present in the Corbridge deposit. As such, Gillam regarded them to be broadly consistent with the destruction he had previously found at Corbridge and believed that they represented further evidence of a catastrophic breach of the frontier in the late 2nd century (Dore 2010: 19-20; 59-62). In 1970, Gillam led a small-scale excavation at

Rudchester, 12 km east to Halton Chesters, which also recovered evidence of destruction in this period. Here, a barrack from the first occupation phase of the site had been destroyed by fire with molten glass, charred wood, burnt daub and oxidised pottery all being recovered. The latest datable pottery in this assemblage was a piece of Central Gaulish samian produced in the mid-Antonine period. Although later dates remain possible, a date for this fire of around 180 was not ruled out (Gillam *et al.* 1973: 82). The similarity in these deposits and their close proximity is striking. To date, no similar evidence has been recovered from the forts immediately east at Benwell or west at Chesters. Although neither of these sites have been subject to large-scale modern archaeological excavations, the forts further east and west along Hadrian's Wall - at Wallsend, South Shields and Housesteads – where modern wide-area excavations have taken place, destruction horizons for this date are also absent. This suggests that the units located near to the junction between Dere Street and Hadrian's Wall were either uniquely careless with regards to the management of domestic fire or they were subjected to an attack.

While the destruction discussed above relates to buildings, there may also be evidence of damage to key communications infrastructure. As Hadrian's Wall was refurbished and re-established as the frontier around 158, three stone bridges were constructed across the Tyne at Corbridge, across the North Tyne at Chesters and across the Irthing at Willowford. Unlike the original bridges that carried the Wall across the latter two rivers as a footway, the three new bridges were much more ambitious and impressive architecturally, each now carrying a road wide enough for wheeled traffic approximately 9 m above the river level (Bidwell and Holbrook 1989; Bidwell 1999; Hodgson 2009). The similarity in design and construction details of the superstructure suggest that these were built as part of a single programme, and possibly by the same architect or engineer. Each seems to have been provided with a ramp to carry the approach road up to the level of the bridge deck, although that at Willowford is only inferred from the strengthened remains around the eastern abutment (Bidwell and Holbrook 1989: 26-27). However, the ramps at Chesters and the southern abutment at Corbridge are both extant and have been excavated. At Chesters, pottery evidence confirmed that the bridge – and presumably the whole bridge programme - was constructed in the mid-Antonine period (Bidwell 1999: 119-120). While the bridges at Chesters and Willowford carried the Military Way of Hadrian's Wall across the rivers, the Roman bridge at Corbridge carried Dere Street across the Tyne on the southern exit of the Roman town. Here, the road ramp approaching the southern abutment was excavated in 2004 (Figure 3), when over 300 blocks of masonry - some weighing over a tonne - were removed and reassembled in a more secure location a short distance from the modern river-bank. These blocks had been used to revet the road ramp and protect the bridge abutment from erosion by the passing river. However, all of them had been reused, some from their original positions in the piers and parapet of the bridge, providing clear evidence that at some point the initial structure had collapsed. Although no dating evidence was recovered for this event, the 'fresh and unweathered' condition of the original external faces of some of the blocks suggested that this was only a few decades after the original mid-Antonine construction (Bidwell 2009: 103). If correct, then dating the collapse and reconstruction to a date *c.* 175-185 is a reasonable assumption, even if it remains unproven on the current evidence.

The cause of the 2nd-century collapse is unknown. Bidwell suggested that this was most probably the result of an extreme flooding event. A similar collapse attested at Willowford Bridge I was ascribed to this cause, but here there was evidence of scouring which had undermined the piers (Bidwell and Holbrook 1989: 66). Given the vagaries of the British weather, severe flooding as a cause for mid-Antonine collapse at Corbridge is a highly plausible – possibly the most probable – conclusion. This was the cause attributed to a second collapse at Corbridge in the post-Roman period, but the scour-pit associated with this event would have made any earlier evidence much more difficult to find (Bidwell 2010: 61). Nonetheless, the destruction of the heavy masonry foundations of Site XI noted above, demonstrates that human endeavour could be equally disruptive. Given these circumstances, human agency must remain at least a possible – if unprovable and very tentative - cause for the destruction of the southern road ramp and at least one of the arches of the bridge at Corbridge.

In addition to the physical evidence of destruction in Corbridge and the surrounding area, Bidwell has also suggested that the architectural fragments reused in the Anglo-Saxon crypt at Hexham Abbey were taken from a massive memorial built at Shorden Brae - just to the west of Roman Corbridge - and that the most likely context for such a construction was as a *tropaeum* commemorating a nearby battle (Bidwell 2010: 67-74). This site was excavated in 1958 by Gillam and Daniels who recognized it as a tower tomb of monumental proportions. The fragments at Hexham include distinctive decorations and architectural features which Bidwell has dated to the second half of the 2nd century. The central tomb was 10.48 m by 9.85 m and was surrounded by a precinct wall 40.84 m by 41.14 m. When compared to similar monuments around the Empire, the proportion of the decoration and the size of its dimensions suggest an exceptional monument

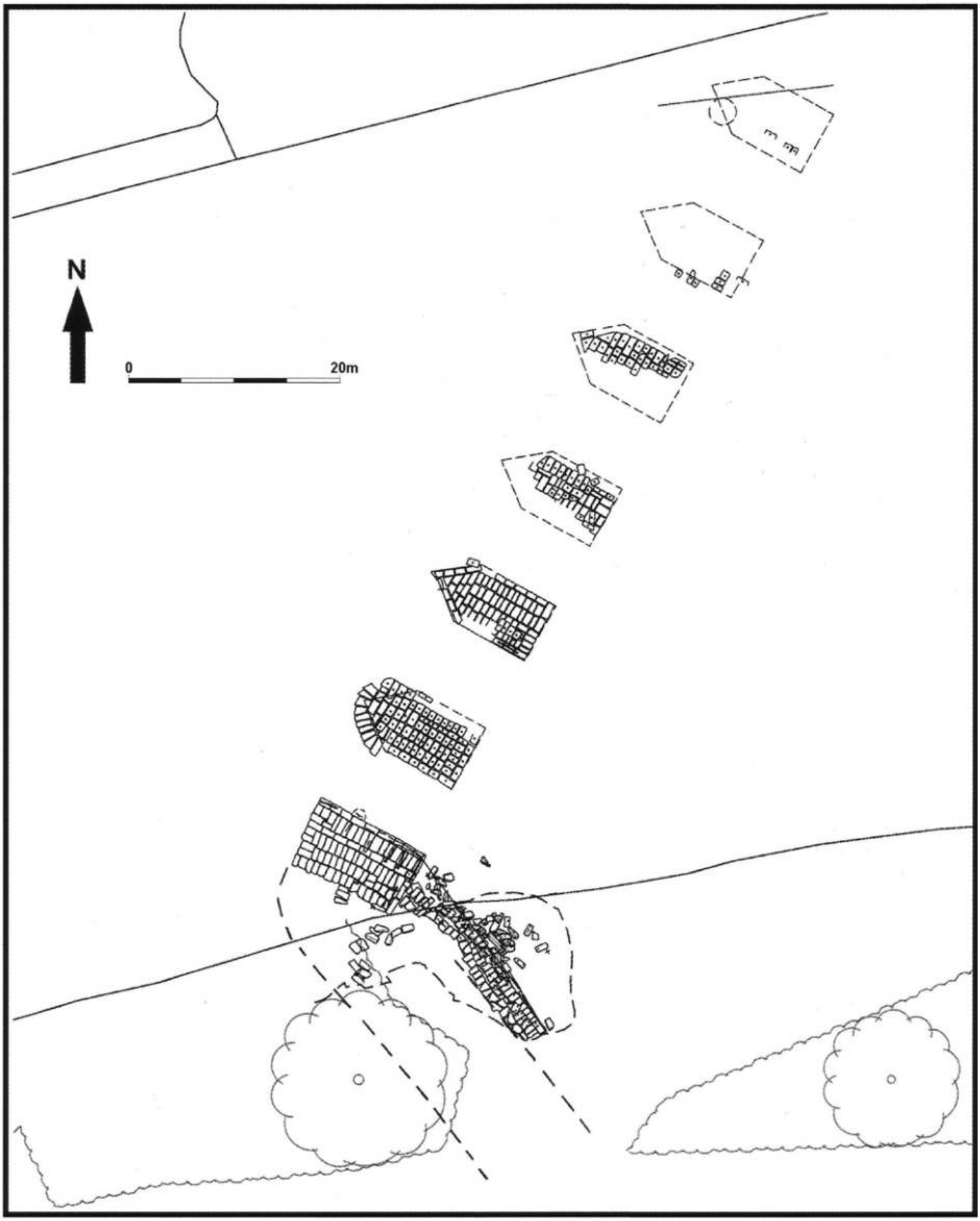


Figure 3. The plan of the Roman bridge at Corbridge showing the revetting wall on the eastern, downstream, side of the southern abutment.

existed at Shorden Brae. At Igel, near Trier, a tomb 4.5 m square survives to a height of 22 m, while at Saint-Rémy in Provence a tomb 3.5 m square has a height of 18 m. If the monument at Shorden Brae is of similar proportions, then with a base 10 m square it will have been of an exceptional character and unique on the northern frontier. The individuals and events that were commemorated at Shorden Brae are currently unknown, but Bidwell compares it to the monument at Adamklissi in Romania, commemorating a battle in 108–109, in which a senior officer and 3000 Roman soldiers were killed. As Bidwell observes, although unprovable in the absence of a confirmatory inscription, the date, scale and character of the monument at Shorden Brae has few occurrences that would better suit it than the Roman defeat during Commodus' British War recorded by Dio.

However, while the destruction in and around Corbridge and the monument at Shorden Brae suggestive of a barbarian assault in the 180s, there is more we can do to strengthen the argument and develop the debate. The deliberate targeting of symbolic architecture and infrastructure is an increasingly well understood strategy and tactic in contemporary urban conflict. If we explore the insights from the modern world, we can begin to discern a plausible rationale for the pattern of the damage at Corbridge, which potentially shows that Rome's barbarian adversaries in North Britain had a finely developed sense of strategic art, although they are unlikely to have recognized the concept in our modern-day terms. If so, the postulated barbarian attack in the 180s may have been far more than a raid on the Roman Empire for short term material gain; it could be evidence of a struggle for long term supremacy in the north.

Understanding urban space and urban conflict

The key to urban conflict is understanding that towns and cities are reliant on internal and external networks for their very existence. These urban networks enable the social, cultural and economic interaction that develops a mutually beneficial and plural existence between different communities. They require various types of infrastructure - sometimes with specialized function - to link them together, which often provide key battlegrounds for competing ideologies engaged in conflict. In effect, the sides which control - either by protecting or destroying - the infrastructure linking these urban networks, can manipulate the urban conflict to defeat, weaken or discredit their opponents.

The importance of networks in the development of cities in the ancient world has been recently highlighted by Woolf (2020: 95-96; 358-362). While these urban networks were never dense, they were underpinned by the concept of exchange. This most usually involved trade, including exotic items such as gold and lapis lazuli, or utilitarian commodities such as textiles, metals, ceramics or seed corn. But it could also include ideas such as technical knowledge, religion, political ideologies and governance (Woolf 2020: 138-140). These networks frequently had local, regional and long-range aspects. At a local level, urban settlements were usually dependent on the agricultural produce of their immediate hinterland for food, or the materials required for buildings. At a regional level, they were dependent on their connectivity to other sites, which usually relied on their geographic location, with the most prominent cities being sited along communication routes including rivers, land routes or the sea. This gave them access to both the export and import markets along which goods, capital and people could travel. Unless cities had a monopoly on a desirable exotic commodity, long-range access was generally controlled by those with the most power. Being at the centre of an exchange network usually gave a city the ability to develop greater military and political strength than those at the periphery. In these cases, those at the centre, such as Rome or Carthage, could exert power through conquest or submission over those in a more remote location, providing we remain aware that such value-laden terms such as 'centre' and 'periphery' have limitations due to the dynamic nature of historical contexts and the plural perspectives in play.

These connected urban networks depended on specialist infrastructure to make them work. Towns and cities needed storehouses to hold agricultural produce and maintain the availability of food for their growing populations throughout the year. They needed places of trade where exchange could take place, in either marketplaces or shops. They needed workshops where raw materials could be turned into consumer products. They needed robust streets and connecting road networks to allow produce to be moved from the point of origin to the point of exchange or use. They needed technical 'connecting' architecture such a bridges, wharves and quays to allow roads to cross obstacles and goods in transit to pass from the river or sea to the land with the minimum of fuss. They required communal administrative buildings where decisions of governance could be made and tax collected. They required temples to connect the secular and the spiritual worlds. They required places of entertainment and cultural expression. And they required specialist accommodation for different communities, sometimes based on ethnic, social or functional backgrounds. It is within these complex urban contexts that the physical and human environments interacted to achieve the mutual communal benefits and face the challenges of everyday life. By corollary, it is also where communities could be polarized to either create or emphasize a strategic boundary.

The use of urban space in strategic competition and conflict has been an increasing area of modern academic research, particularly with respect to the management of spatial continuity. In this work, the use of urban planning and architecture has been analysed to demonstrate how frequently these factors are used by strategic actors to manipulate inter-community activity and shape public opinions. Pullan and Baillie have highlighted the pivotal role that public space and public buildings play in modern towns and cities, pointing out how often they enable the plural existence of different communities to cooperate within a single town or city; the plural aspect of several cities to cooperate within a national or multi-national network context; and why therefore they frequently sit at the nexus of strategic or conflict activity (Pullan and Baillie 2013: 3-6). For example, in the early 20th century both the Ottoman Empire in southern Palestine and the European empires in Shanghai both deliberately cultivated economic architecture and infrastructure to help consolidate their control over the local populations (Tamari 2013: 173-194; Mitter 2004: 50-51).

It is not difficult to see Site XI in these terms. While the intended customer base for such a complex is usually described as being military, its wider strategic potential to deliver Roman imperial benefits to the indigenous populations should be kept in mind. Clearly, the military communities occupying the forts along the Wall and the legionaries moving into the compounds at Corbridge, would have provided a huge economic opportunity for the entrepreneurs who could provide them with the taverns and consumer goods on which to spend their regular pay. However, this form of urban development also enhanced political influence and demonstrated economic power to the local populations. This was not a unique Roman concept, being also used by pre-Roman classical cultures and to a much lesser extent copied by British Iron Age polities, especially in the south (Woolf 2020; Mattingly 2006). Nevertheless, as a Roman strategic toolset, evidence suggests that military and civil levers of power were used in parallel where persuasion was required rather than coercion, or to smooth the transition from military to civil control as more stable relationships developed. At Silchester, the Iron Age oppidum of the *Atrebates* was developed in the 1st century AD with apparent imperial sponsorship. Tiles bearing the stamp of Nero suggest that imperial patronage could have reinforced the legitimacy of the local elite with monumental urban building projects such as a forum and public baths (Creighton and Fry 2016: 105-107; 139-141). In addition to supporting 'in-place' elites, Rome appears to have been equally adept at using urban development to ease a hand-off between military and civic authorities. There appears to have been a correlation between the civic developments at Carmarthen and Caerwent in Wales, and Brough and Aldborough in Yorkshire under Hadrian, and their garrisons being withdrawn for subsequent concentration on the northern frontier (Wacher 1974: 375-405; Mattingly 2006: 268-269). In these examples, architecture that had specific Roman cultural associations appears to have been deliberately used to create a cognitive effect in the local populations to offset the removal of a visible military presence. In the context of mid-Antonine Corbridge, is it too surprising to see the re-consolidation of the military frontier along Hadrian's Wall supported by the development of a civic urbanism with facilities such as a *macellum* at Site XI?

However, the plurality argument has its limitations, as architecture can also be used as a tool to unify or homogenise communities. The totalitarian regimes of the 20th century provide a stark example of this behaviour, with both the Nazis in Germany and the CCP in China both using monumental architecture to communicate the power of the regime and designed to project a sense of strength and permanence to the population (Evans 2006: 182-185; Mitter 2004: 188). In these examples plurality and individualism was certainly not the intent.

Furthermore, culturally significant architecture has also been utilised to 'unify' communities to both identify and isolate an alien 'other' from the wider social group. In Germany, the Nazi regime targeted buildings of identifiably non-Aryan culture to cement its grip on power. More recently, the bombing of the US Embassies in Nairobi and Dar-es-Salaam in August 1998 and the attacks against the World Trade Center in New York in 1993 and 2001, were carefully calibrated strikes against buildings representing American prestige and power (Hiro 2002: 267-300). Likewise, the bombing of the Shia shrines at Karbala and Samarra in January and February 2006 were carried out by Sunni insurgents with the specific intent to generate a civil war in Iraq and undermine the legitimacy of the Coalition-Iraqi government (Burke 2011: 239-255). Actions such as these begin the process of communal polarization in a cognitive sense, with the 'wall in peoples' heads' being just as real as physical barriers and, in many ways, much quicker to build and much slower to dismantle (Cochrane 2013: 224).

Therefore, set against this wider understanding of urban conflict, what can we say about the destruction of the Site XI at Corbridge and across the local surrounding area? If the function of Site XI has been correctly identified as a *macellum*, then it does not seem unreasonable to argue that it is likely to have been part of a broader Roman strategy to consolidate their position in North Britain by adding economic and governance benefits to the military lever of power in the later 2nd century. As well as a tight military grip exercised by the units along and to the north of Hadrian's Wall, economic prosperity could have been encouraged by the establishment of a commercial centre at Corbridge to provide a symbolic benefit associated with Roman presence, to augment the more coercive role of military power. This may have been a precursor to the development of a local tribal government via elevation to *civitas* status as happened elsewhere in this period. There is evidence that Carlisle had achieved this by the mid-3rd century at the latest, and it is not unreasonable to think of Corbridge providing a similar function further east in the Tyne Valley (Burnham and Wacher 1990: 51-62; Mattingly 2006: 261; Hodgson 2017: 130-131). In this respect, the improved prosperity and prestige associated with the town at Corbridge would have broadened and deepened the stabilising effect on the local populations either side of the frontier.

By corollary, as we have seen in the modern examples above, it would have been an equally tempting target for any barbarian leader who sought to contest this approach. A strike against Site XI would have been a highly symbolic move against Roman prestige, sending a clear message - to the barbarian communities in North Britain as much as Roman authorities to the south - that a boundary was being drawn between the Roman and barbarian spheres of control. It is noteworthy that excavations at the major sites along Dere Street south of Corbridge, at Catterick and Aldborough, have not produced evidence of corresponding destruction to symbolic Roman architecture, although both do seem to have been provided with defensive walls around this time (Wilson 2002: 458; Ferraby and Millett 2021: 110). Furthermore, despite the attribution of the initial bridge collapse at Corbridge to barbarian action being highly speculative, it can also be fitted into this model. As Bidwell has observed, there are very few examples of stone bridges in Roman Britain at this time, and in these circumstances the bridge would have been equally symbolic of Roman power as a *macellum* at Site XI (Bidwell and Holbrook 1989: 138). While Hadrian's biographer could describe the rationale for building the Wall as being to separate the Romans from the barbarians, perhaps the barbarians felt the same way; they could even argue that they got the Romans to build and pay for the Wall on their behalf!

However, we should understand the limits of what can be inferred from the destruction evidence at Corbridge, Halton Chesters and Rudchester. While the archaeological evidence can be tentatively argued to represent barbarian activity when considered against a wider context of urban conflict, the case is unlikely to be conclusive on the current evidence. But the character of the destruction deposits, their chronological relationship with the structures damaged and the potential functions of those structures, suggests that Gillam's hypothesis - that the Corbridge destruction deposit does represent barbarian attack - is credible. And as such, we should perhaps see the barbarian leaders as having a well-developed understanding of strategic art – even if they would not recognize that phrase - rather than being the uncouth, uneducated and uncivilized opponents of the classical world.

Afternote

One Friday evening in November 1986, as the Roman archaeological community of Newcastle upon Tyne convened its weekly 'Friday Afternoon Club' in the Haymarket Hotel, Paul invited a young volunteer digging at South Shields Roman fort to join an '*expeditio*' the following day to examine the Roman sites at Chesters and Corbridge. During the trip, the volunteer had his mind opened – just a little bit – on how to interpret the finer points relating to the structural remains on display, particularly those at Site XI. Thirty-five years later - and at the end of thirty-two years of military service that has seen deployment to locations of urban conflict including Belfast, Berlin, Sarajevo and Gorazde - that young volunteer became a Colonel in the Strategy Branch at the Headquarters of the British Army. In this assignment, he worked in teams that attempted to hone the institution's ability to operate more effectively in an increasingly urban contemporary world. Some of the insights from this work are included in the paper above. I suspect that Paul will disagree with the conclusions, but it has been a privilege to write. Paul: thank you for helping to kick-start my journey.

Bibliography

Ancient sources

Dio, *Roman History* 73.8.1-2, Translation by E. Cary

Modern works

Bidwell, P.T. (ed.) 1999. *Hadrian's Wall 1989-1999.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Bidwell, P.T. 2009. The Roman bridge at Corbridge, in N. Hodgson (ed.) *Hadrian's Wall 1999-2009:* 101-107. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Bidwell, P.T. 2010. A survey of the Anglo-Saxon crypt at Hexham and its reused Roman stonework. *Archaeologia Aeliana* 5th series 39: 53–145.

Bidwell, P.T. and N. Holbrook 1989. *Hadrian's Wall Bridges.* London: English Heritage.

Bishop, M.C. and J.N. Dore 1989. *Corbridge: Excavations of the Roman Fort and Town, 1947-80.* London: English Heritage.

Brassington, M. 1975. A re-appraisal of the western enclave and environs, Corstopitum. *Britannia* 6: 62–75.

Burke, J. 2011. *The 9/11 Wars.* London: Allen Lane.

Burnham, B.C. and J. Wacher 1990. *The Small Towns of Roman Britain.* London: Batsford.

Cochrane, A. 2013. Breaking down the walls of heartache: reflections on the ordinary spaces of division and unification in Berlin, in W. Pullan and B. Baillie (eds) *Locating Urban Conflict: Ethnicity, Nationalism and the Everyday*. Basingstoke: Palgrave Macmillan.

Creighton, J. and R. Fry 2016. *Silchester: Changing Visions of a Roman Town* (Britannia Monograph Series

28). London: Society for the Promotion of Roman Studies.

Dore, J.N. 2010. *Haltonchesters: Excavations Directed by J. P. Gillam at the Roman Fort.* Oxford: Oxbow.

Evans, R.J. 2006. *The Third Reich in Power.* London: Allan Lane.

Ferraby, R. and M. Millett 2020. Isurium Brigantum*: an Archaeological Survey of Roman Aldborough.* London: The Society of Antiquaries.

Forster, R.H. 1908. Corstopitum. Report of the excavations in 1907. *Archaeologia Aeliana* 3rd series 4: 205–303.

Forster, R.H. and W.H. Knowles 1911. Corstopitum: report on the excavations in 1910. *Archaeologia Aeliana* 3rd series 7: 143–267.

Gillam, J.P., R.M. Harrison and T.G. Newman 1973. Interim report on excavations at the Roman fort of Rudchester, 1972. *Archaeologia Aeliana* 5th series 1: 81–85.

Hiro, D. 2002 *War Without End: the Rise of Islamist Terror and Global Response.* London: Routledge.

Hodgson, N. 2008. The development of the Roman site at Corbridge from the first to the third centuries A.D. *Archaeologia Aeliana* 5th series 37: 47–92.

Hodgson, N. (ed.) 2009. *Hadrian's Wall 1999-2009.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Hodgson, N. 2017. *Hadrian's Wall: Archaeology and History at the Limit of Rome's Empire*. Marlborough: Hale.

Knowles, W.H. and R.H. Forster 1909. Corstopitum: report on the excavations in 1908. *Archaeologia Aeliana* 3rd series 5: 305–424.

Mattingly, D. 2006. *An Imperial Possession: Britain in the Roman Empire.* London: Allan Lane.

Mitter, R. 2004. *A Bitter Revolution: China's Struggle with the Modern World.* Oxford: Oxford University Press.

Pullan, W. and B. Baillie (eds) 2013. *Locating Urban Conflicts: Ethnicity, Nationalism and the Everyday.* Basingstoke: Palgrave Macmillan.

Richmond, I.A. and J.P. Gillam 1950. Excavations on the Roman site at Corbridge 1946-1949. *Archaeologia Aeliana* 4th series 28: 152–201.

Richmond, I.A. and J.P. Gillam 1955. Some excavations at Corbridge, 1952-1954. *Archaeologia Aeliana* 4th series 33: 218–252.

Tamari, S. 2013. The public sphere in Ottoman Palestine, in W. Pullan and B. Baillie (eds) *Locating Urban Conflicts: Ethnicity, Nationalism and the Everyday.* Basingstoke: Palgrave Macmillan.

Wacher, J.S. 1974. *The Towns of Roman Britain*. London: Batsford.

Wilson, P.R. 2002. *Cataractonium: Roman Catterick and its Hinterland. Excavations and Research 1958-1997 Part II.* York: Council for British Archaeology.

Woolf, G. 2020. *The Life and Death of Ancient Cities: a Natural History.* Oxford: Oxford University Press.

Unravelling the North Tyne crossings of the Stanegate

John Poulter

Introduction

Although the Stanegate has long been known as the Roman road which ran between Carlisle and Corbridge, it is only recently that that the routes by which it approached these two sites have been recognised. At the western end, David Ratledge used LiDAR data and technology to show that this Roman road, after running westwards past Nether Denton fort, then divided just to the south of Naworth Park. One arm passed south of Brampton, and then running mostly under the modern A69 road, it crossed the River Eden at Warwick Bridge to head thereafter almost due west into Carlisle. The other arm, probably the later of the two, curved northwards to service the fort or fortlet at Boothby and the fort at Old Church, Brampton, before crossing the River Irthing at Irthington to stay north of the River Eden and so enter Carlisle from that direction.[1] In addition, also via the use of LiDAR, David Ratledge recently confirmed the course of the Roman road which has now been labelled the Western Stanegate. This showed it to have run almost entirely under the present day B5307 road from Carlisle to within less than a mile of the Roman fort of Kirkbride, near the Cumberland coast.[2] Now, thanks again to the use of the latest LiDAR data and software, David Ratledge has been able to reveal the probable courses of the Stanegate as it reached its putative eastern terminus at Corbridge. The picture, however, is complicated and questions remain to be addressed.[3]

Recent investigations

It is fair to state that until these breakthroughs, the peripheral courses of the Stanegate, especially at its eastern end, had been a mystery. In 2012-13, to help to try to resolve this issue, a major programme of investigation into the course of the eastern end of the Stanegate was conducted by the WallQuest project, managed by Tyne and Wear Archives and Museums. This comprised extensive geophysical surveys of the land on the eastern side of the North Tyne river, and also between the village of Acomb and the site of Roman Corbridge. As it happened, no trace of the Stanegate was revealed by this exercise, but as Nick Hodgson, the organiser, declares, this did not prove that no road had crossed the surveyed area. Geophysical surveys do not always pick up underlying remains, and in any case, ploughing could have removed the road altogether.[4] However, it did make it seem more likely, at least, that the Stanegate had not crossed these parts of the landscape.

As a preliminary to the foregoing study, the author had presented to the 2012 Arbeia Conference a prediction of the possible course of the Stanegate between the North Tyne and Corbridge. This was based upon inspections of the line of the Stanegate where it was already known in its central sectors. The point was made that although the Stanegate, unlike some other Roman roads, had not been underpinned by any long-distance alignment, it did tend to possess straight alignments when in sight of a fort or fortlet. This would make sense in that one of the functions of the forts and fortlets would have been to monitor traffic along the Roman road. Applying this principle to the land between the North Tyne and Corbridge it was noted that, as shown on the English Heritage Map of Hadrian's Wall,[5] the lane past the church at St John Lee was aligned at one end with the known course of the Stanegate, as it departed from Corbridge, and at the other end with a pair of Roman camp sites beside the North Tyne river (Figure 1). Moreover, the site of St John Lee appeared to have had a history going back to the time of Bede.

Because much of this possible alignment had lain under a modern road, it had not been practical to include it in WallQuest's geophysical surveys, but in 2017 the author asked David Ratledge to have a quick look to see if anything might show up using LiDAR. A slight trace of an agger was spotted beside the road near St John Lee, but perhaps more importantly traces of possible aggers were spotted a little further upstream on both sides of the North Tyne (Figure 2). In addition, together with the perceived course of the Stanegate around the north flank of Warden Hill there also appeared to be the short trace of a possible agger on the opposite side of the river, below Low Barns farm (Figure 3).

[1] Ratledge 2020: 62–64.
[2] Ratledge 2021a.
[3] In the period between writing this article and its publication, David Ratledge produced his own account of his discoveries of the course of the Eastern Stanegate. This was published – with the awareness and agreement of the present author – in the Winter 2021 issue of the Newsletter of the Roman Roads Research Association, and it was followed by a commentary by Dave Armstrong, Editor of the Newsletter. No change to the present article was made as a result, but references to Ratledge's account and Armstrong's commentary have been added to the bibliography for readers who might wish to consult these contributions to the literature. See Ratledge 2021b and Armstrong 2021a.
[4] Hodgson 2017a: 70.
[5] English Heritage 2010.

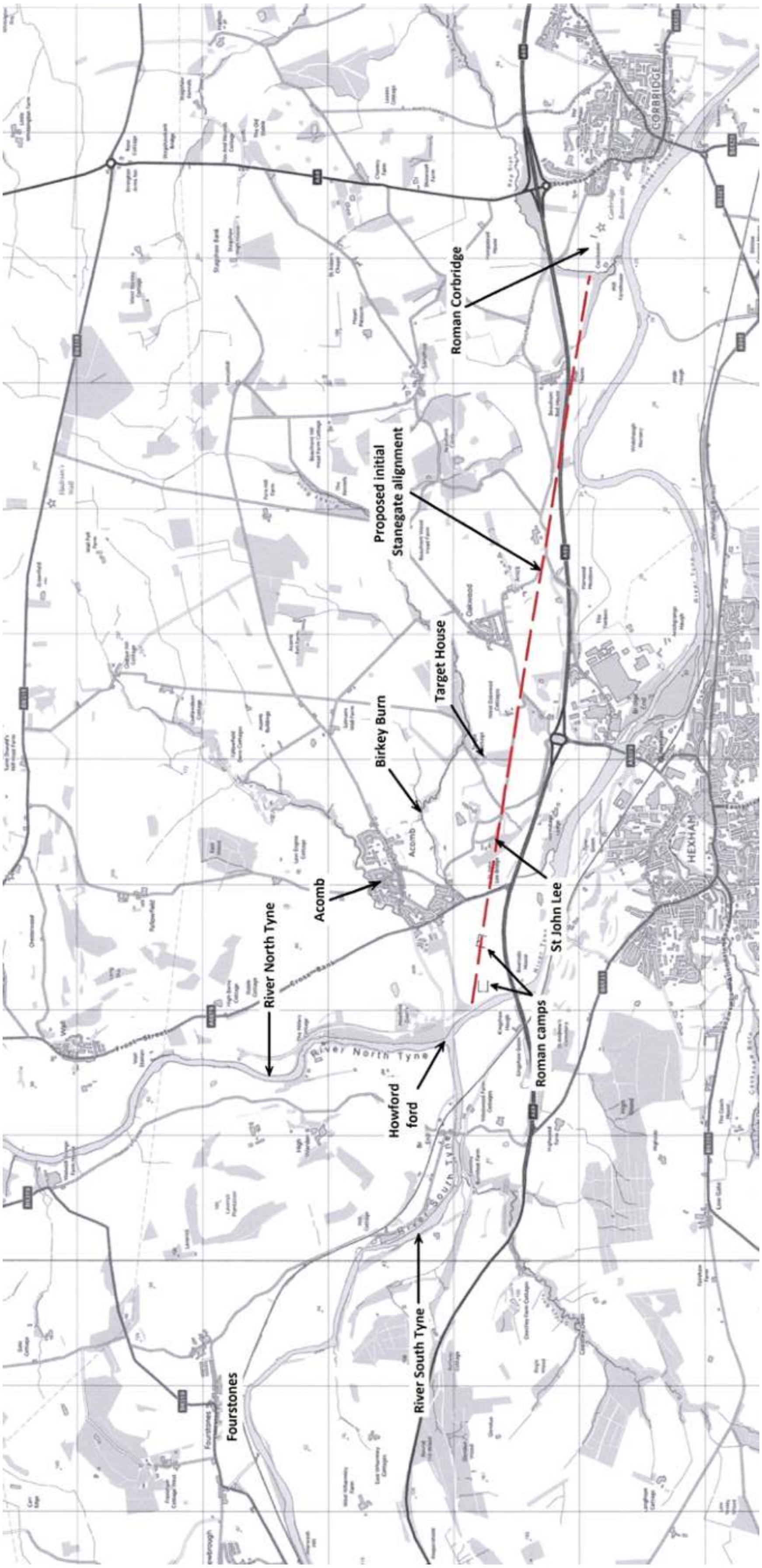


Figure 1: This shows the alignment of what may have been the initial course of the Stanegate route, from the River North Tyne past St John Lee to Roman Corbridge. Other points arrowed on the map indicate places to be discussed later in this article. Base mapping is derived from Ordnance Survey Opendata - © Ordnance Survey.

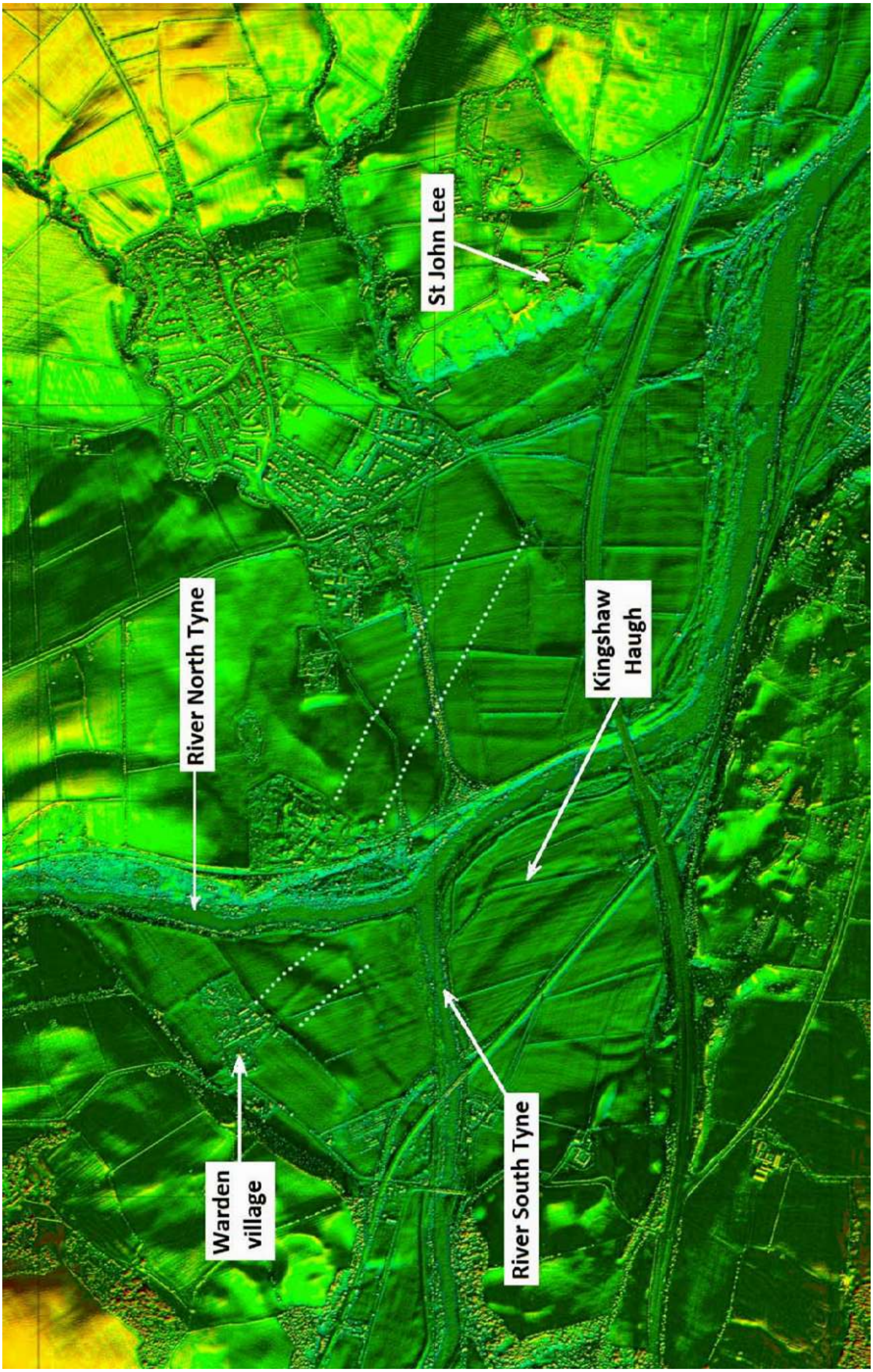


Figure 2: Series 1 LiDAR image showing traces of possible aggers on both sides of the North Tyne, just above its confluence with the River South Tyne. © David Ratledge. The LiDAR images are derived from the data provided by the Department for Environment, Food and Rural Affairs (Defra) and managed by the Environment Agency. It is made available under the Open Government licence v3.0. © Crown Copyright 2020.

It can be easier to view some of the detail of the LiDAR traces on the electronic image. Visit the URL below or scan the QR code on a mobile device.

http://doi.org/10.32028/9781803273440-LiDAR2

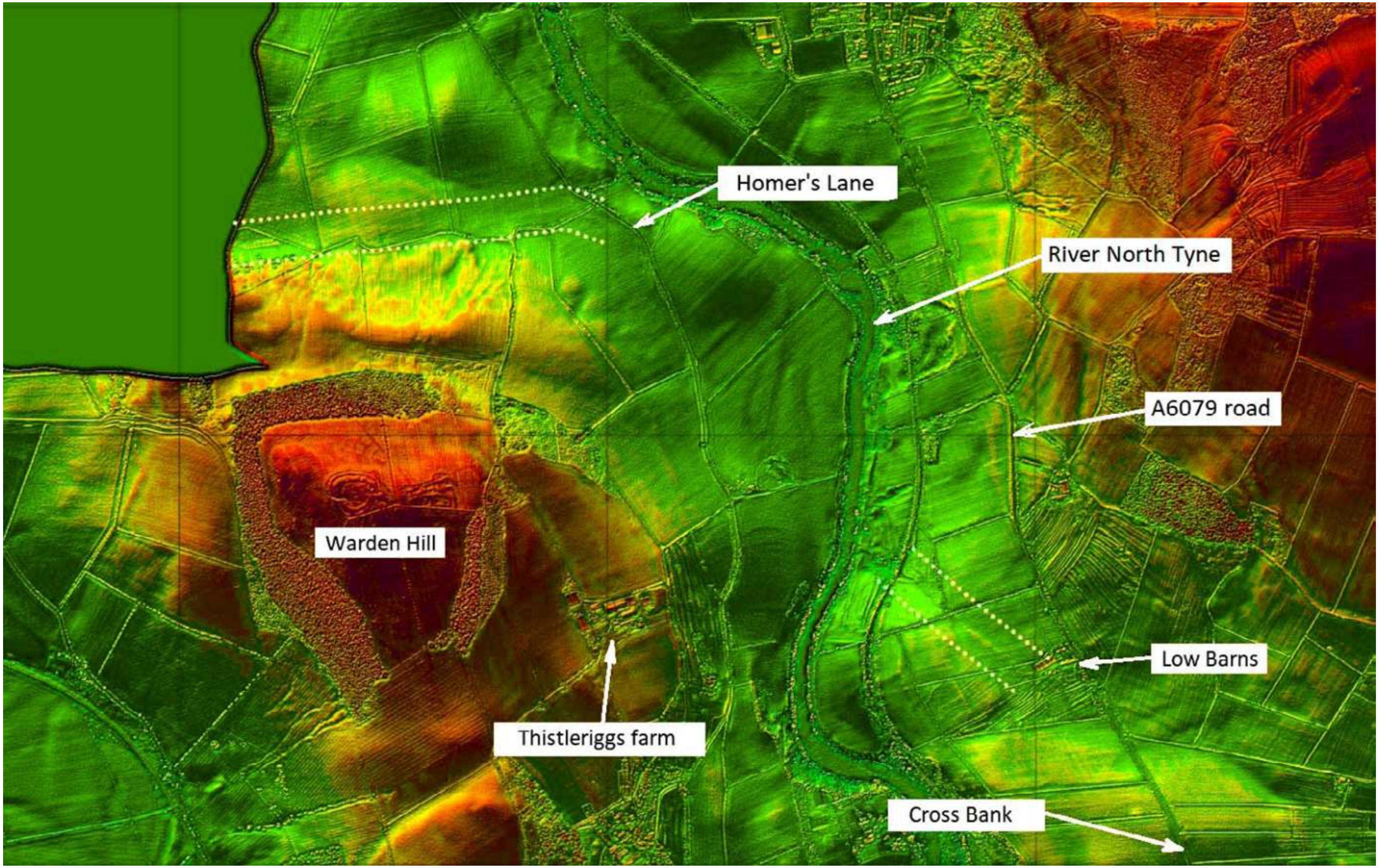


Figure 3: Series 1 LiDAR image showing traces of an agger traversing the northern flank of Warden Hill and, on the other side of the North Tyne, a possible agger to the west and north-west of Low Barns Farm. © David Ratledge. The LiDAR images are derived from the data provided by the Department for Environment, Food and Rural Affairs (Defra) and managed by the Environment Agency. It is made available under the Open Government licence v3.0. © Crown Copyright 2020.

It can be easier to view some of the detail of the LiDAR traces on the electronic image. Visit the URL below or scan the QR code on a mobile device.

http://doi.org/10.32028/9781803273440-LiDAR3

Early in 2021 the author asked David Ratledge if he could conduct a more exhaustive inspection of the area, employing the latest LiDAR data and software. The images shown in Figures 2 and 3 were generated in 2017 from series 1 LiDAR data, whereas the Environment Agency are now releasing higher quality series 2 data. This new data, with the appropriate software, enables LiDAR investigations to be more penetrating and also for examinations to be conducted from various visual perspectives. The outcome of this new inspection has now been to extend significantly the LiDAR traces by the lower North Tyne into indications of a complete road line running through the village of Warden and then over the southern shoulder of Warden Hill to join the known course of the Stanegate at the village of Fourstones (Figure 4). It has also confirmed the course of a branch road from Fourstones to the Hadrian's Wall fort and bridge at Chesters, and, on the other side of the river, the likelihood of a return route from north of the village of Wall, via the present-day A6079 road, to join the possible Roman road line past St John Lee near the village of Acomb (Figures 5 and 6). Unexpectedly, it has also revealed the possibility of a wholly new route into the site of Roman Corbridge.

However, contrary to the image from 2017, this latest LiDAR data and software failed to detect any clear sign of a course for the Stanegate around the northern flank of Warden Hill. In addition, although the trace of the possible agger on the opposite side of the North Tyne, mentioned above, did remain, its length was reduced even more.[6] These results led David Ratledge to raise doubt about the existence of this perceived part of the Stanegate altogether.[7] The past evidence is not without an element of uncertainty too. On the one hand, it was Henry MacLauchlan in the 1850s who first recorded the course of what he believed to be the Stanegate around the northern flank of Warden Hill, and he is generally regarded as a reliable observer.[8] In addition, R.P. Wright's excavations in 1937 and 1938 appear to have been very thorough in detecting a road at that point and concluding that it was Roman.[9] Moreover, the earlier LiDAR trace in Figure 3 matches exactly the line for the Stanegate which Wright published in his 1939 report.[10] On the other hand, it must be noted that R.P Wright's first excavations in 1935 had led him to report that the course of the Roman road had run to the north of the line then shown on Ordnance Survey maps of the time.[11] His later excavations had instead found the course to be on the southern side of this Ordnance Survey line, but there is no comment about this discrepancy in his 1939 report.[12] On balance, in view of the match between the LiDAR trace in Figure 3 and Wright's line in his 1939 report (which is also the line shown on the English Heritage Map of Hadrian's Wall)[13], the author is inclined to proceed with the possibility that one of the courses of the Stanegate had indeed curved around the northern flank of Warden Hill and may also have continued a little downstream on the eastern side of the North Tyne, but that this prospect needs to be treated with caution. This caution is reflected in the Interpretation and in the Scope for Further Work below.

Interpretation

Fundamental to what follows is the presumption that, like the crossings of Roman Dere Street over the River Tees at Piercebridge, the Stanegate would have experienced multiple crossings of the River North Tyne during the 320 years or more of the Roman occupation of the area, and it is likely that these crossings would have existed in more than one place. The River Tyne, and the North Tyne in particular, were renowned for their frequent and destructive flooding. In 1771, for instance, a violent flood brought down all the bridges along the Tyne except for the 1674 bridge at Corbridge. Only ten years later, the new bridge at Hexham, built by John Smeaton no less, and scarcely more than one year old, was wrecked by another flood.[14] It was the failure of this bridge which tarnished Smeaton's glittering reputation as a civil engineer and shaded the final years of his career.

Because of its unbroken alignment, and because, as noted below, all subsequent possible courses of the Stanegate seemed to return to it, the direct line from Corbridge past St John Lee to the two Roman camps beside the river seems to have constituted the original course of the Stanegate (see Figure 1). It also offers the shortest line to Corbridge from where the course of the Stanegate has long been known, in the village of Fourstones. It does, though, pose a problem because with the courses of the South and North Tynes as they flow today, such a line, if extended, would have had to cross both the combined Tyne and then the South Tyne in succession, so doubling the risk of disruption to communications. However, based upon her analysis of the course of the River Tyne past Corbridge, Margaret Snape reports that in Roman times the Tyne is likely to have flowed in multiple braided channels, many of which could have been forded.[15] Pursuing this point,

6 In fact, David Ratledge (*pers. comm.*) wonders if the apparent agger might instead be the remains of a culvert.

7 David Ratledge *pers. comm.*

8 Wright 1936: 200.

9 Wright 1939.

10 David Ratledge (*pers. comm.*) suggests that one possible explanation for the eradication of the apparent LiDAR image between 2017 and 2021 could have been recent heavy ploughing of the two fields to the west of Homer's Lane.

11 Wright 1936, figure on page 203.

12 Although Wright does admit his mistakes to the east of Homer's Lane: see Wright 1939: 140.

13 English Heritage 2010.

14 Linsley 1994.

15 Margaret Snape *pers. comm.*

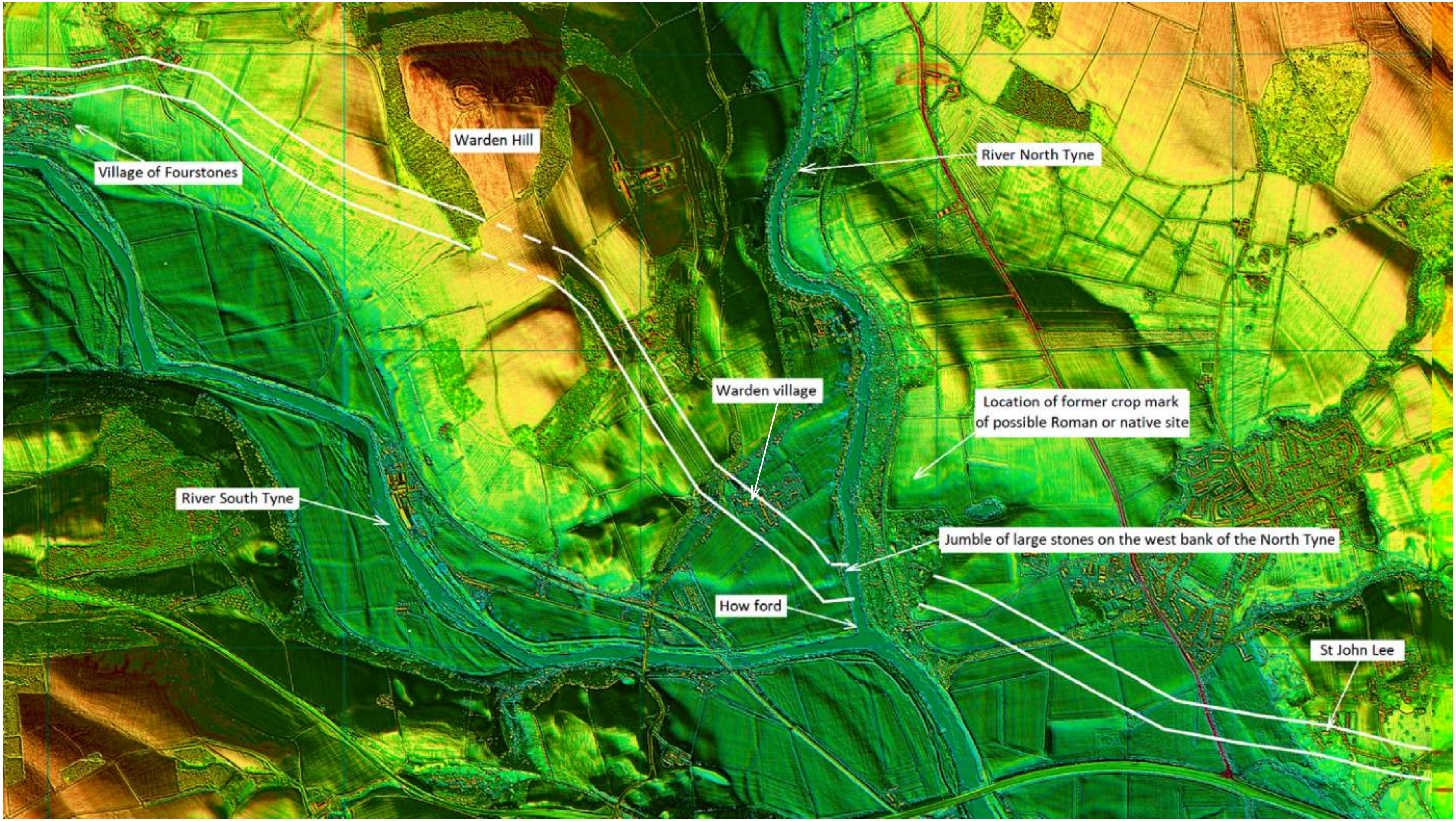


Figure 4: Series 2 Lidar image showing the probable road line running from the crossing of the North Tyne through the village of Warden and then over the southern shoulder of Warden Hill to join the known course of the Stanegate at the village of Fourstones. © David Ratledge. The LiDAR images are derived from the data provided by the Department for Environment, Food and Rural Affairs (Defra) and managed by the Environment Agency. It is made available under the Open Government licence v3.0. © Crown Copyright 2020.

It can be easier to view some of the detail of the LiDAR traces on the electronic image. Visit the URL below or scan the QR code on a mobile device.

http://doi.org/10.32028/9781803273440-LiDAR4

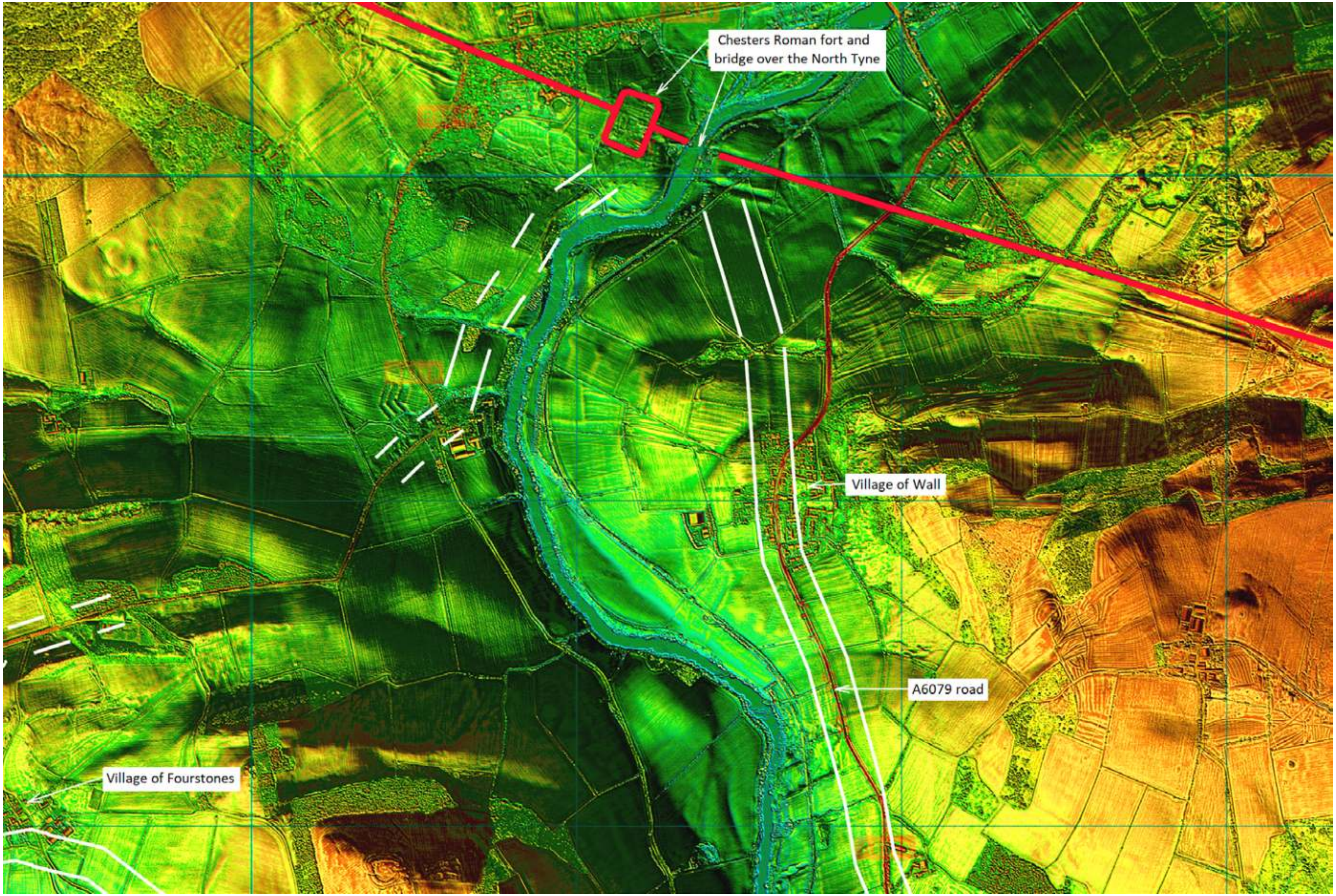


Figure 5: Series 2 LiDAR image showing a branch road from Fourstones to the Hadrian's Wall fort and bridge at Chesters, and, on the other side of the North Tyne, the indication of a return route from the north through the village of Wall and then via the present-day A6079 southwards towards St John Lee. © David Ratledge. The LiDAR images are derived from the data provided by the Department for Environment, Food and Rural Affairs (Defra) and managed by the Environment Agency. It is made available under the Open Government licence v3.0. © Crown Copyright 2020.

It can be easier to view some of the detail of the LiDAR traces on the electronic image. Visit the URL below or scan the QR code on a mobile device.

http://doi.org/10.32028/9781803273440-LiDAR5

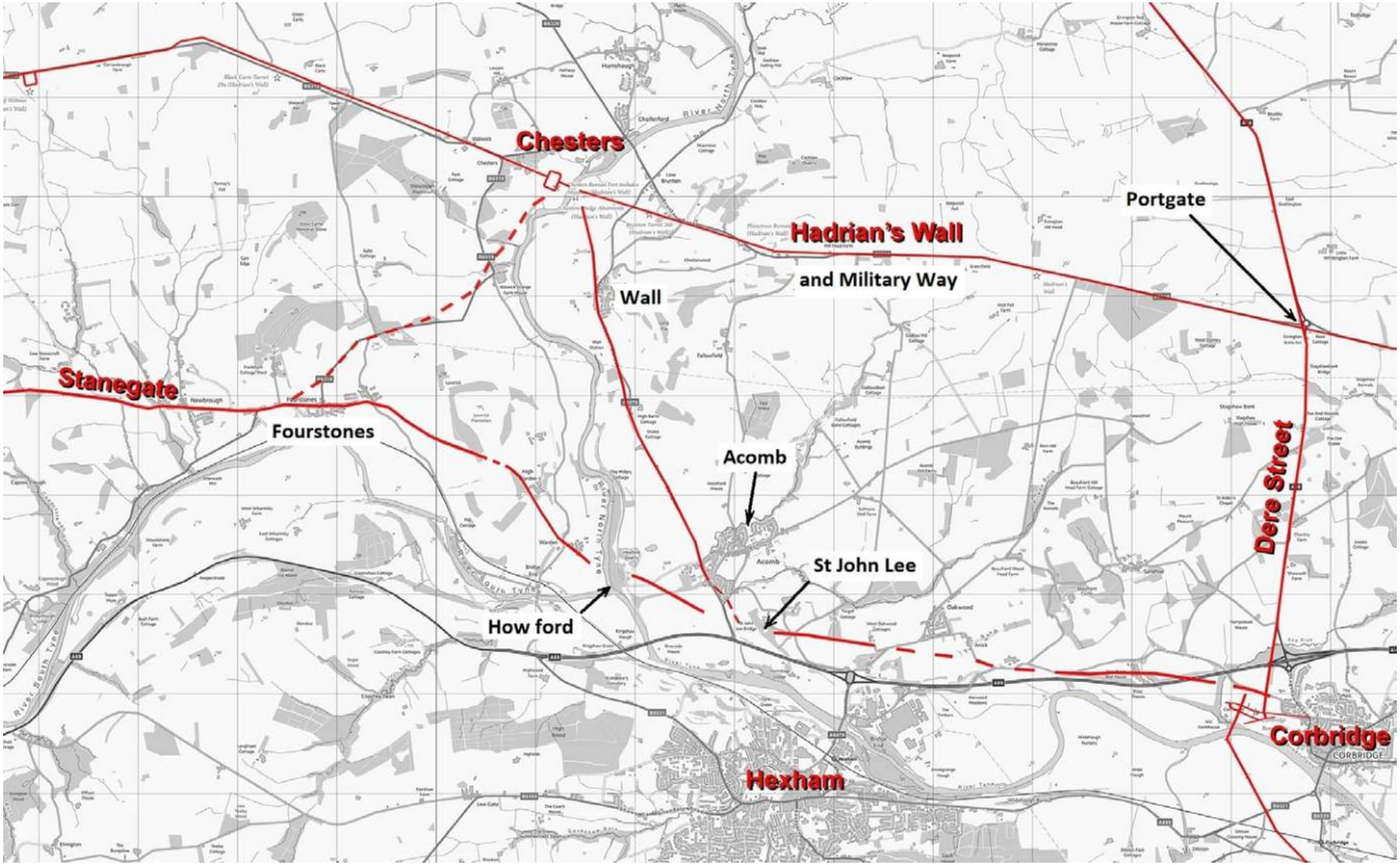


Figure 6: Overall map of the probable Roman roads in the area as revealed by series 2 LiDAR data. © David Ratledge. Base mapping is derived from Ordnance Survey Opendata – © Ordnance Survey.

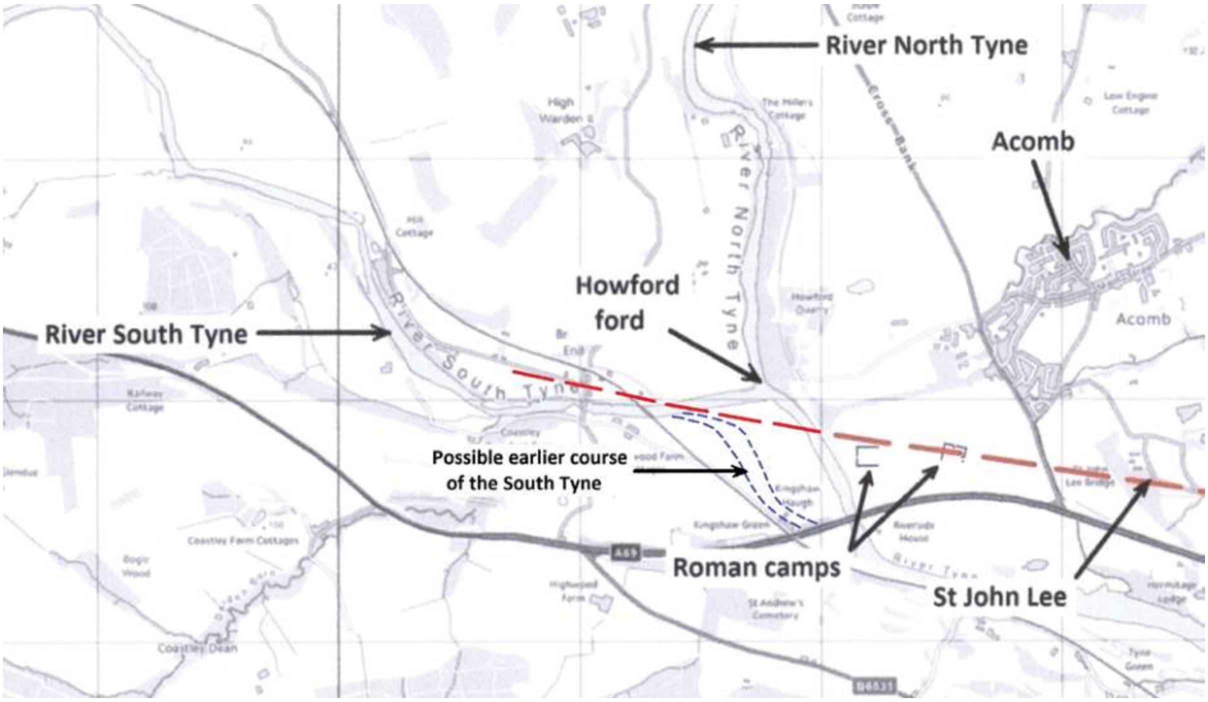


Figure 7: Possible former course of the South Tyne river, showing that the potential initial alignment of the Stanegate route, if extended westwards from St John Lee, could just have skirted the river's north bank at the time. Base mapping is derived from Ordnance Survey Opendata – © Ordnance Survey.

as can be seen on the LiDAR image in Figure 2, there appears to have been a broad earlier river channel which crossed the fields of Kingshaw Haugh, to the south and west of the mouth of the present course of the South Tyne. If this had served as the course of the South Tyne when the Romans had first sought to traverse this area, then the direct alignment extended from St John Lee would have just skimmed along the north bank of the South Tyne – as it had then been – before proceeding onwards towards Fourstones (Figure 7).

Heading in this direction towards Fourstones, a prominent terraceway is visible running in a straight line from NY 903 667 to NY 902 670 on the hillside above the paper mill. It can be seen clearly from the modern public road to the north of the railway crossing. At first sight, this has something of the appearance of the agger of a Roman road. However, where sheep or water action have cut into its embankment, the terraceway can be seen to have been constructed of cinders, and it can therefore be dismissed as Roman. Otherwise no sign of a possible agger along this route, close by the river, has emerged from David Ratledge's latest LiDAR survey.

It is possible, though, that little evidence exists to be uncovered. In 1998 the author showed that the course of the Stanegate as it is known today is unlikely to have been built before 105. This is because the line of the Roman road, where known, notably curves to run past most of the military installations along its way. This is particularly so for the fortlets at Haltwhistle Burn and Throp, which are believed to have been Trajanic or even early Hadrianic in date.[16] Nevertheless the first forts which were erected between Carlisle and Corbridge, such as Vindolanda and possibly Nether Denton and Carvoran, seem to have been established in the 80s, and it is inconceivable that some form of communication between them did not exist from then on. Initially, this might have been just a track or possibly a lightly metalled and/or narrow road, and these might not show up on LiDAR scans.

It is judged unlikely, though, that such a road or track's passage across the North Tyne would have been left unbridged for long. Although that river would have been fordable when water levels were low, its propensity for flooding, and the consequent frequency of interruption to the Roman army's communications, would have been deemed quite unacceptable. This would thus have rendered a bridge across the river indispensable. Such a bridge would almost certainly have been made of timber, the slender posts of which would have presented the least obstacle to a surging torrent. Indeed, it could have been the causeways and embankments leading up to the bridge which would have been most vulnerable to the swirling waters of a major flood. The fact that there are two Roman camps beside the eastern bank of the river might be thought to indicate that at least one episode of repair or reconstruction of such a bridge

[16] Poulter 1998.

could have taken place during the life of this probable initial crossing point. However, Humphrey Welfare considers the camps more likely to have been marching camps,[17] and Nick Hodgson, noting that one of the camps possesses *claviculae*, also suggests that they could have been connected with early Roman campaigning in the area, perhaps denoting a fording/crossing point prior to the erection of a bridge.[18]

At some stage thereafter it appears that this probable original crossing point for the Stanegate became unsuitable. One possibility is that a substantial flood altered the course of the River South Tyne so as to flow where it does today, in which case a move upstream along the North Tyne would have been warranted. This is where the LiDAR traces shown in Figure 2 indicate where such a crossing might have been, almost opposite Warden village. These LiDAR traces may also represent the course of the Stanegate at the time when it was being constructed to a full Roman road standard, i.e., in or after *c.* 105. Thus, turning away from the direct alignment below St John Lee, and after crossing the river at the new location, the LiDAR traces now indicate that the road might have proceeded through the village of Warden and then taken a loftier line across the southern shoulder of Warden Hill on its way to Fourstones (Figure 4).

On the river, just upstream of this possible new crossing point, there is a jumble of large square-cut stones, which have been tossed about on the west bank, presumably by a flood (Figure 4). They appear to have come from a very substantial structure at the side of the North Tyne but, upon first inspection, they did not appear to be Roman. There were no lewis holes on them, for instance, nor any decorative tooling, and so it was assumed that they had probably belonged to a more recent pier or quay for a ferry across the river. However, a subsequent search through records – or indeed for any knowledge – of a ferry across the North Tyne at this point has proved negative. Hence a more extensive inspection of these stones would be warranted, as is discussed under Scope for Further Work, below. Just a little more upstream on the eastern side of the river, an aerial photograph taken in 1949 showed part of a rectangular enclosure, now unfortunately obliterated (see Figure 4 for its location).[19] Ernest Sockett reports that Grace Simpson had sectioned the ditch surrounding the enclosure and found it to be only three feet deep.[20] Furthermore, from an examination of the photograph, Nick Hodgson advises that the ditch could as easily have been part of a native site as a Roman one. Nevertheless, if the possibility exists that it could have been the latter, it would strengthen the case for Roman activity in this area. Finally, just downstream of this potential new crossing point is the ford across the river at Howford, which, as maps show, remained in use until quite recent times.

The next step in the sequence has to remain more speculative, not least because, as discussed above, the existence of a course of the Stanegate around the northern flank of Warden Hill may now be questionable. Within the on-going sequence of events, perhaps the likeliest possibility to have occurred next is that for some reason the postulated bridge crossing over the North Tyne near Warden became unsatisfactory. It may simply have been swept away by another flood. Alternatively, the area of land beside the river, especially on its western side towards Warden, is low-lying. Thus any significant flood would, each time, have created a lake which, despite any embankment of the Stanegate's agger, could have made it difficult on such occasions for traffic even to reach the bridge. Whatever, it appears possible that an attempt may have been made to move the Stanegate's crossing of the North Tyne yet further upstream, where the riverside profile is narrower, and thus where the spread of any flooding would have been more constrained. This narrowing would have made the speed of any torrent even more violent, but the Roman bridge builders may have felt that they could cope with that.

If such a crossing further upstream had indeed been attempted, then, to judge from the trace of a possible agger on the eastern side of the river, the spot chosen is likely to have been to the north west of Low Barns Farm (Figure 3). To reach this point, it might be thought that since the line of the Stanegate had apparently already been built around the southern shoulder of Warden Hill, it would have been easy to have added a new stretch of the road from this line so as to curve round to the new crossing point via Thistleriggs Farm (see Figure 3). However, the slope down to the river from there is quite steep, and this may be why, if such a new crossing had been attempted, the Romans could have opted instead to construct, from Fourstones, a new line for the Stanegate around the northern shoulder of Warden Hill. The overall distance from Fourstones is not much longer and the gradients are less steep. Alternatively, it is possible that the Romans had already built, or planned to build, a link road from the Stanegate at Fourstones to the fort at Chesters. This could have emanated in the same way that link roads came to be built from the Stanegate to the Wall forts at Housesteads and Great Chesters. In this case, constructing a branch

17 Welfare 2017: 566 and fig. 1. These camp sites were discovered during the English Heritage National Mapping Programme and have been given the numbers NMR 2172 1099 and NMR 20394 15 on the National Monuments Record. On the Heritage Gateway web site they can also be accessed as Monument Numbers 1086019 and 1453900 respectively, and their OS Grid References are given as NY 9252 6582 and NY 9219 6579, again, respectively.
18 Nick Hodgson *pers comm.*
19 Cambridge Air Photos 1949: Catalogue ID Acomb, D03.
20 Sockett 1992-3: 7.

from the link road to Chesters so as to run around the northern flank of Warden Hill could have seemed the most economical option.

Thereafter, if they had indeed sought to cross the North Tyne at this new narrower point, it seems likely that, from the LiDAR trace below Low Barns farm, the Romans, after having made the crossing, would have aimed to direct the road southwards via Cross Bank and then along what has now become the A6079 road (see Figure 3). This would have been in order to return the road to what appears to have been the original alignment of the Stanegate by St John Lee. Ernest Sockett notes a verbal report from a local farmer, declaring that earlier in the 20th century a causeway had been removed from a field just north of the cross, and it is possible that this feature might have fitted in with an alignment from the LiDAR trace up to Cross Bank. Unfortunately, the account was no more specific than that.[21]

For many years the author had been under the misapprehension that the perceived course of the Stanegate around the northern side of Warden Hill had simply ended after an abrupt turn southwards above Homer's Lane, and, naturally, the question was why? A careful re-reading of the reports by R.P. Wright and Ernest Sockett in preparation for this article made it clear that, if it had ever existed, it was not the Roman road which had stopped: it was the excavations that had been following it.[22] However, the LiDAR traces stop there too (see Figure 3). Roman roads, of course, are not obliged to reveal themselves to LiDAR surveys, but one possibility is that the conceivably intended new crossing had never been completed. At some time before or by the mid Antonine period, the first bridge carrying Hadrian's Wall across the North Tyne at Chesters – about 1.5 miles further north – was replaced.[23] Presumably the first bridge had failed, after a life of less than 30 years. This would not be surprising in view of its closely-spaced piers and probably not very tall arches, thus making it liable to form a blockage to any serious flood. The bridge which replaced it, built upon exactly the same site, was a much more robust affair, with piers spaced further apart and larger arches. It was also wider, and carried a road as well as Hadrian's Wall.[24] It therefore appears possible that any intention to create a new crossing for the Stanegate north west of Low Barns Farm could have been overtaken by the collapse of the first Hadrian's Wall bridge and that the opportunity had then been taken to construct a new bridge at Chesters which would carry both the Stanegate and Hadrian's Wall over the River North Tyne.

Alternatively, if a crossing for the Stanegate above Low Barns had indeed been constructed but had then failed at a later date, it is possible that advantage could then have been taken of the existence of the second bridge at Chesters to re-route the Stanegate over the latter. This, however, raises the question of what purpose the road bridge at Chesters had initially been intended to serve, if not the Stanegate. It might be thought that it could have been planned to carry the Military Way, maybe as part of the refurbishment of Hadrian's Wall.[25] This refurbishment appears to have been in progress towards the end of the Antonine period, and it is therefore conceivable that the construction of the Military Way, which was set out to run immediately to the south of the Wall, could have been one component of this exercise. However Paul Bidwell and Neil Holbrook express doubt that a monumental bridge such as the second one at Chesters would have been created for what they saw as a secondary route.[26] Admittedly, the creation of such a route would have allowed travellers from the Stanegate, after crossing the bridge at Chesters, to continue along the Military Way to the Portgate and then reach Corbridge by turning down Dere Street (Figure 6). However, if the Military Way had indeed been considered a secondary route, it seems unlikely that it would have been followed by the bulk of the Stanegate's traffic. The conclusions, therefore, are (a) that it is likeliest that the second bridge at Chesters had indeed been intended to take the primary road – the Stanegate – and (b) that the likeliest route for that road's traffic after crossing the North Tyne would have been along what is now the A6079, via the village of Wall, to join the postulated original course of the Stanegate near Acomb. This is what Paul Bidwell and Neil Holbrook suggested in their book *Hadrian's Wall Bridges*[27] and is what the latest LiDAR data shows (see Figures 5 and 6).

Nevertheless the detour via Chesters would have added to the distance which travellers on the Stanegate would have had to take on their way to and from Corbridge. Thus it can be imagined that whenever the North Tyne should still have been capable of being forded, the preferred route would have remained via the ford near Howford. The fact that a Roman milestone found near Crindledykes, towards Vindolanda, and dated to 223, recorded a distance of only 14 Roman miles, presumably to Corbridge,[28] appears to support this, in that it seems to match better the distance via the direct route.

---

21 Sockett 1992-3: 11–13.
22 Sockett 1973; Sockett 1992-3; Wright 1939.
23 Bidwell 1999: 23-24 and 119-120.
24 Bidwell and Holbrook 1989: 137, pl. 8 and fig. 12.
25 From correspondence with Dave Armstrong.
26 Bidwell and Holbrook 1989: 137.
27 Bidwell and Holbrook 1989: 137–138 and fig. 1.
28 *RIB* 2299.

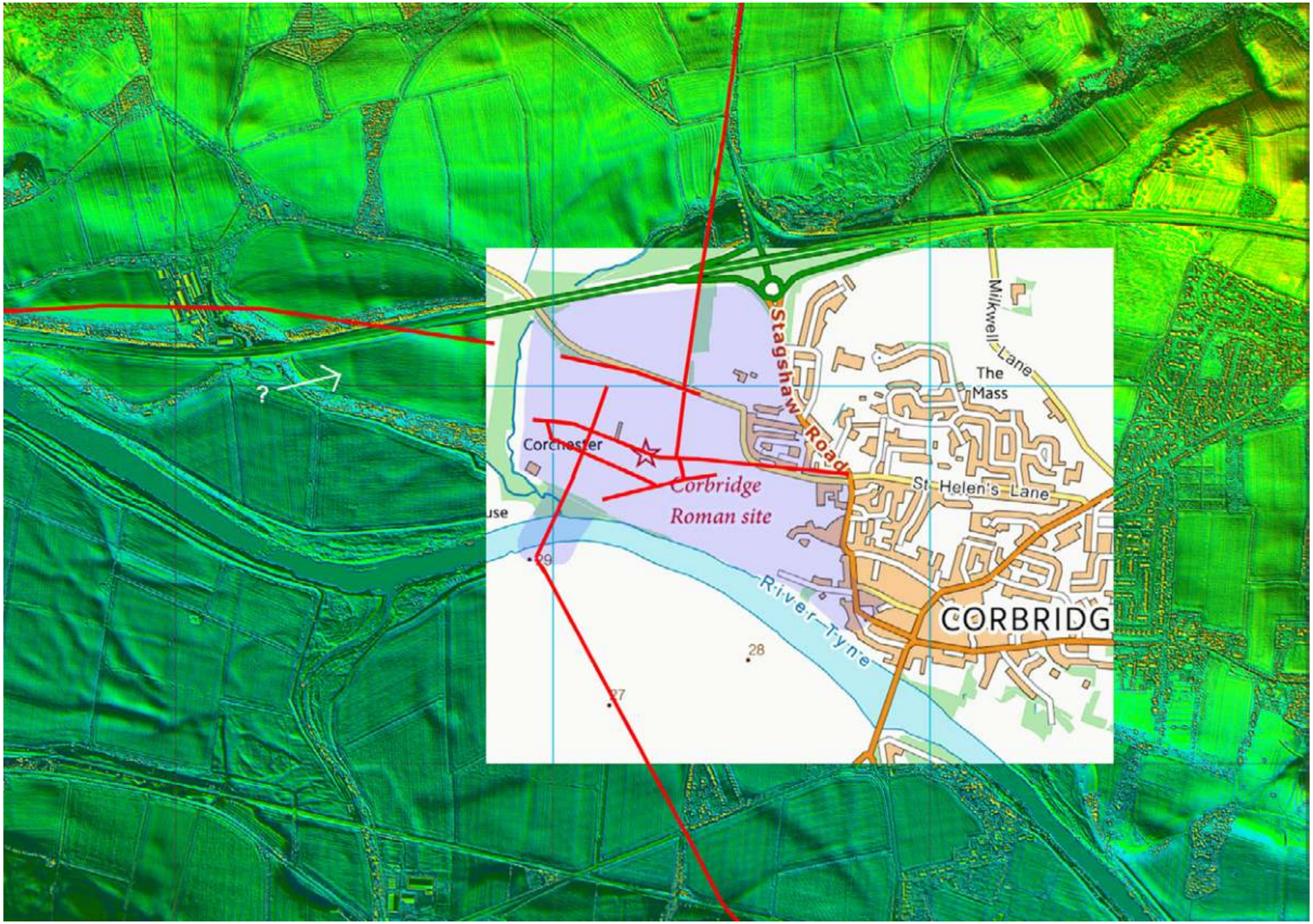


Figure 8: Map of the probable Roman road network in and around Corbridge, derived from series 2 LiDAR data, showing the possible course of the Stanegate unexpectedly entering the northern edge of the Roman site. The small white arrow with a question mark indicates the trace of a possibly more southerly approach to the Roman site from the west, and this does coincide with the putative initial alignment of the Stanegate which is shown in Figure 1. © David Ratledge. The LiDAR images are derived from the data provided by the Department for Environment, Food and Rural Affairs (Defra) and managed by the Environment Agency. It is made available under the Open Government licence v3.0. © Crown Copyright 2020. Base mapping is derived from Ordnance Survey Opendata – © Ordnance Survey.

It can be easier to view some of the detail of the LiDAR traces on the electronic image. Visit the URL below or scan the QR code on a mobile device.

http://doi.org/10.32028/9781803273440-LiDAR8

Scope for further work

The foregoing interpretation, and particularly the proposed sequence of events, is undeniably speculative in many respects, but it does appear to fit the evidence which has accumulated so far. Naturally, discoveries in the future could cause these propositions to be modified in part or even in whole. Meanwhile there are a number of features which would warrant further investigation at present.

The first of these are the LiDAR results themselves. David Ratledge recommends that they should be regarded as probable or likely rather than certainties, so that further LiDAR surveys using ever better-quality data and more sophisticated software would be worthwhile exercises to be undertaken, probably in the near future. Attention might be directed particularly to the question of whether or not one of the courses of the Stanegate did pass around the northern flank of Warden Hill, as discussed under Recent Investigations above. Geophysical survey might also be employed to try to resolve this question, as well as inspections on foot to see if scatters of stones or other possible indications of a ploughed-out Roman agger might still survive. Ultimately, though, only excavation might be able to provide a definitive verdict, and this is something which applies to all the traces of probable Roman roads revealed by the LiDAR images.

Perhaps the biggest surprise to have been thrown up by the latest LiDAR results is that there may have been a wholly new route for the Stanegate running into the northern boundary of Roman Corbridge (Figure 8). There is no sign at all of such a route on recent geophysical surveys,[29] and so perhaps, again, only some form of excavation would be able to resolve this possibility.

Beyond Corbridge, there is the question of whether or not the Stanegate was ever extended eastwards, similar to the way it has now been confirmed that it was extended westwards from Carlisle to the Cumberland coast. Nick Hodgson has revived a proposal that the Roman road known as the Devil's Causeway might have acted as an extension of the Stanegate frontier to the coast on the eastern side of the country.[30] The Devil's Causeway is the Roman road which is known to have run from Beukley on Dere Street, north of Hadrian's Wall, to the mouth of the River Tweed opposite Berwick-upon-Tweed. However, it is clear that this claim is referring to the concept of a Stanegate frontier rather than necessarily to the Stanegate road itself.

[29] Haynes 2019.

[30] Hodgson 2017b: 36; Stobbs 1996: 114.

In Corbridge itself, the Stanegate runs from west to east across the Roman site. Grace Simpson excavated its course up to the site's eastern boundary, but found no trace of the road thereafter.[31] The LiDAR image shown in Figure 8 indicates that there may have been a short extension of the line into modern Corbridge, but anything east of that will have become lost under the village. At the western end of the Roman site, however, R.P. Wright concluded from a series of excavations that the Stanegate's entry to the site there had been a diversion from an original course along the north bank of the River Tyne.[32] This original course, he considered, had run to the bridgehead where Dere Street, coming up from the south, had crossed the river to enter into Corbridge. It can therefore be taken as more likely that any eastward extension of the Stanegate would have commenced from this bridgehead. It should be noted that, from the staggered course which Dere Street – as known today – takes within Roman Corbridge, it is possible that the original bridgehead may have lain further east than the bridgehead belonging to the later stone Roman bridge over the Tyne.

From his latest LiDAR investigations David Ratledge reports that he has found no evidence beyond Corbridge for an eastern extension of the Stanegate along the northern side of the River Tyne.[33] The only recent archaeological evidence of a possible eastward extension has come from an excavation carried out in 2019 by the Northern Archaeology Group. This took place at NZ 0544 6223, on the north side of the River Tyne to the east of the village of Bywell, and was successful in locating what appeared to be the remains of a road possibly 22 feet wide with a profile similar to that of the Stanegate, where excavated elsewhere.[34] Although promising, the excavators regarded their work as exploratory and no more than the start of a more extensive programme of investigation, not necessarily by themselves.

Finally, there have been numerous suggestions that the Stanegate may have been extended eastwards along the southern rather than the northern side of the Tyne. However, so far these appear to be no more than that, i.e., suggestions.

To the west of Corbridge, the lane to St John Lee reaches a summit at the point where the drive to Target House meets it (Figure 1; Figure 9). This location, at NY 940 655, represents the limit of visibility looking westwards from Corbridge, and if the Romans had sought to erect an intermediate observation and signalling tower along the alignment – for instance, to relay to Corbridge a

[31] Simpson 1972.

[32] Wright 1941: 207–208.

[33] David Ratledge *pers comm.*

[34] Trow 2019.

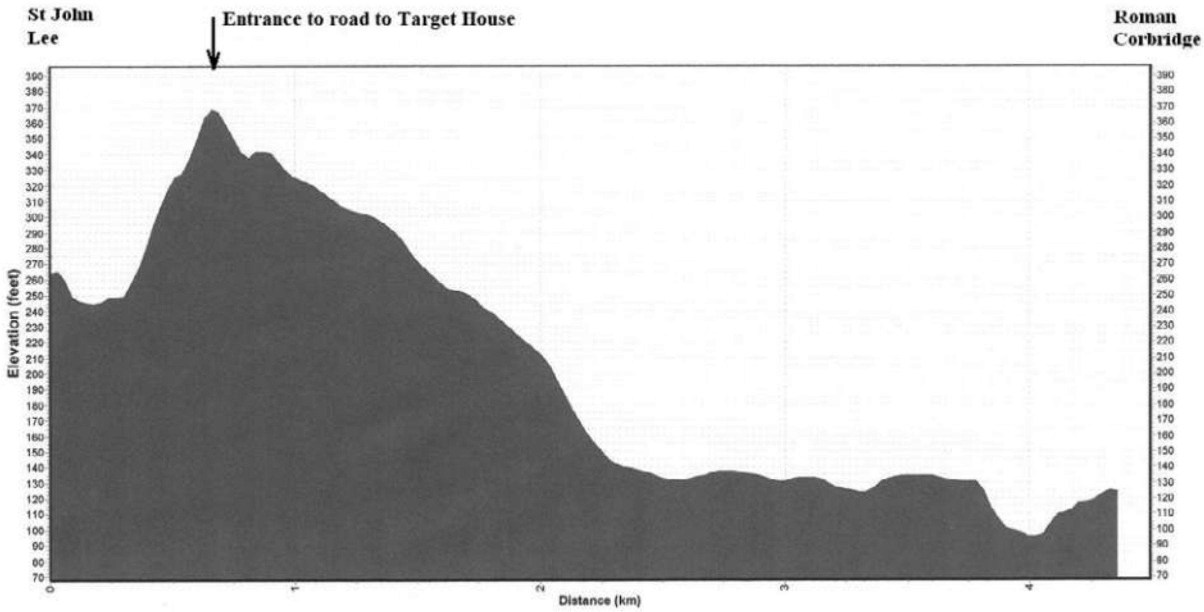


Figure 9: Profile of the elevation of the direct alignment from St John Lee to Roman Corbridge, showing the highest point to be where the private drive to Target House branches off.

warning signal from a vantage point near St John Lee – then this would have been the place. Accordingly, it could be worth conducting a more detailed geophysical or LiDAR survey around this location. Unfortunately, it is understood that some water or drainage work may have been undertaken at this junction in the past, so that a clear result might be difficult to achieve.

A little further to the west, at NY 934 659 to 662, a hedge beside a footpath going down to the Birkey Burn and then into Acomb contains a number of rounded stones and boulders (Figure 1). Such rounded boulders would seem to have been unsuitable for building a field wall, but eminently suitable for metalling a road. In addition, the profile of the ground under and to the east of the hedge is, in places, reminiscent of a Roman road. Therefore it could be worth putting a trench across it to see if this might be at least one way in which a re-routed Stanegate, coming down from the north, may have regained the suspected original alignment at St John Lee. It can be seen on Figure 6 that although the LiDAR image shows the re-routed Stanegate travelling southwards under the modern A6079 road, its passage through or around Acomb is uncertain.

As already discussed, the spread of large cut stones at NY 917 663 along the west bank of the River North Tyne does seem to warrant further investigation, even though on first inspection the stones did not appear to be Roman (see Figure 4). They lie a little upstream of where the LiDAR traces indicate that a Roman crossing of the North Tyne could have been, but not impossibly distant for them not to have been part of a Roman structure. Alternatively, it is at least conceivable that they could have come from the abutment of a second Roman attempt to bridge the river at this point, just slightly more to the north of a first attempt. Even if such a bridge itself might have been made of timber, the massive size of the eastern abutment of the second bridge at Chesters indicates how substantial bridge abutments on the North Tyne needed to be. An investigation on the opposite bank of the river would also be worthwhile, even though, in the end, a Roman connection for these remains may have to be discounted.

Finally, the outstanding mystery concerning the Stanegate's crossing of the North Tyne is the apparent absence of any fortification to protect the road at such an obvious route for hostile incursions into Roman territory from the north, prior to the construction of Hadrian's Wall. Amongst all the various re-routings postulated above, the one fixed point to which all routes seem to have returned is at St John Lee. This would have offered a fine vantage point over the confluence of the South and North Tynes but one which would have been well out of the waters in time of flood. The fact that it seems to have functioned as an oratory at the time of Bede suggests that there might have been some surviving structure there when Bede was writing.[35] Hence a thorough investigation of this site employing the latest archaeological practices and technologies might prove rewarding.

[35] Bede *Ecclesiastical History of the English People* 5.2.

Acknowledgments

First and foremost, thanks must go to David Ratledge, whose knowledge and skill in the use of LiDAR have put this latest research on a firm footing. In fact, David was offered joint authorship of this paper, but declined because of his many other commitments. Secondly, thanks must go to Nick Hodgson, who invited the author to contribute to this *Festschrift* for Paul Bidwell, and who provided some very useful references to sources of information and who also showed a keen interest in the findings as they came together, and then offered many valuable comments and suggestions upon initial drafts of this article.

Margaret Snape's help was instrumental in connection with the possible nature and course of the South Tyne river in Roman times, and Humphrey Welfare provided helpful answers to questions about the English Heritage Map of Hadrian's Wall, the Roman stones which had been observed in Warden village church, and about the lack of knowledge of a ferry across the North Tyne above the ford at Howford. Dave Armstrong, who recently published a comprehensive study of the Military Way which runs behind Hadrian's Wall,[36] engaged in a thought-provoking correspondence about the roadway running across the second bridge over the North Tyne at Chesters.

For information about investigations into the course of the Stanegate which had been carried out in the past, this author has been fortunate in possessing a personal copy of Graeme Stobbs's MLitt thesis.[37] This contains an account of all the antiquarian and archaeological research upon the Stanegate which had been reported up to the late 1990s. Unfortunately, this work has not been published, but it is understood that copies have been lodged in the libraries of the University of Newcastle and the Society of Antiquaries of Newcastle upon Tyne, and that a copy is also held at the English Heritage Museum at Corbridge.

Finally, acknowledgement must be given to the book *Hadrian's Wall Bridges* by Paul Bidwell and Neil Holbrook.[38] It was this book, and the thought that had gone into it, which triggered the author's interest in the Roman roads in the area of Hadrian's Wall, and in the Stanegate in particular.

[36] Armstrong 2021b.
[37] Stobbs 1996.
[38] Bidwell and Holbrook 1989.

Bibliography

Armstrong, D. 2021a. The Stanegate North Tyne crossing. *Newsletter of the Roman Roads Research Association* 21, Winter 2021: 20–24.

Armstrong, D. 2021b. *The Hadrian's Wall Military Way*. Pewsey: Armatura Press.

Bidwell, P.T. (ed.) 1999. *Hadrian's Wall 1989-1999: a Summary of Recent Excavations and Research Prepared for the Twelfth Pilgrimage of Hadrian's Wall, 14-21 August 1999*. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Bidwell, P.T and N. Holbrook 1989. *Hadrian's Wall Bridges*. London: Historic Buildings and Monuments Commission for England.

Cambridge Air Photos 1949. Cropmark west of Acomb, Northumberland, Catalogue number D03, taken 1949-07-09. University of Cambridge: Department of Geography.

English Heritage 2010. *An Archaeological Map of Hadrian's Wall, 1:25,000 scale*. London: English Heritage.

Haynes, I. 2019. Corbridge (?Coria), in R. Collins and M.F.A. Symonds (eds) *Hadrian's Wall 2009-2019: a Summary of Excavation and Research Prepared for the Fourteenth Pilgrimage of Hadrian's Wall, 20-28 July 2019*: 146-152. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Hodgson, N. 2017a. Quest for a lost Roman road in N. Hodgson, *Hadrian's Wall on Tyneside: an Introduction and Guide to the Latest Discoveries*: 68-74. Newcastle upon Tyne: Tyne and Wear Archives and Museums.

Hodgson, N. 2017b. *Hadrian's Wall: Archaeology and History at the Limit of Rome's Empire*. Ramsbury, Marlborough: Robert Hale.

Linsley, S.M. 1994. Tyne crossings at Hexham up to 1795. *Archaeologia Aeliana* 5th series 22: 235–253.

Poulter, J. 1998. The date of the Stanegate, and a hypothesis about the manner and timing of the construction of Roman roads in Britain. *Archaeologia Aeliana* 5th series 26: 49–58.

Ratledge, D. 2020. Cumbria's Roman roads, a second LiDAR update. *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* 3rd series 20: 38–42.

Ratledge, D. 2021a. The Western Stanegate Roman road, Carlisle to Kirkbride. *Newsletter of the Roman Roads Research Association* 19 (Summer 2021): 4–8.

Ratledge, D. 2021b. The Eastern Stanegate. *Newsletter of the Roman Roads Research Association* 21 (Winter 2021): 14–19.

Simpson, G. 1972. The Roman road eastwards from Corstopitum - Corbridge. *Archaeologia Aeliana* 4th series 50: 224–233.

Sockett, E.W. 1973. The Stanegate at Homer's Lane. *Archaeologia Aeliana* 5th series 1: 241–243.

Sockett, E.W. 1992-3. The Stanegate crossing of North Tyne. *Tyne and Tweed* 47: 3–16.

Stobbs, G.C. 1996. The Stanegate: a Frontier System in Northern Britain, *c.* AD 90-122. Unpublished MLitt dissertation, University of Newcastle upon Tyne (pdf obtainable from the author at graeme.stobbs@gmail.com).

Trow, W. 2019. Result of archaeological excavation at Bywell. Unpublished report Northumberland HER Event Record 16861.

Welfare, H. 2017. The function of temporary camps along Hadrian's Wall, in N. Hodgson, P. Bidwell and J. Schachtmann (eds) *Roman Frontier Studies 2009: Proceedings of the XXI International Congress of Roman Frontier Studies (Limes Congress) held at Newcastle upon Tyne in August 2009* (Roman Archaeology 25): 565–570. Oxford: Archaeopress.

Wright, R.P. 1936. The Stanegate at North Tyne. *Archaeologia Aeliana* 4th series 13: 199–206.

Wright, R.P. 1939. The Stanegate at Walwick Grange. *Archaeologia Aeliana* 4th series 16: 140–147.

Wright, R.P. 1941. The Stanegate at Corbridge. *Archaeologia Aeliana* 4th series 19: 194–209.

Declining military *vici* and emerging markets at forts on the North British frontier: two case studies

Margaret Snape

Introduction

It has long been noted that many civil settlements outside frontier forts apparently declined in the later 3rd century. Excavation of an area of *vicus* at South Shields revealed demolition of residential buildings by *c*. 260-70. This raises questions about the subsequent development of the extramural area and the fate of the *vicani*. Recent work across the frontier provides evidence suggesting market activity at several forts – either within the fort or at the gate – in the 4th century. For example, at Newcastle upon Tyne patterns of coin loss are best explained by the presence of a market extending into the centre of the fort at this date. These new discoveries raise new questions.

The case studies in this paper stem from the work of Paul Bidwell as head of the Archaeology Department of Tyne and Wear Archives and Museums (TWAM). They rely on the results of excavation under his leadership in the *vicus* at South Shields, and his interpretation of the coin evidence from the fort at Newcastle upon Tyne.

Military *vici* in general have received less excavation and study than the forts around which they were located, and are less well understood. A review by Sebastian Sommer (2006) of the present knowledge of military *vici* in Roman Britain is important for the study of the subject. His paper highlights two factors which have greatly increased knowledge, namely campaigns of geophysics in Wales and along Hadrian's Wall, and comparison with information derived from Continental examples (Sommer 2006: 96-97). Geophysical survey of *vici* on Hadrian's Wall has shown that these settlements are much more extensive than previously realised. However apart from sites at Vindolanda and Housesteads, there has been only limited excavation in *vici* along the northern frontier.

On the Continent it was found that in some *vici* the main road had a wide layout forming a piazza-like structure, usually interpreted as a market place: also simple strip buildings there were often provided with a *porticus*, lending a more conspicuous appearance and providing protection for passers-by (Sommer 2006: 117-118). This emphasises the commercial role of military *vici*, augmenting the accepted presence of houses, shops, taverns, workshops, temples and shrines (Breeze 2006: 82-83).

Geophysics has revealed possible market places in military *vici* on Hadrian's Wall. Geophysical survey at Birdoswald revealed that the main road leading out from the *porta principalis sinistra* widened into an open triangular space in the centre of the western *vicus* (Biggins and Taylor 2004a), suggesting a market place (Sommer 2006: 117-118). At Maryport geophysics found no widening of the main road; however this road ended in an area with no geophysical anomalies immediately outside the fort defences, running the length of the north-eastern side of the fort (Biggins and Taylor 2004b). Since the area is too small for an exercise ground for horses, and a parade ground is known elsewhere, it could be interpreted as a market place, although if so, its layout would be unique (Sommer 2006: 118).

It is therefore surprising that some of these large and thriving settlements apparently declined or were abandoned at a time when the fort which they served was occupied. In the 1980s there was much discussion on the end date of *vici*, with growing evidence that excavation in many military *vici* in northern England had failed to recover substantial traces of 4th century occupation (Bidwell 1991: 14). Notably this is true of the *vici* at Housesteads, on coin evidence (Brickstock and Casey 2009: 365-367; Rushworth 2009: 264-268), and Vindolanda where both coinage and pottery indicates the *vicus* 'was almost entirely abandoned in the later third century and certainly by the beginning of the fourth' (Birley 2013: 55-57). A recent review, providing further discussion, indicates that some of the military *vici* throughout northern England share the same sort of history as *vici* on Hadrian's Wall (Bidwell and Hodgson 2009: 33-34; Hodgson 2009: 35-36). However, there is a wider date-range for their abandonment. In some cases this occurred earlier than on the frontier, but at Malton the *vicus* continued into the second half of the 4th century (Wilson 2006) and at Greta Bridge into the first quarter of that century (Casey and Hoffmann 1998). Local factors, such as the topography, character or purpose of individual forts may have influenced the date of abandonment of their *vici*.

Reasons proposed for decline or abandonment of northern military *vici*

It is now recognised that an important factor in the decline of *vici* is the reduction in the strength of auxiliary units at this date (Breeze 2006: 84). Assuming that most of *vicani* were dependent on the market created by the units in the forts, the economy of the civil settlements would be badly affected (Bidwell and Hodgson 2009: 33-34; Hodgson 2009: 35-36). In addition the introduction of payment-in-kind through the *annona militaris* may have further reduced the spending power of the soldiers.

Possibly also the effects of civil wars and invasions in the empire of the later 3rd century would have affected the army of Northern Britain. Recently David Breeze has drawn attention to another possible factor: a pandemic in the 250s and 260s, known as the Plague of Cyprian, which was first attested in Egypt and spread westwards (Hodgson and Breeze 2020: 32-35). There are no references to the pandemic in the northwest provinces, but the army 'would have been an excellent vector for plague, with forts along the whole of the northern frontier of the empire providing stepping-stones for the spread of disease' (Hodgson and Breeze 2020: 34).

These are the various factors suggested to have caused the decline in many military *vici*. Of course it is possible that cutbacks to services, administrative and financial changes, conflicts abroad and a pandemic could all have occurred simultaneously, creating a 'perfect storm' which devastated the economy of many, though not all, of these communities.

South Shields *vicus*: a case study

Location and background: South Shields fort is located on The Lawe, a promontory at the mouth of the River Tyne (Figure 1). In this location the existence of a port would have been crucial. Except for the relatively brief occupations of Scotland 'the Tyne was the natural point of entry to the northern frontier zone' and the primary purpose of the fort 'must always have been to control and defend the port which would have been vital in maintaining links by sea with southeast Britain and the continental empire' (Bidwell and Speak 1994: 12-13). The port would have seen its greatest importance during the 3rd century when the fort was extended to become a supply base – housing 24 granaries at its maximum – for grain arriving by sea. The exact location of the port is unknown, but the topography of the river mouth suggests the closest point to the fort would be *c.* 400 m to the west of a sand bank called the In Sand (Figure 1) around a bend in the river (Bidwell and Speak 1994: 12-13).

As the fort lies in an urban setting, the potential for excavation in the extramural area has been limited, but prior to redevelopment works some investigative trenches have been available. The results of these excavations, together with watching briefs and records of earlier excavations and chance finds, have been collated (Figure 2). A study of the *vicus* area to the west of the southwest gate has been published (Snape *et al.* 2010). Subsequently an area immediately outside the fort's southwest corner was excavated in 2009-16 (Hodgson 2019).

The extramural area: Excavation showed that Roman remains lie 1.5-2 m below modern ground surface, thus Roman levels are remarkably well-preserved. However, the overburden contains ballast, foundry waste and building rubble, hindering exploration by geophysics. Hence there is insufficient information about the layout of the *vicus*. 'What is known of the *vicus* plan probably reflects the complex development of the fort and the presence of two separate focuses: the fort and the port' (Snape *et al.* 2010: 126).

As noted above, a port is likely to have existed from the earliest history of Roman activity on the promontory, the arrival of ships in the summer sailing season perhaps always attracting traders to the quayside.

One of the areas of the fort around which activity may have been focussed is the southwest gate. In the mid-Antonine period the *via principalis* led out of this gate. Excavation in 1985-89 of an area outside the gate (Figure 2) revealed a complex of roads beyond the outermost ditch (Frere 1989: 272). The main road out of the gate was 5-6 m wide and turned to run parallel with the ditches to the southeast of the gate, probably a little west of modern Baring Street (Snape *et al.* 2010: 63). Its line suggests it may have joined the major road to the south, known as the Wrekendike (Bidwell and Speak 1994: 133).

On construction of the supply base the fort plan changed, but the southwest gate remained important. Pottery evidence indicates that by the early or mid-3rd century the main road out of the gate had been extended on both sides. Another road approached the gate from the north. The overall impression was of an area beyond the defences covered by a broad spread of metalling (Bidwell and Speak 1994: 135). Also at this date a fence appears to have followed the edge of the main road where it curved southeast to run roughly parallel with the fort, thus enclosing the ditch system and preventing damage by humans and animals (Bidwell and Speak 1994: 135-6).

Initially the possibility was raised that this area might be a market place. However, the area is too small to make that interpretation. The presence of the modern road and buildings makes it impossible to say whether the metalling extended along the whole length of the fort defences as at Maryport, or simply formed a widening road running out under modern Baring Street.

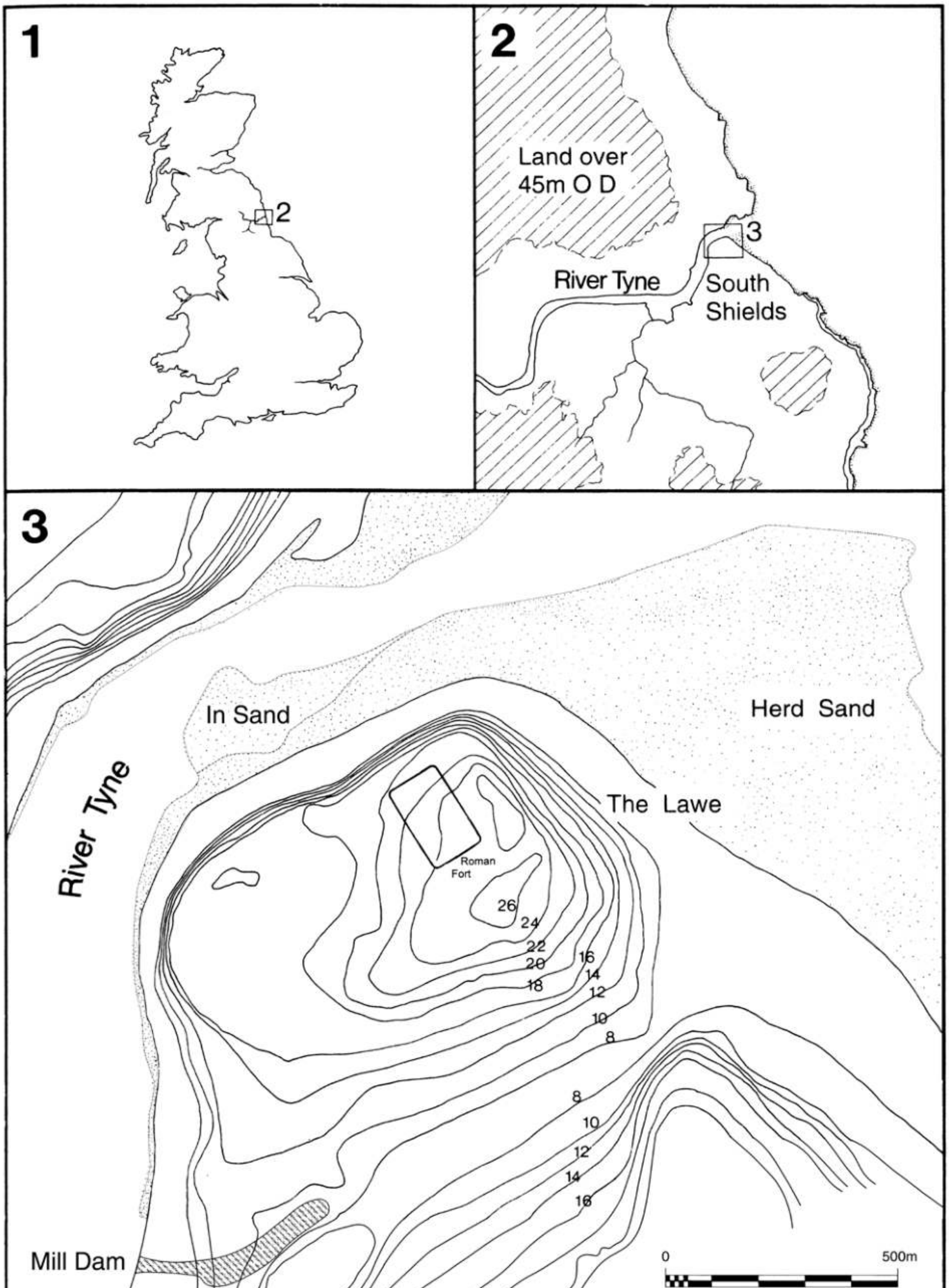


Figure 1. Location map showing South Shields Roman fort. Contours in metres indicate the present-day ground level, c. *2 m above Roman levels. Also superimposed are features shown on antiquarian maps. Reproduced from Snape* et al. *2010: 42, fig. 1.*

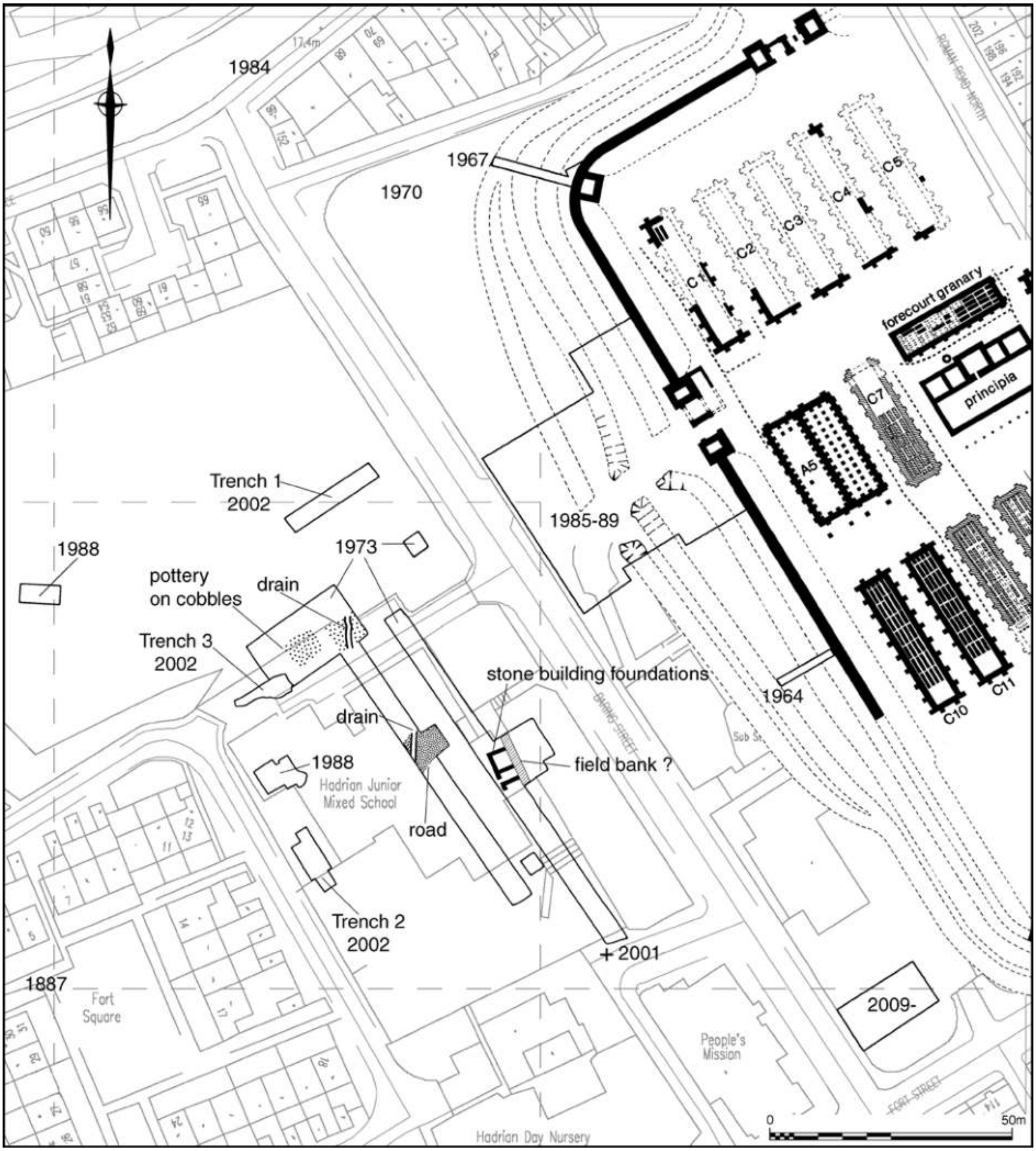


Figure 2. The location of investigative trenches in the extramural areas to the southwest of South Shields Roman fort. Reproduced from Snape et al. *2010: 44, fig. 2.*

Excavation in the *vicus* (Figure 2)**:** To the west of the southwest gate trenches were dug by South Shields Archaeological and Historical Society in 1973, and by TWAM in 1988, 2002 and 2009-16. Only small portions of buildings were revealed, but it was possible to glean much information. The large amount of pottery recovered was very useful in enabling dating (Bidwell and McBride 2010: 98-119). There were four main periods of activity to the west of the gate (Snape *et al.* 2010: 45, 125-128) and five outside the southwest corner of the fort (Hodgson 2019: 109-113).

i) Activity pre-dating the mid-Antonine stone fort.

Roads and structures of this period are likely to belong to the *vicus* serving an unlocated early fort (Bidwell and Speak 1994: 14-16). In Trench 2 a road, not closely dated but possibly Hadrianic or Trajanic, ran east/west towards the location suggested for the port. In Trenches 2 and 3 traces of timber buildings were dated by Hadrianic to early Antonine pottery; burnt daub indicated demolition prior to construction of the mid-Antonine fort. In the 2009-2016 trench a hollow was filled with clay dumps containing burnt daub, above which was a road on the same alignment as the new fort (Hodgson 2019: 109). Following construction of the mid-Antonine fort there was no occupation in the western area in the second half of the 2nd century, but the roads continued in use, influencing the layout of the 3rd-century *vicus* (Snape *et al*. 2010: 126).

ii) Reoccupation *c*. 210-230, contemporary with the supply base (Bidwell and Speak 1994: 20-26).

In Trench 2 a new road ran north/south, and fronting it was a timber building with a narrow passage on the north side. On the side of the building facing the road there may have been a narrow portico, possibly indicating a shop front. Beside it was a stone-lined well. Another stone-lined well was found nearby in 1988. In the 2009-2016 trench the clay dump was cut by the outermost ditch of the extended supply base. A paved walkway led to a hollow used for gold- and silver-smithing, dated by coins and pottery to the 3rd century (Hodgson 2019: 110).

iii) Modifications, 210-230 to 260/270, supply base fully enlarged, with 24 granaries (Bidwell and Speak 1994: 26-27).

Timber buildings in Trenches 2 and 3 were modified; part of a timber building was found in the 1988 trench on the same alignment as that in Trench 3. Excavation in 1973 of a trench close to the main road out of the southwest gate revealed foundations of a stone building with a cross-wall - or a building with stone foundations and timber superstructure (Snape *et al*. 2010: 60-5). As the stratigraphic record is missing it is impossible to relate this directly to the mid-Antonine stone fort (Snape *at al*. 2010: 126).

iv) Abandonment of *vicus* buildings, *c*. 260-270, change to agricultural use.

Although there was no break in occupation of the fort at this time (Bidwell and Speak 1994: 32-33) occupation ceased in the western *vicus* area. In Trench 3 the building was demolished. At the western end of the trench a north/south boundary gully was infilled and replaced by a clay bank with stone revetting, on the same alignment. This bank seems best interpreted as the boundary bank of a field (Snape *et al*. 2010: 127). Built directly on top of *vicus* levels, it remained in use into the 330s: a clay layer abutting contained slightly worn coin of Constantine I dated to 334-6 (Snape *et al.* 2010: 55).

In the 1973 trench systematic dismantling of the building is suggested by a spread of small stones in the interior, either infilling to level the remains or fallen in courses from the cross wall. A burnt layer overlying the floor could derive from roof timbers or wattle and daub walls. Above this were layers of large flagstones and blocks, and several associated hearths (Snape *et al*. 2010: 61, fig. 19). Running northwest/southeast across the remains of the building was a linear feature, of roughly the same dimensions as the bank in Trench 3 and with stone revetting at the sides, although the core contained small stones as well as clay. The two banks were on similar alignments, just 45 m apart, suggesting small fields.

In the 1988 trench the well was relined in the late 3rd century or later (after demolition of the adjacent building) and was used for a few decades after the abandonment of *vicus* buildings. The waterlogged fill contained plant remains, indicating food remains and the result of agricultural or food processing activities in the vicinity (Gouldwell and van der Veen 2010: 119-123). A linear intrusion suggested the robber trench of another possible field bank.

In Trench 2 the building went out of use, but it is unclear whether the removal of flags from the latest floor was the result of deliberate demolition or early medieval stone robbing. The *vicus* remains were sealed by layer of cultivated soil up to 0.3 m in depth rich in pottery, bone, iron and other finds, together with a few sherds of medieval pottery. Demolition levels and any possible late Roman accumulations will have been churned up by medieval ploughing. Samples from the fill of the well represented a mixture of natural silting and intentional infill material (Gouldwell and van der Veen 2010: 124). The plant remains suggest the well may have fallen out of use during the late 3rd century, but possibly remained open for some time afterwards. Both wells may thus have been surrounded by agricultural or cultivation activities for the time they remained open, i.e. till the early 4th century (Gouldwell and van der Veen 2010: 119-124).

Although the change to agriculture seems to provide evidence of decline, it must be stressed that the agricultural activity means only that an important area of the military *vicus* ceased to be residential. It does not necessarily mean total abandonment. There may have been occupation in other areas.

Evidence for continued activity in the extramural area: In the trench beside the southwest corner of the fort, the gold and silver workshop went out of use in the later 3rd century. Here, in contrast to the western *vicus* area, there was a final phase dating to the late 3rd century or possibly the early 4th. The fill of the former metal-working hollows was overlain by a new stone building - one corner of which was found - which was possibly the rear corner of a strip building fronting onto the road leading southeast from the southwest gate. This building was eventually destroyed by fire and contained a thick layer of burnt daub. An outermost ditch of the extended supply base cut the backfill of metal-working hollows; an intrusion cutting the road was maybe the terminal of another. The Roman sequence was overlain by a deep layer of ploughsoil (Hodgson 2019: 110-113).

In addition there could have been dispersed activity elsewhere, as suggested by pottery evidence. The cultivated soils above *vicus* remains contained 'only a little late third- and fourth-century pottery and some fourth-century coins. If these six or eight coins were lost in the course of sedentary occupation on the spot, one would normally expect to find much more pottery associated with them. The likelihood is that the coins were casual losses, but that the pottery represents one or more episodes of ephemeral occupation. The sources and types of almost all the pottery correspond with that from the main occupation of the *vicus*' (Bidwell and McBride 2010: 104-5).

Further evidence comes from excavation of a cemetery beside the main road 240 m south of the southwest corner of the fort (Snape 1994). The cemetery was in use for a long time. Two cremations were found, dated by pottery to the 2nd century. However, there were also inhumations dated to the 4th century by grave goods, of which some may belong to the second half of the 4th. One of the burials was of a female and two were of children (Snape 1994: 64). This indicates the presence of a civilian community, which by this late date might have been situated inside the fort walls.

As yet there is no evidence from South Shields that civilians moved into the fort. But by this time small towns had grown up at Corbridge and Carlisle. Any soldiers' families or veterans living in South Shields *vicus* could have moved to Corbridge, only a two day journey away. No fort along the Wall is more than one or two days journey from a town, close enough for a soldier on leave to visit his family or send rations to support them.

This is relevant to *vicani* engaged in commerce. Although veterans and families might readily move from South Shields *vicus* to settle in a town like Corbridge, for traders the situation may have been different. As mentioned above, from the earliest times the port could have been a magnet for trade. It is easy to imagine the arrival of ships in the summer sailing season greeted by stall-holders eager to sell fresh produce, local handicrafts and souvenirs. In the *vicus* outside the fort the shops, taverns and temples would be equally eager to greet the new arrivals.

During the 3rd century when the supply base held 24 granaries, the Tyne would have been busy with convoys of merchant ships and their warship escorts, so the *vicus* would have been a thriving community. The supply base was much reduced in size in the 4th century. However 'South Shields probably still remained of importance as a port until the end of the Roman period .... the port would have remained a vital link in the chain of communication for as long as dispatches, pay-chests and personnel passed between the northern frontier and the various seats of government' (Bidwell and Speak 1994: 45). Clearly in the 4th century there would still be a need for the commercial facilities apparently abandoned when buildings in the western *vicus* were demolished in the 260s or 270s. One can imagine ships arriving at the port, their passengers and crews streaming out onto the dock, happy to have survived the hazardous sea crossing and dangers of piracy, anxious to give thanks for a safe crossing and eager to find good food and drink, convivial company and lively entertainment. It seems unlikely, to say the least, that they would be told the nearest temples, taverns and shops were in the town of Corbridge, 30 miles away. A settlement providing these establishments could have grown up along the road leading from the fort to the riverside (Snape *et al.* 2010: 127). The arrival of ships would also provide a commercial opportunity for itinerant traders.

The emergence of markets in frontier forts in the late Roman period

In the absence of *vici*, itinerant traders might travel the frontier, seeking customers amongst the soldiers. This may have led to the emergence of markets in frontier forts, evidence of which is suggested at Newcastle upon Tyne.

Newcastle Roman fort (*Pons Aelius*): a case study

Introduction, location and background: Excavation by F. G. Simpson in 1929 established the position of the Roman fort (Spain and Simpson 1930: 505-6). An extensive campaign of excavation was undertaken by Newcastle City Archaeological Unit (NCAU), directed in 1976 by Barbara Harbottle and Margaret Ellison. In 1984-5 excavation was directed by Barbara Harbottle and John Nolan, and in 1987-92 by John Nolan. Post-excavation work was begun and an interim summary published (Harbottle 1989). TWAM excavated at the southeast corner of the fort in 1995-6. Following the merger in 1997 of NCAU and TWAM Archaeology Department, TWAM took responsibility for publication. This comprised an account of the excavations (Snape and Bidwell 2002) and a discussion paper (Bidwell and Snape 2002), the latter setting out the evidence for a probable market within the fort.

Newcastle was not one of the original Wall forts, but was added in the late 2nd or early 3rd century. It was built a little south of Hadrian's Wall, on a steep triangular promontory now called Castle Garth, bounded by the River Tyne and deep valleys of the Lort Burn and a tributary (Figure 3). This position was the lowest bridging

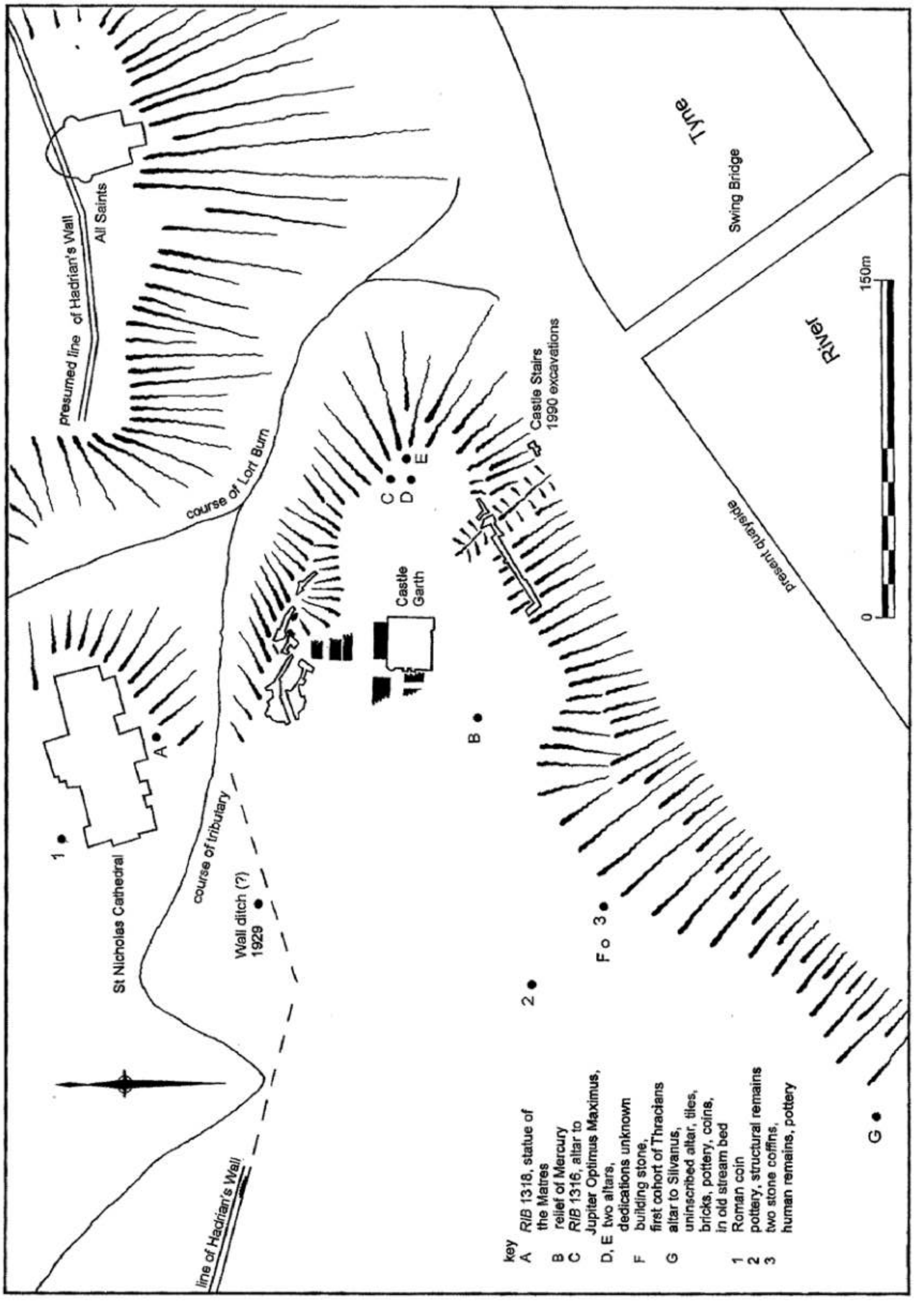


Figure 3. The location of Newcastle Roman fort on Castle Garth promontory. The course of the Lort Burn and its tributary are based on antiquarian records. The steep scarps are based on modern contours; it is assumed that in the Roman period the river ran close to the foot of the promontory. Excavated Roman buildings shown in black; also shown are the line of Hadrian's Wall and the location of Roman finds. Superimposed are the remains of the Castle and other structures. Reproduced from Bidwell and Snape 2002: 255, fig. 2.

point of the Tyne, with the Roman bridge – the *Pons Aelius* – located somewhere in the vicinity. A fort on the high-point of the promontory, with wide-ranging views, was tactically crucial in commanding the northern bridgehead and road networks connecting with it. However the topography of the site placed constraints on the layout of the fort. It was only *c.* 0.64 ha (1.53 acres) in size, and in shape an irregular rectangle with constricted northeast and southeast corners (Bidwell and Snape 2002: 253-7; Snape and Bidwell 2002: 5). The subsequent history of the site is complex, and 18 centuries of later building on Castle Garth have left scant remains of the Roman fort. The excavations of 1976-92 covered *c.* 770 sq m, probably less than 10% of the total fort area (Bidwell and Snape 2002: 253).

Nevertheless, the surviving remains are sufficient to reveal unusual elements in the street pattern and buildings, comprising an unusually wide cross street in the *praetentura*, unusual positioning of the granaries, and a small *principia* lacking a forecourt. These features have enabled a hypothetical reconstruction of the fort plan to be drawn (Figure 4). Detailed analysis and reasoning on which this plan is based is fully published, and is based on the changes of fort plan on Hadrian's Wall dating to the late 2nd or early 3rd century (Bidwell and Snape 2002: 293-274).

The plan proposed by Bidwell (Figure 4) differs from the conventional one for auxiliary forts on Hadrian's Wall, in which the *via principalis* is positioned so that the *praetentura* is about half the depth of the central range and *retentura* combined. Instead the northern part of the fort at Newcastle has a cruciform plan, formed by the *via praetoria* and the wide cross street. For practical purposes the granaries might have been regarded as part of the central range, the street formerly the *via principalis* becoming in effect an elongated courtyard of the *principia*. The *via praetoria* south of the cross street would then have been reserved as part of the ceremonial area in front of the *principia*, replacing the missing forecourt. A fort of this size could have accommodated a 3rd-century unit of reduced size (Bidwell and Snape 2002: 262-3).

The extramural area: Antiquarian discoveries indicated the presence of Roman occupation to the west of the fort. Altars found on the southern edge of the escarpment suggest possible temples. Further information has come from modern excavation, although because of the intense urban development, excavation has been limited to a few areas; a summary of all results is published (Graves and Heslop 2013: 56-64).

The main extramural excavation revealed rectangular strip buildings, a large well and signs of industrial activity; the buildings lay off a substantial metalled road which led in the direction of the west gate of the fort, 150 m away. Other trenches produced occupation material, roof tiles and considerable amounts of pottery of 2nd- and 3rd-century date. Roman pottery was found widely distributed through the extramural area, suggesting that 'the Newcastle *vicus* may therefore have been more significant than the meagre archaeological evidence, to date, suggests' (Graves and Heslop 2013: 60). Cemeteries, aligned at right angles to the road through the *vicus*, contained stone coffins and cremations (Graves and Heslop 2013: 60-62). The *vicus* may also have contained a market place. North of the fort and south of the Military Way there were no structures, but 'metalled surfacing overlain by accumulations of occupation debris might suggest the presence here of a marketplace, which would have flourished during the main period of extra-mural occupation' (Graves and Heslop 2013: 59).

Market activity within the fort: Evidence for marketing activity within the fort comes from the large number of coins lost on both the *via praetoria* and even on the street in front of the *principia* (Figure 5) (Bidwell and Snape 2002: 275-280). As part of building work in the second quarter of the 4th century (see below), the street in front of the central range was resurfaced. In the silt overlying the street there were 64 coins ranging in date from radiates of the 270s to issues of the 350s, the majority being coins of the 330s to 350s. On the metalling of the main part of the *via praetoria* there were 75 coins, mostly of the 330s to 350s, but with two Valentinianic issues of 364-375. The late Roman streets thus produced 143 coins, or 35% of the total coin list for the site.

More Roman coins were found in layers above the latest Roman occupation, presumably displaced by stone-robbing and the establishment of an Anglo-Saxon cemetery. They were concentrated on the line of the *via praetoria* and the area in front of the *principia*. Most of the 105 coins were of the 330s to 350s, but with five later issues – two of Valentinian (364-375), two of Valens (364-378) and one of Gratian (375). In conclusion the total number of coins from the streets and disturbed layers above the streets was 248, or 61% of the total coin list.

At first sight it might seem unlikely that a functioning fort could have existed when commercial activity extended towards the front of the *principia*. As explained above, this was a sacred area where this part of the street had a ceremonial function. However, the army had not completely abandoned the fort, because both the *principia* and *praetorium* were reconfigured in the second quarter of the 4th century – and the workers helpfully lost a coin of the 330s in the rebuilt layers of each structure.

The north wall of the *principia* was rebuilt, an undertaking which must have involved re-roofing the cross-hall. In the foundations of the new wall was

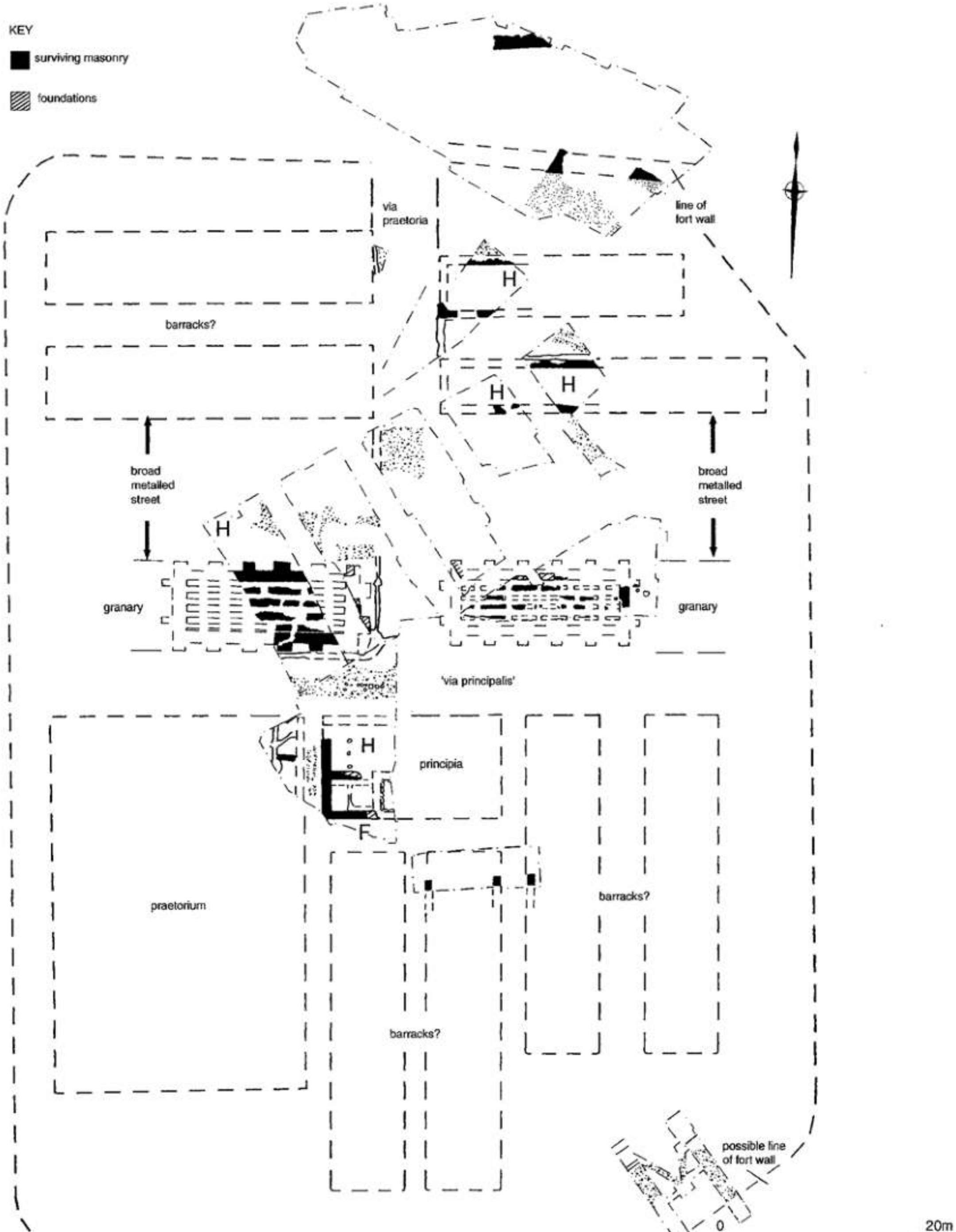


Figure 4. Hypothetical reconstruction of the plan of Newcastle fort. Reproduced from Bidwell and Snape 2002: 274, fig. 6.

a corroded coin of the House of Constantine, dated 330-335 (Bidwell and Snape 2002: 280; Snape and Bidwell 2002: 37). The east wall of the *praetorium* was reconstructed, a new hypocaust installed and possibly a new floor. A *terminus post quem* for the work is provided by an unworn coin of Constantine I dated 330-331, from the levelling layer preceding the work (Snape and Bidwell 2002: 44). The provision of a door in the east wall of the *praetorium* opposite that in the west wall of the *principia* gave the commander private access to the headquarters (Bidwell and Snape 2002: 280). So both buildings were operational when commerce was at its peak. Furthermore it is not known what structures existed in the rest of the fort. Perhaps there was enough space for a small unit, sufficient to supervise markets, which might have taken place only occasionally.

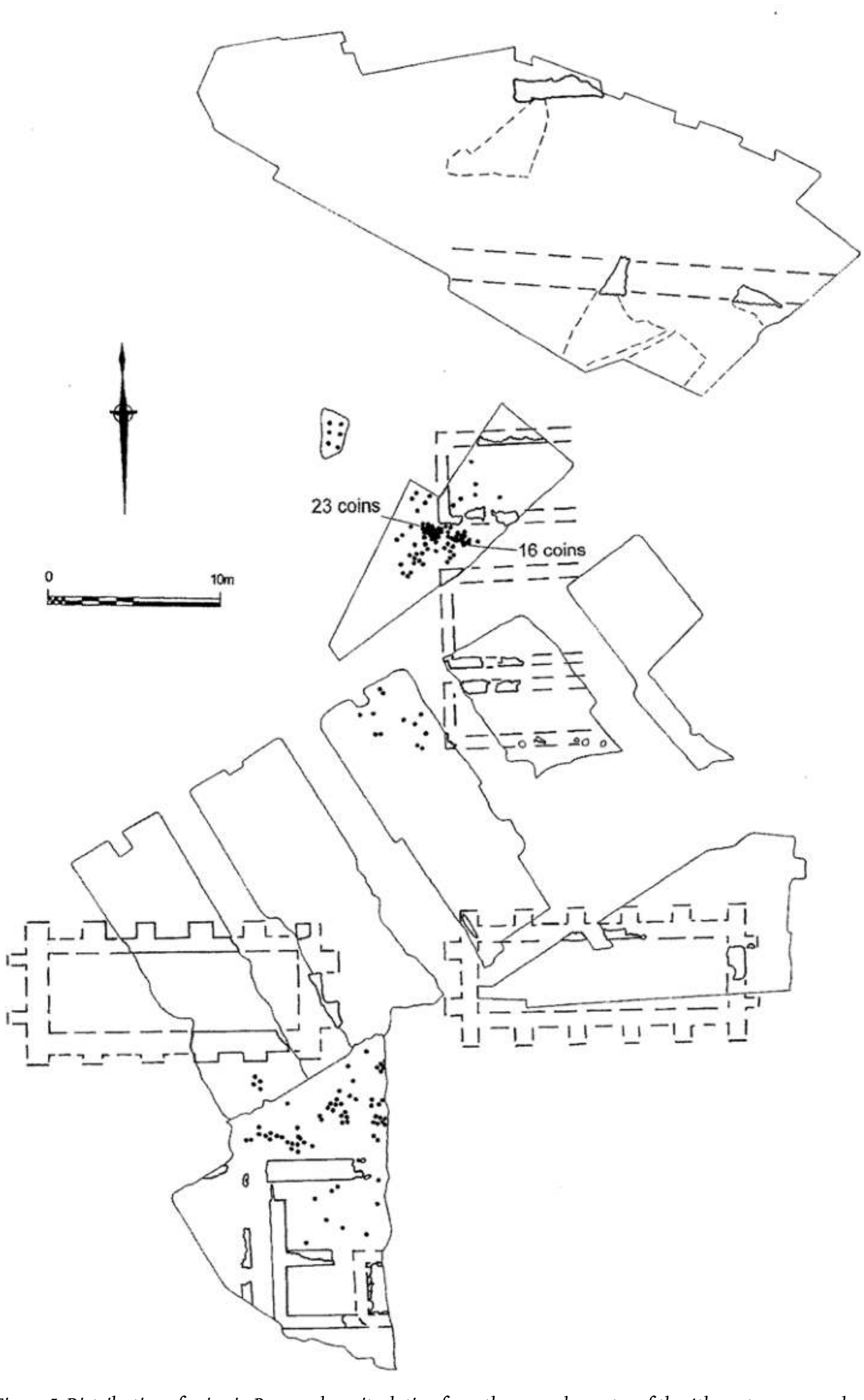


Figure 5. Distribution of coins in Roman deposits dating from the second quarter of the 4th century onwards. Also included are six coins found on the via praetoria *in 1973. Reproduced from Bidwell and Snape 2002: 278, fig. 8.*

The sheer number of coins has suggested a market of exceptional significance. Other finds from the street surfaces included many small copper-alloy objects. The pottery included unusually large amounts of handmade local traditional wares, presumably either a commodity in itself or as containers for locally made produce. Large quantities of this ware suggests direct trade between the occupants of the fort and people in its hinterland and indeed beyond the Wall (Snape and Bidwell 2002: 169-170). It has been suggested (Paul Bidwell *pers. comm.*) that farmers could have been paid in money at a cattle market somewhere outside the fort, money which they then spent in the fort – buying smaller, higher value goods, such as metalwork, glass or wine.

The end of military use of the site occurred in the second half of the 4th century as indicated by robbing of the *principia*, including stones from the *aedes* screen; a period of abandonment followed, dated by an accumulation of earth containing a coin of Theodosius I (388-395) (Bidwell and Snape 2002: 280; Snape and Bidwell 2002: 37-38).

In a significant event the *principia* was reoccupied after its abandonment. In the cross-hall a levelling layer containing red deer antler was overlain by a flagged floor covered in ashy soil. There was a floor of crude construction in the rear range office; charcoal fragments suggested occupation material. At some time after the 360s the inscribed base of a statue to the Empress Julia Domna was broken up and part of it used as a threshold stone (Bidwell and Snape 2002: 280; Snape and Bidwell 2002: 38). Thus a dedication to an Empress was placed on a layer of silt to be trodden underfoot – there could be no clearer sign of the end of normal military order.

Marketing activity at other forts along the frontier

Vindolanda: Here the *vicus* was almost entirely abandoned in the later 3rd century and certainly by the beginning of the 4th, as shown by the almost complete absence of coinage post-dating 270. Only occasional sherds of late Roman pottery were found in the *vicus*, in contrast to its abundance in the fort (Birley 2013: 56-57).

Excavation within the fort in the granary and stores area indicates the eastern granary may have retained its original function in the early 4th century, but later its role changed. The under-floor space became blocked with soil and debris, in which the latest dateable find was a coin of the House of Valentinian of 364-378. However, important structures like doors, loading bays and floor surfaces were retained. Possibly the frontage exiting onto the *via principalis* was used as a shop or other non-granary function. There is little evidence for use of internal space in the western storehouse, but it too could have been used for commerce rather than storage. The *via principalis* and street surfaces surrounding these buildings were resurfaced in the 4th century (Birley 2013: 40, 44-45; Hodgson 2009: 120).

Scattered on the *via principalis*, streets around the granary and stores, and *intervallum* road were nearly 500 mid- to late 4th century coins; they had a date range of 260-378, with a peak in the 330s to the 350s. In addition, excavation by Anthony Hedley in the 1830s recovered some 300 mid-4th century coins in the ruins of the west gateway. As at Newcastle, this can be explained by the presence of marketing activity (Birley 2019: 169; Brickstock 2013:123; Hodgson 2009:120). It is unlikely to have extended into the last years of the 4th century, since the assemblage includes only a single Theodosian coin of 388-402 (Brickstock 2013: 123).

The existence of 4th-century commerce at Vindolanda is taken to suggest the population of the *vicus* did not abandon the site altogether, but moved into the fort, the reduced size of units at this time creating sufficient space. However, this does not necessarily equate to a demilitarisation taking place, 'as the quantities of arms and armour located in the 4th century buildings indicate a continuous and strong military narrative' (Birley 2019: 169).

As at Newcastle changes to the central range signal the ending of conventional military usage. The *praetorium* was furnished with a bath-house and a small church while the *principia* has multiple surviving post-Roman features (Birley 2019: 166-168).

Carlisle: The early *vicus* grew into a sizeable town extending south and east of the fort. In the late 2nd or early 3rd century stone buildings appeared, including a possible *mansio* and public baths. There is good evidence that intensive occupation continued at least into the late 4th or early 5th century (Zant 2009: 9).

The fort continued in military use in the second half of the 4th century, when the portico of the *principia* was remodelled (Hodgson 2009: 137; Zant 2009: 334). The southern part of the area east of the *principia* was resurfaced, and a timber structure - possibly a lean-to against the east wall of the *principia* - was built (Zant 2009: 337-339).

Approximately 250 4th-century coins were found on the street surface in front of the *principia* and on the main east-west road to the south of the *principia*, but there were none within the building itself. The assemblage ranged in date from the 270s to the 360s-370s, the latest issued after 378, the great majority being issues of the 330-340s, again suggesting market activity (Shotter 2009: 684; Zant 2009: 463). It is suggested that the putative structure erected against the east wall of the *principia* was associated with this, perhaps even serving as a market stall. Items of personal adornment were concentrated in this area, as well as late Roman pottery (Zant 2009: 465).

Three or possibly four Theodosian issues, including one of 338-392, were associated with the penultimate phase of the lean-to structure. Also animal bone was associated with this phase, suggesting continued occupation into the 5th century (Shotter 2009: 684; Zant 2009: 465).

Wallsend: Here *vicus* occupation ceased or was drastically diminished by 270-280 (Hodgson 2003: 15, 17). Evidence of 4th-century marketing activity was found at the minor west gate of the fort in the TWAM excavations in 1997-8, directed by Paul Bidwell, Nick Hodgson and Bill Griffiths.

The minor west gate served as the principal entrance to the fort, being the first gate encountered by travellers approaching from the west along the Military Way. A high number of mid-4th century coins were lost in the passageway through the gate and in the immediately adjacent area of the *intervallum* street to the north. On the surface of the road through the gate, laid in the late 3rd or early 4th century, were 23 coins, with another eight on the northern *intervallum* street. A likely explanation is the existence of marketing activity, though on a smaller scale than that at the above-mentioned forts. Restricted to an area too small for an open marketplace, the activity is likely to have been purely local, the fort garrison being the principal customers. The pattern of coin loss suggests individual traders were admitted into the fort, with marketing closely supervised within or inside the minor west gate. With the exception of two radiates, the coins were of 4th-century date, the latest being slightly worn issues of Valentinian (367-375) (Hodgson 2003: 166-167).

Discussion

Of the factors which might explain why markets developed in these particular forts, the likeliest is accessibility. Newcastle lay at the northern end of the *Pons Aelius*, and it is possible there was a road running north of the fort (Bidwell and Snape 2002: 277). Similarly Carlisle could have been approached by a road from the north, suggesting a market operating in the same way.

At Vindolanda commerce could have started in a small way, with passing traders and pedlars arriving at the west gate. But again the road network was perhaps crucial. The east-west Stanegate road would have provided good access for travellers, so that eventually markets developed and extended into the centre of the fort. However, Wallsend at the eastern end of the frontier and bounded by the Tyne to the south, perhaps attracted fewer traders. However, it must be noted that the markets at Newcastle and Carlisle may have begun in the way suggested for Vindolanda – but we lack evidence from their gateways.

Newcastle provides another possible factor in the emergence of markets in forts. The area may have been a meeting place in prehistoric times. The deposition of high-status bronze objects in the River Tyne suggests the river crossing could have been the focus of important religious ceremonies (Graves and Heslop 2013: 23-25). As a fort located at a former meeting place, its local tradition may have been revived in late Roman times. Might the same factor apply at other sites?

This may apply to Carlisle where the town became the tribal capital of the Carvetii, the *civitas Carvetiorum* by 223 (Zant 2009: 9). But why at Carlisle was a market held within the fort when the adjacent town was presumably an active marketing centre (Hodgson 2009: 38)? Was there a particular need for close military supervision?

As listed above the factors leading to decline or abandonment of many military *vici* suggest probable economic collapse. So what became of the inhabitants? At South Shields was there ephemeral occupation in the extramural area, or a move to the port? There is nothing to show that civilians moved into the fort – at least before the later 4th century – however this has been argued to have happened at Vindolanda. Did soldiers' families and veterans move into the towns? Could craftsmen and traders find work and settle there? Or become itinerant traders, peddling their wares along the frontier?

After the initial shock to many northern military *vici* in the 270s there was some revival of trade, perhaps recovering slowly at first, but only six to eight decades later a new market economy flourished in some forts whose civil settlements had suffered decline. But profound changes were to come. At Newcastle eventually commerce encroached into the sacred space in front of the *principia*. Military use of the site ended and the *principia* was robbed and abandoned. The old order weakened, and former officers gave way for those who reclaimed the abandoned building, living in a changed world. The same process has been recognised in the central ranges at Vindolanda and Carlisle, also dated by Theodosian coins. And will the same be found at other sites?

The studies of South Shields and Newcastle shed light on the decline of military *vici* and emergence of markets in frontier forts. A remarkable amount of information has been gathered from the excavation of fragments of buildings in scattered trenches. This is the achievement of Paul Bidwell. For South Shields, it was his analysis of the results of excavation which made clear the abandonment of the western *vicus* (Snape *et al.* 2010: 125-228) and he recognised that the pattern of coin losses at Newcastle indicated a market within the fort (Bidwell and Snape 2002: 275-280).

Acknowledgements

I am grateful to Nick Hodgson for his advice and to David Breeze for providing helpful information.

Bibliography

Bidwell, P.T. 1991. Later Roman barracks in Britain, in V.A. Maxfield and M.J. Dobson (eds) *Roman Frontier Studies. 1989*: 9-15. Exeter: Exeter University Press.

Bidwell, P.T. and N. Hodgson 2009. *The Roman Army in Northern England*. Kendal: The Arbeia Society, on behalf of XXIst *Limes* Congress organizing committee, Newcastle upon Tyne 2009.

Bidwell, P.T. and R. McBride 2010. The coarse wares, in M. Snape, P. Bidwell and G. Stobbs, Excavations in the military *vicus* south-west of the Roman fort at South Shields in 1973, 1988 and 2002. *Arbeia Journal* 9: 98-119.

Bidwell, P.T. and M.E. Snape 2002. The history and setting of the Roman fort at Newcastle upon Tyne. *Archaeologia Aeliana* 5th series, 31: 251- 283.

Bidwell, P.T. and S.C. Speak 1994. *Excavations at South Shields Roman Fort. Volume 1.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne with Tyne and Wear Museums.

Biggins, J.A. and D.J.A. Taylor 2004a. Geophysical survey of the *vicus* at Birdoswald Roman fort, Cumbria. *Britannia* 35: 159-178.

Biggins, J.A. and D.J.A. Taylor 2004b. The Roman fort and *vicus* at Maryport: geophysical survey, 2000-2004, in R.J.A. Wilson and I.D. Caruana (eds) *Romans on the Solway. Essays in Honour of Richard Bellhouse* (Cumberland and Westmorland Antiquarian and Archaeological Society Extra Series 31): 102-33. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society.

Birley, A. 2013 *The Vindolanda Granary Excavations.* Greenhead: Roman Army Museum Publications.

Birley, A. 2019. Vindolanda, in R. Collins and M. Symonds (eds) *Hadrian's Wall 2009-2019*: 164-177. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Breeze, D.J. 2006. *Handbook to the Roman Wall. Fourteenth Edition.* Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Brickstock, R.J. 2013. Vindolanda 2008: the coins, in A. Birley, *The Vindolanda Granary Excavations*: 121-167. Greenhead: Roman Army Museum Publications.

Brickstock, R.J. and P.J. Casey 2009. The coins, in A. Rushworth, *Housesteads Roman fort – the Grandest Station Vol. 2 The Material Assemblages*: 363-429. Swindon: English Heritage.

Casey, P.J. and B. Hoffmann 1998. Rescue excavations in the *vicus* of the fort at Greta Bridge, Co. Durham, 1972-4. *Britannia* 29: 111-183.

Frere, S.S. 1989. Roman Britain. Sites explored: Hadrian's Wall. *Britannia* 20: 272-275.

Gouldwell, A.J. and M. van der Veen 2010. Plant remains from the *vicus* at South Shields Roman fort, in M. Snape, P. Bidwell and G. Stobbs, Excavations in the military *vicus* south-west of the Roman fort at South Shields in 1973, 1988 and 2002: *Arbeia Journal* 9:119-125.

Graves, C.P. and D.H. Heslop, 2013. *Newcastle upon Tyne, the Eye of the North: an Archaeological Assessment.* Oxford: Oxbow Books in association with English Heritage.

Harbottle, B. 1989. Newcastle – *Pons Aelius*, in C. Daniels (ed.) *The Eleventh Pilgrimage of Hadrian's Wall*: 75-76. Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne and Cumberland and Westmorland Antiquarian and Archaeological Society.

Hodgson, N. 2003. *The Roman Fort at Wallsend* (Segedunum*). Excavations in 1997-8.* Newcastle upon Tyne: Tyne and Wear Museums Archaeological Monograph 2 and the Arbeia Society.

Hodgson, N. (comp.) 2009. *Hadrian's Wall 1999-2009.* Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Hodgson, N. 2019. South Shields fort (*Lugudunum/ Arbeia*), in R. Collins and M. Symonds (eds) *Hadrian's Wall 2009-2019*: 109-114. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and Society of Antiquaries of Newcastle upon Tyne.

Hodgson, N. and D. Breeze 2020. Plague on Hadrian's Wall. *Current Archaeology* 365: 28-35.

Rushworth, A. 2009. *Housesteads Roman Fort – the Grandest Station, Volumes 1 and 2.* Swindon: English Heritage Archaeological Reports.

Shotter, D.C.A. 2009. The Roman coins, in J. Zant, *The Carlisle Millennium Project. Excavations in Carlisle 1998-2001. Volume 2*: 679-686. Oxford: Lancaster Imprints, Oxford Archaeology North.

Snape, M.E. 1994. An excavation in the Roman cemetery at South Shields. *Archaeologia Aeliana* 5th series 22: 43-66.

Snape, M.E. and P.T. Bidwell 2002. Excavations at Castle Garth, Newcastle upon Tyne, 1976-92 and 1995-6: the excavation of the Roman fort. *Archaeologia Aeliana* 5th series 31: 1-249.

Snape, M., P. Bidwell and G. Stobbs 2010. Excavations in the military *vicus* south-west of the Roman fort at South Shields in 1973, 1988 and 2002. *Arbeia Journal* 9: 42-132.

Sommer, C.S. 2006. Military *vici* in Roman Britain revisited, in R.J.A. Wilson (ed.) *Romanitas. Essays on Roman Archaeology in Honour of Shepherd Frere on the Occasion of his Ninetieth Birthday*: 95-145. Oxford: Oxbow.

Spain, G.R.B. and F.G. Simpson 1930. The Roman frontier from Wallsend to Rudchester Burn. *Northumberland County History* 13: 484-564.

Wilson, P. 2006. A Yorkshire fort and 'small town': Roman Malton and Norton reviewed. *Yorkshire Archaeological Journal* 78: 35-60.

Zant, J. 2009. *The Carlisle Millennium Project. Excavations in Carlisle 1998-2001. Volume 1, Stratigraphy*: Oxford: Lancaster Imprints, Oxford Archaeology North.

Was Hadrian's Wall a response to a military threat?

Matthew Symonds

There is no shortage of theories about what Hadrian's Wall was intended to do. Researchers building or testing interpretations can draw on a wealth of data generated by over a century of scientific excavations. While this extraordinary resource continues to allow fresh insights into frontier life, it has not yet provided the foundations for a modern consensus concerning why the Wall was built. In many ways this is unsurprising, as the nature of archaeological evidence can leave it ambiguous about intent, and Hadrian's Wall is far from being the only major monument attracting competing interpretations. Today, there are two dominant views of the frontier's purpose, which can be crudely characterised as a means to regulate the peaceful movement of people and goods, or a military stop-line capable of repulsing a full-scale invasion (Breeze and Dobson 1976: 37; Hodgson 2017: 164-166). Although there is some overlap between these camps, with both sides viewing the Wall as an effective means to curtail raiding, they envisage Hadrian's Wall as comparatively easy or hard to cross respectively, amounting to a radical difference in intent. When surveying the contemporary state of interpretation in 2009, Paul Bidwell, who has added so much to our knowledge of the monument, remarked that 'Lively controversy encourages interest in a subject, but in this particular instance it has some dangerous implications. The opposing views necessarily carry with them contrary views about most political, social and economic aspects of society in the Roman and non-Roman north, and perhaps in Roman Britain as a whole' (Bidwell 2009: 36). Given that the question of whether Hadrian's Wall was a response to a genuine threat is central to understanding its purpose, the topic seems an appropriate one to explore in a volume honouring Paul.

Considering the opposing views of two of the Wall's signature features illustrates the degree of divergence. Firstly, there is the question of the Wall's scale, which made it a more formidable obstacle than its peers. This is now so widely accepted that it has lost its power to surprise, but comparing the linear barriers on Hadrian's Wall with that on the artificial frontier in Upper Germany at the end of Hadrian's reign helps convey the magnitude of the difference (Figure 1). In Upper Germany, there was a palisade featuring hefty timbers perhaps standing roughly 2.5-3 m high (Thiel 2008: 85). On Hadrian's Wall, by contrast, there was normally a ditch averaging 8.23-8.53 m wide and 2.7 m deep, then – in places – a wide berm bristling with timber entanglements, followed by a stone or turf rampart perhaps standing *c.* 4.3 m high to wall-walk height, and finally a *c.* 36 m wide earthwork known as the Vallum (Breeze 2006: 53-85). Unquestionably, then, the multiple barriers on Hadrian's Wall are in a different league to the Upper German palisade, but the significance of this remains disputed. While Hodgson (2017: 164) sees the Wall as 'designed along

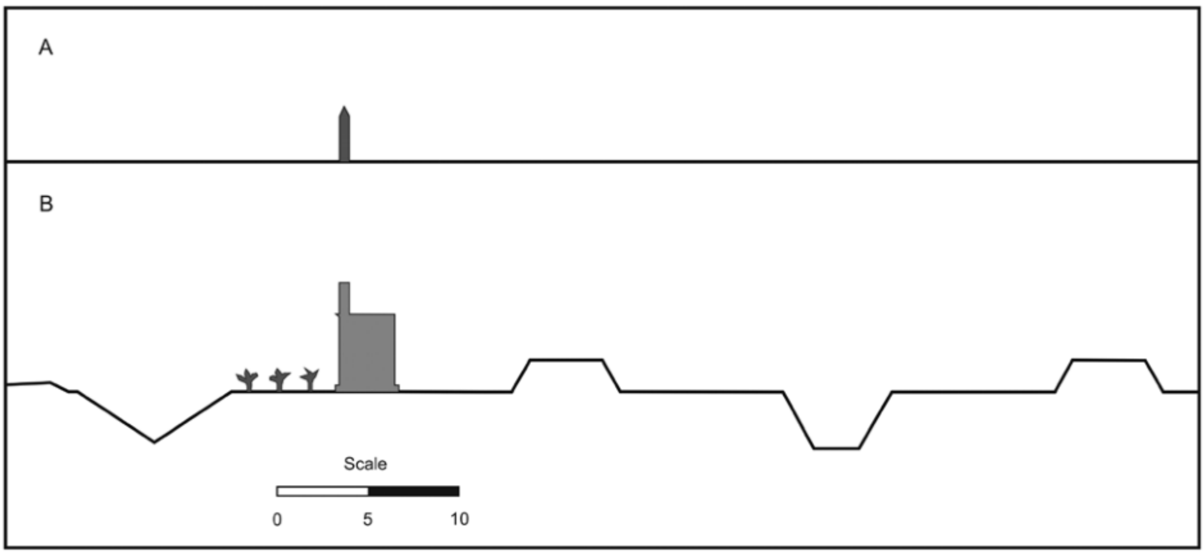


Figure 1. A generic comparison between the linear barriers in Britain and Upper Germany at the end of Hadrian's reign. A) The Upper German palisade. B) The Wall ditch, the timber obstacles (only present in places), the Wall curtain, and the Vallum.

conventional lines as a defensible structure', Mann (1990: 53) perceives no more than 'a rhetorical overstatement' of the might of Rome, lacking defensive merit. A similar duality concerns the regular series of gateways that were placed in posts known as milecastles and permitted passage through Hadrian's Wall. While Breeze and Dobson (1976: 37) argued that 'civilians...would be allowed through the gateways', Bidwell (1999: 35) has cautioned that the multitude of gateways may have been primarily intended as a military convenience, in which case the Wall would be 'virtually a closed frontier'.

Decisive new evidence may well emerge from future archaeological work, but in the meantime various avenues of investigation to refine the options have been explored. These include attempting a synthesis of the available archaeological, ancient historical, epigraphic, numismatic, and geographical evidence to try and clarify the context in which the Wall was built. Most of this evidence is well known, and indeed regularly rehearsed, but it will be recapped below to help build a tentative picture of the military situation in Britain at around the time Wall construction commenced. Studies of this nature usually focus on the Roman material, but other relevant factors include the temperaments and capabilities of the various local groups that were living in the region when the Roman army arrived. Local fighting styles rarely receive detailed coverage in analysis of Hadrian's Wall, although Bidwell (1999: 32) has stressed that 'fundamental to any consideration of how the Wall functioned is the perception of threat'. His words echo a much earlier observation made by British Army officer C.E. Callwell, who wrote (in 1896) a treatise on what he called 'small wars' fought between regular and irregular forces during the 19th-century European colonial period. Callwell emphasised that 'the strength and fighting methods of the enemy must always be most carefully considered', as regular forces failing to pay sufficient attention to local circumstances 'may meet with grievous misfortune' (Callwell 2016: 17, 21). Although lessons learned during more recent colonial warfare cannot prove anything about circumstances in Roman Britain, the possibilities they present appear instructive. As such, the following paper will address the Roman and local context for Hadrian's Wall, while also noting observations drawn from more recent conflicts.

Violent ends

It would be fair to observe that construction of the Wall followed a period of fluctuating fortunes for the Roman army in Britain. The Roman governor Agricola led his forces to a decisive victory at Mons Graupius, somewhere on the Scottish highland fringe, in 83 or 84. In the judgement of Tacitus, Agricola's son-in-law, this feat of arms left the island 'subdued' (*Histories* 1, 2), but circumstances prevented Rome from pressing home its advantage. Instead, *c.* 87, one of the four legions in Britain was redeployed to counter problems on the Danube, forcing the remainder of the army into a withdrawal. At first, an attempt seems to have been made to hold southern Scotland, but this proved unsustainable and by 105 the army was reconfiguring its forces on the Tyne-Solway isthmus (Hartley 1972: 15). This broad region was home to stable and sophisticated local farming communities with a combined population that plausibly lay in the tens of thousands. Roman military bases already existed on the isthmus, but control was subsequently tightened, with the ensuing chain of forts, fortlets, and towers generally referred to as the Stanegate system. Debate continues about whether or not this amounted to a formal frontier in its own right (see Hodgson 2009), but the position of many installations would enable closer control of north-south movement. That said, distribution of the military posts suggests tighter measures were enacted in the west than east of the isthmus, hinting at differences in the temperament of local groups being factored into the deployment strategy. Indeed, the Irthing and Eden may have been exploited as the backbone of a western control system, echoing the development of river frontiers elsewhere in the Roman Empire (Symonds 2020). Whatever the intention, the subsequent decision to build Hadrian's Wall emphasises that the Stanegate system was found wanting.

Work on the Wall is traditionally believed to have started in 122, when Hadrian was in Britain, but the possibility that construction commenced a little earlier is increasingly being entertained by scholars (Graafstal 2012: 149-151). When it comes to the Wall's remit, a statement in the *Historia Augusta* (*HA*) offers our only Roman-era account, albeit one probably compiled over 200 years after Hadrian's death. It discloses that he 'was the first to build a wall, 80 miles in length, to separate the barbarians from the Romans' (*Hadrian* 11, 2). This brief aside can probably be fleshed out by inscription fragments from an apparent victory monument, which were found reused at Jarrow and may have been sourced from Wallsend. Although much of the text is missing, one portion identifies Hadrian, while the other can be reconstructed to state that 'after the barbarians had been dispersed and the province of Britain had been recovered, he [presumably Hadrian] added a frontier line between either shore of the Ocean for 80 miles' (*RIB* 1051). This implication that the genesis of the Wall lay in the immediate aftermath of an episode of violence fits well with other references to warfare in Britain. The *HA* records that the Britons 'could not be kept under Roman sway' at the beginning of Hadrian's reign (*Hadrian* 5, 2), while Fronto later reminded Marcus Aurelius that 'under the rule of your grandfather Hadrian what a number of soldiers were killed by the Jews, what a number by the Britons'

(Fronto *On the Parthian War* 2). One of those slain soldiers was probably Titus Annius, who died 'in war' and is commemorated on a tombstone from Vindolanda (*RIB* 3364). Two further inscriptions record the participation of Maenius Agrippa and Pontius Sabinus in an *expeditio Britannica* – a military expedition to Britain – under Hadrian (Tomlin 2018: 94-98). We know that Sabinus commanded 3000 reinforcements, drawn from two legions in Upper Germany and one in Spain, giving a sense of the severity of the situation. Clearly, then, there was significant bloodshed, but attempting to pin down precisely when has proven contentious.

This brings us to the thorny question of how many Hadrianic wars were fought in Britain (see Breeze 2003). The turmoil noted in the *HA* is traditionally thought to have been brought to a conclusion *c.* 119, on the strength of coins featuring Britannia, Victory, or Security. To focus on the Britannia *aes* coins, their issue date can be narrowed to between 119 and mid 121. This is thanks to them identifying Hadrian as consul for the third time, a status he achieved in 119, and a quirk in the obverse legend. A contraction from TRAIANVS HADRIANVS to TRAIAN HADRIANVS can be assigned to the period from April to August 121 (Abdy 2019: 13). As the Britannia *asses* refer to TRAIANVS, they predate this 121 change. The distribution of the coins is also significant, as they occur in Britain and the near-Continent, suggesting that the Britannia imagery was aimed at an insular audience, rather than the Empire more widely (Hoffmann 2013: 142). As such, the issues have been linked to measures boosting 'the local supply of small change on the island and thus possibly related to concerns to help reconstruct a battered province' (Abdy 2019: 46). This initiative fits well with the earliest datable milestones from Britain, which testify to road building underway in 119–120 and 120–121 (*RIB* 2244, 2265), indicating contemporary infrastructure upgrades that delivered the practical advantage of accelerating future troop movements. It has been speculated that the earliest work on Hadrian's Wall may also slot into this period, with a decision to build it and preparation work occurring *c.* 119–120, followed by actual construction commencing *c.* 121. There are signs, then, of a package of measures designed to alleviate the impact of fighting in Britain and bolster security. But entertaining a cessation of hostilities in 119 also requires consideration of a second round of fighting, as the *expeditio Britannica* probably occurred at a later date.

Establishing when the *expeditio* was dispatched is central to understanding the Hadrianic security situation. The details of Sabinus' career provide broad parameters by suggesting a date in the 120s. Of these, one year seems more likely than the others: 122 (Hodgson 2021: 8-10). There are two reasons for this. The first is that, as Anthony Birley stressed, an emperor should normally be present during an *expeditio*, and 122 is when Hadrian was in Britain. Secondly, coin issues assignable to 122-123 refer to an EXPED AVG, which is most likely a contraction of *expeditio Augusti* (Birley 1997: 123; Abdy 2019: 50). On that basis, at least part of Hadrian's journey during this critical period was being actively promoted as an *expeditio*. There are, then, reasonable grounds to believe that Hadrian's visit in 122 and the *expeditio Britannica* could be one and the same. If so, the need for a military taskforce overlaps with the origins or initial impact of Hadrian's Wall. The traditional start date for building operations in 122 would place them in the immediate aftermath of a putative *expeditio* that year. Equally, if building work did get underway slightly earlier *c.* 121, a sudden need for reinforcements suggests a major military convulsion soon afterwards, hinting that imposing the Wall on local communities galvanised resistance. Although we currently lack the precision to pick between these potential start dates, it is certain that work on the Wall was underway at around this time. A diploma issued on 17 July 122 names Aulus Platorius Nepos as governor, but also refers to his predecessor Pompeius Falco, suggesting Nepos had recently taken up the post, presumably after arriving in Britain with Hadrian (Tomlin 2018: 87-90). Several inscriptions from milecastles and forts along Hadrian's Wall also refer to Nepos, indicating that they were constructed before his tenure expired, probably in 126 (and certainly by August 127).

Although the evidence is ambiguous, it seems reasonable to suspect two episodes of violence, one running from *c.* 117–119 and followed by various relief efforts, before further fighting flared *c.* 121, with reinforcements arriving in 122. This in turn has implications for how we view Hadrian's presence in Britain. Because this peregrine emperor travelled widely throughout the Empire, it is generally assumed that his British sojourn was just another imperial inspection. After all, the *HA* specifies that Hadrian 'corrected many abuses' while in the province, but does not mention any associated fighting (*Hadrian* 11, 2). Hypothetically, though, if the Roman army in Britain did suffer serious casualties *c.* 121, this could have provided an impetus for Hadrian's presence. It has been suggested that he departed from Rome in late summer 121, before heading via Gaul to Germany, where he probably wintered. There, the emperor immersed himself in military matters, which included training soldiers 'as if war were imminent' (*Hadrian* 10, 2), in the broad region that supplied two of Sabinus' legionary detachments. Travelling north would allow Hadrian to rendezvous with Nepos in Lower Germany, before presumably crossing to Britain after the sailing season commenced in April 122. His return journey took him to Spain, once again via Gaul, which meant that Hadrian's British trip was bookended by the emperor wintering in the general regions that supplied Sabinus' legionary reinforcements. If

Hadrian did lead an *expeditio*, it would emphasise that his presence in Britain was not just a stage-managed opportunity to order construction of the Wall or inspect work already in progress. It would also place the origin of the Wall in the direct aftermath of conflict in either 117–119 or 121–122, matching the implications of the reconstructed text of the Jarrow inscription fragment.

Perhaps the strongest counter argument to the possibility that the Wall followed fighting comes from its curious design (Figure 2). As is well known, the initial plan for Hadrian's Wall involved a chain of milecastles and turrets arranged along the curtain according to a preconceived spacing system. Although some limited flexibility was permitted, the end result placed the milecastles approximately one Roman mile apart (1.479 km), with a pair of intervening turrets at intervals of about one third of a Roman mile (495 m). Naturally, running a regularly spaced cordon over irregular terrain threw up various absurdities and prevented maximum advantage being drawn from individual Wall posts. While this superficially seems to vindicate the belief that the Wall was an arbitrary imposition on the landscape, assessing the building order suggests a shrewd interest in practical concerns. Early work on several milecastles is suggestive of a desire to control important natural or artificial passages through the landscape (Figure 3; Symonds 2005), paralleling one of the preoccupations seemingly apparent among the Stanegate sites. Sealing off the key access points to a region, city, or street remains standard practice for security forces seeking to tighten control of it. Manipulating the construction schedule in this way would fit with the army attempting to make the best of a prescriptive frontier concept. If so, it raises the question of why they did not simply break with the spacing system outright. One plausible explanation is that it was mandated by Hadrian (Mann 1990: 53), who was something of an amateur architect.

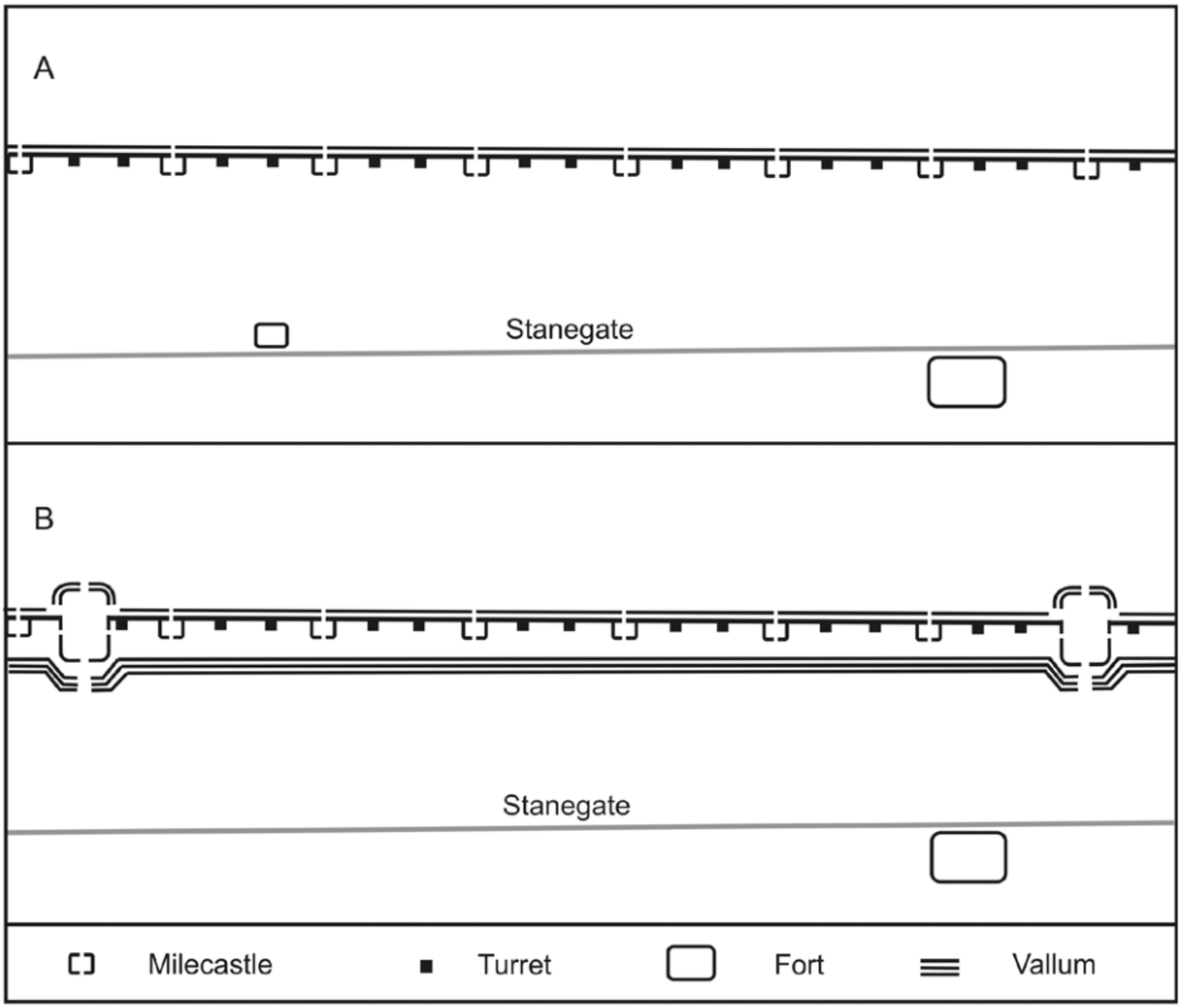


Figure 2. A schematic representation of Hadrian's Wall. A) The Wall as originally planned. B) The Wall following the addition of forts and the Vallum. After Breeze and Dobson 1976.

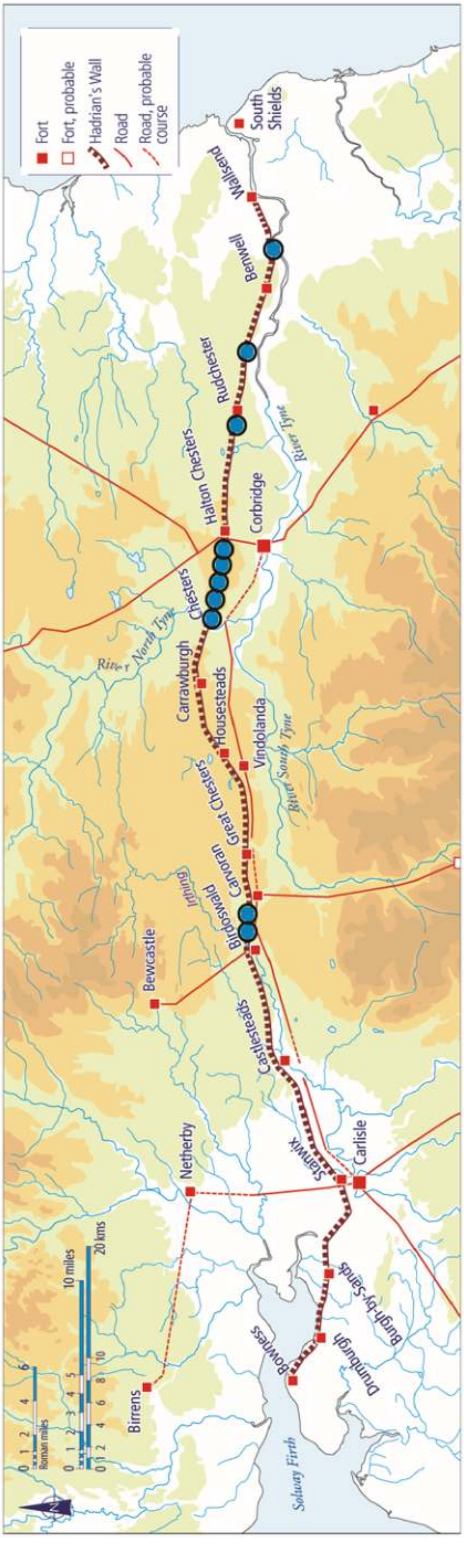


Figure 3. The location of milecastles that were probably or entirely Broad Wall in plan. These occupied key points in the landscape, including examples in the Tipalt-Irthing gap, the North Tyne valley, near Dere Street, north of possible Tyne fords at Newburn, and near Pons Aelius*. Courtesy of David J. Breeze, with amendments.*

Changes to the basic Wall template while construction was underway emphasise that the monument had a practical purpose. If it was simply the hollow statement of imperial power envisioned by Mann, revisions would be redundant. Instead, numerous tweaks can be discerned, with the most momentous known to specialists as the 'fort decision' (Figure 2). As this name suggests, it involved adding a series of forts to the line of the Wall, inserting garrisons ranging from just under 500 to over 1000 strong into the barrier system. These bases are traditionally described as lying at intervals of roughly seven and one third to seven and two thirds of a Roman mile (Swinbank and Spaul 1951: 228), but flexibility was permitted and various adjustments to the standard scheme can be viewed as a response to key thoroughfares, corroborating the implication of the milecastles (Figure 4; Symonds 2021: 77). Curiously, many of the new forts were positioned astride the Wall curtain, resulting in three of their four principal gateways opening to the north. Another apparent change in plan at around this time is presented by the enigmatic earthwork known as the Vallum. It has no known parallel on other Roman frontiers, but broadly comparable ditches could be used to protect extended Roman fortifications, such as siege works (see Symonds 2019: 54), suggesting a calculated response to a particular problem. Indeed, the sudden and seemingly broadly contemporary need for forts and the Vallum appears most easily explained as a product of a sharp deterioration in the security situation; one that might conceivably have triggered the dispatch of an *expeditio*. If Wall construction work was underway *c*. 121, then both the *expeditio* and the fort decision could potentially have followed in 122.

Various other strands of evidence support the notion that both the year 122 and construction of the forts and Vallum followed an episode of violence. The diploma issued in July 122 is of interest for listing an unprecedented number of auxiliary units for Britain. As only those units discharging veterans were included, the exceptional numbers involved would fit with lengths of service being temporarily extended to quell a preceding crisis. Equally, while early work on the milecastles, turrets, and curtain was seemingly handled by legionary infantry, the forts and Vallum appear to have coincided with a diversification in the work force. Members of the British fleet and probably also cavalry worked on the forts, while auxiliaries and conceivably civilian levies dug the Vallum (Symonds 2021: 80). This development has parallels with measures adopted elsewhere to remedy severe Roman casualties. On that score, Hodgson (2021) has rekindled the argument that much of the *IX Hispana* legion may

Figure 4. The North Tyne, seen from Chesters fort. This lay only six Roman miles from its neighbour at Halton Chesters, allowing Chesters to command a key valley.

have been annihilated in Britain, rather than being redeployed to Nijmegen and then destroyed in the east. As with so much else, the evidence remains ambiguous, but if the loss of the *IX Hispana* did contribute to the need for an *expeditio*, it raises the possibility of a symbolic dimension to including legionaries based in Spain. That members of the *expeditio* were operating in the Wall zone is supported by the recovery from the Tyne of a legionary shield boss, which may have been a votive deposit or lost in a shipwreck. It was the former property of a member of the *VIII Augusta*, a legion that supplied the soldiers for one of the Upper German detachments (Tomlin 2018: 96). Another incoming legion operating in the region was the *VI Victrix*, which remained in Britain as a replacement for the *IX Hispana*, and took over its former fortress at York. As the *VI Victrix* had previously been based in Lower Germany it is usually presumed that the legion travelled to Britain with Hadrian and Nepos in 122 (Breeze 2006: 27), although slightly earlier or later arrival dates have also been mooted.

If it is accepted that 122 is the most likely date for the *expeditio*, and if it is also accepted that the *VI Victrix* arrived in Britain in the years around 122, then combining what we know of the legionary numbers with an allowance for associated auxiliaries suggests that over 10,000 soldiers arrived in Britain either around 122, or in 122 alone. This provides the backdrop to the radical adaptations strengthening Hadrian's Wall that also occurred in or reasonably soon after 122 and imply a deterioration in the security situation. Given, then, that the archaeological and epigraphic evidence is compatible with a problem in Britain occasioning a significant military response in 122 or thereabouts, what are we to make of the absence in the surviving ancient histories of any suggestion of fighting during Hadrian's visit? Equally, and just as pertinently, how does the Roman-centric perspective outlined above slot into what is known about the Britons' approach to warfare? Can assessing their fighting styles shed any light on the purpose of Hadrian's Wall and the events playing out in and around 122?

Chasing shadows

James (2011, 27) has observed that modern scholars lavish rather more attention on Rome's forces than their enemies, and this is certainly true of the Britons. When their warriors are considered, they are generally found wanting. One example is a critique of the host assembled to fight Agricola at Mons Graupius in 83 or 84: 'It is perhaps unfair to castigate the Caledonians for their military ineptitude, for it is only with hindsight that we can predict the inevitability of their defeat in the face of a better equipped, better trained and better organised foe' (Hanson 1987: 128). When considering combat in Iron Age Europe, Cunliffe (2018: 213, 229) perceives 'primitive warfare' featuring protagonists 'who could at one moment be fierce and bombastic and at another flee in deranged panic'. He adds that this mercurial quality is a product of stereotypes that Classical commentators chose to perpetuate. This brings us to a central problem for studying the Britons' way of war: the surviving accounts were tailored for Mediterranean audiences. The old adage about the victors writing the history remains relevant, and there is no question that these sources are compromised by biases, blind spots, and even traditions governing how rhetoric should be composed. Mann (1990: 51) has characterised our key source for fighting in the north, Tacitus' *Agricola*, as every bit as misleading as the monumental form of Hadrian's Wall. In order to ground ourselves before considering the implications of the surviving classical sources, it is valuable to assess the archaeological evidence for Iron Age warfare in Britain.

Weaponry from the era usually survives as either grave goods or votive deposits, and a recent survey has been undertaken by Inall (2020). She notes that while swords and heavy spears occur, apparent throwing spears are especially common. Widespread use of spears makes sense as these formidable weapons were comparatively cheap and simple to produce (James 2011: 19). Burials of bodies with embedded spearheads at Burton Fleming and Wetwang Slack testify to their effectiveness (Cunliffe 2005: 541). Protection was normally limited to a shield, with armour and/or helmets rare. Elite combatants could employ chariots, and the remains of nearly 30 have been recorded, most preserved courtesy of distinctive burial practices in East Yorkshire. Ostentatious embellishments on some Iron Age martial kit reinforce that 'Display and performance clearly had a role to play in close quarter combat. While the majority of warriors would have maintained their distance, throwing spears and hurling insults, those equipped with swords and heavy thrusting spears would have sought out similarly equipped enemies against whom they could engage in dramatic duels' (Inall 2020, 80). When general fighting did occur, Inall envisages an emphasis on shock tactics, with cavalry and chariots allowing warriors to close on their foes at 'ferocious speed'. While we cannot be sure how representative the surviving evidence is, and there were doubtless regional differences in style, Inall proposes 'highly mobile and loosely formed' combat focused on 'raiding and guerrilla warfare' (Inall 2020: 79-81; see also Cunliffe 2005: 537). This suggests that many warriors effectively acted as skirmishers, who preferred to harry enemies from a distance rather than come into direct contact with them.

An apparent aptitude for guerrilla warfare seems significant, as this form of resistance is still commonly encountered by regular forces confronting irregular opponents. It reflects the reality that the superior training, weaponry, and technology available to conventional armies often make attempts to better them in a set-piece battle folly. Instead, guerrilla tactics typically involve targeting troops while they are vulnerable, so that attackers can strike and escape before the regular forces bring their overwhelming military superiority to bear. Unlike regular forces, guerrillas are generally less interested in taking and holding territory. Callwell (2016) chronicles the prevalence of such conflict in the 19th-century European colonial era, as well as the frustrations experienced by regular soldiers caught up in it. That tackling elusive enemies can have a corrosive effect on morale is well understood, and you do not have to look far in the annals of modern conflict to find examples of regular soldiers committing what are now classed as war crimes. Concerning what is and is not conscionable, it is sobering to note a critique of policy on the North West frontier in India compiled as recently as 1932. This openly asserted that punitive expeditions, which were branded 'butcher and bolt' operations and acknowledged to visit 'indiscriminate slaughter' on local villages, remained 'justifiable' when British subjects needed protection and it was 'extremely difficult' to identify the actual troublemakers (Davies 1932: 25-27). It has also been observed time and again that armies trained for conventional warfare need to rethink their tactics when facing guerrillas. As a presidential committee examining the situation in Vietnam reported in 1959: '[defeating guerrillas] requires widespread deployment rather than concentration. It requires small, mobile, lightly equipped units... It requires different weapons, command systems, communications, logistics...' (cited in Nagl 2008: 132). As the Roman army furnishes one of the finest examples in history of a force calibrated to fight set-piece battles, encounters with guerrillas could easily have taken it out of its comfort zone.

This raises the question of whether the implications of the archaeological evidence for Iron Age warfare and more modern comparanda mesh with ancient historical accounts of clashes between Roman and Britons. Overlap can be found in descriptions of Roman forces facing chariots and volleys of missiles that were probably or certainly spears (for instance, *Gallic War* 4, 26, 32-33; *Agricola* 36). Cavalry is also noted. The ancient authors make clear that the Britons sometimes stood and fought, with numerous battles – including two opposed Roman river crossings – reported in the south. Many of these can plausibly be linked with Roman moves to capture population centres, an objective that Callwell (2016: 23-25) advocates as an effective method of forcing a foe to give battle. In the north, battles – some bloody (*Agricola* 17) – were fought against the Brigantes, but we do not know what form they took. More is recorded about the famous set-piece confrontations of the Boudican revolt and Mons Graupius, but it seems exceptional for the Britons to seek such clashes. We will examine the circumstances of Mons Graupius later, but it is worth noting that both it and the final battle of the Boudican revolt saw Britons killed in prodigious quantities. We are tentatively given the figure of nearly 80,000 Britons and 400 Romans dead after the latter, a kill ratio of 200:1 (*Annals* 14, 37). At Mons Graupius, Tacitus claims 10,000 enemy slain for the loss of just 360, a kill ratio of 28:1 (*Agricola* 37). The magnitude of these is illustrated by the notorious Roman defeat inflicted by Hannibal at Cannae only having a reported kill ratio, if we follow Livy's figures, of 6:1 (22, 49-52). Even that is high, with an American officer complaining that an identical kill ratio fabricated after an engagement in Vietnam was simply not credible (Ward and Burns 2017: 199). Allowance must be made for considerable Roman exaggeration, but anything even close to the quoted kill ratios implies disintegration of the British force and a collapse in effective resistance, followed by indiscriminate slaughter. Such a scenario hardly dispels the notion that this was not the Britons' preferred mode of war.

Despite the prominence of major set-piece battles in both the ancient literature and popular mindset, the surviving histories indicate that Roman forces in Britain were most commonly confronted – and confounded – by guerrilla-style warfare. This has recently been discussed in detail (Symonds 2021), but the salient evidence can be swiftly summarised. In the aftermath of the 43 landing, we hear of enemies hiding in swamps and forests, 'hoping to wear out the invaders in fruitless effort', which sounds like an allusion to hit-and-run tactics. If so, it provided a foretaste of the far more resilient resistance that Tacitus documents in Wales. There, the Silures proved adept at ambushing Roman forces while they were vulnerable, and inflicted severe casualties on legionary cohorts detailed to construction duties, and a foraging party. When their legionary comrades responded in force, the Silures 'escaped with trivial losses' (*Annals* 12, 38-39). In all, the Silures resisted Roman dominion for a quarter of a century, with the end only coming when the governor Julius Frontinus 'surmounted not only the valour of the enemy, but also the physical difficulties of the land' (*Agricola* 17). Tacitus' vague remark can be explained by victory against guerrillas often involving attacks petering out, rather than a decisive final battle. His emphasis on the landscape is also echoed in more recent parallels, with the situation in the hills beyond the 19th-century North West frontier in India being likened to 'as much a struggle between man and nature as between man and man' (Davies 1932: 178-179). When Roman forces advanced into Scotland they encountered still bolder foes, who once again struck from forests and marshes. They even perpetrated a night assault on the *IX Hispana* legion while it was in camp, reducing the legionaries to a state of 'somnolent confusion' (*Agricola* 26). Once again, when the Romans counter-attacked, their enemies slipped away. Here, then, we seem to have unambiguous accounts of Britons in Wales and Scotland achieving notable martial successes by waging effective guerrilla warfare.

One objection has been raised by Breeze (2019: 123), who cautions that these references to ferreting out enemies from swamps and forests could be *topoi*. He notes that 'Roman writers on Britain appear to be obsessed by marshes', while generals were 'always cutting their way through forests'. This last seems particularly suspect, as environmental evidence suggests that large areas of Britain had been deforested before the Roman army arrived. As such, much woodland was presumably light scrub comprising trees such as birch, which 'would not have created difficulties for the Roman army' (Breeze 2019: 125). Birch, though, grows both quickly and densely, making it perfect for springing ambushes (Figure 5). That vegetation can be a factor is illustrated by the experiences of early European settlers in parts of Australia, who reported attacks by traditional owners of the land being launched near thick foliage, aiding a rapid escape (Reynolds 1982: 99). More significantly, the ancient historical accounts of sustained guerrilla combat in Wales and Scotland are strongly supported by the archaeology. In Wales, a web of forts interspersed with smaller fortlets was established along key roads, creating a network of posts that appears unprecedented in Britain. Not only does this fresh approach fit with the observation in Vietnam that conventional forces needed to adapt when facing guerrillas, but it also matches what Callwell (2016: 114-115) advocates as the best bet for beating irregular opponents: 'the sub-division of the theatre of war into sections, each with its commander, its chain of posts, and its mobile columns'. He judges a combination of larger and smaller posts essential to safeguard supplies and communications. The distinctive fort-fortlet-fort arrangement in Wales was replicated in Scotland and also formed the backbone of the Stanegate system, supporting the presence of durable irregular resistance in these areas (Symonds 2017: 92, 101; Symonds 2021: 49).

Why, then, if the Britons – and especially western and northern Britons – were such accomplished guerrilla fighters, did they assemble for a set-piece battle at Mons Graupius? One answer to this question is presented during Agricola's speech to his troops before the battle. In reality these are Tacitus' words, but it is reasonable to believe that he was familiar with the nature of the campaign. Tacitus has Agricola declare that 'Often on the march... I overheard the exclamations of your bravest, "When will the enemy be delivered into our hands? When will (they come)?" They are coming: they have been dragged from their coverts' (*Agricola* 33). This impatience to encounter elusive foes has echoed down the ages, with one US serviceman noting of the

Figure 5. Naturally-seeded scrub that is roughly 20 years old and includes silver birch and blackthorn. It is difficult to see into, and because of the blackthorn can also be difficult to enter if you do not know the best access points.

Viet Cong in Vietnam that 'if you could find them, you could kill them' (cited in Ward and Burns 2017: 240). It also appears significant that Agricola states the enemy 'have been dragged from their coverts', indicating they were forced to make a stand. Although Mons Graupius came at the close of a campaigning season, Tacitus glosses over earlier activity within it (Hanson 1987: 128). Hingley (2022: 158) suggests this period was spent destroying settlements, killing and enslaving the population, and seizing victuals. Such an approach is advocated by Callwell (2016: 25-27), who notes that 'it is the difficulty of bringing the foe to action which, as a rule, forms the most unpleasant characteristic of these wars'. He stresses that a set-piece battle will greatly benefit the regular soldiers, but the real trick is coercing irregular forces into fighting one. When this cannot be achieved by threatening a settlement, shrine, or other significant site, the 'regular troops are forced to resort to cattle lifting and village burning and the war assumes an aspect which may shock the humanitarian'.

Perhaps Mons Graupius was a site of special significance for the Caledonians, or perhaps Agricola's army forced their hand by committing chilling provocations, but whatever the truth it seems likely that the battle was a calculated Roman contrivance. Tacitus' account of the Britons' kit reinforces this suspicion. He describes them brandishing 'shields [that] were small and swords too long; for the British swords, without points, did not admit of locked lines and fighting at close quarters' (*Agricola* 36). To put it another way, their equipment was poorly suited to this style of combat. Instead, it sounds better designed for exactly the sort of loosely formed fighting implied by the archaeology. That some of the Britons assembled at Mons Graupius appreciated this is also implied by Tacitus' account. After using shock tactics to turn the Roman flank failed, some elements of the Caledonian force appear to have disintegrated, but others withdrew in good order, before apparently attempting to ambush pursuers in nearby woods. Agricola was wise to this – he may well have encountered the tactic before – allowing his forces to extinguish the remaining resistance. It is this second act of the battle that appears more representative of the overall archaeological and ancient historical evidence for the Briton's preferred mode of warfare.

Indications that the Britons favoured surprising their enemies and keeping them at a distance, match Caesar's earlier eye-witness testimony. One attack, in

55 BC, seems a strong fit with the later archaeological and ancient historical evidence. The Britons were able to ambush a legion detailed to harvest corn, after correctly anticipating its movements: 'when the corn had been cut from the rest of the neighbourhood one part remained, and the enemy, supposing that our troops would come hither, had hidden by night in the woods: then when the men were scattered and, having grounded arms, were engaged cutting corn, they had suddenly attacked them. They had killed a few, throwing the rest into confusion before they could form up, and at the same time surrounding them with horsemen and chariots'. Good fortune alerted Caesar to what was afoot and he found 'his troops were being hard pressed... the legion was crowded together, while missiles were being hurled from all sides'. Following the arrival of Roman reinforcements, the Britons withdrew (*Gallic War* 4, 32-34; see also 5, 15-16). It was probably a rerun of these broad tactics over a century later that allowed the Silures to surround and annihilate a sizable portion of a legion undertaking construction duties. Although Tacitus demurs from giving the total number killed in that incident, we are told 'the prefect fell, with eight centurions and the boldest members of the rank and file'. Indeed, had the Silures not failed to cut the lines of communication the legionaries would 'have perished to the last man' (*Annals* 12, 38). The deaths of the prefect and centurions underline both the size of the legionary vexillation and the severity of its mauling. Although the Silures' talent for guerrilla warfare is well recognised (Burnham and Davies 2010: 37), this notable victory, and its implications for our appreciation of the Britons' tactics, deserves greater prominence in the literature.

Clashing ways of war

How can this rapid survey of the Britons' martial capabilities help us to understand whether Hadrian's Wall was a response to a threat? Although the following can be no more than conjecture, if the archaeological and ancient historical evidence is taken at more or less face value, several observations can be made. The first is that while the Britons would sometimes fight pitched battles, this was probably often compelled by Roman moves to capture important objectives, such as significant settlements. On at least two occasions after the Claudian invasion, warriors seeking to check Roman progress used natural obstacles in the form of rivers to strengthen their position, rather than choosing to face the invaders on an open battlefield. Although we only rarely get a glimpse of the Britons' motivations, seeking battle against a prepared Roman force appears to have been exceptional (see McCluskey 2018: 160). The best-documented exceptions, during the Boudican revolt, appear to have flowed from confidence brought about by a numerical advantage that seemed insurmountable. Even then, Tacitus indicates that Boudica's defeat of the hapless Ninth Legion involved surprising it on the march (*Annals* 14, 32; see Frere 1967: 90). Most of the Britons' other notable victories also appear – where we have enough details to make a judgement – to have involved surprise attacks. There is also evidence for periods of persistent low-level attacks of this kind in parts of Britain. Given what we know of the Britons' form and the nature of their martial kit, they seem most likely to have inflicted the kind of losses necessary to trigger a Hadrianic *expeditio* during an ambush and follow-up attacks. The Silures exposed the vulnerability of legionary cohorts during building work, so the early stages of constructing Hadrian's Wall potentially presented opportunities for attacks. After all, little could be more predictable than soldiers leaving their temporary camp to resume work where it had concluded the day before (Symonds 2021: 68-69).

Although we only have limited evidence for the nature of local resistance in the immediate Wall zone, what is available suggests guerrilla warfare was a factor. As noted, the fort-fortlet-fort arrangement, which coincides with accounts of ambushes in Wales and Scotland, also forms part of the Stanegate system. There is a reference to six wounded soldiers on a unit strength report from Vindolanda (*TV* II 154), as well as the famous document concerning wretched Britons: 'the Britons are unprotected by armour. There are very many cavalry. The cavalry do not use swords nor do the wretched Britons mount (*residunt*) in order to throw javelins'. Bowman and Thomas note that the reference to javelins might refer to the Britons generally, rather than just their cavalry, and that *residunt* can also mean 'take up fixed positions' (*TV* II 164). Either way, this text is an excellent fit with the general picture of mobile, unarmoured, spear-throwing Britons already outlined. Birley (2002: 95-96) has argued, though, that the tablet is a critique of local conscripts rather than an account of enemy activity. While the latter seems more likely, both interpretations mean the text describes the fighting style of warriors from the vicinity of the future Wall zone. That the Romans were facing elusive enemies who proved hard to bring to battle is also implied by the description of them being 'dispersed', rather than decisively defeated on the apparent Wallsend victory monument. This inference is supported by a reference in the *HA* to Roman forces 'driving back' their foes after Antoninus Pius ordered the advance north following Hadrian's death (*Antoninus Pius* 5, 4).

An argument can also be made for the original Wall concept forming part of a strategy to clamp down on guerrilla warfare, as it would help weaken any resistance to the south by isolating it from support and safe havens to the north. If so, the scale of the Wall makes sense as a calibrated response to the perceived threat. Substantially higher local population numbers directly beyond the frontier in Britain than Upper

Germany would explain why these barriers appear geared towards different levels of resistance. Even so, the subsequent addition of forts and the Vallum to the Wall are suggestive of a response to a greater intensity of guerrilla warfare than the original plan allowed for. A desire among regular forces to accelerate their response time and so intercept elusive enemies before they vanish is a common feature of guerrilla warfare. Seeking to enable more rapid movement north of the Wall would explain why some forts were placed astride the curtain. An altar probably set up at Chesters fort by a prefect of cavalry commemorates 'slaughtering a band of *Corionototae*' (*RIB* 1142; Bidwell 2010: 77-78), illustrating that cavalry were engaging mobile adversaries in the vicinity of Hadrian's Wall. Behind the curtain, the Vallum appears well suited to preventing ambushes from the south. Even if warriors crossed under cover of darkness and lay in wait, the earthwork would hamper a clean escape. Naturally, all of this is purely speculative. The same applies to a potential explanation for why various strands of evidence support an *expeditio* in 122, but the ancient histories do not refer to fighting during Hadrian's visit. As the Britons seemingly preferred not to confront prepared Roman forces, it is conceivable that Hadrian's *expeditio* failed to coerce its foes into giving battle. This would also explain why claiming he had 'dispersed' his enemies was the best Hadrian could credibly muster for the apparent Wallsend victory monument. Given that a similar problem later bedevilled Septimius Severus' campaigns in Scotland, it might be wondered if some Roman emperors would also have benefitted from closer scrutiny of the Britons' tactics.

Bibliography

Ancient Sources

Agricola: M. Hutton (translator) 1970. *Tacitus: Agricola, Germania, Dialogus* (Loeb Classical Library 35). London: Harvard University Press.

Annals: J. Jackson (translator) 1937. *Tactius: the Annals* (Loeb Classical Library 312 and 322). London: Harvard University Press.

Fronto: C.R. Haines (translator) 1920. *The Correspondence of Marcus Cornelius Fronto with Marcus Aurelius Antoninus, Lucius Verus, Antoninus Pius, and Various Friends* (Loeb Classical Library 113). London: Harvard University Press.

Gallic War: H.J. Edwards (translator) 1917. *Caesar: the Gallic War* (Loeb Classical Library 72). London: Harvard University Press.

HA: D. Magie (translator) 1921. *The Scriptores Historiae Augustae* (Loeb Classical Library 139). London: Harvard University Press.

Histories: C.H. Moore (translator) 1925. *Tacitus: the Histories* (Loeb Classical Library 111). London: Harvard University Press.

Livy: Rev. Canon Roberts (translator) 1905 *The History of Rome*. London: J.M. Dents and Sons.

TV II: Bowman, A.K. and J.D. Thomas 1994. *The Vindolanda Writing-tablets (Tabulae Vindolandenses II)*. London: British Museum Press.

Modern works

Abdy, R.A. 2019. *The Roman Imperial Coinage, Volume II – part 3: from 117-138 Hadrian*. London: Spink.

Bidwell, P.T. (ed.) 1999. *Hadrian's Wall 1989-1999*. Carlisle: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Bidwell, P.T. 2009. Overview, in M.F.A. Symonds and D.J.P. Mason (eds) *Frontiers of Knowledge*: 34-36. Durham: Durham County Council.

Bidwell, P.T. 2010. A survey of the Anglo-Saxon crypt at Hexham and its reused Roman stonework. *Archaeologia Aeliana* 5th series 39: 53–145.

Birley, A.R. 1997. *Hadrian: the Restless Emperor*. London: Routledge.

Birley, A.R. 2002. *Garrison Life at Vindolanda: a Band of Brothers*. Stroud: Tempus.

Breeze, D.J. 2003. Warfare in Britain and the building of Hadrian's Wall. *Archaeologia Aeliana* 5th series 32: 13–16.

Breeze, D.J. 2006. *J. Collingwood Bruce's Handbook to the Roman Wall*. Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Breeze, D.J. 2019. *Oppida* in Britain in the face of the Roman conquest, in T. Romankiewicz, M. Fernández-Götz, G. Lock and O. Büchsenschütz (eds) *Enclosing Space, Opening New Ground*: 121-128. Oxford: Oxbow.

Breeze, D.J. and B. Dobson 1976. *Hadrian's Wall*. London: Allen Lane.

Burnham, B.C. and J.L. Davies 2010. *Roman Frontiers in Wales and the Marches*. Ceredigion: Royal Commission on the Ancient and Historical Monuments of Wales.

Callwell, C.E. 2016. *Small Wars: their Principles and Practice* (reprint of 1896 work). Braintree: Albion Press.

Cunliffe, B. 2005. *Iron Age Communities in Britain: an Account of England, Scotland and Wales from the Seventh Century BC until the Roman Conquest*. Abingdon: Routledge.

Cunliffe, B. 2018. *The Ancient Celts*. Oxford: Oxford University Press.

Davies, C.C. 1932. *The Problem of the North-west Frontier 1890-1908 with a Survey of Policy since 1849*. London: Curzon Press.

Frere, S. 1967. *Britannia: a History of Roman Britain*. London: Routledge and Kegan Paul.

Graafstal, E.P. 2012. Hadrian's haste: a priority programme for the Wall. *Archaeologia Aeliana* 5th series 41: 123–184.

Hanson, W.S. 1987. *Agricola and the Conquest of the North*. London: Batsford.

Hartley, B.R. 1972. The Roman occupations of Scotland: the evidence of the samian ware. *Britannia* 3: 1–55.

Hingley, R. 2022. *Conquering the Ocean: the Roman invasion of Britain*. Oxford: Oxford University Press.

Hodgson, N. 2009. Pre-Hadrianic military installations and the question of the 'Stanegate frontier', in M.F.A. Symonds and D.J.P. Mason (eds) *Frontiers of Knowledge*: 13-15. Durham: Durham County Council.

Hodgson, N. 2017. *Hadrian's Wall: Archaeology and History at the Limit of Rome's Empire*. Marlborough: Hale.

Hodgson, N. 2021. The end of the Ninth legion, war in Britain and the building of Hadrian's Wall. *Britannia* 52: 97-118.

Hoffmann, B. 2013. *The Roman Invasion of Britain: Archaeology Versus History*. Barnsley: Pen and Sword.

Inall, Y. 2020. New light on Iron Age warfare in Britain, in P. Halkon (ed.) *The Arras Culture of Eastern Yorkshire: Celebrating the Iron Age*: 67–84. Oxford: Oxbow.

James, S. 2011. *Rome and the Sword: How Warriors and Weapons Shaped Roman History*. London: Thames and Hudson.

Mann, J.C. 1990. The function of Hadrian's Wall. *Archaeologia Aeliana* 5th series 18: 51–54.

McCluskey, A. 2018. The "functions" of Hadrian's Wall; a view from the trenches, in C.S. Sommer and S. Matešić (eds) *Limes XXIII. Proceedings of the 23rd International Congress of Roman Frontier Studies Ingolstadt 2015*: 159-163. Mainz: Bayerisches Landesamt für Denkmalpflege.

Nagl, J.A. 2008. Counterinsurgency in Vietnam: American organisational culture and learning, in D. Marston and C. Malkasian (eds) *Counterinsurgency in Modern Warfare*: 131-148. Oxford: Osprey.

Reynolds, H. 1982. *The Other Side of the Frontier: Aboriginal Resistance to the European Invasion of Australia*. Australia: Penguin.

Swinbank, B. and J.E.H. Spaul 1951. The spacing of the forts on Hadrian's Wall. *Archaeologia Aeliana* 4th series 29: 221–238.

Symonds, M.F.A. 2005. The construction order of the milecastles on Hadrian's Wall. *Archaeologia Aeliana* 5th series 34: 67–81.

Symonds, M.F.A. 2017. *Protecting the Roman Empire: Fortlets, Frontiers, and the Quest for Post-conquest Security*. Cambridge: Cambridge University Press.

Symonds, M.F.A. 2019. The Wall and its constituent parts, in R. Collins and M.F.A. Symonds (eds) *Hadrian's Wall: 2009-2019*: 43-56. Kendal: Cumberland and Westmorland Antiquarian and Archaeological Society and the Society of Antiquaries of Newcastle upon Tyne.

Symonds, M.F.A. 2020. Fords and the frontier: waging counter-mobility on Hadrian's Wall. *Antiquity* 94 issue 373: 92–109.

Symonds, M.F.A. 2021. *Hadrian's Wall: Creating Division*. London: Bloomsbury.

Thiel, A. 2008. Innovation and perfection: Antoninus Pius' frontier in Germany, in P.T. Bidwell (ed.) *Understanding Hadrian's Wall*: 83–90. Kendal: Arbeia Society.

Tomlin, R.S.O. 2018. *Britannia Romana: Roman Inscriptions and Roman Britain*. Oxford: Oxbow.

Ward, G.C. and K. Burns 2017. *The Vietnam War: an Intimate History*. New York: Alfred A. Knopf.

Cade's Road – the 'missing' forts and other thoughts on the deployment of the Roman army in Northern England

Pete Wilson

Paul's interests, as one of the leading British scholars of the Roman army amongst many other things, notably Roman pottery and bridges, has ranged far beyond the 'Hadrian's Wall Zone'. His involvement with the Roman military takes in early work in Exeter (notably Bidwell 1979) and extends to the publication of excavations undertaken at Bainbridge, Yorkshire by the late Brian Hartley (Bidwell 2012). With Nick Hodgson, in 2009 he published *The Roman Army in Northern England*, which remains the most up-to-date review of the subject, although Breeze's important paper also needs to be acknowledged (Breeze 2011). Obviously, others have contributed on this topic, notably David Mason with his *Roman County Durham* (2021) whose 'Eastern Hinterland' I am presuming to trespass in. Of equal importance is work by the late Sebastian Sommer (1984) and others on *vici*, a topic crucial in any consideration of the Roman 'military community' (James 2001: 80-82) in Northern England.

The decision to focus primarily on the eastern part of northern England (Figure 1) in this paper has two main drivers: my long personal association with Roman Yorkshire and North-East England and a prior commitment to a paper focussed west of the Pennines (Wilson *in prep.*). My previous considerations of the

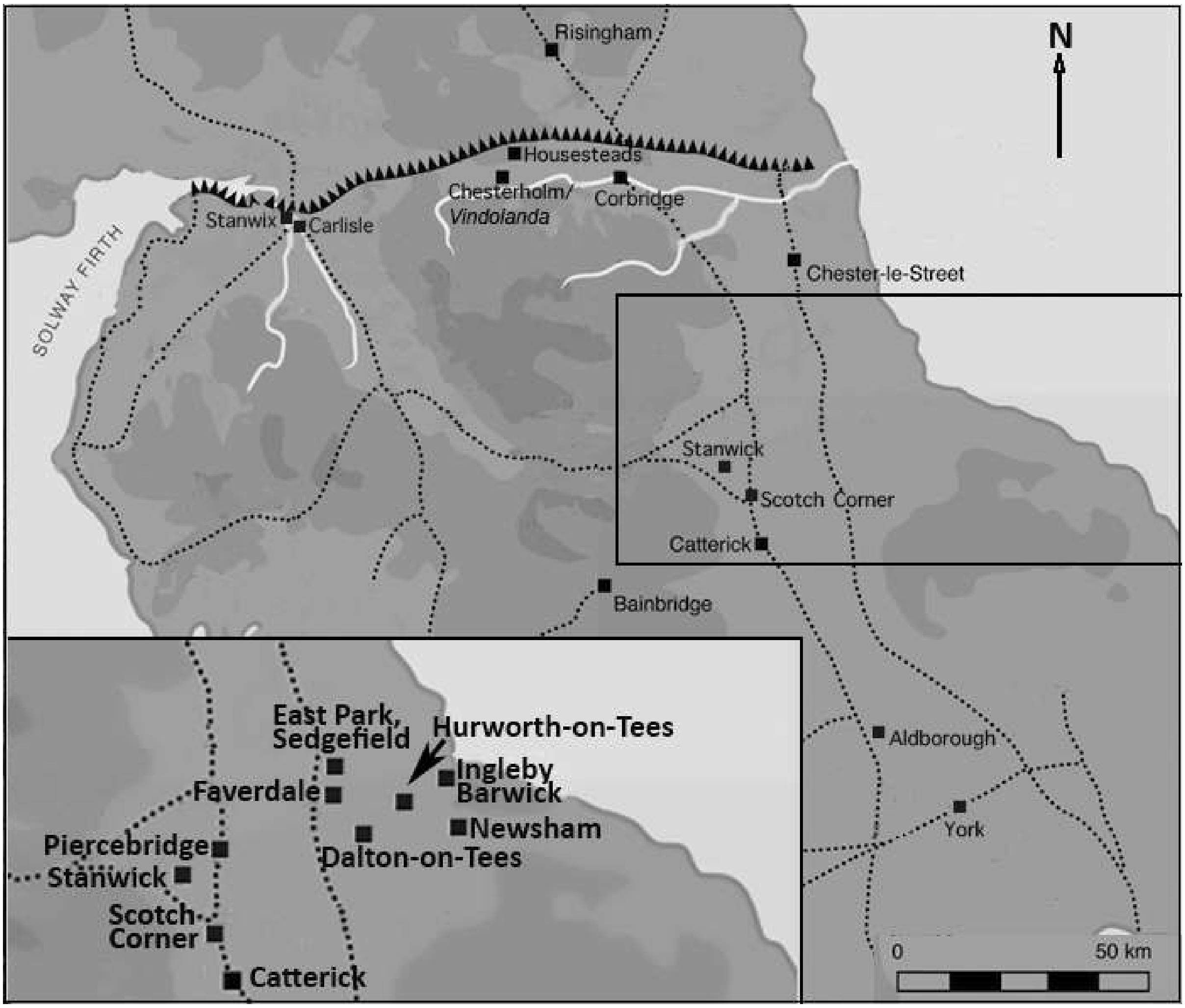


Figure 1. Sites mentioned in the text (after Breeze 2011: fig. 1).

Roman Frontier Archaeology (Archaeopress 2022): 328–333

Roman military in the region have ranged from aspects of initial contact and conquest (Wilson 2009a; 2009b), through site-specific discussions of coastal fortlets (1991), Catterick (2002a: 446-457); Cawthorn Camps (2002b) and Staxton fort (2017), to considerations of later Roman military dispositions (2015a; 2018a). A recognition of the importance of the wider 'military community' and its engagement with the wider population has led to attempts to understand aspects of military-civilian interaction (Wilson 2015b; 2018b).

One topic that has not seen much serious consideration is that following the changes associated with the garrisoning of Hadrian's Wall in the 120s and the subsequent Antonine retreat from Scotland in the 150s. Behind Hadrian's Wall the latter is usually characterised as resulting in the reoccupation of some forts in the hinterland – Bidwell and Hodgson suggest 29 (2009: 21, fig. 8 – compare with their fig. 5 for 87-122). As Breeze (2011: 114) notes Bidwell and Hodgson's next map (2009: fig. 9) spans the period 197 to 367 and can either be taken as evidence of a lack of change or of our collective ignorance of an extended period.

Specific topics, such as the date of the Piercebridge fort and the nature of legionary involvement there provide a rare exception (Cool and Mason 2008: 302-309; Bidwell and Hodgson 2009: 148). Generally, elsewhere seemingly statis, or inertia, is seen not only in military dispositions, at least in terms of fort location, but also with respect to military architecture, with innovations such as the addition of external bastions being extremely rare anywhere north of the Humber/Mersey line (Wilson 2018a). This contrasts strongly with the 'churn' seen in some fort garrisons, most obviously at Vindolanda, where a change of garrison was often associated with major programmes of building that variously removed or buried the previous fort structures completely. While the forts belonging to Vindolanda Periods IV/V and VIb are markedly different sizes to the others known on the site, what is not clear at Vindolanda is what drove the repeated 'level and rebuild' philosophy that often produced a replacement fort that was little different, at least in size, to its predecessor. In contrast at Housesteads it appears that a change in unit, or possibly the brigading of a smaller unit or part of another unit with the garrison, led to the building of additional accommodation (Building XV/2; Rushworth 2009: 360). Whatever the cause of this building work it is clear that the solution was to 'cram in' additional accommodation, rather than extend or rebuild the fort. This can be explained by a number of possible reasons – inertia created by the incorporation of the fort into the mural barrier, or simply the fact that the defences were constructed in stone as opposed to the earth and timber of the earlier phases at Vindolanda which would have been more readily levelled and replaced.

That change happened is certain, for example at Bainbridge with the possible incorporation of the *brachium*, assumed to be the eastern annexe, in the Severan period and the subsequent reintroduction of the eastern fort wall later in the 3rd century (Bidwell and Hodgson 2009:111; Bidwell 2012: 55-56). Similarly, replacement and replanning happened in relatively heavily developed locations which would have necessitated considerable dislocation and demolition as with, for example, the Antonine fort at Catterick (Ross and Ross 2021: 112; 174).

Despite the intensity of research devoted to the Roman army over many decades this may be a propitious time for a reconsideration of Roman military strategy in the region. Our level of knowledge of key military sites has advanced through development led investigations at, for example, Catterick (Ross and Ross 2021) and Healam Bridge (Ambrey *et al.* 2017). However, we have also benefitted from targeted research programmes, as at Aldborough (Ferraby and Millett 2020) and a considerable number of new discoveries, such as the early Roman fort at Thirkleby (Millett and Brickstock 2020) and the possible Roman installations at Dalton-on-Tees (Mason 2021: 81, fig. 4.5).

While new discoveries are in themselves 'interesting' what we are often left struggling with is 'understanding'. How does the Roman military in the region realign itself from 'conquest and expansion' to what may be termed 'consolidation and control'? What did the army do in Yorkshire and North-Eastern England when seemingly in total control behind Hadrian's, and briefly, the Antonine Wall? A question that has troubled Romanists for generations is 'why so many troops in Britain', including at a time when it could be argued that they faced more pressing demands on other frontiers? It is this enigma that Breeze (2011) sought to consider and underpinned my discussion of 'defence in depth' as a possible later Roman strategy in Northern England (Wilson 2018a). But, as considered then, defence against who? By the 4th century the conclusion was 'threats from the north' (Wilson 2018a: 489), but does that work for the 2nd and 3rd centuries?

Breeze and Dobson (2000: 133-134) quite reasonably take Dio's reference to 'tribes crossing the wall ... [and] ... killing a general and the troops he had with him' to refer to Hadrian's Wall, but recognise that Dio does not state that, nor does he clarify what the Caledonians making 'ready to assist the Maeatae' meant in reality (76.15.1-2). As Breeze and Dobson point out neither Dio, nor Herodian (3.14) who records that the 'barbarians ... were overrunning the country, carrying off booty and causing great destruction', mention any specific places. Rivet and Smith (1979: 404) identify the Maeatae as a confederation, similar to the Picts, but located in Southern Scotland. Given that they are recorded as living close to a 'Wall' various locations have been suggested – Malcolm Todd (2002) places them 'north of the Antonine Wall', possibly focussed on the Stirling area (Rivet and Smith 1979: 404). However, Frere (1974: 188) favours a more southerly location, seeing them as incorporating the Selgovae, 'though not the Votadini', which would place them closer to Hadrian's Wall.

This uncertainty does not help greatly in understanding the nature of threats to North-East England that could have justified the concentration of troops in what was becoming a more recognisably 'civilian' area with the emergence of, albeit small, villas and the development of what can be regarded as a 'proto-town' at East Park, Sedgefield (Mason 2021: 404-427). If the tribes had crossed the line of the abandoned Antonine Wall in the episode that resulted in the death of 'a general' would this suggest that the area of Scotland south of the Forth, despite the gradual withdrawal of garrisons from the 'outpost forts' in the later 2nd century, was seen as very much within the Roman sphere of influence and subject to active Roman military protection? Alternatively, if the Wall referred to was Hadrian's Wall, as suggested by Bidwell and Hodgson (2009: 22) and if, for example, Hodgson (2017: 109) is correct that the refurbishing/regarrisoning of High Rochester and Risingham in the early 3rd century was a response to reverses suffered by the Roman army in the later 2nd century, the military focus on North-East England can perhaps be more readily explained.

That said what may have influenced the choice of sites to (re)occupy on the retreat from the Antonine Wall? A comparison of Bidwell and Hodgson (2009) figs 7 (140-157) and 8 (158-196) suggests that, east of the Pennines, control of the roads south from Hadrian's Wall and the route across Stainmore were seen as key. On Dere Street this extends to the reoccupation of the fort at Catterick (Ross and Ross 2021), but to the east no sites are suggested on Cade's Road (Margary 1973: Road 80a) south of Chester-le-Street.

Mason illustrates the possible Roman-period military site at Dalton-on-Tees (2021: fig. 4.5). The site which is suggested to consist of a 16 ha camp that is suggested to post-date a less certainly identified, *c.* 6 ha, fort or camp (Adams and Daniels 2017: 17). However, the excavations did not investigate the smaller possible fort/camp (Adams and Daniels 2017: figs 2 and 7). The sequence, as suggested, is based on interpretation of the aerial photography and is 'unproven' by ground truthing. Mason (2021: fig. 4.5) 'dots-in' a putative external *clavicula* on the north-western rampart of the large camp, a feature that could possibly support the suggestion of an early date for it.

If the smaller enclosure is a fort, not a camp, at a size of *c.* 6 ha it would fall within Bennett's (1986: fig. 2) Group F which only housed *alae milliaria* in the sample of sites he considered. Only one *ala milliaria* is known in Britain, the *ala Petriana milliaria*, suggested as arriving in Britain with Cerealis, but possibly only being made milliary in size under Trajan (Holder 1982: 108-109). The unit is believed to have been stationed at Stanwix from the later 2nd century (Breeze 2006: 344) where its fort was 3.96 ha in size. This raises at least two possibilities:

- The later 2nd century fort at Stanwix fort was built for the *ala Petriana*, but the accommodation provided was cramped in comparison with, for example, Heidenheim (5.26 ha) or Aalen (6.19 ha). This could be the case as the Hadrianic *ala* fort at Albertfalva in Pannonia is believed to have been *c.* 3.50 ha in size (fort sizes from Bennett 1986, table IV).
- The later 2nd century fort at Stanwix fort could have been built as the main base for the *ala Petriana*, but with the intention that elements be out-stationed as a matter of course, perhaps providing cavalry support as needed in the Wall zone.

The size of the garrison at Stanwix is perhaps something of a divergence from my core topic but may provide the only clues as to the nature of the force that may have occupied Dalton, if it represents a fort, rather than a camp. Using Heidenheim and Aalen as comparators, if the site were a fort, the unit could have been as large as a milliary *ala*. However, given the lack of evidence for units of that type in Britain it is more likely that, whether a camp or fort, it was occupied by a mixed force drawn from two or more units.

The existence of the sites at Dalton-on-Tees, away from Cade's Road and its probable crossing point of the Tees in the vicinity of Middleton St George, in combination with the possible *clavicula* on what could be the later enclosure at Dalton, could suggest an early date for the site. The location away from Cade's Road could be taken to suggest, whatever the sequence of military occupation at Dalton, the likely military significance attached to the lower Tees Valley in, most probably, the 'contact' and 'conquest' phases in the area. The Roman army may have been looking to control access to their ally Cartimandua's probable heartland around Stanwick and Scotch Corner (Haselgrove 2016; Fell 2020). If that were the case the Dalton sites could relate to the known activities of either Bolanus (69-71), or his successor as governor Cerialis (71-73/4) (Frere 1974: 115-120). However, Brigantian engagement with Rome, whose domination and control of Britain gradually extended north after, could be argued to be at its peak in AD 51 during the governorship of Scapula (47-52) when Cartimandua, as a loyal ally, handed over Caratacus, which could suggest a pre-Bolanus date. Mason (2021: 31) suggests that the possible military site(s) at Dalton-on-Tees, along with a camp recorded at Newsham on the north bank of the Tees to the east of Cade's Road, may have been sited to control, or at least to take advantage of, fording points on the river. The Newsham camp is square in plan and is 4.41 ha within the ramparts. *Tituli* protect its entrances on all four sides (Jennifer Parker *pers. comm.*). The likely association with fords and the morphology of the Newsham site support the idea that it, and perhaps the Dalton site(s) could be relatively early in date, it being reasonable to assume that later in the Roman period troops in transit would have utilised the Cade's Road crossing point under most circumstances.

While the date of Cade's Road is uncertain, although generally it is assumed to be later than Dere Street – Mason (2021: 37), for example, suggests 'probably around AD 120' – in large part this received wisdom appears to derive from the lack of associated military installations. However, it can probably be accepted that, whatever the date of its inception, Cade's Road would have been in existence by the time of the Antonine retreat from Scotland and reoccupation of Hadrian's Wall. This means that it would have presumably been seen as having potential strategic significance if the locating of troops returning south was part of a 'grand plan', either defensive with respect to potential external threats, or intended to control the populations behind the Wall. That new forts were built is accepted; Piercebridge, on the presently available evidence, sees the creation of a fort, or at least the arrival of 'an official presence' around 170-180 (Cool and Mason 2008: 302).

The nature of that initial 'presence' is uncertain, but by the early 3rd century Piercebridge is the base for a detachment of legionaries with a centurion from *legio II Augusta* commanding detachments from *legio VI Victrix* and the armies of both Upper and Lower Germany (Cool and Mason 2008: 302; Bidwell and Hodgson 2009: 145). The location of the legionary accommodation is uncertain, as is the role of the legionaries themselves. They could have been in some way associated with the construction of 'Bridge 2' at Piercebridge, as may have been the *mensor* (surveyor) who set up an altar to Mars Condatis found at High Coniscliffe (*RIB* 1024). Alternatively, given the presence of legionary detachments in Carlisle and at Corbridge in the early 3rd century, those units and the legionaries based at Piercebridge may have been part of a developing defensive strategy following Severus' campaigns in Scotland (Cool and Mason 2008: 302).

A perceived need for legionaries to bolster the defence of the Wall Zone following the Severan campaigns can be readily accepted as a reasonable strategic response following 'a job left unfinished' after the emperor's death, particularly, if those campaigns had been prompted by it being Hadrian's Wall that the Maeatae had crossed in the 180s. Why Piercebridge may have been similarly reinforced is less obvious, particularly give the lack of evidence, noted above, for military control being imposed on Cade's Road.

One possible explanation is that the perceived threat was not only from the Maeatae, but also from peoples within the province located in the Pennine uplands. In that case the 3rd-century military *raison d'être* for Piercebridge may have been to protect the western flank of the area of emerging civilian development in the Tees Valley and County Durham, including the proto-town at East Park, Sedgefield, villas such as Ingleby Barwick (Willis and Carne 2013) and Dalton-on-Tees (Brown 1999), and sites such as Faverdale (Proctor 2012), Hurworth-on-Tees (Mason 2021: 474-478), and others with more limited, often antiquarian, evidence such as those summarised by Mason (2021: 479-481). The development of a 'more civilian' zone in County Durham would also explain the lack of, at least, post-Antonine Roman military installations on Cade's Road south of Chester-le-Street.

Such a suggestion is, at present, at best 'unproven' and could be argued to fly in the face of Breeze's suggestion that the fact that 'most of the forts in northern England could be abandoned when the Antonine Wall was constructed ... indicates that the army did not consider that security in the area was an issue' (Breeze 2011: 131). Obviously, Breeze is referring to a possible strategic decision relevant to the 140s and, by the time of Dio's 'crossing of the Wall', the situation could have changed, with the peoples of Northern England, perhaps specific 'septs', or sub-tribes, within the Brigantes (Hartley and Fitts 1988: 1-4) acting in concert with, or being inspired by the actions of, the Maeatae, if Hadrian's Wall was indeed the barrier which was crossed.

Acknowledgements

I am grateful to Robin Daniels and Jennifer Parker for supplying information on the Dalton-on-Tees and Newsham sites respectively in advance of publication. Dr Nick Hodgson also provided useful and thought-provoking comments. That said the author alone bears responsibility for any errors and 'kites flown'. Figure prepared by Jill Wilson.

Bibliography

Adams, J. and R. Daniels 2017. *River Tees Rediscovered Project. Archaeological Excavations at Dalton on Tees, North Yorkshire*. Hartlepool: Tees Archaeology.

Ambrey, C., D. Fell, R. Fraser, S. Ross, G. Speed and P.N. Wood 2017. *A Roman Roadside Settlement at*

Healam Bridge: the Iron Age to Early Medieval Evidence (Northern Archaeological Associates monograph 3). Barnard Castle. Viewed 31 October 2021, <https://doi.org/10.5284/1041575>.

Bennett, J. 1986. Fort sizes as a guide to garrison type: a preliminary study of selected forts in the European provinces, in Landesdenkmalamt Baden-Württemberg Archäologische Denkmalpflege (ed.) *Studien zu den Militärgrenzen Roms III. Vorträge des 13. Internationalen Limeskongresses Aalen 1983* (Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 20): 707–716. Stuttgart: Konrad Theiss Verlag.

Bidwell, P. 1979. *The Legionary Bath-House and Basilica and Forum at Exeter* (Exeter Archaeological Reports 1). Exeter: Exeter City Council and The University of Exeter.

Bidwell, P. 2012. The Roman fort at Bainbridge, Wensleydale. Excavations by B.R. Hartley on the Principia and a summary Account of Other Excavations and surveys. *Britannia* 43: 45–113.

Bidwell, P. and N. Hodgson 2009. *The Roman Army in Northern England*. Wallsend: Arbeia Society.

Breeze, D.J. 2006. *J. Collingwood Bruce's Handbook to the Roman Wall*. Newcastle: Society of Antiquaries of Newcastle upon Tyne.

Breeze, D.J. 2011. The Roman Military Occupation of Northern England. *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* 3rd series 11: 113–136.

Breeze D.J. and B. Dobson 2000. *Hadrian's Wall* (4th ed.). London: Penguin Books.

Brown, J. 1999. A Romano-British villa complex at Chapel House Farm, Dalton-on-Tees, North Yorkshire. *Yorkshire Archaeological Society, Roman Antiquities Section Bulletin* 16: 19–27.

Cool, H.E.M and D.J.P. Mason 2008. *Roman Piercebridge: Excavations by D.W. Harding and Peter Scott 1969-1981* (Architectural and Archaeological Society of Durham and Northumberland Report 7). Durham: Architectural and Archaeological Society of Durham and Northumberland.

Fell, D.W. 2020. *Contact, Concord and Conquest. Britons and Romans at Scotch Corner.* (Northern Archaeological Associates monograph 5). Barnard Castle. Viewed 31 October 2021 <https://doi.org/10.5284/1078330>.

Ferraby, R. and M. Millett 2020. *Isurium Brigantum. An Archaeological Survey of Roman Aldborough* (Research Report of the Society of Antiquaries of London 81). London: Society of Antiquaries of London.

Frere, S.S. 1974. *Britannia. A History of Roman Britain*. London: Cardinal.

Hartley, B. and L. Fitts 1988. *The Brigantes*. Gloucester: Sutton.

Haselgrove, C. (ed.) 2016. *Cartimandua's Capital? The Late Iron Age Royal Site at Stanwick, North Yorkshire. Fieldwork and Analysis 1981–2011* (Council for British Archaeology Research Report 175). York: Council for British Archaeology.

Hodgson, N. 2017. *Hadrian's Wall. Archaeology and History at the Edge of Empire*. Ramsbury: Hale.

Holder. P.A. 1982. *The Roman Army in Britain*. London: Batsford.

James, S. 2001. Soldiers and civilians: identity and interaction in Roman Britain, in S. James and M. Millett (eds) *Britons and Romans: Advancing an Archaeological Agenda* (Council for British Archaeology Research Report 125): 77-88. York: Council for British Archaeology.

Margary, I.D. 1973. *Roman Roads in Britain* (3rd edn). London: Baker.

Mason, D.J. P. 2021. *Roman County Durham. The Eastern Hinterland of Hadrian's Wall.* Durham: Durham County Council.

Millett, M. and R. Brickstock 2020. An early Roman fort at Thirkleby, North Yorkshire. *Britannia* 5: 318–323.

Proctor, J. 2012. *Faverdale, Darlington. Excavations at a Major Settlement in the Northern Frontier Zone of Roman Britain* (Pre-Construct Archaeology monograph 15). Durham: Pre-Construct Archaeology.

Rivet, A.L.F and C. Smith 1979. *The Place-Names of Roman Britain*. London: Batsford.

Ross, S. and C. Ross 2021. *Cataractonium: Establishment, Consolidation and Retreat*, (Northern Archaeological Associates monograph 6). Barnard Castle. Viewed 31 October 2021, <https://doi.org/10.5284/1078331>.

Rushworth, A. 2009. *The Grandest Station: Excavation and Survey at Housesteads Roman Fort, 1954-95, by C.M. Daniels, J.P. Gillam, J.G. Crow and others* (2 vols), Swindon: English Heritage.

Sommer, C.S. 1984. *The Military* Vici *of Roman Britain* (British Archaeological Reports, British Series 129). Oxford: British Archaeological Reports.

Todd, M. 2002. Maeatae, in Brill's New Pauly, viewed 31 October 2021, <https://referenceworks.brillonline.com/search?s.au=Todd,+Malcolm+(Exeter)>.

Willis, S. and P. Carne 2013. *A Roman Villa at the Edge of Empire* (Council for British Archaeology Research Report 170). York: Council for British Archaeology.

Wilson, P. 1991. Aspects of the Yorkshire signal stations, in V.A. Maxfield and M.J. Dobson (eds) *Roman Frontier Studies 1989. Proceedings of the XVth International Congress of Roman Frontier Studies*: 142-147. Exeter: University of Exeter Press.

Wilson, P. 2002a. *Cataractonium: Roman Catterick and its Hinterland. Excavations and Research 1958-1997* (Council for British Archaeology Research Reports 128/129). York: Council for British Archaeology.

Wilson, P. 2002b. Cawthorn Camps: 70 Years after Richmond, in P. Freeman, J. Bennett, Z.T. Fiema and B. Hoffman (eds) *Limes XVIII. Proceedings of the XVIIIth International Congress of Roman Frontier Studies held in Amman, Jordan (September 2000)* (British Archaeological Reports International Series 1084ii): 859-866. Oxford: British Archaeological Reports.

Wilson, P. 2009a. The Roman expansion into Yorkshire reconsidered, in A. Morillo, N. Hanel and E. Martín (eds) *Limes XX: Estudios Sobre La Frontera Romana (Roman Frontier Studies) (Anejos de Gladius 13, 3 vols)*: 103-111. Madrid: Ediciones Polifemo.

Wilson, P 2009b. Holding the line? The Humber frontier and the expansion into Yorkshire reconsidered, in D. Breeze, L.M. Thoms and D.W. Hall (eds) *First Contact: Rome and Northern Britain*, (Tayside and Fife Archaeological Committee Monograph 7): 8-14. Perth: Tayside and Fife Archaeological Committee.

Wilson, P. 2015a. Change behind the frontier: Roman military deployment north of the River Humber, England, in the third and fourth centuries AD, in L. Vagalinski and N. Sharankov (eds) *Limes XXII. Proceedings of the 22nd International Congress of Roman Frontier Studies Ruse, Bulgaria, September 2012*: 19-25. Sofia: National Archaeological Institute.

Wilson, P. 2015b. Living in the shadow of the Roman army: aspects of civilian settlement in northern England, in D.J. Breeze, R.H. Jones and I.A. Oltean (eds) *Understanding Roman Frontiers. Papers Offered to Professor Bill Hanson on the Occasion of his Retirement*: 273-285. Edinburgh: John Donald.

Wilson, P. 2017. A 'new' Roman fort at Staxton in the Vale of Pickering, Yorkshire, England, in N. Hodgson, P. Bidwell and J. Schachtmann (eds) *Roman Frontier Studies 2009. Proceedings of the 21st International Congress of Roman Frontier Studies, Newcastle upon Tyne, August 2009* (Archaeopress Roman Archaeology 25): 342-345. Oxford: Archaeopress.

Wilson, P. 2018a. Was Britannia different? Defence in depth, topographic necessity or inertia? Military deployment in Northern England in the fourth century, in C.S. Sommer and S. Matešić (eds) *Limes XXIII: Proceedings of the 23rd International Congress of Roman Frontier Studies, Ingolstadt 2015*: 487-490. Mainz: Bayerisches Landesamt für Denkmalpflege.

Wilson, P. 2018b. The Roman Army and living behind the Wall, in R. Martlew (ed.) *Romans and Natives in Central Britain, 1-8*. Skipton and Leeds: Yorkshire Dales Landscape Research Trust and Yorkshire Archaeological and Historical Society.

Wilson, P. in prep. Looking to the West? Roman military deployment in West Cumbria.

Other frontiers

Military activities at the western frontier of Roman Dacia

Eduard Nemeth

Roman Dacia having most of its limits (western, northern, and eastern) also as external frontiers of the Roman Empire at the Lower Danube, it is not surprising that we have data about military activities at these frontiers. The information concerning such activities is however not equally rich about all the above-mentioned frontier sectors. It seems that military-related events occurred more often at the western frontier of the province during its entire period than at the other sectors. This could certainly be due to the chance survival of historical and archaeological sources, but one could think of other reasons as well, as we examine the known events.

The first hint at a military conflict at the western border of Roman Dacia occurred very soon after the founding of the province under Emperor Trajan. One indication is provided by an inscription found in Vršac (nowadays Serbia), which was a dedicated by the *cohors II Hispanorum* to Mars V[ictor] or U[ltor] (a fragment is missing) for the health of Trajan.[1] The inscription is dated by the mention of Trajan's *tribunicia potestas XII* between December 107 and December 108. The finding place Vršac (see map, Figure 1) might have had a Roman auxiliary fort during Trajan's Dacian Wars, but it has not been explored archaeologically since it is supposed to have been located where the central park of this Serbian city is.[2] Given the position of the supposed auxiliary from Vršac and the dedication to the war god Mars, one can think of a military conflict on the western frontier of the newly founded province of Dacia. We can connect this with a piece of information found in the *Historia Augusta*, *Hadr.*, 3, 9, which is that future emperor Hadrian, as he was governor of Pannonia Inferior,[3] among other things '*Sarmatas compressit*'. In this case, the Sarmatians must have been the Iazyges that settled the territory between Dacia and Lower Pannonia. We have no idea about the gravity of this conflict between Iazyges and Romans, but the choice of words in the source suggests one that was contained: *compressit* can be translated as 'he pushed the Sarmatians back', 'put the Sarmatians in their place', 'restrained the Sarmatians'. As for the reason for the Iazyges becoming hostile toward the Romans at that point in time, we might connect it to what we know from Dio's 'Roman History', where he mentions that the Dacian king Decebalus occupied a territory of the Iazyges between Trajan's Dacian wars (i.e. between 102 and 105), since the Iazyges fought on the Roman side in the first war. After Trajan defeated Decebalus, he incorporated said territory into the Roman province of Dacia, which frustrated the Iazyges[4] and probably caused not only this conflict, but also the one that we will discuss next. The exact location of this territory remains unknown, but it was obviously one in the west of the land controlled by Decebalus, most probably north of the river Mureș.[5]

The cohort that dedicated this inscription was *cohors II Hispanorum*, a unit mentioned in the military diplomas as being part of the army of Roman Dacia practically from the beginning of the province.[6] This suggests that in this conflict with the Iazyges, troops from Dacia were also involved, including possibly the legion IV Flavia felix from Berzobis (nowadays Berzovia, in Romania, Figure 1) and auxiliary units garrisoned in the southwest of Roman Dacia, even if Hadrian might have played the main part in this while he was governor of Lower Pannonia. It is of interest to mention that this cohort was stationed later in the fort of Bologa (Figure 1), also on the western frontier of Roman Dacia.[7]

The next episode of military confrontation on the western Dacian frontier was also caused by the neighboring Iazyges and might even have occurred because these Sarmatians did not obtain the return of the territory they claimed as theirs when they first asked for it. This conflict started in the year 117, as Trajan was involved in the war against the Parthian Kingdom. Parts of the army from Lower Pannonia and Dacia must have followed the emperor in the Parthian war, which would have appeared as a good opportunity for the Iazyges to claim their territory back again. The Iazygian revolt seems to have been directed at first against Dacia. Trajan sent there one of his best generals, Caius Iulius Quadratus Bassus, at the time governor of Syria, to take over Dacia as governor and resolve this conflict in the favour of the Romans. Bassus was familiar with this region from his previous postings

1 *CIL* III, 6273 = *IDR* III/1, 106.
2 Milleker 1886: 16-17.
3 This province ensued after Trajan split Pannonia in two: Pannonia Superior and Inferior in the second half of the year 106.
4 Dio, 68, 10, 3.
5 There are strong arguments for thinking of a territory north of river Mureș: at that time the Iazyges had not expanded yet south of the line (and probably road) that was the continuation of the direction of the Mureş course, west from where it flows into the river Tisza (Mócsy 1974: 95). One could also add that Decebalus could not have occupied after 102 a territory south of the mentioned line, since what was left of his kingdom after the defeat in the first war against the Romans was in the north of the river Mureş, the whole region south of this river having now been occupied by the Romans (Opreanu 1998: 47-48).
6 About this cohort see Nemeth 2007: 90-91.
7 Nemeth 2007: 91, where the evidence for the presence of the cohort in this fort is listed.

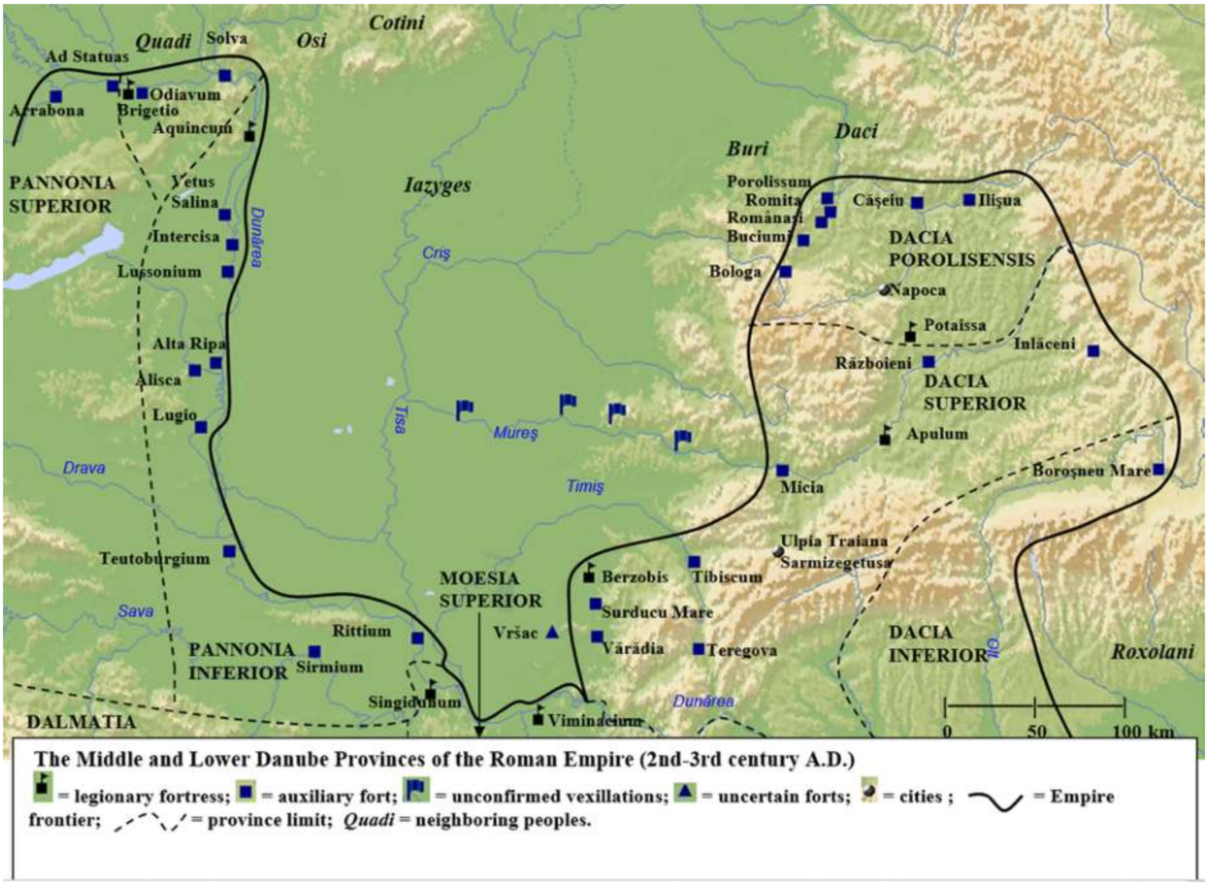


Figure 1. The western frontier of Roman Dacia.

in Pannonia and from him being a participant at least at the second Trajan's war against the Dacians (105-106).[8] Unfortunately for the Romans, Bassus died on the field in battle against the Iazyges, probably at the end of the year 117.[9] In the East, Trajan died too, and his successor Hadrian had to handle the ending of the war against the Parthian Kingdom and the complicated legacy of Trajan in that region. Under these circumstances Hadrian appointed one of his closest collaborators and a friend, the equestrian Quintus Marcius Turbo Fronto Publicius Severus to solve the conflict with the Iazyges, while having under his orders military units from Dacia as well as from Lower Pannonia, including the legions of these two provinces (IV Flavia felix and XIII Gemina from Dacia and II Adiutrix from Pannonia Inferior). The fact that Turbo was given so many troops from two provinces for this operation speaks of the gravity of the conflict. Since Turbo belonged to the equestrian order, Hadrian gave him the equivalent powers and attributes of a *praefectus Aegypti*, of a governor of Egypt, the only governor in the Roman Empire who was an equestrian entitled to command legions, not just auxiliary units like his equestrian colleagues from other provinces. Turbo had previous experience in Pannonia, where at the start of his career in the last years of Domitian's reign he had been a centurion in the legion II Adiutrix, stationed in Aquincum, most probably at the same time as the future emperor Hadrian started his senatorial career as a *tribunus laticlavius* in the same legion. In this post he had the occasion to fight the Iazyges during Domitian's wars of 89-92. Also Turbo's successful missions in Cyrenaica and Cyprus, where he defeated the Jewish uprisings and in Mauretania against the rebelling Moors in the years 113-115[10] recommended him as the right man for the fight against the Iazyges. We only know the names of some of the units that participated in this war under Marcius Turbo and they are the ones listed a military diploma from 10 August 123,[11] the year when the privileges were finally granted to veterans honorably discharged already by Turbo right after the end of the war, probably in the early autumn of 119. The units listed on this diploma were stationed in Lower Pannonia and in Dacia and the reason why they appeared on the same imperial constitution is that they had fought under the common command of Marcius Turbo in the war against the Iazyges. This means that Turbo was not only the commander of the Roman units from the two provinces in the war against the Iazyges, but also their temporary governor.[12]

[8] Piso 1993: 26-27; Nemeth 2007: 34-35.

[9] Piso 1993: 27.

[10] *HA*, *Hadr.*, 5; 6.

[11] *RMD* I, 21.

[12] *HA*, *Hadr.*, 6: *Marcium Turbonem post Mauretaniam praefecturae infulis*

It is well known that after this conflict and the settlement of the discontent with the Roxolani[13] that lived north of the Black Sea, that is to the east from Roman Dacia, Emperor Hadrian proceeded to reorganize the province of Dacia, splitting it in two (at first) and then in three provinces. He also decided to give up the direct Roman control over the plains of Eastern Wallachia and Southern Moldova. What was not very clear until relatively recent years were the measures Hadrian took concerning the western frontier of Dacia. This frontier belonged after the reorganization to two provinces: the northern part of it to Dacia Porolissensis and the southern part to Dacia Superior. Important changes were made concerning the military units garrisoned along both stretches of this frontier. The legion IV Flavia felix from Berzovia was sent back to Upper Moesia and was stationed in the legionary fortress of Singidunum, on the Danube. This legion was not replaced by other units, so the whole defensive system on the road that led from the Danube to the north through Vărădia-Surducu Mare-Berzovia-Fârliug-Cornuțel (Figure 1) was canceled and the units withdrawn and redistributed. This situation is being confirmed archaeologically as well: our excavations in the auxiliary stone fort in Vărădia, for example, produced only finds that are datable to the end of Trajan's and the very beginning of Hadrian's reign.[14] This is one of the signs that Hadrian made important changes at the western frontier of Roman Dacia as well, not just at the southeastern one. The withdrawal of the troops from these forts could have been an agreement between the Romans and the Iazyges within the peace treaty at the end of the war of 117-118/119, but there is no mention of the conditions from this treaty in the extant sources. In order to partially reconstruct the circumstances after the conflict and the decisions taken by Hadrian, we need to look at the changes that occurred at the western frontier in the aftermath of the war. One of the new things was the appearance in Upper Dacia of a military unit, or rather of an expeditionary corps, called *Palmyreni sagittarii ex Syria*. They appear in a series of special military diplomas based on constitutions of Hadrian from the years 120 and 126, that grant the Roman citizenship to the members of this corps.[15] The fact that these are the first known mentions of the Palmyrene archers in the province and that they were granted citizenship while in active duty (there is no mention of *honesta missio*, nor of *conubium*) suggests that we have here a reward from the emperor for these soldiers for the way they fought in the war against the Iazyges.[16] The Palmyrenes fought as archers, mounted or on foot, and must have been seen as efficient against the Iazyges that fought in a similar way. After this war, these Palmyrenes stayed in Dacia and were organized in several numeri: *numerus Palmyrenorum Tibiscensium*, *numerus Palmyrenorum Porolissensium* and a possible *numerus Palmyrenourm O(ptatianensium)*.[17] We are not certain whether the acronym NPO in the text of two funerary inscriptions from Ulpia Traiana Sarmizegetusa is to be read as belonging to a numerus of Palmyrenes stationed in *Optatiana* (nowadays Sutoru, in western Dacia), but we are sure that the other two numeri of Palmyrenes were garrisoned together with other auxiliary units in important forts on the western Dacian frontier, at Porolissum and Tibiscum. Another auxiliary fort on the western frontier, Micia (Figure 1) (nowadays Veţel), had two units already under Trajan: *ala I Augusta Ituraeorum* and *cohors II Flavia Commagenorum*, both recruited in the Roman East and having the bow as usual weapon.[18]

This seems to be a measure taken to reinforce this frontier against the potentially most dangerous neighboring people in these parts, the Iazyges. Also the fact that the Palmyrene units were garrisoned in places where there were already other auxiliary units (*cohors I Ulpia Brittonum milliaria* and *cohors V Lingonum* in the two forts from Porolissum[19] (Figure 1) and presumably a *cohors I Sagittariorum* in Tibiscum)[20] shows that these places were meant to be among the main military centers at the western Dacian frontier. Another such place with more than one military unit was the fort from Bologa,[21] where the *cohors I Aelia Gaesatorum milliaria*[22] was stationed somewhat later, but still under Hadrian's reign, between 126 and 133, next to the above-mentioned *cohors II Hispanorum* that was moved here after being dispatched to North Africa against the rebelling Jews and where it earned the honorary names *scutata Cyrenaica*.[23] Seen from this angle, all these changes would have been was a withdrawal of the units from the road between the Danube and Tibiscum and, at the same time, the strengthening of some crucial places on the western frontier by stationing of several units in the same place. A policy of concessions combined with frontier defense reinforcements would be quite consistent with Hadrian's strategy in general.

This type of strategy for the western Dacian frontier had a certain continuation under Hadrian's successor, Antoninus Pius.[24] There are certain indications of possible military conflict in the last years of this emperor's reign at the western border of Roman Dacia. The governor of Dacia Superior between 155-158, M. Statius Priscus,[25] put up an inscription that refers to a victory of the Romans, however without naming the

ornatum Pannoniae Daciaeque ad tempus praefecit.

[13] *HA*, *Hadr.*, 6: *Cum rege Roxolanorum, qui de imminutis stipendiis querebatur, cognito negotio pacem composuit.*

[14] Nemeth 2005a; Nemeth 2005b: 150.

[15] *RMD* I, 17 and *CIL* XVI, 68 (29 June120); *RMD* I, 27 and 28 (31 January or 12 February 126).

[16] *IDR* I, ad DiplD V, p. 84 (I. I. Russu).

[17] See Nemeth 1997: 102-103.

[18] Nemeth 2009: 882-883.

[19] Gudea 1997: 45-50; Nemeth 2007: 86-87 (for the I Ulpia Brittonum).

[20] Gudea 1997: 32-34.

[21] Gudea 1997: 39-42.

[22] Nemeth 2007: 88-89.

[23] Nemeth 2007: 90-91.

[24] See also Nemeth 2009.

[25] See *PIR*^{2}: S 880; Piso 1993: 70-71; Nemeth 2007: 17.

enemy in the conflict. The inscription is dedicated to the Victory of the Augustus (*Victoriae Augustae*).[26] Another inscription, dedicated to Jupiter Optimus Maximus, mentions the *virtus* of the legion XIII Gemina under M. Statius Priscus.[27] There is also a mention by Aelius Aristides in his Oration to Rome, 70 (written in Greek), of the 'madness of the Getae', who among other rebellious peoples caused conflicts at the Empire's frontiers. The *Historia Augusta* mentions also Dacians among the peoples that rebelled against the Romans under Antoninus Pius and were dealt with by the provincial governors.[28] Even if the name of Dacia's western neighbors, the Iazyges, does not appear among these peoples, some scholars have expressed the opinion that there might have been a war against free Dacians and Iazyges around 155-157[29] or 156/7-158.[30] We have here again a situation where we suspect a possible conflict at the western Dacian frontier, however without having direct evidence for it. Under these circumstances, the modifications among the military units stationed at the above-mentioned frontier might shed some light on the matter. In several military diplomas issued in the reign of Antoninus Pius for Upper Dacia[31] we see listed, among other units, a rather unusual troop called *vexillarii Africae et Mauretaniae Caesariensis*. They were in Upper Dacia together with some *Mauri gentiles*,[32] a designation that hints at a group of Moors that were not organized yet as one of the auxiliary structures of the Roman army: *ala*, *cohors* or *numerus*. Thus the role of the vexillarii from Africa and Mauretania Caesariensis would have been to train these new Moorish recruits and probably also to keep the military discipline among them. At some later point in time, we encounter several numeri of Moors (*numeri Maurorum*) in Dacia, most of them being stationed in the western part of Dacia Superior: a *numerus Maurorum Tibiscensium* in Tibiscum, joining the cohort and the Palmyrene unit stationed there; a *numerus Maurorum Miciensium* in Micia, joining there a cohort and an ala and a *numerus Maurorum Optatianensium* in *Optatiana* (Sutor), where there possibly was already stationed a unit of Palmyrene archers.[33] There are also inscriptions from Ampelum (nowadays Zlatna), in the Western Carpathians of Transylvania, that mention a *numerus Maurorum Hisp*(*anorum*?).[34] Another two, rather hypothetical numeri of Moors might be attested in eastern and southeastern Dacia, which places them outside of the scope of this article.[35] It is remarkable, however, that most of the Moorish units from Dacia have been stationed in its western part and some of them precisely in forts on the western frontier. This dispatch pattern could have been a consequence of a conflict with the neighbors to the west of the province.

The next significant military events to affect the western Dacian frontier happened during the Marcomannic Wars. The Iazyges were again among the neighboring peoples that got into conflict with the Roman Empire at that time. The western parts of Dacia were again the most threatened by these Sarmatians and the measures taken by the emperors Marcus Aurelius and Lucius Verus (and then only by the first, after the latter died in January 169) were as exceptional as the danger itself. The governor of Upper Moesia, Marcus Claudius Fronto,[36] was appointed also as *legatus Augusti pro praetore* of something named *Dacia Apulensis,* yet before Verus' death, in order to lead troops both from his initial province and from this Dacia Apulensis, which we should see as the former Dacia Superior and, at this point, most probably former Dacia Porolissensis. We can assume that Fronto commanded an expeditionary corps built from vexillations of the two legions of his main province Upper Moesia (IV Flavia felix, VII Claudia) and the ones from Dacia as well (XIII Gemina and the newly dispatched – in the year 168 – V Macedonica)[37] plus parts of auxiliary units from both provinces. Ultimately Fronto's expedition failed, and he died on the battlefield as he was in retreat. Most probably the whole expedition unfolded in the Iazyges' territory between Dacia and Lower Pannonia.[38] The attacks of the Iazyges on (western) Dacia have left quite a few archaeological traces as well and one of the main cities of the province, Colonia Ulpia Traiana Sarmizegetusa, erected a statue in honour of Fronto. Its inscription is however shorter and contains fewer career details than the one in Rome.[39]

Further conflicts with the western neighbors of Dacia seem to have occurred under Commodus as well, although we are missing the details and cannot estimate their gravity. There are some hints at this conflict in Dio's Roman History, who mentions fights 'against the Barbarians that live beyond the Dacian borders' and that two men who later became quite famous, namely Clodius Albinus and Pescennius Niger, have gained merits in these conflicts.[40] On the other hand, *Historia Augusta* tells us that under Commodus certain generals had military successes in Sarmatia that the pretorian prefect Tigidius Perennis wanted to attribute to his son.[41] This would mean that the

[26] *CIL* III, 1416 = *IDR* III/3, 276.
[27] *CIL* III, 1061 = *IDR* III/5, 185.
[28] *HA*, *Pius*, 5, 4.
[29] Benea 1985: 142-143.
[30] Piso 1993: 70-71.
[31] *AE* 2014, 1639, year 146; *AE* 2007, 1763, year 152; *CIL* XVI, 108 = *IDR* I, 16, year 158.
[32] For a recent analysis of the *Mauri gentiles*, see Christol 2020.
[33] About the numeri of Moors from Dacia, see Nemeth 1997: 103-105.
[34] *AE* 1971, 383 = *IDR* III/3, 302; *CIL* III, 1294 = *IDR* III/3, 312; *CIL* III, 1149 = *IDR* III/3, 325; *CIL* III, 1316 = *IDR* III/3, 339.
[35] See Nemeth 1997: 104.
[36] Fronto's entire career is listed in the inscription on a statue base from Rome *CIL* VI, 1377 = 41142.
[37] For this legion and its transfer from Lower Moesia to Dacia (Porolissensis) see Bărbulescu 1987.
[38] See the phases of this expedition well deduced in Piso 1993: 94-98.
[39] For the evidence of how western Dacia was affected in those years see Piso 1993: 101. The inscription in Ulpia Traiana Sarmizegetusa: *CIL* III, 1457 = *IDR* III/2, 90.
[40] Dio, 72, 8.
[41] *HA*, *Commodus*, 6, 1.

conflicts took place before 185, when Perennis was disgraced by the emperor for this misattribution of the merit and killed.[42] Niger, who was governor of Dacia (the three Dacias reunited prior by Marcus Aurelius under one governor) probably between 182-183/184[43] and Albinus, who was at that time legate of the legion V Macedonica,[44] were possibly those generals whose merits Perennis had misattributed to his son. The fact that the legion V Macedonica from Potaissa (nowadays Turda) was involved in these conflicts, but not the XIII Gemina, stationed in the more southerly fortress of Apulum, might indicate that the hot spot of the war was in front of the northern stretch of the western frontier of Roman Dacia. The same general area is indicated by an inscription found in Ampelum (today Zlatna), that was dedicated to the Victory of Commodus (*Victoria Commodi*).[45]

An interesting situation from time of the reign of Septimius Severus and his two sons seems to have been recorded in an inscription found in Micia (nowadays Vețel).[46] The fragmentary inscription (now missing) was dedicated to Iupiter Optius Maximus and recorded the names of several auxiliary units. It looks like a lot of auxiliary troops or at least vexillations thereof have gathered sometime between 197-211 in Micia. The purpose could have been a threat or a conflict at the western Dacian border,[47] rather than a collective construction activity, as some authors have proposed.[48] Unfortunately we have no further information about this possible conflict that made it necessary to have so many units or parts thereof (the inscription lists seven or maybe eight names of auxiliary units) gathered at the same place at the western frontier of Dacia.

The next known conflict with the Sarmatians that lived west of Dacia occurred during the reign of Maximinus Thrax,[49] but we do not know whether it affected the western Dacian frontier or if it involved Roman military units stationed there. Maximinus also led a war against some Dacians, but again we do not know in which region and how the war unfolded. From Herodian we know that in 236 the emperor established his headquarters for the war against the Sarmatians in Sirmium, in southeastern Lower Pannonia, but we have no reference about the whereabouts of the war against the free Dacians, that could have been west of Dacia as well as north of it. In any case, Maximinus received the designation of *Sarmaticus Maximus* as well as the one of *Dacicus Maximus* at the end of the year 236.[50] It is, of course, possible that the Iazyges and the free Dacians were allies and fought at the same time against the Romans in this conflict,[51] which would rather point to the free Dacians living in the plains immediately to the west of the Western Carpathians of Transylvania, in the region of the three Criș rivers.

In the following decades of the 3rd century, we no longer hear of conflicts on the western frontier of Roman Dacia. The explanation is that the attention of the Roman authorities, as well as the focus of our sources, shifted toward the Moesian provinces, above all to Lower Moesia, where the raids and attacks of the Goths and the Carpi started to happen. If there were further conflicts with the Iazyges and/or the free Dacians, we have no more mentions of them. It also true that contemporary literary sources are non-existent for the middle and the second half of the 3rd century. Other types of sources like the epigraphy or the archaeology do not hint at any specific military conflicts on the western Dacian frontier for the remaining period until 271/272, when Dacia north of the Danube was abandoned under Aurelian. By then more pressing and grave events were playing out south of the Danube.

Abbreviations

Dio Cassius. *Rhomaiké Historia*. Loeb Classical Library. 1914-1927.

HA *Historia Augusta*. Loeb Classical Library. 1921-1932.

Herodian. *Herodian of Antioch's History of the Roman Empire*. (E. C. Echols ed.). 1961. Berkeley and Los Angeles.

IDR *Inscripțiile Daciei Romane*. București.

PIR² *Prosopographia Imperii Romani*. 1933-2015. Berlin.

RMD *Roman Military Diplomas*. (M. M. Roxan, P. Holder eds). 1978-2006. London.

Bibliography

Bărbulescu, M. 1987. *Din istoria militară a Daciei romane. Legiunea V Macedonica și castrul de la Potaissa*. Cluj-Napoca.

Benea, D. 1985. Numerus Maurorum Tibiscensium. Contribuții la istoria trupelor de mauri din Dacia. *Banatica* 8: 139-154.

Christol, M. 2020. Conflits, tensions et recrutements: les *Mauri gentiles*. *Antiquités africaines* 56: 293-301.

Gudea, N. 1997. Der dakische Limes. Materialien zu seiner Geschichte, *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz* 44,2 (offprint with own page numbering). Mainz: RGZM.

Kienast, D., W. Eck and M. Heil 2017. *Römische Kaisertabelle. Grundzüge einer römischen Kaiserchronologie*. 6. überarbeitete Auflage. Darmstadt: Wissenschaftliche Buchgesellschaft.

Loriot, X. 1975. Les premières années de la grande crise du IIIe siècle: De l'avènement de Maximin

[42] *HA*, *Commodus*, 6, 2.
[43] Piso 1993: 137-141.
[44] Piso 1993: 267-269.
[45] *CIL* III, 1333 = 7842 = *IDR* III/3, 334.
[46] *CIL* III, 1343 = *IDR* III/3, 77.
[47] Nemeth 2005b: 159-160.
[48] Petolescu 2002: 73; 82; 126.
[49] Herodian, VII, 2, 9.
[50] Kienast, Eck and Heil 2017: 177.
[51] Thus Loriot 1975: 675 and note 148.

le Thrace (235) à la mort de Gordien III (244), in H. Temporini and W. Haase (eds) *Aufstieg und Niedergang der römischen Welt* II/2. Berlin-New York: De Gruyter.

Milleker, F. 1886. *Geschichte der königlichen Freistadt Werschetz*, I. Budapest: Moritz Rath's Commissions-Verlag.

Mócsy, A. 1974. *Pannonia and Upper Moesia. A History of the Middle Danube Provinces of the Roman Empire*. London-Boston: Routledge.

Nemeth, E. 1997. Die Numeri im römischen Heer Dakiens. *Ephemeris Napocensis* 7: 101-116.

Nemeth, E. 2005a. Die neuen Ausgrabungen im Auxiliarkastell von Varadia- 'Pusta', in Zs. Visy (ed.) *Limes XIX. Proceedings of the XIXth Congress of Roman Frontier Studies held in Pécs, Hungary, September 2003*: 689-696. Pécs: University of Pécs.

Nemeth, E. 2005b. *Armata în sud-vestul Daciei Romane / Die Armee im Südwesten des römischen Dakien*. Timișoara: Mirton.

Nemeth, E. 2007. *Politische und militärische Beziehungen zwischen Pannonien und Dakien in der Römerzeit / Relații politice și militare între Pannonia și Dacia în epoca romană*. Cluj-Napoca: Tribuna.

Nemeth, E. 2009. Änderungen und Truppenversetzungen an der Westgrenze Dakiens von Trajan bis Antoninus Pius, in A. Morillo, N. Hanel and E. Martin (eds) *Limes XX. XX Congreso Internacional de Estudios sobre la Frontera Romana:* 879-888. Madrid: Polifemo.

Opreanu, C. H. 1998. *Dacia Romană și Barbaricum*. Timișoara: Mirton.

Petolescu, C. C. 2002. *Auxilia Daciae*. București: Ars Docendi.

Piso, I. 1993. *Fasti provinciae Daciae I. Die senatorischen Amtsträger*. Bonn: Rudolf Habelt.

A view from beyond Rome's southern frontier: technological exchange and trade with the Kingdom of Kush

Derek A. Welsby and Isabella Welsby Sjöström

To the south of Egypt for much of the Roman Imperial period was the Kingdom of Kush. After a brief period of conflict in the early years of Augustus's reign peaceful co-existence appears to have been the norm for over three centuries thereafter, making this the most stable of all Rome's frontiers. In this article, focussing on results from recent excavations in the Kushite town of Kawa in Northern Sudan, the authors examine a few examples of the movement of goods (IWS), but also of ideas (DAW), from the Roman Empire to its southern neighbour reflecting aspects of the soft power Rome was able to exert far beyond its territory. The authors are pleased to submit this article in a volume acknowledging the considerable contribution made by Paul Bidwell to the archaeology of Roman Britain. It offers an, albeit tenuous, link between the fort at South Shields, one of the foci of Paul's activities, and a site well beyond the bounds of the Roman Empire lying on the banks of the Nile 4700 km to the south east.

The urban centre at Kawa, set within a region where there are abundant traces of Neolithic (6th-5th millennia BC) and Kerma period (*c*. 2400-1450 BC) occupation, was named Gematon by the Ancient Egyptians suggesting that the town was founded by the pharaoh Akhenaton or by his predecessor Amenhotep III or his successor Tutankhaton (before he changed his name to Tutankhamun), that is in the mid 14th century BC. It is possible however, that this was a refounding of an earlier pharaonic town, itself possibly succeeding an urban centre of the Kerma period. The fate of the town in the immediate aftermath of the withdrawal of pharaonic control in the 11th century BC is unclear but it seems to have been thriving by the 8th century BC if not in the previous century (Welsby 2017). Particularly favoured by the Kushite king Taharqo (reigned 690-664 BC) it remained an important urban centre perhaps as late as the collapse of the Kushite state in the 4th century AD.[1] Kawa is located on the east bank of the Nile a little upstream of the modern regional administrative centre, Dongola, and is approximately 500 km north of Khartoum.

Movement of ideas (DAW)

During a survey of the environs of the Kushite town at Kawa in 1993 a small rectangular building was observed on the surface and the tops of its surviving walls were planned. Subsequently a similar building was observed a little over 20m to the south and these were excavated in the winters of 2007-8 and 2009-10 (Welsby 2008: 36-37, col. pl. XI; 2010, 50, col. pl. XVII).

Both structures, which are undoubtedly kilns, are very similar in design and construction (Figure 1). The southern building, Building F7, appears to be the earlier. It is constructed throughout of mud brick and is rectangular in shape measuring 5.24-5.32 x 3.64 m over its walls (Figure 2). These are 580-620 mm thick and made from alternate courses each of one header and one stretcher. It was set into the ground resting in a presumably roughly rectangular pit 1.97 m deep dug through earlier occupation material and then down into the natural – a fine sand. The long axis of the kiln is east-west with an arched opening in the centre of each of its end walls, 500 mm wide and with a maximum height of 580-600 mm. The interior is divided by six cross walls each pierced by an arch approximately 2.1 m wide and with a maximum height of *c*. 1.35 m. Some of these cross walls survive to their full height of about 1.82 m (Figure 3). They are constructed of alternating courses of one header and of two stretchers and are 400 mm thick. The arches are made from bricks identical to those used in the walls, arranged radially (Figure 4). They were triangular in profile and rounded at the top.[2] Each cross wall is separated from its neighbour by a gap ranging in width between 220 mm and 335 mm. The walls of the structure survive to a maximum of 300 mm above the cross-wall tops. All of the internal wall surfaces, including the tops of the cross walls, are coated in a mud-mortar render. To east and west of the kiln large pits with gently sloping bases, 4.9 m and 4.6 m in length, allow access to the arched openings (Figure 5). In the lower parts of these pits mud-brick walls extend out from the kiln and act as retaining walls. The external walls of the kiln, where visible in the stoking pits, along with the sides of the stoke-holes, are rendered in the same mud mortar as seen within the interior. This was applied, or at least smoothed, by

[1] For a brief overview of the history and archaeology of Kawa see Welsby 2013.

[2] For similar shaped arches in a Roman context at Holt in Wales see Grimes 1930: fig. 21.

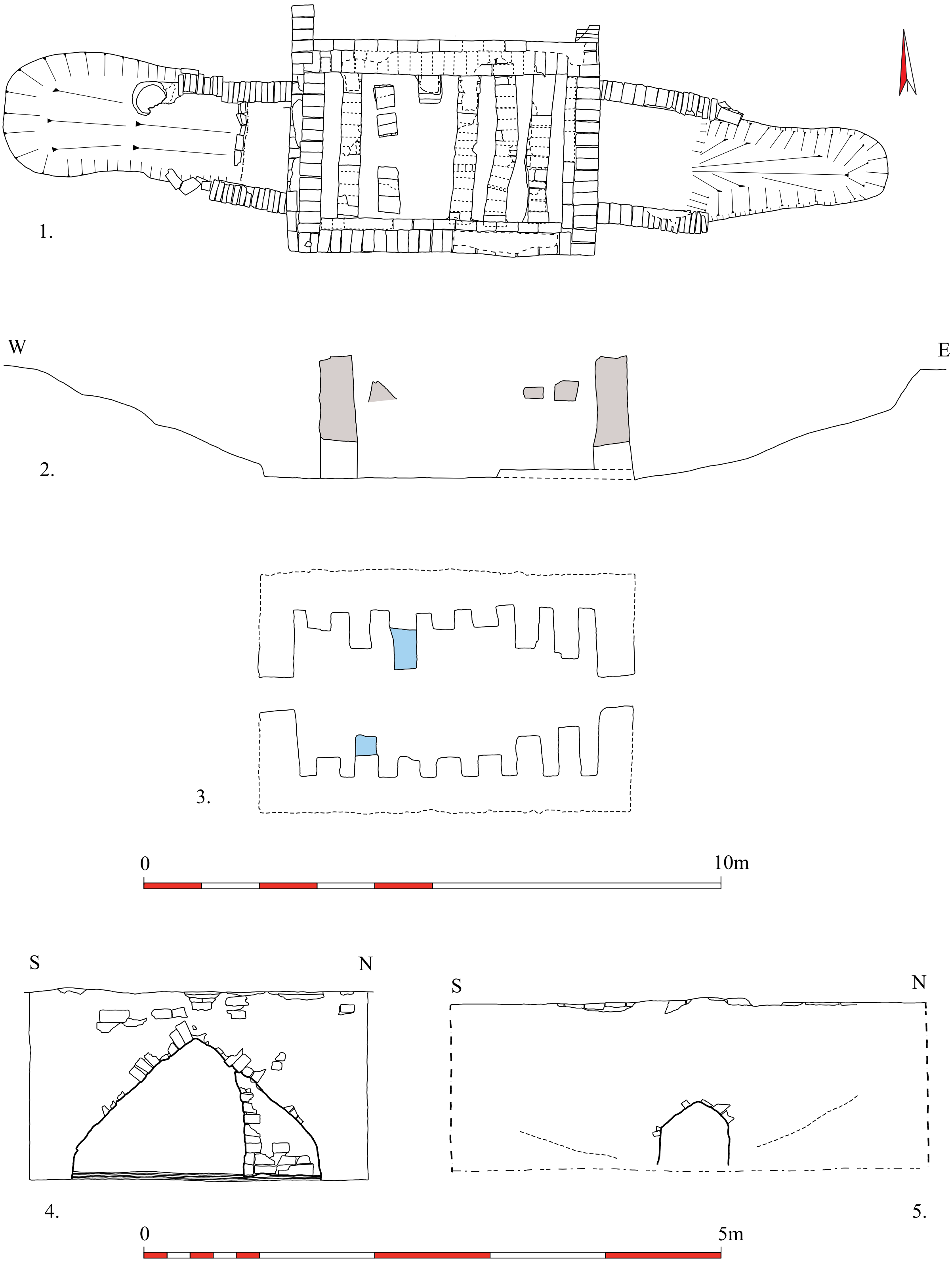


Figure 1. Kawa. 1 & 2 – plan and section of F7; 3 – plan of the furnace chamber floor of F3, second phase walls in blue; 4 – elevation of a cross wall in F3 showing later addition; 5 – elevation of the exterior of the eastern wall of F3 (1-3 scale 1:100; 4 & 5 scale 1:50).

Figure 2. Kawa. View over the cross walls in the furnace chamber of Building F7 (scale bar 1 m).

Figure 3. Kawa. The furnace chamber of Building F7 looking towards the eastern stoke-hole.
The ash deposits on the floor are visible in section
(scale bar 2 m).

Figure 4. Kawa. The junction of one cross wall with the south wall of the kiln in the furnace chamber of Building F7 (scale bar 2 m).

hand and the finger marks of the builders are readily visible.

The northern kiln, Building F3, was a little larger at 6.58-6.63 x 4.15-4.2 m in size over its walls and survived to a maximum height of 1.7 m. In mode of construction it was identical to the other kiln but its slightly greater size resulted in an additional cross wall being provided (Figures 6 and 7). Each cross wall was approximately 300 mm apart. Owing to erosion none of these walls survived to their full height, nor did the external walls of the kiln extend above their tops. As with the other kiln it had large sloping stoking pits at both ends (Figures 8 and 9).

The floor of the furnace chambers in both kilns was the natural sand at the base of the construction pit. No trace of any floor for the firing chamber was noted in Building F7. The other kiln however, contained amongst its rubble many pieces of large flat tiles of an unusual shape. These are presumably the elements of the floor of the chamber and when arranged together

Figure 5. Kawa. The eastern stoking pit and east wall of Building F7 (scale bar 2 m).

Figure 6. Kawa. View along the furnace chamber of Building F3 (scale bar 2 m).

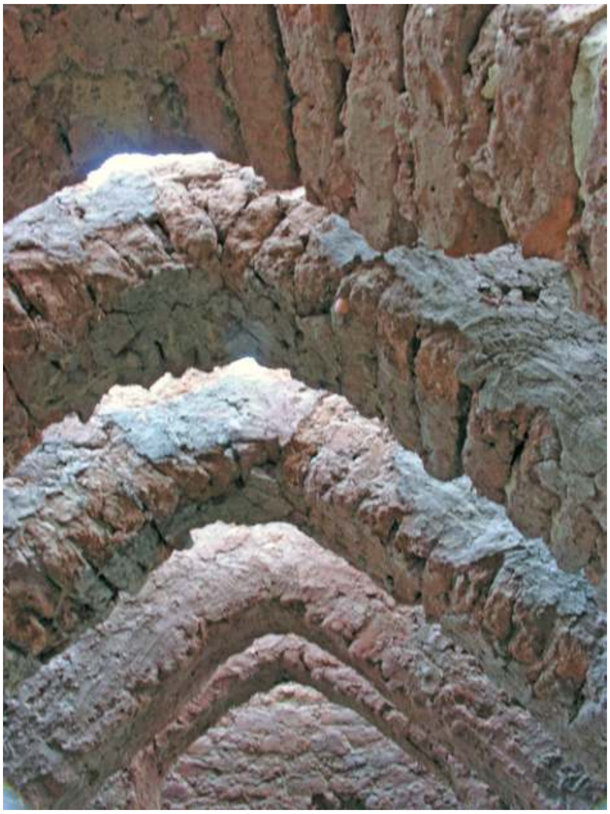


Figure 7. Kawa. Detail of the soffit of the arches in the cross walls of Building F3.

form a surface pierced by rectangular holes *c*. 287 x 198 mm in size which will have served to allow the hot gasses to circulate freely (Figure 10).[3] It is possible that these flooring elements were partly reused from Building F7 which would explain their total absence in that building. Figure 10 offers a suggested reconstruction of a section of this firing chamber floor. How the tiles were supported adjacent to the walls of the kiln is unclear as, on the evidence from the other Kushite rectangular kilns, no scarcement was provided. Possibly tiles of a different form were used to cover the gap between the last cross wall and the ends of the kiln or this gap was left open.

Both kilns had been used extensively resulting in the mud bricks of the cross walls being totally baked and the surrounding walls being fired to a considerable depth. Two of the cross walls in Building F3 were strengthened

[3] If these are from the firing chamber floor they would only have been the first layer of that floor and will have served to support a layer of mud which, after the first firing, will have created the load-bearing floor.

Figure 8. Kawa. The western stoking pit and stoke-hole of Building F3 (scale bar 500 mm).

Figure 9. Kawa. View of Building F3 looking east (scale bar 2 m).

by sections of walling partly supporting the arch (Figure 1.4). These were also mud plastered and then fired brick red as the kiln continued in use.

When first discovered the form of these kilns was of a type hitherto unknown in the Kingdom of Kush. In 2010 and 2011 however, another very similar example was excavated within the Kushite town at Muweis which lies upstream on the Nile 400 km to the south east of Kawa. Although slightly smaller than the Kawa kilns, at 5.5 x 3.3 m in size, it is otherwise almost identical.[4] Built throughout of mud bricks it has external walls between 550 mm and 600 mm thick. The one well-preserved arched stoke-hole was 600 mm wide and 500 mm high. Internally there are seven cross walls, spaced at intervals of between 200 mm and 220 mm, thus slightly less than at Kawa. The arches in the cross walls are approximately 1.4 m wide. The external

[4] Information on this kiln was kindly provided by Michel Baud over a decade ago and more recently by Marie Millet and Aurélie Schenk.

Figure 10. Kawa. Reconstruction of the arrangement of tiles from the firing chamber floor in Building F3 (scale bar 200 mm).

walls survive to a maximum of 600 mm above the top of the cross walls. No elements which may have formed a part of the firing chamber floor were recovered.[5]

What the superstructure of these kilns may have looked like is uncertain. The evidence from Muweis indicated that the walls were continue upwards for a minimum of 600 mm above the firing chamber floor supports on which will have rested the floor of uncertain thickness. A number of options are available. The walls may have extended to a sufficient height to contain the expected kiln load which may then have been covered with a temporary roof to seal in the heat. Alternatively the upper parts of the walls may have been temporary, being dismantled after each firing. Finally a permanent roof structure is possible taking the form of a brick vault. If such a roof was provided a means of access into the firing chamber will have been required.[6]

Although at Kawa in both kilns there was abundant evidence for the use of the installations nothing was found to indicate what they had been used for. Both had distinct layers of ash extending right across their furnace chamber floors (Figure 3) but this was largely homogenous material. Analysis of the ash indicated that while it had approximately twice the concentration of limestone than is usually found in ash is does not allow definite conclusions to be drawn regarding the use of the kiln.[7] At Muweis the presence of complete fired bricks associated with the kiln led the excavator to claim that it was used for firing brick.[8] At Kawa many fired bricks were found within the kiln but these are just as likely to have come from the collapse of the structure itself rather than being products of the kiln. The same argument may be advanced, equally plausibly, in the case of Muweis. At none of the kilns has any evidence for pottery production been found. This is particularly telling at Kawa where the kilns survive up

[5] At Muweis three further kilns have been excavated, two circular, the other (Kiln FaF2) possibly a hybrid of the two types being rectangular on the outside but curved at one end on the interior (Figure 11.3). Like the other rectangular kiln it had the cross walls (three) pierced by arches but had only one stoke-hole (Baud 2008: 53-54, fig. 1).

[6] For a recent discussion of this issue with references see Harizanov 2019, 23.

[7] This analysis, facilitated by Serge Feneuille, was undertaken in the Analysis Department at the Lafarge Research Centre with the financial support of Lafarge Group.

[8] In Sudan today, and presumably at many periods in the past, bricks are fired in clamps. This was also a method used by the Romans (see for example references in Grimes 1930: 60) and presumably the Kushites.

Table 1. Areas of the firing chamber.

	Length (m)	Width (m)	Area (m^2)
Kawa F7	4.25	2.49-2.53	10.58
Kawa F3	5.29-5.33	2.9	15.11
Muweis F40	4.5	2.25	10.13

to the present ground surface. Had there been pottery waster dumps close by, although these could have been dispersed by erosion, some concentrations of sherds would be expected to survive and to have been readily visible.

Discussion

A fair number of kilns have been excavated in the Middle Nile region dating to the Kushite, but also to earlier and later periods. These are invariably circular and many are double chambered kilns.[9] What is particularly interesting, given the vast amount of archaeological activity along the Lower Nile and in the adjacent deserts of Egypt, is again a total absence, as far as the author is aware, of rectangular kilns. The initial reaction of the author to the discovery of the first kiln at Kawa was to compare it with the two kilns constructed on the site of the probably already demolished Antonine double granary in the fort at South Shields (Figure 11.7) and to the innumerable other examples known from Roman sites across the western part of the Empire.

Given the extreme rarity of the rectangular kiln type in the Nile Valley and its ubiquity in the Western Roman Empire is it justifiable to suggest that its presence in Sudan is the result of technological exchange? There are two particular problems with this suggestion. One is chronological, the other spatial. The kilns at Kawa are not closely dateable but may well be contemporary with the Roman presence in the Eastern Mediterranean and in Egypt. At Muweis, however, the excavator is confident that the kiln there can be dated on ceramic grounds to the later 1st century BC which would give little time for direct contact between Kush and Rome. As this material has yet to be published it is impossible to evaluate it in the context of this discussion.

The other issue relates to the spread of the rectangular kiln technology across the Roman world. Very few kilns of this type have been discovered in the Roman provinces adjacent to the Eastern Mediterranean. In Jerusalem the occupying Roman legion, the *X Fretensis*, constructed a row of at least five rectangular kilns in the late 1st century AD. In these the internal arches appear to have rested on a scarcement running the full length of each kiln on both sides. Of the two later kilns, in operation in the later 2nd or early 3rd century, one (K6) had cross walls with arches (Figure 11.6), as is the case with the Kushite kilns. These kilns were used to produce pottery and a wide range of building elements (Goldfus and Arubas 2019: 189-190).

At Elaiussa Sebaste on the south-east coast of Turkey, between the modern towns of Silifke and Mersin, is an example dated to the 5th-6th century AD which was used to produce amphorae (Ferrazzoli 2010: fig. 41). The kiln, which was aligned east-west with its stoke-hole to the east (Figure 11.5), was constructed throughout of mud brick and measured *c.* 7 x 5 m with eight cross walls internally (Schneider 2008: 118-120). It is several centuries later than the Kushite examples. A little further afield there are a number of rectangular Roman tile kilns in Bulgaria, almost all dating at the earliest to the first half of the 1st century AD becoming more common in the 4th-6th centuries. Some of these are rather different than the Kushite examples, the furnace chamber being divided in two by a wall resulting in two arched chambers (Harizanov 2019: 25, fig. 12 and tab. 4). Kilns of this type have also been excavated in Greece; those at Kalapodi thought to have been in use in the Hellenistic to early Roman period (Sporn 2016/17: 219, 224. Abb. 18, 19 and 24).

Could this kiln technology have an entirely different origin? At an earlier period there are a small number of examples of kilns of this general type in Mesopotamia and surrounding areas. In Delcroix and Huot's survey of kilns two of their types, D3.3 and D.7, are similar to the Kushite kilns. Several Type D.3.3 kilns have been excavated at Khafajeh in Iraq dating to the 3rd and 2nd millennia BC. The Type D.7 kiln was found in Uruk, again in Iraq. Its date is uncertain (Delcroix and Huot 1972: 29, 33, figs 5 and 6).[10] As with the standard Roman kilns these have only one stoke-hole.

On the Euphrates a number of rectangular kilns have been excavated at Dura Europos. Where sufficiently preserved all but one has a single stoke-hole through one of the shorter sides and have a firing floor supported on arches with the floor pierced by holes. They range in size from 3.2-4 m in length and are up to 2.25 m wide. These kilns were used for firing ceramics and brick (Kiln F.1) as well as some being used to create lime. Those used for brick production tend to be larger; the same kiln may be used for producing lime and for firing ceramic (Allara 1992: 111). All the kilns pre-date the destruction of the town by the Persians in 256.

[9] For circular kilns of the Kushite period see for example at Kerma (Salah el-Din Mohammed Ahmed 1992: 76-77 and fig. 7), Muweis (Baud 2008: 53, fig. 1), Meroe (Török 1997: I 173-4, II pls 140-143) and Kedurma (Edwards 1996: 40).

[10] This reference was kindly brought to my attention by Dr Daniela Baldoni.

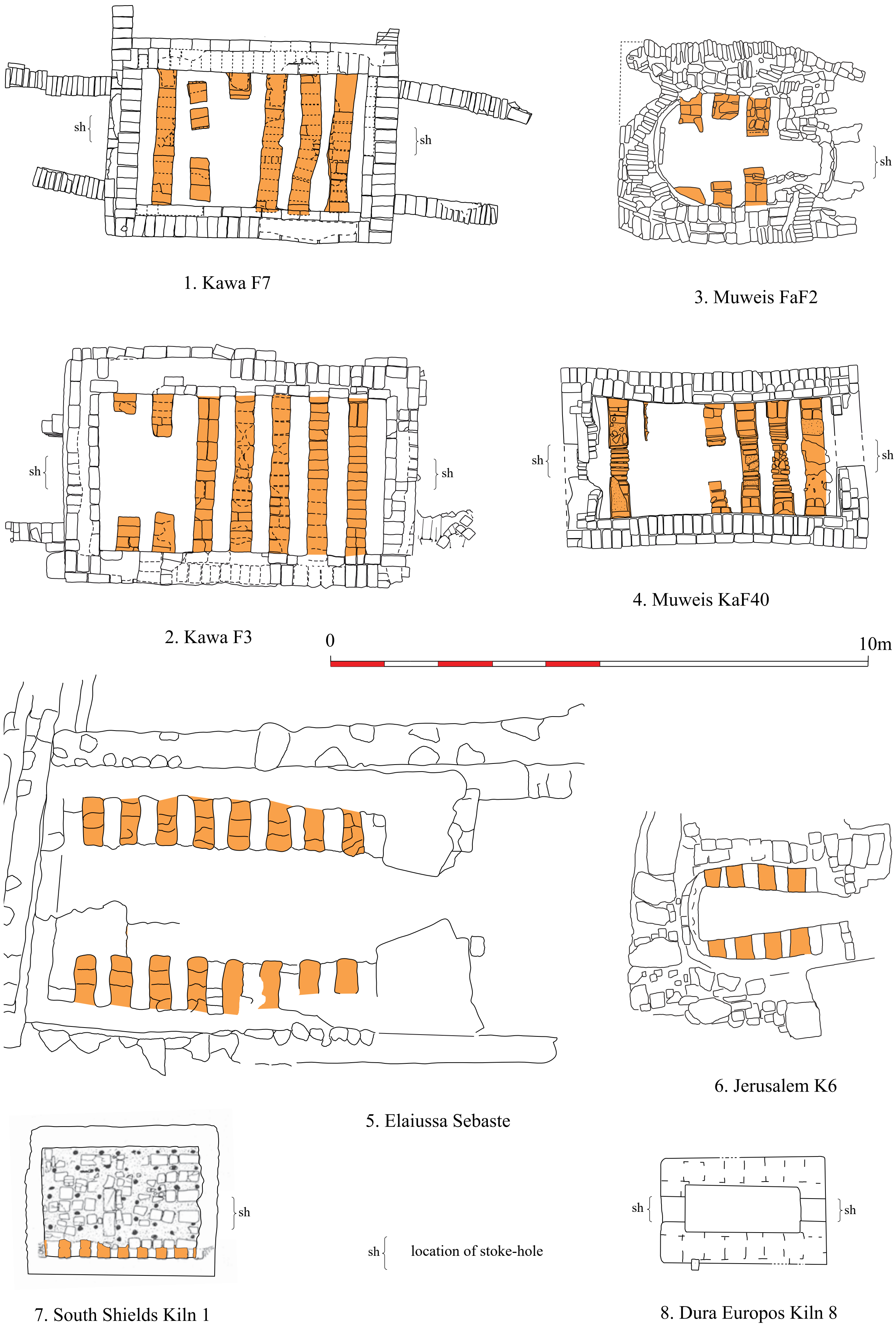


Figure 11. Kushite, and a selection of Roman, rectangular kilns (scale 1:100). 1 & 2 – Sudan Archaeological Research Society Kawa Archive; 3 – after Baud 2008: fig. 1; 4 – © Musée du Louvre - Mission archéologique de Mouweis - Michel Baud, Aurélie Schenk; 5 – after Borgia and Iacomi 2010: fig. 2; 6 – after Goldfus and Arubas 2019: 188-189; 7 – after Dore and Gillam 1979: fig. 10; 8 – after Rostovtzeff 1939, fig. 56.

The exact date of the Dura Europos kilns is uncertain but is of particular importance as the town was only under Roman control between 165 and 256 apart from a very brief time under the emperor Trajan. Are its kilns influenced by Roman or more local traditions? Many are to be found in residential quarters and, therefore, do not seem to be directly associated with the Roman military if indeed they are contemporary with its presence in the town. It is suggested that kiln F.1 may be of Severan date (Allara 1992: 112). Several of the others do not appear to have been in use in the latest period of occupation of the town. The single horse-shoe shaped kiln found at Dura is thought to date to the latter half of the 1st century BC, i.e. is pre-Roman (Allara 1992: 113). As with the rectangular kilns at Jerusalem and at Elaiussa Sebaste they are of significantly later date that the Kushite kilns.

It would appear that the rectangular kiln with the furnace chamber spanned by arches supporting the floor of the firing chamber had a long history both in the Middle East but also in the Western Mediterranean and Greece. It appears in Delcroix and Huot's typology (types D3.3 and D.7), noted above, in that of Cuomo di Caprio (type 2B - based on kilns in Sicily and Southern Italy) (Cuomo di Caprio 1979: 75 and fig. 5.2),[11] that of Fletcher Valls (Type 3-A – based on kilns in Spain) (Fletcher Valls 1965) and that of Hasaki (Type IIc – based on kilns in Greece) (Hasaki 2002: 172-3) amongst others. In a Roman context the type is widely distributed – two good examples of late 3rd or early 4th century date are to be found within the fort at South Shields for example (Bidwell and Speak 1994: 35 and fig. 2.13; Dore and Gillam 1979: 32 and figs 9 and 10). They occur both in military and civilian contexts.

Kilns with two opposed stoke-holes

Perhaps the most significant difference between the majority of rectangular kilns across the Middle East, around the Mediterranean and in the Roman Empire on the one hand, and the Kushite kilns on the other, is the presence of two opposed stoke-holes. Almost all the rectangular kilns, as well incidentally as circular kilns,[12] only have a single stoke-hole.[13]

Although an exhaustive search through the literature for rectangular kilns with this feature cannot be claimed, only one is known to the author, Kiln 8 at Dura Europos (Rostovtzeff *et al.* 1939). Thought initially to have been used for the preparation of lime there does not seem to be any evidence to support this (Allara 1992: 117 and fig. 9). It measures approximately 3.35 x 2.15 m (Figure 11.8).

With any large kiln there was always the potential problem of the heat from the combustible fuel not circulating sufficiently to provide an even firing temperature and this was exacerbated with a rectangular kiln where cool spots could develop in the corners (discussed in Cuomo di Caprio 1992: 50). The possibility of providing a heat source at both ends of the furnace chamber will have greatly reduced this problem allowing the kiln to be fired from both ends simultaneously. Was this approach taken in Kush following the perception of the relatively low calorific value of the available fuel?[14] Certainly timber was used – some charred branches were found in the stoke-hole of Building F3, but timber was always a valuable commodity along the Middle Nile and other less efficient fuels, such as straw, may also have been burnt. The Kushite kilns appear to be relatively large in size when compared to similar Roman kilns but larger Roman examples with only a single stoke-hole are known.

Having opposed stoke-holes would also allow greater flexibility in utilising the wind to help feed the fire but at Kawa the prevailing wind comes from the north in the winter and for a period in the summer from the south, yet the stoke-holes of both kilns face to the east and west.[15]

While the advantages of the double stoke-hole system seem clear there are also very significant disadvantages which are discussed in detail by Cuomo di Caprio in the context of the double-flued circular kiln no. 10 at Morgantina in Sicily. She notes the difficulty of keeping the temperature at the same level at both ends of the kiln and the consequences of not achieving this – the flow of air from the hotter to the cooler end which would then vent out of the flue. To this can be added the danger from flames issuing from the stoke-hole, posed to the stoker at that end of the kiln. This would result in an inefficient use of fuel. At Morgantina these problems were foreseen; a baffle was inserted across the mid-point of the furnace chamber to deflect the hot gasses upwards (Cuomo di Caprio 1992: 57). Was such a feature provided in one of the Kushite kilns at Kawa? Noted above are two additions to

[11] In the context of the Covid 19 pandemic access to some of the relevant literature has proved problematic or impossible. The first author would like to thank Dr Nick Hodgson for scanning through a copy of the volume on Roman brick and tile edited by McWhirr which he was able to borrow, while obscuring the true reason, from the personal library of Paul Bidwell. Also Dr Ross Thomas, of the Department of Greece and Rome at the British Museum, facilitated access to information on the Morgantina kilns, Mr Jack Ullman on that at Dura Europos and Prof. Wolfgang Czysz on the kilns at Rohrbach and Kalapodi.

[12] For oval pottery kilns of the Late Roman period with opposed stoke-holes in southern Britain see Clark 1949. The excavator considers that, as apparently these kilns were of single chamber type, the additional stoke-hole was required to obtain an even firing of the load. For other circular kilns of this type, considered by Cuomo di Caprio to be a type distinct from the double stoke-holes kilns under discussion here, see Cuomo di Caprio 1992: 68 with references.

[13] For a variant type with two stoke-holes side by side which appears to have been associated with the very large size of the kiln see 'the double flue kiln' (Figure 12.2) in the legionary tilery at Holt in Wales, which had a square firing chamber 19.5 m^2 in floor area (Grimes 1930: 24.).

[14] For the availability of fuel for kiln firings in an arid environment and the poor quality of some of it see Möller and Rieger 2019: 85; Veal 2019.

[15] Kiln orientations, as defined by the direction of the stoke-hole, vary markedly even within a given site (see Cuomo di Caprio 1992: 49-50).

the cross walls in Building F3 which were assumed to be designed to strengthen the cross-wall arches (Figure 1.3 and 1.4). These are on adjacent cross walls on opposite sides of the central 'corridor' and perhaps should be reinterpreted as baffles. At Muweis the furnace chamber was modified with the construction of what appears to have been a solid wall made of bricks and brick fragments with a maximum thickness of 1.16 m. This divided the chamber into two parts, one 918 mm long, the other 2.5 m in length. The excavators suggested that it was designed either to shorten the kiln – one stoke-hole then going out of use - or to provide additional support to the side walls which were bowing inwards (Schenk, unpublished report).

Relevant to this discussion is a kiln at En Chaplix in Switzerland. Here Kiln II (Figure 12.1) has an opening 900 mm wide directly opposite the stoke-hole but this was not a second stoke-hole as its base is at the level of the firing chamber floor, not that of the furnace chamber. It is assumed that it functioned as a chimney (Eschbach *et al.* 1995: 161, fig. 18). A kiln at Kaiseraugst also has a similar arrangement along with further small vents in the lower walls of the firing chamber (Allemann 2014: Abb. 1).

One Kushite circular kiln deserves mention here. Excavated at Kerma, 55 km to the north of Kawa, it does have opposed stoke-holes of a similar size (420 mm wide) although the associated stoking pits are of differing form and size suggesting that they may have been used in a different way (Salah el-Din Mohammed Ahmed 1992: 76-77 and fig. 7). Also of interest are the firing floor supports, two parallel cross walls likely with an arch spanning the central channel. This is similar to what is observed in the rectangular kilns but rather different to many other circular kilns in the Middle Nile Valley where the arch supports are arranged radially. This kiln dates to the early Kushite period, predating the Kawa and Muweis rectangular kilns by over half a millennium.

The firing chamber floor

The other unusual feature, at least of Building F3, is the nature of the firing-chamber floor. In Roman rectangular kilns the floor is generally pierced by circular holes arranged in rows corresponding to the voids between the cross walls, sometimes being cut in the edges of tiles after their manufacture, an *ad hoc* modification of a pre-existing object.[16] Some kilns however, did employ specially shaped floor tiles. In Kiln no. 1 at Holt, used to fire pottery, each tile had semi-circles cut out mid-way along two opposite sides[17] which when laid formed a floor with circular holes through it approximately 150 mm in diameter (Grimes 1930: 35, fig. 23). The same arrangement can also be seen in the kiln at Rohrbach near Augsburg in Germany, the holes in the firing floor being 40-50 mm in diameter (Czysz 2000/ 01: 138 and Abb. 18).[18] At Nied also in Germany the tiles had triangular cut-outs forming a floor with rectangular (diamond-shaped) openings through it (Wolff 1893). It has been suggested that the tiles found at Saint-Maurice-de-Ventalon in the 1st century AD kiln, and possibly the similar example from Fuengirola (Southern Spain), if they actually came from the firing chamber floor will, when laid, have formed a surface pierced by elongated hexagonal holes (Dardaine and Waton 1986: 342, fig. 8, fn.12-14). A not dissimilar system was probably employed at Chancy in Switzerland (Cailler and Bachofen 1922: 28).

Two of the Holt kilns have rectangular vents, in the double stoke-holed kiln these have their long axes parallel to the cross walls (Figure 12.2), in Kiln no. 6 they are at 90º to the cross walls. In the former kiln the cross walls are very close together, 127 mm, except at each end where the gap is 178 mm. The floor was made of tile fragments set in mud, with a total thickness of 305 mm. Each vent was 229 x 127 mm in size apart from those by the end walls which were 229 x 178 mm. Due to the nature of the floor no specially shaped tiles were required. Kiln 6 had vents 229 x 102 mm. Details of its floor construction are not published (Grimes 1930: 27, 40).

It appears to have been standard practice to apply a thick layer of mud over the floor tiles and to pierce holes through it conforming to those in the tiles below. After the first firing this will have provided a very strong floor on which the load for future firings could be placed. In one kiln at Viminacium it is suggested that the floor was made from unfired bricks up to 140 mm thick, the whole being fused into a single mass after the kiln's firing (Jovičić and Milovanović 2016: 24 and fig. 7).

The tiles forming the firing chamber floor in Building F3 at Kawa display a sophisticated design, which in the absence of other direct parallels known at present, must be assumed to be an innovative local solution to the problem of providing a porous floor between the two chambers in the kiln. Here it was the combination of four tiles which formed each rectangular opening.

The source of inspiration for the Kushite rectangular kilns

The complete absence of rectangular kilns at any other period along the Middle Nile, both before and after the kilns discussed here, indicates that the technology is not local. The close correspondence in basic form to kilns known elsewhere strongly suggests that the

[16] In the sub-rectangular kilns at Gouy-Saint-André in north-east France (Masse *et al.* 2011: 27 and fig. 17) the firing chamber floor, supported by ceramic columns, is pierced by square openings varying in size in three kilns, 80 mm, 90 mm and 100 mm. These floors are a single slab, not formed from individual tiles.

[17] The tiles were of two sizes, 419 x 279 mm and 279 mm square.

[18] The tiles were of two sizes 390 x 280 mm and 350 x 280 mm.

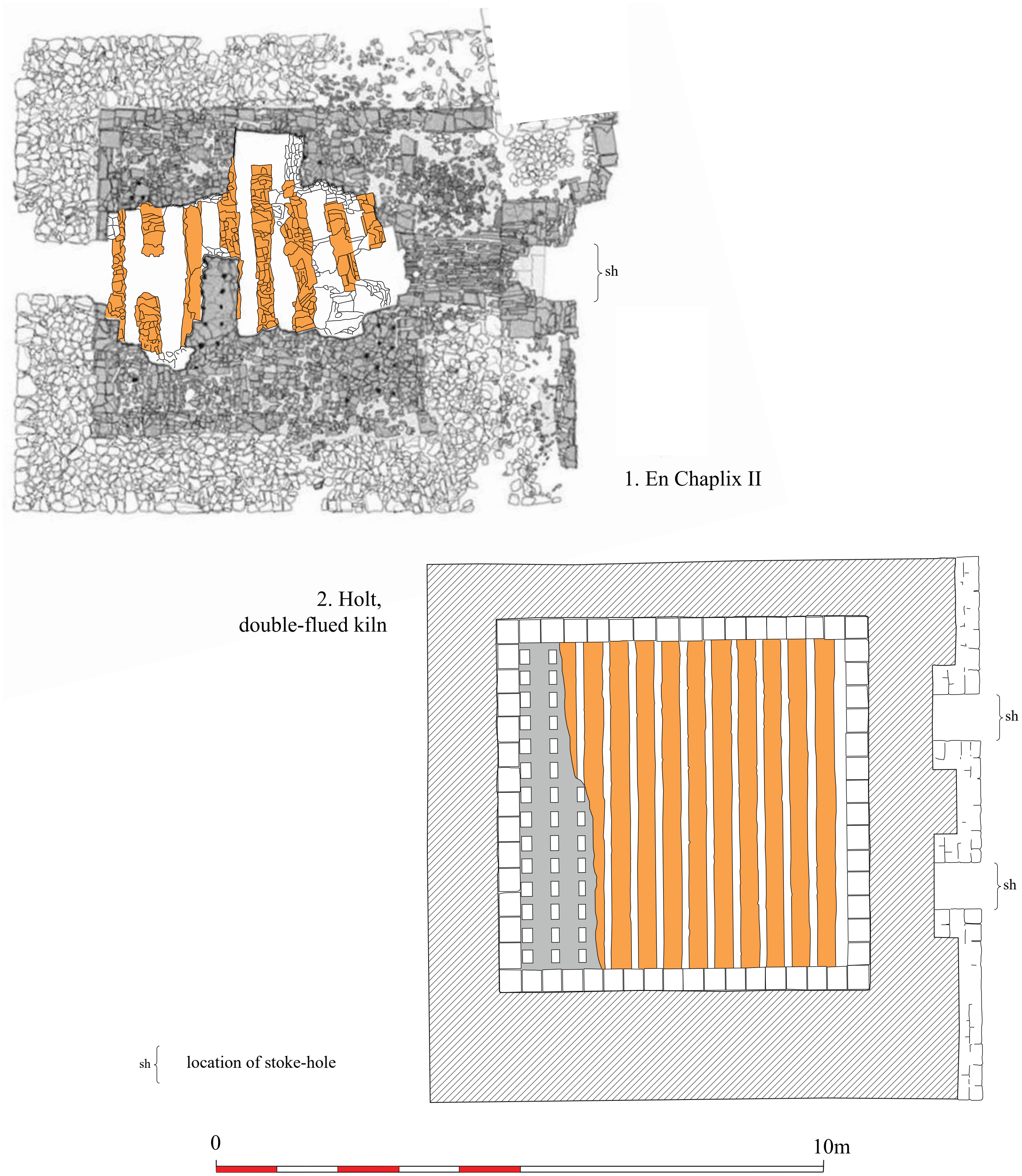


Figure 12. Roman rectangular kilns (scale 1:100). 1 – after Eschbach et al. 1995: fig. 6; 2 – after Grimes 1930: fig. 15.

technology was imported into Kush. Given the presence of rectangular kilns like those at Kawa and Muweis in Europe and Western and Central Asia how are we to account for their presence in a Kushite context? The idea of technological exchange between Rome and Kush as manifested by the kilns at Kawa and Muweis remains an intriguing possibility but at present cannot be proven.[19] Although this technology had been in use in some cases for millennia elsewhere, the appearance of the Kushite kilns perhaps in the later 1st century BC, coinciding with the beginning of close relations between Rome and Kush from 30 BC onwards, may not be coincidental. These relations were usually peaceful but in the 20s BC resulted in a Kushite attack on Egypt and a Roman invasion of Kush.

[19] For Roman influence on Kushite architecture see, for example, the Hathor Chapel at Naqa which exhibits pharaonic Egyptian, Greek and Roman inspired elements (Wildung and Riedel 2011: Abb. 136-139).

That this kiln type appears in Kush at approximately the time of the Roman takeover of Egypt suggests that the most probable source of inspiration came from within the Roman Empire. The absence of similar kilns in Egypt remains problematic.[20] It is difficult to suggest a mechanism which brought the idea of this kiln type into Kush but not into Egypt.[21] While doing little to account for the problem just noted, one might very tentatively suggest that the most likely agent of transmission was the Roman army, the later 1st century BC seeing a sudden influx of non-Egyptians, some certainly from the Western Roman Empire, into the Nile Valley. The Roman military units entering and thereafter based in Egypt can be expected to have included soldiers skilled in building activities.[22] Rectangular kilns are frequently associated with legionary fortresses, as the examples from Jerusalem and many other legionary bases elsewhere in the Empire, highlight. Is it not to be expected that similar installations remain to be discovered associated with the presence of *legio XXII Deiotariana* and *III Cyrenaica* based at Alexandria in the later 1st century BC and in the 1st century AD and another legion at Luxor for a shorter period of time? Kilns of this type are less well known in association with auxiliary forts but they do occur and the presence of several auxiliary units close to, and on, the borders of Kush, some units originating in the western provinces of the empire, may have provided the cross-over point for the technological exchange. No installations associated with the legionary occupation in Alexandria during the period relevant to this discussion are known while very limited archaeological work was conducted on the Roman military installations south of the First Cataract before the region was totally flooded by the successive dams at Aswan (Maxfield 2000: 414-418; Welsby 1998).

From wherever the design of the rectangular kiln came, although found at two sites far apart in the Kingdom of Kush, it did not catch on and the dominance of the circular kiln was never seriously challenged.[23]

As far as we are aware there is no especial link between the Kushite towns of Kawa and Muweis and, therefore, no obvious reason why rectangular kilns should have been built in those two places exclusively. Further discoveries of this unusual kiln type are to be expected within the Kingdom of Kush, and perhaps at some point in Roman period Egypt.

Movement of goods (IWS)

A more tangible and incontrovertible link between the Roman world and Kawa is represented by a Dressel 2-4 amphora, albeit of table size, rather than the more common full size variant. It has been chosen for publication in this context not only because of its connection to Roman archaeology but because Dressel 2-4 amphora have been found at South Shields. Found whole in grave (JG2)2 (Figure 13), it is unique at Kawa. It is covered in a thin, glossy orange wash and it appears to be made from a typical Campanian fabric, with augite inclusions visible under a hand lens. As the vessel was both complete and so unusual, no attempt was made to achieve a fresh break to study the fabric more closely. It measures 42.5 cm in height, about half the size of a regular Dressel 2-4, has a rim diameter of 4.7 cm and at its maximum a diameter of 19.5 cm, and the typical bifid handles (Figures 14 and 15). The vessel was found without its original seal or stopper, and may have been reused or even brought to Kawa as a curiosity rather than with its original contents intact. As for its date, considering the fabric, its manufacture can be placed between *c.* 70 BC and AD 79.[24] No other closely datable grave goods were found in the tomb.

Its size makes it all the more noteworthy, as the author has not been able to find a direct parallel, neither in Italy nor elsewhere in the Roman Empire (let alone in Sudan). A similar sized vessel, with a similar surface treatment, is curated in the Museo Archeologico Nazionale di Napoli (inv. no. 23093), but the form is different: the body is more angular and the handles are not bifid; it is in fact described as a *garum* jug (*brocca di garum*). *Garum* would indeed have been a more practical type of contents for a vessel of reasonably small dimensions (when exported so far afield), rather than the Falernian(?) wine that would have been the usual contents of the larger Dressel 2-4 produced in Campania.[25] There exists a series of 'table amphorae', and there is such a variant of this type (University of Southampton 2014) but it has a ring-footed base, whereas the Kawa example has the spike of the regular type.[26]

[20] Roman kilns of this type are commonly used to produce not only brick and tile but other ceramic architectural elements as well as pottery. One type of building which made extensive use of ceramic architectural elements was the bathhouse and, at least in Late Roman to Byzantine bathhouses in Egypt, these materials formed a significant component of those buildings (Fournet and Redon 2017: 287). The evidence for such buildings in the early Roman period is sparse. I am grateful to Paul Nicholson, Michael Mackensen, Aurelia Masson-Berghof and Pamela Rose for their comments on kiln types in Egypt.

[21] As far as the author is aware no comparable kilns have been noted in the Ethiopian highlands.

[22] For the Roman Army as builders in Egypt see Alston 1995: 80-81 with references.

[23] For advantages of the circular over the rectangular design see Cuomo di Caprio 1992: 50.

[24] https://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/details.cfm?id=102&CFID=70f3ffed-81cf-4d08-ble9-4d777034ffde&CFTOKEN=0, viewed 28 February 2022.

[25] https://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/details.cfm?id=102&CFID=70f3ffed-81cf-4d08-b1e9-4d777034ffde&CFTOKEN=0, viewed 28 February 2022.

[26] Enquiries to various amphora experts, including Paul Reynolds and Roberta Tomber, has not elicited recognition of the form with these reduced dimensions.

Figure 13. Kawa. The table amphora in situ *in the mud-brick vaulted chamber of grave (JG2)2 (arrow length 200 mm).*

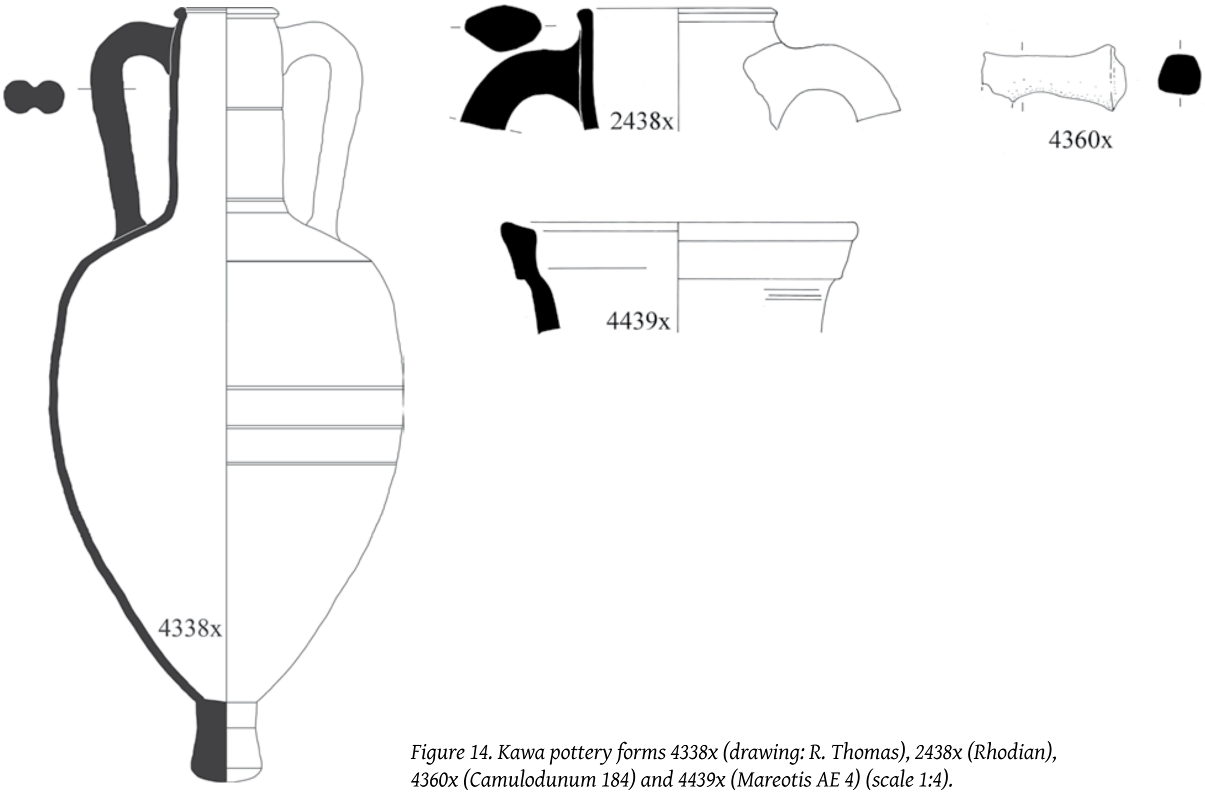


Figure 14. Kawa pottery forms 4338x (drawing: R. Thomas), 2438x (Rhodian), 4360x (Camulodunum 184) and 4439x (Mareotis AE 4) (scale 1:4).

The table amphora variant of Dressel 2-4 is not the only Mediterranean amphora found at Kawa; other forms represented (by one specimen each) include a Rhodian rim of Hellenistic date, the handle of a Camulodunum 184 (late 1st century BC - early 2nd century AD)[27] and possibly the rim of an Egyptian Dressel 2-4, Mareotis A4E (1st - early 4th century AD) (Bagińska 2005: 24) (Figures 14, 16 and 17). Several examples of this type of amphora were found in the course of excavations at Kawa in the 1930s, placed in what was interpreted as a wine press (Macadam 1955: II, pls XXXII and CVIII.d).

While the table amphora (Kawa form 4338x) is unique at Kawa and apparently elsewhere, other finds from the Roman world are by no means exceptional (though not common) in Kush. See for example Bagińska 2005, with an exhaustive survey of amphorae from the Mediterranean that have been found (almost exclusively) in funerary contexts. Not only amphorae made their way south along the Nile but prestige objects, such as elegant metalwork, including bowls, cups, colanders and lamps (Dunham 1957: passim). These were regarded as luxury objects, but the volume of trade does not appear to have been on a large scale.

Final comments

Rome and Kush co-existed and shared a common frontier for nearly 400 years. During that period it is only to be expected that there was some exchange of goods and ideas. The two empires did not maintain a hard and impenetrable border. The Temple of Isis at Philae in particular, in the 1st-3rd centuries AD *c.* 135 km inside Roman territory, was a regular meeting place for inhabitants of the two states, it being an extremely important centre for Kushite religious practices. Kushites were frequent visitors there and among them were royal officials described as 'great envoy to Rome' (Pope 2019). A Kushite peace delegation travelled to meet Augustus in Samos in 21/20 BC and a Kushite, a senior official described as being in charge of the treasury of the Candace (the title of the Kushite queen), is mentioned in the Bible travelling on the road between Jerusalem and Gaza in the 1st century AD (Acts 8:26). Kushites are also mentioned by Dio Chrysostom in Alexandria *c.* AD 71-75 or AD 105 (Eide *et al.* 1998: 924-926). From the Roman side the army led by Petronius campaigned deep into Kush at least as far as the Semna Cataract 375 km south of Egypt's

Figure 15. Kawa pottery form 4338x (scale bar 20 cm).

Figure 16. Kawa pottery form 4360x (scale bar 10 cm).

[27] The former and latter were identified by R. Tomber from drawings and photos.

traditional border at the First Cataract and, if Augustus is to be believed, as far as the preeminent Kushite cult centre at Jebel Barkal 725 km further upstream (Brunt and Moore 1967: 33). Under Nero one or possibly two exploratory missions passed through Kush undoubtedly with the permission of the Kushite administration, they are recorded as meeting with a Kushite king and queen, and probably reached the swamps of the Sudd 2675 km upstream of the First Cataract (Eide *et al.* 1998: 884-895).

The comments here on kilns and Roman objects at Kawa mark but a small addition to the body of evidence for Romano-Kushite contacts.

Figure 17. Kawa pottery form 2438x (scale bar 10 cm).

Bibliography

Allara, A. 1992. L'îlot des potiers et les fours à Doura-Europos. Etude préliminaire. *Syria* 69 fasc. 1-2: 101-120.

Allemann, M. 2014. Die spätantiken Ziegelbrennöfen in der Flur Liebrüti (Kaiseraugst AG) und ihr Bezug zur Legio I Martia. *Jahresberichte aus Augst und Kaiseraugst* 35: 157-240.

Alston, R. 1995. *Soldier and Society in Roman Egypt*. London - New York: Routledge.

Bagińska, D. 2005. Amphora Imports in Nubia. *Gdańsk Archaeological Museum African Reports* 3: 15-36.

Baud, M. 2008. The Meroitic royal city of Muweis: first steps into an urban settlement of riverine Upper Nubia. *Sudan & Nubia* 12: 52-63.

Bidwell, P. and S. Speak 1994. *Excavations at South Shields Roman Fort* (The Society of Antiquaries of Newcastle upon Tyne Monograph Series 4). Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne with Tyne and Wear Museums.

Brunt, P.A. and J.M. Moore (eds) 1967. *Res Gestae Divi Augusti. The Achievements of the Divine Augustus*. London: Oxford University Press.

Cailler, P. and N. Bachofen 1922. Four d'un four à tuiles, de l'époque romaine, à Chancy (Canton de Genève). *Indicateur d'Antiquités suisses* XXIV: 23-32.

Clark, A.J. 1949. The Fourth-Century Romano-British Pottery Kilns at Overwey, Tilford. *Surrey Archaeological Collections* 51: 29-56.

Cuomo di Caprio, N. 1979. Pottery- and Tile-kilns in South Italy and Sicily, in A. McWhirr (ed.) *Roman Brick and Tile. Studies in Manufacture, Distribution and Use in the Western Empire* (British Archaeological Reports International Series 68): 73-95. Oxford: British Archaeological Reports.

Cuomo di Caprio, N. 1992. *Fornaci e Officine da Ellenistiche* (Morgantina Studies 3). Princeton, NJ: Princeton University Press.

Czysz, W. 2000/01. Die spätrömische Töpferei und Ziegelei von Rohrbach im Landkreis Aichach-Friedberg - Ausgrabung des Brennofens 1 (1983). *Bericht der Bayerischen Bodendenkmalpflege* 41/42: 129-159.

Dardaine, S. and M.-D. Waton 1986. Un four à tuiles du Ier s. ap. J.-C. à Saint-Maurice-de-Ventalon (Lozère). *Revue archéologique de Narbonnaise* 19: 337-350.

Delcroix, G. and J.-L. Huot 1972. Les Fours dits «de potier» dans l'Orient ancien. *Syria* 49, Fasc. 1/2: 35-95.

Dore, J.N. and J.P. Gillam 1979. *The Roman Fort at South Shields* (The Society of Antiquaries of Newcastle upon Tyne Monograph Series 1). Newcastle upon Tyne: Society of Antiquaries of Newcastle upon Tyne.

Dunham, D. 1957. *Royal Cemeteries of Kush IV; Royal Tombs at Meroe and Barkal*. Boston: Museum of Fine Arts.

Edwards, D.N. 1996. A Meroitic Settlement and Cemetery at Kedurma in the Third Cataract Region, Northern Sudan. *Archéologie du Nil Moyen* 7: 37-52.

Eide, T., T. Hägg, R.H. Pierce and L. Török (eds) 1998. *Fontes Historiae Nubiorum. Textual sources for the history of the Middle Nile Region between the eighth century BC and the sixth century AD. Volume III From the first to the sixth century AD*. Bergen: Universitetet i Bergen.

Eschbach, F., D. Castella and A. Duvauchelle 1995. L'atelier de tuiliers d'Avenches «En Chaplix». *Bulletin de l`Association Pro Aventico* 37: 143-188.

Ferrazzoli, A.F. 2010. Economy of Roman Eastern Rough Cilicia: Some Archaeological Indicators. *Bollettino di Archeologia* Volume speciale: 39-50.

Fletcher Valls, D. 1965. Tipologia de los Hornos Cerámicos Romanos de España. *Archivo Español de Arquelogia* 38: 170-174.

Fournet, T. and B. Redon 2017. Romano-Byzantine baths of Egypt, the birth and spread of a little-known regional model, in B. Redon (ed.) *Collective baths in Egypt 2. New discoveries and perspectives* (Études urbaines 10): 279-322. Le Caire: Institut Français d'Archéologie Orientale.

Goldfus, H. and B. Arubas 2019. The Legio X Fretensis Kilnworks at the Jerusalem International Convention Center, in H. Geva (ed.) *Ancient Jerusalem Revealed. Archaeological Discoveries, 1998–2018*: 184-194. Jerusalem: Israel Exploration Society.

Grimes, W.F. 1930. *Holt, Denbighshire: The Works-Depot of the Twentieth Legion at Castle-Lyons* (Y Cymmrodor 51). London: The Honourable Society of Cymmrodorion.

Harizanov, A. 2019. Bridging the Gap: Continuity and Innovation in Ceramic Kiln Technology from the 6th c. BC to the Beginning of the 7th c. AD in the Territory of Bulgaria. *Archaeologia Bulgarica* XXIII, 3: 15-39.

Hasaki, E. 2002. Ceramic Kilns in Ancient Greece: Technology and Organization of Ceramic Workshops. Unpublished PhD dissertation, Department of Classics, College of Arts and Sciences, University of Cincinnati.

Jovičić, M. and B. Milovanović 2016. Roman brick kiln from the eastern necropolis of Viminacium. *Archaeology and Science* 12: 19-38.

Macadam, M.F.L. 1955. *Temples of Kawa. II. History and Archaeology of the Site*. Oxford: Oxford University Press.

Masse, A., N. Tachet and M. Meurisse-Fort 2011. Un atelier de saunier gaulois d'arrière pays à Gouy-Saint-André « Le Rossignol » (Pas-de-Calais) : présentation générale. *Archeologie de la Picardie et du Nord de la France (Revue du Nord)* 93, N° 393: 13-36.

Maxfield, V.A. 2000. The Deployment of the Roman Auxilia in Upper Egypt and the Eastern Desert during the Principate, in G. Alföldy, B. Dobson and W. Eck (eds) *Kaiser, Heer und Gesellschaft in der Römischen Kaiserzeit* (Habes 31): 407-442. Stuttgart: Franz Steiner Verlag.

Möller, H. and A.-K. Rieger 2019. Necessity is the mother of invention: the fuel of Graeco-Roman pottery kilns in the semi-arid Eastern Marmarica, in R. Veal and V. Leitch (eds) *Fuel and Fire in the Ancient Roman World. Towards an integrated economic understanding:* 71-86. Cambridge: McDonald Institute for Archaeological Research.

Pope, J. 2019. Figural Graffiti from the Meroitic Era on Philae Island, in G. Emberling and S. Davis (eds), *Graffiti as Devotion Along the Nile and Beyond* (Kelsey Museum Publication 16): 71-86. Ann Arbor: The Kelsey Museum of Archaeology.

Rostovtzeff, M.I., F.E. Brown and C.B. Welles (eds) 1939. *The Excavations at Dura-Europos. Preliminary Report of the Seventh and Eighth Seasons of Work, 1933–1934 and 1934–1935*. New Haven – London – Prague: Yale University Press; Oxford University Press; Kondakov Institute.

Salah el-Din Mohammed Ahmed 1992. *L'agglomération napatéenne de Kerma. Enquête archéologique et ethnographique en milieu urbain*. Paris: Editions Recherches sur les Civilisations.

Schneider, E.E. 2008. *Elaiussa Sebaste, A Port City between East and West*. Istanbul: Homer kitabevi.

Sporn, K. 2016/17. Forschungen zur Anlage, Ausdehnung und Infrastruktur des Heiligtums von Kalapodi. Die Kampagnen 2014 – 2016. *Athenische Mitteilungen* 131/132: 193-278.

Török, L. 1997. *Meroe City. An Ancient African Capital* (Egypt Exploration Society Occasional Publications 12). London: Egypt Exploration Society.

University of Southampton 2014. Roman Amphorae: a digital resource [data-set]. York: Archaeology Data Service [distributor]. Viewed 28. February 2022, <https://doi.org/10.5284/1028192>.

Veal, R. 2019. The history and science of fuel and fire in the Roman Empire, in R. Veal and V. Leitch (eds) *Fuel and Fire in the Ancient Roman World. Towards an integrated economic understanding*: 11-23. Cambridge: McDonald Institute for Archaeological Research.

Welsby, D.A. 1998. Roman Military Installations along the Nile south of the First Cataract. *Archéologie du Nil Moyen* 8: 157-182.

Welsby, D.A. 2008. The Northern Dongola Reach Survey. Excavations at Kawa, 2007-8. *Sudan & Nubia* 12: 34-39.

Welsby, D.A. 2010. Excavations at Kawa, 2009-10. *Sudan & Nubia* 14: 48-55.

Welsby, D.A. 2017. Gematon between the reigns of Ramesses VI and Taharqo, in N. Spencer, A. Stevens and M. Binder (eds) *Nubia in the New Kingdom. Lived Experience, Pharaonic Control and Indigenous Traditions* (British Museum Publications on Egypt and Sudan 3): 473-485. Leuven - Paris - Walpole, MA: Peeters.

Welsby, D.A. (with a contribution by D. Antoine) 2013. *KAWA. The Pharaonic and Kushite town of Gematon: History and archaeology of the site*. Viewed 28. February 2022, <http://www.sudarchrs.org.uk/wp-content/uploads/2018/07/Kawa_QSAP_English_booklet.pdf>.

Wildung, D. and A. Riedel 2011. Die Kunst von Naga · The Arts of Naga, in K. Kröper, S. Schoske and D. Wildung (eds) *Königsstadt Naga · Naga - Royal City. Grabungen in der Wüste des Sudan · Excavations in the Desert of the Sudan*: 108-152. München - Berlin: München / Berlin, Staatliches Museum Ägyptischer Kunst.

Wolff, G. 1893. Die römischen Ziegeleien von Nied bei Höchst a. Main und ihre Stempel. *Archiv für Frankfurter Geschichte und Kunst*: 212-267.

Strategic surprise and John Lydus: Constantine's 'last plans'

Everett L. Wheeler

O illustris praefecte Arbeiae, quondam Luguduno (Bidwell 2014)! Although others may better laud your professional and administrative accomplishments, I hail an esteemed colleague's keen, critical assessment of evidence and generosity in sharing your knowledge over thirty years. For true familiars, you engender a warm fondness inviting celebration. You're just really a fun guy! You once emailed that you never disagree with what I write – restrained courtesy no doubt – but I pray this modest homage meets the approval of a current 'great' of Roman army studies and a valued friend.

See Figure 1 for location of some places mentioned in the text.

John Lydus (*De Magistratibus* 3.33.2-34) preserves from Constantine I's papers (ἐν τοῖς ἑαυτοῦ συγγράμμασι) the emperor's own consideration of a surprise attack on the Persians. Support came from Celsus *tacticus*' work (συγγραφή μονηρής) on how to defeat the Persians: a surprise attack via Colchis. Rome's first Christian emperor departed this world 22 May 337 at Achyrona near Nicomedia *en route* to a Persian war (e.g., Aur. Vict. 41.16). That much is undisputed. But little else about Constantine's final days and the circumstances of a Persian war escapes controversy. Facts flounder in a quagmire of sparse, scattered, and conflicting sources, further muddied by Eusebius and later church historians. The massive bibliography cannot be addressed in detail here, nor hope offered of definitive solutions to all problems. In any case, Constantine's Persian war belongs in the category of 'last plans'.

Remarkably, however, Lydus' claim to written documentation of Constantine's strategic thinking, largely unnoticed,[1] has not influenced the Roman strategy debate, now largely a dialogue of the deaf. Space precludes a *status quaestionis* of that debate.[2] Celsus' fragment, as noted long ago, clearly demonstrates Roman geo-strategic thought at the highest level, although Lydus' reproduction of the fragment (as shown below) inspires little confidence in its geographical or historical accuracy.[3] Both false and correct notions can mark strategic thinking.

Likewise the fragment garners little attention in assessing events 335-338. To overgeneralize, three interpretations of the war can be discerned, although individuals' views vary in details. The idea of Constantine's Persian war as a 'crusade', long contemplated with universalist pretensions for greater conquests (cf. Alexander the Great, Trajan) and inspired by Sapor II's supposed persecution of Christians, originates with Tillemont (1697). Recent anglophone enthusiasm for 'Constantine the crusader', largely based on Eusebius (especially the *Vita Constantini* with its controversial 'letter to Sapor' of 324?), endorses an emperor's new role as the protector of Christians even beyond Roman borders and credits intermittent reports of Roman-Persian tensions after the Nisibis treaty ending Galerius' Persian war (296-299). Religious motivation for a Persian war in the 4th c., not unusual in the 5th, invites criticism.[4] Secular motives sufficed. The eternal Armenian question again looms large from sparse Graeco-Roman sources and Armenian accounts contradictory in facts and chronology.[5] Further, the Sasanids craved recouping territorial losses from the 299 treaty and pro-Roman (?) Saracen raids in Sasanid Adiabene irritated. Roman revenge for Sapor I's capture and humiliation of Valerian (260) still seethed in the 320s.[6]

[1] Cited but not discussed at Lee 1993: 119; ignored by Mattern 1999; cf. Wheeler 2011a: 216, 217, 615 n.181.

[2] Recent assessments: e.g., Raisbeck 2020; Speidel 2020a (unaware of Luttwak 2016 and more about trends in frontier studies than strategy). A session at the 2015 Ingolstadt Limes Congress (Sommer and Matešić 2018: 407-92), largely intent on debunking Luttwak's view of 'defense in depth', essentially beat a 'dead horse', as papers did not consider the 1976 book's revised edition (2016), confessing errors but also rebutting critics, partly recycled from Luttwak 2009: 421-422, 471 n.2; see Rance 2017 for a review.

[3] Wheeler 1993: 239; cf. Kaegi 1981: 210, positing Celsus' title as *De bello Parthico*; baseless is Speidel's conjecture (2020b: 141) that Celsus' work treated Corbulo's Armenian campaigns exclusively.

[4] Tillemont 1697: 265-266; anglophones (e.g.): Barnes 1981: 258-260; 1985: 130-133; Blockley 1992: 11-12; 1998: 419; G. Fowden 1993: 85-97; 1994: 146-148; E. Fowden 2006: 377-382, 389-392; Dignas and Winter 2007: 33, 88-92; Whitby 2007: 329; Shean 2010: 301; Sarris 2011: 229-230; Assénat and Pérez 2012: 33, 41; 2014:199; Potter 2013: 286-89; Morley 2016: 118; *contra*, Matthews 1989: 499 n.14; Wirth 1990: 218-219; Wheeler 1998: 88-89; 2009: 230; Frendo 2001: 64; Mosig-Walburg 2009: 275-278; Luther 2011: 116; Angelou 2014: 277; Smith 2016: 43; 299 (not 298) for the Treaty of Nisibis: Zuckerman 1994: 70.

[5] A summary of the Armenian evidence at Hewsen 1985-1986.

[6] Amm. 17.5.3-6; Zonar. 13.9, p.202 Dindorf; cf. Aur.Vict. 39.37; Lib. *Or* 59.71; revenge for Valerian: E. Fowden 2006: 282-283; Saracens: Lenski 2011: 244, discussing Theophanes *Chron.* A.M. 5828 (AD 335/336; p.54 Mango/Scott) and *Chron. ad 724*, p.101 Chabot: apparently Saracens were selling captured Persian subjects as slaves in Roman Mesopotamia. The disputed historicity of the Metrodorus affair (Sapor II's pilfering of treasure sent to Constantine from an Indian king) cannot be treated here. See Amm. 25.4.23; Youinou 2008; Potter 2013: 289; Mosig-Walburg 2009: 211-212.

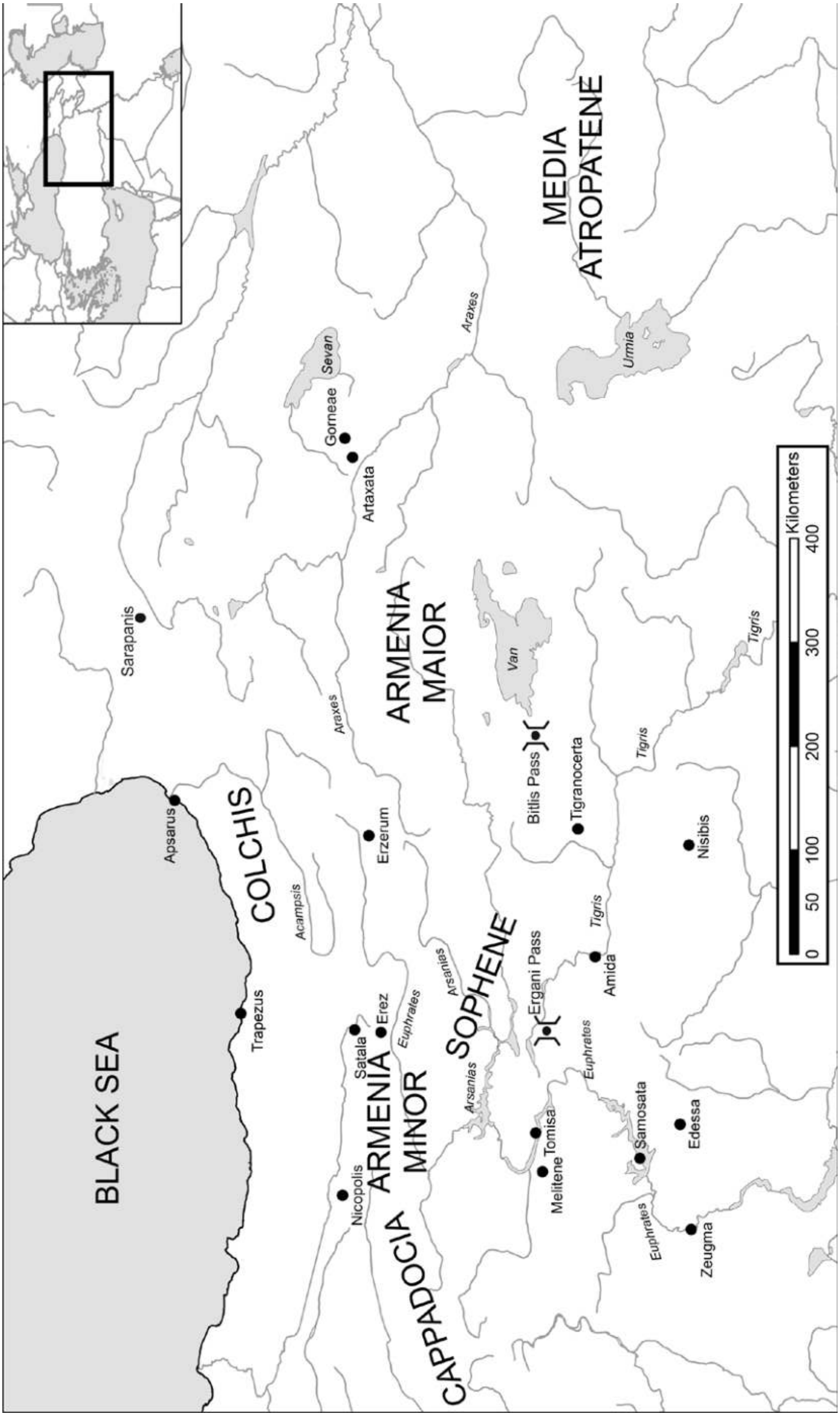


Figure 1. Upper Euphrates frontier and Armenia.

Nevertheless, Mosig-Walburg's 2009 tightly-argued discussion, the new benchmark for treatment of Roman-Sasanid relations to 363, eliminates Christianity's role in Constantine's war besides any ideological basis (Alexanderism, Trajanic model) for Constantine's motives or plans. Rather, Sapor II surprised Constantine with coordinated double-pronged attacks on Amida and Nisibis in 337, against which Rome scrambled to assemble a defense. If Armenia, especially Constantine's designation (335/336) of his nephew Hanniballianus as a *rex* (not *rex regum*) of Armenia and 'Pontic peoples', remains in this view the chief bone of contention, her reconstruction of the chronology of 335-338 and the sequence of events often borders on hypercriticism and at times arbitrary rejection of contrary evidence. A detailed critique is not possible here.[7] Further, the sources change their tune about responsibility for the war. Initially, regardless of any 'plans' of Constantine, Sapor II provoked hostilities.[8] A more retrospective, later fourth-century evaluation of Roman-Persian wars 337-363 shifted the blame to Constantine, thus suggesting the emperor did have plans.[9]

Different interpretations also reflect historiographical methodology. The highly historicist/positivist approach of Mosig-Walburg strongly contrasts with that taking account of culture and ideology (cf. Fowden 1994: 168-170). Did Constantine lack any sense of Alexanderism or ignore a Trajanic model in contemplating a Persian war? Given the contradictory evidence for events 335-338 and their chronology (i.e., disputes over whether some events occurred in 335, 336, or 337), Constantine's Persian war invokes the Thucydidean-Polybian dilemma of determining a war's cause, pretext, and beginning (Plb 3.6-8). Significantly, Mosig-Walburg ignores Lydus on Constantine's plans, as does Fowden's treatment of the historiographical trends. Lydus' fragment fits neither model. But before delving further into these issues, the character of supposed 'last plans' merits attention, as does the extent of originality for military theory in Celsus' fragment.

The unreality of 'last plans' generates counterfactual fantasies. Accomplishments of the supposed originator of such 'plans' facilitated their credibility and invention. But some kernel of historical probability often underlies tales of 'last plans', e.g., Alexander the Great's 'last plans', the most discussed. Arrian (*Anab.* 7.1.2-4) summarizes a series of extensive schemes without endorsement. A supposed plan for the invasion of Italy probably cannot be divorced from the failed campaign (334-331/330 BC) of Alexander's uncle, Alexander of Epirus, as *hegemon* of the 'Italiote League' (modern term) against the Lucanians and Messapians – perhaps a western attempt at empire parallel to Alexander's in Asia. His uncle's defeat occasioned the Macedonian to look west.[10] Indeed for Livy, the Epirot's defeat exemplified the fate (real or anticipated) of foreign invaders of Italy, not least Alexander the Great's in the famous digression (9.17-19), the first attested attempt at counterfactual history, appended to a *laus* of L. Papirius Cursor, victor over the Samnites (319 BC), whose *laudatio funebris* may be the digression's inspiration.[11] Later sources even have Papirius appointed to command against Alexander.[12] Cleitarchus adds an otherwise unattested Roman embassy to Alexander in 323 BC – historical, as some believe, although Arrian decisively rejects it.[13] Yet another peregrine scheme belongs to Mithridates VI Eupator's last days. Isolated at Panticapaeum in the Crimea after eluding Pompey (66-63 BC), he posited an attack on Italy via the Danube with a host of barbarian allies.[14] Although no doubt a desperate pipedream, actual preparations and raising forces occurred.[15]

The Ides of March cut short Julius Caesar's plans for Dacian and Parthian campaigns in 44 BC. Plutarch (*Caes.* 58.6-7) fantasizes defeat of the Parthians before circumventing the Caspian and Black Seas to conqueror Germany, thus an empire bordered by the ocean on all sides. Plutarch's order of attack is reversed in three sources (Vell.Pat. 2.59.4; Suet. *Iul.* 44.3; App. *BC* 2.110, 459-460): first Dacia, then Parthia. For both, preliminary arrangements had been ordered. Sixteen legions and 10,000 cavalry had crossed the Adriatic, the young Octavian (as some say) seemed designated as a *comes* for the campaign, and Octavian's own Illyrian campaigns

[7] See Mosig-Walburg 2009: 149-282; cf. her 2002, 2005a-b, 2006, 2007. E.g., her belief in Libanius' accuracy in his panegyric to Constantius II and Constans (*Or.* 59), delivered at Nicomedia 344/345, unconvincingly rejects (2009: 197-198 with n.899) Wiemer (1994) that Libanius reproduced not the 'truth' but an 'official version' of events 335-338, even if not all of Wiemer's arguments avoid objections. Space precludes discussion. A concession (2009: 263) that the Armenian Ps.-Faustus might be right on some points contradicts arguments (226-35, 240-245) on the unreliability of Armenian sources. Zuckerman (2002) on possible Roman annexation of Armenia in 314 and the events of 335-337 seems not addressed in detail or rebutted. For Mosig-Walburg (130-134, 240) the Nisibis treaty rendered Armenia a non-aligned state – a highly problematic view.

[8] Euseb. *Vit.Const.* 56.1; Lib. *Or.* 59.60-71; Jul. *Or.* 1.13b, 18b; Aur.Vict. 41.16; Fest. *Brev.* 26; Eutrop. 10.8.2; *Chron.Pasch.* a. 337, p.21 Whitby/Whitby; Theoph. *Chron.* AM 5828 (335/336), p.54 Mango/Scott.

[9] Amm. 25.4.23; Lib. *Or.* 49.2 (to Theodosius I in 388 or 391). See Fowden 1994: 147-153 for discussion, including later Christians on Constantine's victory in the war – a view also at Festus *Brev.* 26.

[10] Plut. *Mor.* 326B; a summary of the Epirote Alexander in Italy at Wheeler 2011b: 158-160.

[11] On the digression see Morello 2002; Oakley 2005: 184-261; subsequent discussions, e.g., Overtoom 2012, add little. Livy's chronology at this point is about five years off: e.g., 8.24.1, where the foundation of Alexandria (332/331 BC) and Alexander of Epirus' death (331/330 BC) are placed in 326 BC.

[12] Orosius 3.15.10; Lyd. *Mag.* 1.38.9-10.

[13] Cleitarchus, *FGrH* 137 F 31 (=Plin. *HN* 3.57); *contra*, Arr. *Anab.* 7.15.5-6; defense of the embassy's historicity: Bosworth 1988: 83-93, followed by many; *contra*, Sonnabend 1989: 327; Oakley 2005: 231-33; on the now disputed date of Cleitarchus, see Prandi 2012.

[14] App. *Mith.* 102, 473-474; Dio 37.11.1-2; Plut. *Pomp.* 41.2; Flor. 1.40.25.

[15] App. *Mith.* 107, 508-510; for discussions see Sherwin-White 1984: 203-206; McGing 1986: 164-165; Sonnabend 1998.

(35-33 BC) perhaps owed something to Caesar's plans.[16] Caesar began contemplating a Parthian war even before his victory at Zela (47 BC): a legion left in Syria for future use. A Parthian campaign aroused enthusiasm at Rome, where arrangements for the city estimated Caesar's three-year absence. C. Cassius Longinus, a 'Parthian expert' and later assassin, was designated governor of Syria for 44 BC.[17] Suetonius (*Iul.* 44.3) even specifies that Caesar would attack via Armenia Minor, not necessarily the later Roman province of that name, as south-western Armenia (Hellenistic Sophene) also bore that name (Wheeler 2002: 99-106).

Imperial Roman 'last plans' should also be noted. Trajan, undeterred by Mesopotamian and Jewish revolts and a reverse in Armenia, planned to renew the Roman offensive in 117, before illness overtook him. Hadrian assumed the governorship of Syria and apparently direction of the war, as C. Iulius Quadratus Bassus, Syrian governor 114-117 and a veteran commander in Trajan's Dacian wars, was sent to address the collapse of Trajan's arrangements on the Danube – the real reason for Hadrian's abandonment of the Parthian war.[18] Trajan's plans cannot be equated with the supposed 'secret instructions' to withdraw from conquests east of the Euphrates, which Hadrian later pretended he had received from Trajan (*HA*, *Had.* 9.1-2). Caracalla's assassination, which an inopportune call of nature near Carrhae facilitated, scuttled grandiose, 'Alexanderesque' plans (216-217) for a major reorganization of the East, involving Edessa, Armenia, and even a proposed Parthian marriage.[19]

The *Historia Augusta* seems an ideal source for 'last plan' fantasies. Aurelian's supposed intentions in 275 fit the model: like Caracalla, assassinated *en route* to a Persian war, although acclaimed *Persicus Maximus* in 272 from a supposed Persian victory (Aur.Vict. 35.1).[20] Probus is more problematic. A military mutiny did him in – again – *en route* to a Persian war (282), and like Aurelian, acclaimed *Persicus Maximus* at least on a papyrus of 21 October 279 (*P.Oxy.* 14.1713), for which a Roman-Persian skirmish is conjectured.[21] But Carus, his successor, did fight a Persian war in 283, which, the *HA* asserts, executed Probus' preparations. For some, the eastern mints' lack of activity relegates Probus' Persian war to another invention of the *HA*.[22] Indeed Mosig-Walburg denies historicity to all plans for Persian wars in the *HA*, but coins from Tarsus confirm the reality of Pupienus' projected campaign (summer 238).[23] Finally, after a decade of Armenian turmoil and frustrating negotiations with Sapor II, Valens planned a three-pronged attack on the Sasanid empire for spring 377 and recruited Goth auxilia. The Goth crisis in Thrace leading to Adrianople (378) thwarted his plans.[24]

The reality of 'last plans' cannot be summarily rejected, if preparations can be demonstrated. Lydus had documentary proof of Constantine's plans for a Persian war; preparations were in progress, debated whether long contemplated or spur of the moment; and Constantine passed on his way to the front. Constantine's plans fit a pattern and, if Aurelian's and Probus' Persian wars are fiction, one wonders whether Constantine provided a model for the *HA*'s author.[25]

John Lydus, a native of Lydian Philadelphia, spent over forty years as a bureaucrat in the office of the Praetorian Prefect.[26] Although his major works (e.g., *Mag.*) may date after his retirement in 552 (or 554?), his literary talent attracted Justinian's attention twenty years earlier: he was invited to deliver a panegyric before an embassy from Rome and then to write a history of Justinian's Persian war (527-532), Justinian's only commission of a literary work.[27] Doubts that Lydus produced the Persian war tome persist.[28] If his reproduction of Celsus' fragment exemplifies his skills at military history, it would probably have resembled the exaggerations and *topoi* seen in Cornelius Fronto's efforts at a history of L. Verus' Parthian war (161-166), the *Principia Historiae*, of which his death in 167

[16] App. *BC* 2.110, 460; other sources and bibliography collected at Wheeler 2011a: 198-199 with n.124.

[17] Dio 43.51.1-2; 44.46.3; App. *BC* 3.2, 5; 3.77, 312; 4.58, 250; Cassius as 'Parthian expert': Sonnabend 1986: 184-185 with n.110; more detailed analytical discussions at McDermott 1982-1983; Malitz 1984.

[18] Dio 68.33.1; 69.1.2; Dąbrowa 1998: 85-91; on Danubian events 117-120, see Wheeler 2011a: 213-215. L. Catilius Severus, Trajan's governor of Cappadocia and Armenia, surrendered a part (euphemism for 'most'?) of Armenia (except for Sophene) to Vologaeses I of Armenia (son of Sanatruces) in 116 (Dio 68 [75].9.6; Bennett 1997: ix, 197-198), but 117 for Speidel (2021), exaggerating the success of Roman pacification. See Chaumont 1976: 141-143; Wheeler 2002: 117; the major Roman defeat of 116 in Armenia: Gerhardt/Hartmann 2000. Catilius assumed the Syrian governorship by August 117.

[19] For a recent attempt at unraveling at least some details, see Patterson 2013; cf. Millar 1993: 142-144; Caracalla's Alexanderism: e.g., Wheeler 2004: 313 with nn.25-26; Kühnen 2008: 176-186; Müller (2014) doubts the tale of Caracalla's demise.

[20] *HA*, *Aurel.* 35.4-5; cf. 41.9; Lee 1993: 119 n.33; Watson 1999: 102-104; Kreucher 2003: 112-113; Mosig-Wahlburg 2009: 53-54; Hartmann (2001: 385-387; 2008: 317), attributes the victory title and Aurelius Victor's note to an unattested minor Roman-Persian skirmish in northern Mesopotamia.

[21] *HA, Prob.* 20.1; Kreucher 2008: 408; Mosig-Walburg 2009: 55-56.

[22] *HA, Carus*, 7.1, 8,1; Dodgeon/Lieu 1991: 114 (5.1.6); Kreucher 2003: 180-181; but cf. 160; 2008: 409. An alleged Roman-Persian treaty of 280 (?), which postponed the war's outbreak, need not be treated here; sources collected at Dodgeon/Lieu 1991: 111, 317.

[23] *HA*, *Max.Balb.* 13.5; Ziegler 2001-2002, followed by Brandt 2006: 20-21; Mosig-Walburg 2009: 56-57.

[24] Amm. 30.2.6; Lenski 2002: 184.

[25] The model may also have influenced Malalas (or his source) at 12.32: the assassination of Florian at Tarsus when he began a Persian war. Florian ruled only April-June 276.

[26] *PLRE* 2.612-615 (Johannes 75); Bandy 1983: ix-xxxviii; Dubuisson/Schamp 2006: XIII- LXXVI.

[27] *Mag.* 3.28.4-5; Rapp 2005: 384-385. The *Mag.*, an unfinished work, may date as late as 557-561 (*PLRE* 2.614-615; Carney 1971: 2), *contra*, Wallinga 1992, arguing for 552.

[28] Cameron 1985: 242 n.1; Maas 1992: 33; Dubuisson/Schamp 2006: LXVIII; Rapp (2005: 384-385) assumes he wrote it.

forestalled completion[29] Nevertheless, Lydus certainly had access to archival materials and Constantinople's libraries. His claim to consultation of Constantine's papers merits no skepticism (Kaegi 1981: 210).

Constantine, hardly a crude Illyrian raised to the purple, earned high praise for his learning and rhetorical skills, which Eusebius asserts (*Vit.Const.* 4.55.1) were still strong to the end. His time as a political 'hostage' at Galerius' court at Nicomedia (*c.* 293-305) exposed him to many intellectuals, including Lactantius, years later the tutor of Constantine's son Crispus. He was an avid reader.[30] Nor did he lack military experience in the East. A participant in at least Galerius' second Persian campaign (297-299) and the advance to Ctesiphon, he apparently also accompanied Diocletian in Egypt (301/302?), besides fighting Sarmatians on the Danube under Galerius at some point 299-305 and the Picts in Britain with his father Constantius I (306). His rank, *tribunus primi ordinis*, although unclear in definition and date, suggests something more 'hands-on' than a *comes*.[31]

As a general, Constantine bequeathed a legacy of military planning to the Byzantines. In the 950s Constantine VII Porphyrogenitus associated with Constantine the research, intelligence gathering, and detailed logistic planning of the ideal *bonus dux*.[32] Constantine's generalship emphasized stratagems. Panegyrists waxed eloquent about his ruses (disinformation, feigned retreat, ambush) against the Franks (313) and his sudden Alps crossing (312) against Maxentius represents a strategic surprise similar to what Celsus recommended against the Persians.[33]

Celsus *tacticus* presents an enigma. Domitius Corbulo's campaigns (55-63) to illustrate a successful Roman surprise attack via Colchis dates Celsus to at least 59, when the first phase of Nero's Parthian war ended with the crowning of Tiridates VI.[34] Lydus includes a Celsus in his list of military writers (*Mag.* 1.47.1), most probably A. Cornelius Celsus (*PIR*² C 1335), the Julio-Claudian encyclopedist of (*inter alia*) medicine (eight books), agriculture (five books), law (unknown length), and *militaria* (unknown length). The military work, known to Quintilian (12.11.24), was a major source for Vegetius (1.8.11).[35] An alternative candidate, A. Marius Celsus (*PIR*² M 296), suffect consul in 69, who served with Corbulo as *legatus legionis* of the *XV Apollinaris* in 63, is not known to have written a word.[36] A supposed chronological difficulty, Celsus the 'Tiberian' encyclopedist, is a chimera. Columella, writing his agricultural treatise in the 60s, referred to Celsus as a contemporary (*Rust.* 1.1.14) and initially Nero's Armenian war ended in 59. Celsus' age is not an issue.[37]

Problematic remains identification of Celsus *tacticus* (*Mag.* 3.33-34) with the Celsus of *Mag.* 1.47 (Dubuisson/Schamp 2006: CLXVIII), but Lydus, consulting for Book 3 sources different from Book 1, may simply have copied Constantine's citation, as juxtaposition of Constantine's advocacy of surprise attack and Celsus' fragment suggests – the simplest solution. Otherwise, Constantine's reference to surprise attack necessitated additional research in obscure sources.[38] Further, if a συγγραφή μονηρής advocating surprise attack in a specific war seems discordant with general matters of training, organization, and deployment associated with Vegetius' use of Cato through Celsus, military treatises can range widely in coverage, as Vegetius' work demonstrates. How literally συγγραφή μονηρής should be understood (monograph? chapter? memorandum?) is obscure, and (again) the phrase may be borrowed from Constantine's imprecise citation of Celsus or use of Celsus through an epitomator.[39]

A grossly erroneous summary of Danubian developments in the 320s and administrative changes introduces Constantine's plans and the Celsus fragment. Constantine's loss of Scythia (*scil.* Minor) and Moesia with their revenues led to the creation of Palestine and Syria as provinces besides the appointment of regional praetorian prefects, especially one for Oriens, as a

[29] See Wheeler 2010: 16 with n.38 and 1996: esp. 230, 258-62, on the *topos* of lax Syrian legions in Fronto. Polyaenus almost begged to be commissioned to write a history of Verus' war.

[30] On Constantine's education see sources collected at Millar 1992: 205-206 with n.21; Barnes 1981: 47, 73-74, followed by Lenski 2006b: 60; G. Fowden 1994: 146. Lydus (*Mag.* 3.33.3) praised his learning; cf. Körfer 2019.

[31] *PLRE* 1.223 (Fl. Val. Constantinus 4); Lenski 2006b: 60-61; cf. Anon. Val. 2.2-3: personal combat with Sarmatians.

[32] Constantine Porphyrogenitus B.1-79, in Haldon 1990: 82-87, probably from a treatise of Leo Katakylas (Haldon 41-42).

[33] *Pan.Lat.* 9 (12).22.3-6; *cf.* 10 (4).18; Carrié, in Carrié/Rousselle 1999: 641; cf. Burckhardt (1880: 319-320), comparing Constantine's northern Italian campaign with that of the young Napoleon in 1796.

[34] Wheeler 1997a: 385; Celsus' 'Colchis' would also antedate the late Roman term 'Lazica' for the area (*Mag.* 3.34.5); hence Lydus' gloss: the toponym Lazica derives from an eponymous *hegemon*; cf. *Mag.* 3.56.1: the Sygambri (a Caesarian term: *BG* 4.16-19; 6.35) identified as Franks, also called after a *hegemon*.

[35] Wellmann 1900; other bibliography on Celsus at Kaegi 1981: 210 n.6; for arguments that Vegetius used Cato Maior's *De re militari* through Celsus, see Schenk 1930. Celsus is omitted in Maas' catalogue of Lydus' sources: 1992: 119-37.

[36] The case for Marius Celsus: Schanz 1881, revived by Syme (1958: 1.297 n.1; *cf.* 2.682-683) and followed by many (e.g., Dąbrowa 1998: 62-64 with n.615), most recently by Speidel (2020b: 141 n.22).

[37] Advocates of Cornelius Celsus: Jähns 1889: 85 (Neronian); Kaegi 1981: 209-13; 1979: 225-26 with n.14, followed by Matthews 1989: 499 n.19; Wheeler 2010: 50-51. John Scarborough (per. comm.) in a future paper promises medical reasons for Cornelius Celsus' longevity and authorship of Lydus' fragment. See also Dubuisson/Schamp 2006: CLXVIII-CLXVIX.

[38] Survival of Celsus' military work in the 6th c. seems unlikely, although Vegetius knew it in the 4th; cf. Kaegi 1981: 210.

[39] A view that Constantine's memorandum (the Celsus fragment), composed in 337, was directed at Constantius' operations (Dubuisson/Schamp 2006: CLXX) contradicts the emphasis on strategic surprise and the location of Constantius' activity in north-western Mesopotamia.

Persian war was planned (*Mag.* 3.33.1-2). Lydus shares with Zosimus (2.32-34) a sixth-century confusion about administrative reforms.[40]

Lydus continues with Celsus' *exemplum* of Corbulo's Armenian campaign to illustrate a successful surprise attack via Colchis. The fantastic account with antiquarian asides and *topoi* owes more to Herodotus than Tacitus. Celsus explains that the Persians, like the early Romans a bellicose people, depart for war through a severed human body. They lack a standing army, so a quick strike precludes assembling an army and arranging finances. Colchis' rough terrain impeded Persian cavalry. Thus Corbulo's unexpected attack became irresistible. He negated any Iranian victory through feigned retreat and stopped Persian raids through Hyrcania, when he clogged the Persian hordes in a narrow pass. Survivors fled to Antioch in Mygdonia, which the Persians had renamed Nisibis, only to abandon it under Roman assaults.[41] Herodotean echoes resound: Persian departure for war through a severed body (a purification ritual);[42] Persian hordes, reflecting a Greek notion that Persians believed superior numbers always win, thwarted in a situation resembling Thermopylae; and rough terrain to counter an enemy's superiority in cavalry.[43]

Lydus' (or Constantine's?) presentation of Celsus' views scarcely resemble the realities of Corbulo's campaign. Armenia, absent by name, is regarded as Iranian territory devoid of Armenians and armed forces, whether Armenian or Parthian. Adduced is the traditional notion of a Parthian/Sasanid army largely composed of 'feudal' contingents of the great noble houses. The supposed absence of a standing army (not in earlier summaries of the Parthian army at Justin 41.2 or Dio 40.14.4-15.6) derives from erroneous interpretation of Herodian 3.1.2, the only explicit reference before Lydus, and a standing Sasanid army may well antedate the reforms of Chosroes I (r. 501-579).[44]

Nor could Corbulo have surprised Tiridates, the Parthian pretender on the Armenian throne since 54, as Corbulo spent at least a year (55-56) on the upper Euphrates before advancing farther into Armenian territory, passing two winters near Erzerum (later Theodosiopolis), and setting up a supply line from Trapezus on the Black Sea, before initiating operations in 57.[45] Any surprise was tactical, not strategic, i.e., 'when;', not 'if'. Corbulo's initial efforts to bring Tiridates to battle failed; success did not come quickly (Wheeler 1997: 394-395).

Only by a stretch of geographical imagination can Corbulo's advance from Armenian Erzerum up the Araxes River valley to Artaxata be called operating from Colchis. The Pontic Alps, Moschi Mountains, and ridges of the Little Caucasus preclude a major invasion of Armenia from Colchis. During Corbulo's campaigns Pontus, a client-kingdom, partially controlled only the Colchian coast (not the interior). Similarly, in Constantine's era subject to Rome was the southern coastal strip between Trapezus and Apsarus and a northern stretch from Pityus to Dioscurias/ Sebastopolis; from the mid-third century central Colchis belonged to the Lazi. The Acampsis (mod. Çoruh) River, whose mouth lay near Apsarus, can never have been a line of operations into either Armenia or Iberia.[46] A portage of four-days connected the Colchian Phasis and Iberian Cyrus River valleys – a Colchis-Iberia route, not leading directly to Armenia. A fort at Sarapanis (originally Iberian but Laz in the 6th c.) guarded the Colchian entry. The route might have been contemplated for Nero's proposed Albanian campaign (68), another example of 'last plans', but Heraclius in 627, targeting Persians in Albania and Media, offers the only known Roman example – a paradigm of strategic surprise.[47] A recent misuse of Celsus' fragment asserts that Corbulo's Armenian campaign belonged "zu den bekannten strategischen Optionen römischer Feldherren" (Speidel 2020b: 141). Yet Corbulo did not surprise Tiridates by a sudden attack, nor did he pass through Colchis.

[40] On Zosimus' errors see Paschoud 2000: 246-252; Brennan 2007: 211-14; Lydus repeatedly notes the supposed loss of Scythia and Moesia: 2.10; 3.31.4-5, 40.1; a summary of Danubian developments preceding Constantine's Gothic war (332) at Wheeler 1998: 81-82; Lydus' confusion about Palestine and Syria may relate to the tradition (Malalas 13.3) that Constantine created a new province of Euphratensis from parts of Syria Coele and Osrhoene, but that province more likely belongs to Constantius II. Space precludes discussion.

[41] In reality, a Seleucid (which one is debated) renamed Nisibis as Antioch in Mygdonia; cf. Plin. *HN* 6.117; Steph.Byz. *s.v.* Ἀντιόχεια (3).

[42] Hdt. 7.39.3-40.1; cf. Curt. 10.9.11-12; Livy 40.6.1-5 with Walbank 1979: 233-234 on Macedonian practice (with a dog); also a Hittite custom: Kuhrt 1994: 1.275.

[43] Persian emphasis on numbers: references at Wheeler 2021a: 1531; rough terrain against cavalry: Hdt. 5.64.3-4; 6.102; advanced seizure of passes also appears a factor in 'Diocletian's' (Galerius') victory of 297: Jul. *Or.* 1.18b: exaggerations discordant with other sources.

[44] See Wheeler 2016: 206-207; cf. Hauser 2006: 390-310; Sasanids: Howard-Johnston 1995: 219; 2012; Sauer *et al.* 2013: 613-615.

[45] See Wheeler 1997a on the chronology (ignored by Hirt 2008: 66-68) and 1996 (esp. 265-71) on the *topos* of lax discipline in Syrian legions; cf. Bennett's faulty attempt (2006: 83) to revive the myth; his conjecture that Corbulo's base was Erzincan (2006: 84), Armenian Erez (Agathangelus 48, 756, pp.61, 325 Thomson; Hübschmann 1904: 425), ignores Henderson's convincing case (1903: 167, 472-73) for Erzerum; before *c.* 390 the Erzincan area belonged to Armenia Maior (Wheeler 1991: 507-509; 2012: 627-28 with nn.21-22), not Roman Cappadocia (Bennett 2006: 85, apparently followed by Kilndjian 2009: 196). Despite Mitford's autopsy, his recent discussion (2018: 252-282) – not definitive – trivializes the Armenian evidence. Dubuisson/ Schamp (2006: CLXX) bizarrely think that Corbulo campaigned in Caucasian Iberia.

[46] Wheeler 2012: 633-635, 641-644, 655-657; 2021b: 795-796, 800-806.

[47] See Wheeler 2012: 655-657; 2021b: 807: Heraclius: Kaegi 1981: 213; 2003:142-143; cf. Speidel's misrepresentation (2020b: 141 n.21) of Wheeler 2012 on the portage.

Further, Corbulo did not capture Nisibis in north-central Mesopotamia. Nisibis remained in Parthian hands throughout the war (Tac. *Ann.* 15.5.2; Sturm 1936: 732-733). The only accurate assertions of Lydus' reproduction of Celsus concern the rugged terrain hindering his stereotypical presentation of Persian (i.e., Parthian) forces as exclusively cavalry and probably Corbulo's sealing off Armenia's south-eastern border to interdict Parthian reinforcements to Tiridates, that is, if Lydus' reference to Hyrcania is generously taken as Media Atropatene.[48] A pastiche of the conventional view of Parthian feigned retreat and the 'Parthian shot' (*Mag.* 3.34.5) may also be conceded.

But does Celsus offer anything new for military theory? Uneven terrain impeding armies predominantly of cavalry begins with Herodotus and became a truism. Artavasdes II of Armenia offered the same advice to Crassus (53 BC). Paradoxically, Armenian forces following the Parthian model of noble cataphracts, supported by horsearchers and infantry, emphasized cavalry; Armenia in fact produced some of the finest mounts.[49] In general, Celsus' advice (as presented by Lydus), far from sophisticated strategic thinking, recalls the catalogue of strategic options already assembled by Anaximenes and Aristotle.[50] Similar views appear in Themistius' *Letter to Julian* (dated 356 or later), preserved in an Arabic translation, where in the panegyrical tradition of texts on kingship surprise from secret plans is stressed.[51] Constantine (not Celsus), however, noted that the Persians could only be defeated by a sudden attack (*Mag.* 3.33.3), for which Celsus supplies the example of surprise via Colchis.[52]

Strategic surprise is not easily achieved. Even with antiquity's irregular mode of intelligence gathering, in the East the target usually became aware of impending operations.[53] In 337 Constantine was not about to surprise to Sapor II. On some reconstructions – and without considering Armenian developments in the 330's – Constantius (Caesar for Oriens since fall 335) had defeated a Persian army east of Amida in 336 after the Sasanids captured that site.[54] A Christian writing in spring 337 near modern Mosul knew of Persian mobilization before Constantine's death (22 May 337). In fact, Sapor dispatched an embassy in early 337 – in some sources an attempt to forestall war, but in others an ultimatum for revision of the 299 treaty, i.e., a pretext for hostilities.[55] Persian operations began well before Constantine's death.[56] Whichever interpretation of events 336-337 is preferred, clearly the active theater of operations was northern Mesopotamia and southern Armenia, not Colchis. Constantine's plans in Lydus should be distinguished from what transpired in 337 and later, although Constantine's destination in May 337 is unknown.[57]

The point of both Constantine and Celsus was to attack quickly in an unexpected sector, the 'indirect approach' generating surprise. Colchis, introduced in Lydus' version of Celsus, becomes a red herring for Armenia.[58] Any Roman campaign in Mesopotamia, the central theater, required a secure Armenia, lest operations south of the Taurus face an exposed flank and rear. The strategic question became whether to attack directly from the middle Euphrates, the most obvious approach and closest to the Roman base in Syria, or to circumvent the obvious by attacking from the north via Armenia. In 54 BC, Crassus initially surprised the Parthians, distracted by civil war, through a direct advance, but squandered his advantage in postponing further activity for the following year, shunned Artavasdes II's advice to switch his line of advance to Armenia in 53 BC, and met his fate at Carrhae (Wheeler 1996: 244-245; Plut. *Crass.* 19.2). Trajan in 114, likewise taking advantage of Parthian dynastic squabbles, turned a political surprise in dethroning Parthamasiris and annexing Armenia into a military advantage. He began his conquest of northern Mesopotamia from the north (Birley 1997: 69-71).

Surprise is also produced through feints and misdirection. Parthians knew the principle: Vologaeses

[48] Lydus (or Celsus) may refer to Corbulo's repulse of Tiridates' counter-offensive from Media Atropatene after the capture of Tigranocerta in 58: Tac. *Ann.* 14.26.1. Likewise, the speed of Corbulo's conquest in Lydus (Celsus) may echo the campaign of 58, when both Artaxata and Tigranocerta were captured: Wheeler 1997a: 395-397.

[49] Onas. 31.1; Front. *Strat.* 2.2.11; Veg. 3.9.6-7, 13.3, 26.25-26; [Maur.] *Strat.* 8.2.20-21; Artavasdes: Plut. *Crass.* 19.2; Wheeler 2017: 111-112; Armenian horses: Strabo 11.14.9; Veg. *Mul.* 3.6.4 (Sophene).

[50] Anaximenes [Arist.] *Rhet. ad Alex.* 1424b-1425b; Arist. *Rh.* 1.4, 1359b-1360a.

[51] Swain 2013: 155-157 (*Ep. ad Iul.* 41-42) with detailed discussion (22-91); Shahîd 1974: 114; cf. Menander *Rh.* 373.20-25; cf. 375.21-25 Russell/Wilson; Greatrex (2007: 114-115) notes Themistisus' *Letter* as proof of Roman strategic thought. Frontinus devotes a chapter to secret plans, but only *Strat.* 1.1.2, 8 could be considered strategic rather than tactical.

[52] Cf. Wheeler 1997b on Roman frustrations with fighting Parthians on the eve of Severus Alexander's Persian war.

[53] Lee 1993: 113-120; *cf.* Clausewitz 1976: 198-203 (Book 3, Chs. 9-10).

[54] Theophanes *Chron. A.M.* 5815, with Burgess 1999: 153, 199-200, 230; Zuckerman 2002, 634-35; cf. Peeters 1951; Warmington 1977: 510-512; Blockley 1989: 465-72; 1992: 8-14; Wirth 1993; Dodgeon/Lieu 1994: 89-100; *contra*, Mosig-Walburg 2009: 201, 213-224, who denies Persian operations in 336 and attributes the victory near Amida to a subordinate of Constantius in 337.

[55] Aphraat, *Demonstratio* 5.1.24=Dodgeon/Lieu 1991: 162; embassy: Euseb. *Vit.Const.* 4.57: Fest. *Brev.* 26: ultimatum: Lib. *Or.* 59.71.

[56] Aur,Vict. 41.1.16; Lib. *Or.* 59.60; Zonar. 13.4.25-28; cf. *Euseb. Vit.Const.* 4.56.1; *contra*, Mosig-Walburg 2009: 201 with n.915. Libanius (*Or.* 59.60-71) has Sapor and the Persians plotting revenge for the 299 treaty over four decades, but Sapor was essentially crowned *in utero c.* 309.

[57] The Roman plans and hasty preparations, at which Eusebius hints (*Vit.Const.* 4.56.2), need not be related to Lydus' account of Constantine's plans.

[58] Gray's comparison (1973: 35-36) of Justinian's eastern policy as a defensive counterpart to the plan at Lyd. *Mag.* 3.34 misses the mark. Indeed envelopment of Persians was intended, but not from a base in the Caucasus, non-existent in either Corbulo's or Constantine's time, and Julius Caesar's planned Parthian war did not involve advance through Mesopotamia.

I (62) duped Corbulo into thinking he was about to attack Syria, but then scurried across the Taurus to ensnare the unsuspecting Caesennius Paetus at Armenian Rhandeia (Dąbrowa 1983: 143; Wheeler 1996: 270). In the eastern crisis of 34-37, Tiberius had the Iberians and their allies secure Armenia from the north, while L. Vitellius, the Syrian governor, checked Parthian countermeasures by threatening an invasion from Syria (Tac. *Ann.* 6.32-36.2; Wheeler 2016: 219-220). In 363 Julian coordinated his advance down the Euphrates with a second prong operating in northern Mesopotamia and the upper Tigris.[59] Multi-pronged attacks from different geographical directions were a favorite of Roman strategy.[60] Yet some scholars even invent them.[61]

More exact parallels to the scenarios of Constantine and Celsus occur in Caesar's plan for a Parthian war (44) and later that of M. Antonius (36). Logistic logic suggests that Syria, the only Roman province on the Euphrates at the time, was the intended Roman base for Caesar and Antonius, especially as Suetonius (*Iul.* 44.3) specifies Caesar's intention to attack via Armenia Minor, understood as Sophene (Wheeler 2002: 99-106). The Armenian Arsanias River valley could be most quickly reached from (e.g.) Zeugma via Amida and the Ergani Pass through the Taurus. A '*ripa* road' paralleling the upper Euphrates north of Zeugma was a Flavian development. Pompey's 'Pontic road' connecting the Roman *colonia* at Nicopolis (Armenia Minor) with Chalcedon, an aspect of his reorganization of Pontus, did not long survive and had to be instituted by the Flavians (Bekker-Nielsen 2016). Access to the upper Euphrates from Trapezus on the Black Sea awaited Corbulo (55-57). The memory of Carrhae and Artavasdes II's advice to Crassus about the advantages of an Armenian line of operations (Plut. *Crass.* 19.1-2) surely underlies Caesar's precaution not to seek battle with an army unfamiliar with Parthian tactics.[62]

Whether or not Antonius in 36 BC followed Caesar's plans, his army assembled at Zeugma and he proceeded through Arabia and Armenia to meet the forces of Canidius Crassus, Artavasdes II, and other allies probably at Artaxata.[63] If 'Arabia' is taken as Sophene, no geographical gaff of Plutarch need be postulated. Antonius marched to Amida and through the Ergani pass.[64] So far as known, at this point Amida, an insignificant site, still belonged to Armenian Sophene.[65] Antonius feigned a direct approach through Mesopotamia, which the Parthians expected and were prepared to meet. Antonius' attack on Media Atropatene surprised the Parthians, whose forces were initially caught out of position.[66]

Besides these historical precedents – to which addition of Corbulo's campaign was certainly contrived – Constantine knew a more recent example. Roman response to Narses' invasion of Armenia and Mesopotamia in 296 led to Galerius' defeat in early 297 somewhere between Carrhae and Callinicum. Beaten in Mesopotamia, Galerius switched his operational base to Satala (Armenia Minor), home of the *legio XV Apollinaris*, collected additional units from Illyricum, Moesia, and Dacia, including some Goths, and defeated Narses by a surprise attack in north-western Armenia (fall 297).[67] Aurelius Victor's summary of the campaign emphasizes Armenia as "almost the only or the easier way of conquering."[68] Galerius' quick Armenian victory, conspicuously absent in Lydus, had made an impression on Victor (or his source) and no doubt Constantine himself, a participant in the campaign. But Galerius was forgotten in the 6th c. (cf. Métivier 2006: 169) and even Julian (*Or.* 1.18b) made a point of obscuring him in the 4th.

The Nisibis treaty of 299 left a bad taste in Sasanid mouths – not least because of Galerius' 'unsportsmanlike conduct' in winning by surprise attack (*composita fraude*).[69] As generally agreed, Constantine's appointment (335/336) of Hanniballianus

[59] See Kaegi 1981: 211-213, who conjectures a connection with the views of Constantine and Celsus in Lydus; Julian did surprise the Persians.

[60] See Wheeler 1993: 237; cf. Greatrex 2007: 130-140, stoutly rebutting the view of 'no maps = no strategy'.

[61] Speidel (2020b) would have M. Claudius Fronto (*PIR*[2] C 874) bring the *legio I Minervia* cross the Phasis-Cyrus portage to aid Statius Priscus' recovery of Armenia from the Parthians (162-163); Fronto even had time to settle an Iberian-Albanian border dispute, unattested in the 160s. This is fantasy. For the enigmatic *CIL* 13.8213 (*ILS* 4795) see Wheeler 2021b: 822-823 with n.163; 1994-1996: 60-70, where the credibility of Them. *Or.* 34.8 of 384 (regarding Arrian, the Alans, and a border dispute in 135) is undermined.

[62] Suet. *Iul.* 44.3: *nec nisi ante expertos adgredi proelio.*

[63] Strabo 11.13.4 (an apologia of Antonius' failure probably from Q. Dellius, a participant in the campaign and its historian: Strabo 11.3.3); Plut. *Ant.* 37.2-3; Dio 49.25.1-2; on the debate about a connection between Antonius' and Caesar's plans, see Patterson 2015: 85-86 with n.27.

[64] On Sophene as 'Arabia', see Wheeler 2002: 106, 109-110; 2016: 221 with n.351; Pelling (1988: 222-223), essentially following Sherwin-White (1984: 309-312), who confuses the Ergani with the Bitlis Pass near Lake Van.

[65] Recent conjectures about Amida (e.g., Assénat/ Pérez 2012, 2014) must be treated elsewhere.

[66] Parthian forces in Mesopotamia: Dio 49.25.1; cf. Plut. *Ant.* 28.1; Sherwin-White's numerous assumptions (1984: 310-11) lead to speculation that Parthians, guarding the Euphrates crossing at Zeugma, compelled Antonius' march via Commagene and Cappadocia to Artaxata. Parthians opposite Zeugma are unattested and the Parthian satrapy of Mesopotamia and Parapotamia ended south-east of Zeugma: see Wheeler 2016: 192 with n.148.

[67] Graeco-Roman sources collected at Dodgeon/Lieu 1991: 125-131; Ps.-Faustus 3.21, pp.98-99 Garsoïan. Orosius (7.25.10) stresses Galerius' speed and stratagems*: itaque mox per Illlyricum et Moesiam undique copias contraxit raptimque in hostem reversus, Narseum magnis consiliis viribusque superavit.*

[68] 39.34: *A quis* [scil. *Persis*] *primo graviter vexatus contracto confestim exercitu e veteranis ac tironibus per Armeniam in hostes contendit; quae ferme sola seu facilior vincendi via est.*

[69] Amm. 17.5.6; on *fraus*, a common term for stratagem, see Wheeler 1988: 58, 63-65.

as a *rex* of Armenia and Pontic peoples, signaling a major Roman reorganization of the East, stimulated a Persian reaction. Whether Hanniballianus represented a Thucydidean 'truest cause' or simply a Polybian 'pretext' can be debated. Hanniballianus, absent in the Armenian tradition, never ruled or commanded an army. Roman-Persian relations 299-335, not without aggravations, cannot be surveyed here. Some contemplate a shift in Constantine's horizon from west to east beginning as early as 316 and intensifying with universalist aspirations after the defeat of Licinius (324), even without considering Christian factors, e.g., the controversial 'Letter to Sapor' (324?).[70] A portrait of Constantine in an 'Alexander pose' appeared on coins from the Siscia mint in 326-327.[71] Danubian troubles in the 320s and early 330s raised the specter of Trajan: a new bridge over the Danube at Oescus, reoccupation of some transdaubuian territory (*Dacia recepta*), and the title of *Dacicus Maximus* in 336. The martial theme on coins, *gloria exercitus*, from the Gothic war (332) continued at numerous mints through the end of the reign.[72] As Eusebius noted, paraphrasing Constantine (*Vit. Const.* 4.56.1): his achievements lacked only a Persian victory.

For Mosig-Walburg (2009: 203, 266), Constantine anticipated a Persian war but had no long-term plans. She ignores Lydus, who had documentary evidence, Constantine's own papers. Apparently Constantine envisioned a quick strike through Armenia on the model of Galerius' campaign and probably, like Galerius, with reinforcements from the Danube. A Danubian unit, *equites Mauri scutarii*, assigned to Egypt by 339, perhaps formed part of Constantine's actual expeditionary force in 337 (Brennan 2007: 216-217). Plans, however, are not mobilization, much less execution. Constantine's destination in 337 and the units at his disposal are unknown. The actual war of 337 may not have been the one he planned. Such is the character of 'last plans'.

Bibliography

Angelou, A. 2014. Bishop over 'those outside'. Imperial diplomacy and the boundaries of Constantine's Christianity. *Greek, Roman and Byzantine Studies* 54: 274-292.

Assénat, M. and A. Pérez. 2012. Amida Restituta, in A. Gasse *et al.* (eds) *Et in Aegypto et ad Aegyptum: Recueil d'études dédiées à Jean-Claude Grenier*: 7-52. Montpellier.

Assénat, M. and A. Pérez. 2014. Amida 4. Constance II et Amida. *Anatolia Antiqua* 22: 199-218.

Bandy, A. (ed., trans., comm.) 1983. Ioannes Lydus, *On powers, or the magistracies of the Roman state*. Philadelphia.

Barnes, T. 1981. *Eusebius and Constantine*. Cambridge, Mass.

Barnes, T. 1985. Constantine and the Christians of Persia. *Journal of Roman Studies* 75: 126-136.

Bekker-Nielsen, T. 2016. Trade, strategy and communications on the Roman north-east frontier. *Cedrus* 4: 31-46.

Bennett, J. 1997. *Trajan optimus princeps: A life and times.* Bloomington.

Bennett, J. 2006. The origins and early history of the Pontic-Cappadocian frontier. *Anatolian Studies* 56: 77-93.

Bidwell, P. 2014. The Roman names of the fort at South Shields and an altar to the *Di Conservatores*, in R. Collins and F. McIntosh (eds.) *Life in the* limes: *Studies of the people and objects of the Roman frontiers presented to Lindsay Allason-Jones on the occasion of her birthday and retirement*: 49-58. Oxford.

Birley, A. 1997: Hadrian: The restless emperor. London.

Blockley, R. 1989. Constantius II and Persia, in C. Deroux (ed.) *Studies in Latin literature and Roman history* 5: 465-90. *Collection Latomus* 206. Brussels.

Blockley, R. 1992. *East Roman foreign policy: Formation and conduct from Diocletian to Anastasius.* Leeds.

Blockley, R. 1998. Warfare and diplomacy, in A. Cameron (ed.) *The Cambridge ancient history,* XIII: *The late empire, A.D. 337-425*, 2nd ed.: 411-436. Cambridge.

Bosworth, A. 1988. *From Arrian to Alexander.* Oxford.

Brandt, H. 2006. Facts and Fictions – Die Historia Augusta und das 3. Jahrhundert, in K.-P. Johne *et al.* (eds) *Delato paene imperio Romano. Transformationsprozesse der Römischen Reiches im 3. Jahrhundert und ihre Rezeption in der Neuzeit*: 11-23. Stuttgart.

Brennan, P. 2007. Zosimus II.34.1 and 'the Constantinian reform': Using Johannes Lydos to expose an insidious fabrication, in A. Lewin and P. Pellegrini (eds.) *The late Roman army in the Near East from Diocletian to the Arab conquest*: 211-18. Oxford.

Burckhardt, J. 1880. *Die Zeit Constantins des Großen.* Leipzig.

Burgess, R.W. 1999. *Studies in Eusebian and Post-Eusebian chronography.* Stuttgart.

Cameron, A. 1985. *Procopius and the sixth century*. Berkeley and Los Angeles.

Cameron, A. and Hall, S. (trans. and comm.) 1999. Eusebius, *Life of Constantine.* Oxford.

Carney, T. (ed. and trans.) 1971. John the Lydian, *On the magistracies of the Roman constitution* [*De Magistratibus*]. Lawrence.

Carrié J.-M. and A. Rousselle 1999. *L'Empire romain en mutation des Sévères à Constantin 192-337.* Paris.

Chabot, J. (trans.) 1904. *Chronicon miscellaneum ad AD 724 pertinens, Corpus Scriptorum Christianorum Orientalium*, *Scriptores Syriaci*, Ser. 3, 4. Paris.

[70] Lenski 2006b: 81 with n.85; bibliography at *supra* n.4. Eusebius' efforts to 'christianize' the Gothic war (332) and Sarmatian troubles (334) parallel his views of the Persian war: Wheeler 1998: 87-91.

[71] *RIC* VII, Siscia 206 no. 29 (gold 1.5 solidus; cf. 207: 2 solidi) with the legend, *Gloria Constanti Aug.*; E. Fowden 2006: 377.

[72] On Constantine's Trajanic echoes see Wheeler 1998: 81-82, 91. The *gloria exercitus* series, common from 332, cannot be directly connected to plans for a Persian war: *sic* Cameron/Hall 1999: 336.

Chaumont, M.-L. 1976. L'Arménie entre Rome et Iran. I. De l'avènement d'Auguste à l'avènement de Dioclétien, *Aufstieg und Niedergang der römischen Welt* II.9.1: 71-194. Berlin.

Clausewitz, Carl von, trans. M. Howard and P. Paret 1976. *On War*. Princeton.

Dąbrowa, E. 1983. *La politique de l'état parthe à l'égard de Rome – D'Artaban II à Vologèse I (ca 11-ca 79 de n.e.) et les facteurs qu la conditionnaient*. Cracow.

Dąbrowa, E. 1998. *The governors of Roman Syria from Augustus to Septimius Severus.* Bonn.

Dignas, B. and E. Winter 2007. *Rome and Persia in late antiquity: Neighbors and rivals.* Cambridge.

Dodgeon, M. and S. Lieu (eds) 1991. *The Roman eastern frontier and the Persian wars (AD 226-363): A documentary history.* London.

Dodgeon, M. and S. Lieu 1994. Libanius and the Persian wars of Constantius II, in C. Cannuyer *et al.* (eds) *Guerre et paix – War and Peace*: 83-109. Brussels.

Dubuisson, M. and J. Schamp 2006. Jean le Lydien, *De magistratures de l'état roman*, I.1-2. Paris.

Fowden, E. 2006. Constantine and the peoples of the eastern frontier, in Lenski 2006a: 77-98.

Fowden, G. 1993. *Empire to commonwealth: Consequences of monotheism in late antiquity*. Princeton.

Fowden, G. 1994. The last days of Constantine: oppositional versions and their influence. *Journal of Roman Studies* 84: 1476-170.

Frendo, D. 2001. Constantine's letter to Shapur II, its authenticity, occasion, and attendant circumstances. *Bulletin of the Asia Institute* N.S. 15: 57-69.

Garsoïan, N. (trans. and comm.) 1989. *The* Epic Histories *attributed to P'awstos Buzand (Buzandaran Patmt'iwnk')*. Cambridge, Mass.

Gerhardt, T. and U. Hartmann 2000. *Ab Arsace caesus est.* Ein parthischer Feldherr aus der Zeit Trajans und Hadrians. *Göttinger Forum für Altertumswissenschaft* 3: 125-42.

Gray, E. 1973. The Roman eastern *limes* – perspectives and problems. *Proceedings of the African Classical Association* 12: 24-40.

Greatrex, G. 2007. Roman frontiers and foreign policy, in R. Alston and S. Lieu (eds) *Aspects of the Roman east: Papers in honour of Professor Fergus Millar*: 103-173. Turnhout.

Haldon, J. (ed. and trans.) 1990. Constantine Porphyrogenitus, *Three treaties on imperial military expeditions*. Vienna.

Hartmann, U. 2001. Das palmyrenishce Teilreich. Stuttgart.

Hartmann, U. 2008. Claudius Gothicus und Aurelianus, in Johne (ed.) 2008: 297-323.

Hauser, S. 2006. Was there no paid standing army? A fresh look on military and political institutions in the Arsacid empire, in M. Mode and J. Tubach (eds) *Arms and armour as indicators of cultural transfer: The steppes and the ancient world from Hellenistic to the Early Middle Ages*: 295-31. Wiesbaden.

Henderson, B. 1903. *The life and principate of the emperor Nero*. Philadelphia.

Hewsen, R. 1985-1986. In search of Tiridates the Great. *Journal of the society for Armenian studies* 2: 11-49.

Hirt, A. 2008. The Roman Jazira from a military perspective, in T. Hofmeier and O. Kaelin (eds) *Beiträge zur Kulturgeschichte des Alten Orient*: 45-117. Berlin and Basel.

Howard-Johnston, J. 1995. The two great powers in late antiquity: A comparison, in A. Cameron (ed.) *The Byzantine and early Islamic Near East*, III: States, resources and armies: 157-226. Princeton.

Howard-Johnston, J. 2012. The late Sasanian army, in T. Bernheimer and A. Silverstein (eds) *Late antiquity: Eastern perspectives*: 87-127. Exeter.

Hübschmann, H. 1904. Die altarmenischen Ortsnamen. *Indogermanische Forschungen* 16: 197-490.

Jähns, M. 1889. *Geschichte der Kriegswissenschaften vornehmlich in Deutschland*, I. Munich and Leipzig.

Johne, K.P. (ed.) 2008. *Die Zeit der Soldatenkaiser: Krise um Transformationen des Römischen Reiches im 3. Jahrhundert n. Chr. (235-284)*. Berlin.

Kaegi, W. 1979. Two notes on Heraclius. *Revue des études byzantines* 37: 221-27.

Kaegi, W. 1981. Constantine's and Julian's strategies of strategic surprise against the Persians, *Athenaeum* 59: 209-213.

Kaegi, W. 2003. *Heraclius: Emperor of Byzantium*. Cambridge.

Kilndjian, S. 2009. De Zeugma à Mélitène: quelques passages sur l'Euphrates, du 1er siècle av. J.-C. au IIe siècle apr. J.-C., in H. Bru *et al.* (eds) *L'Asie Mineure dans l'Antiquité: échanges, populations et territories*: 181-204. Rennes.

Körfer, A.-L. 2019. *Kaiser Konstantin als Leser. Panegyrik, performance und Poetologie in den "carmina" Optatians.* Berlin.

Kreucher, G. 2003. *Der Kaiser Marcus Aurelius Probus und seine Zeit*. *Historia* Einzelschr. 174. Stuttgart.

Kreucher, G. 2008. Probus und Carus, in Johne (ed.) 2008: 395-423.

Kuhrt, A. 1994. *The ancient Near East c. 3000-300 BC*, 2 vols. London.

Lee, A. 1993. *Information and frontiers: Roman foreign relations in late antiquity.* Cambridge.

Lenski, N. 2002. *Failure of empire: Valens and the Roman state in the fourth century A.D.* Berkeley and Los Angeles.

Lenski, N. (ed.) 2006a. *The Cambridge companion to the age of Constantine*. Cambridge.

Lenski, N. 2006b. The reign of Constantine, in Lenski 2006a: 59-90.

Lenski, N. 2011. Captivity and slavery among the Saracens in late antiquity (*ca* 250-630 CE), *Antiquité Tardive* 19: 237-266.

Luther, A. 2011. Konstantins letzte Pläne. Die 'unvollendete Persienexpedition', in K. Ehling and G. Weber (eds) Konstanin der Große. Zwischen Sol und Christus: 110-117. Mainz.

Luttwak, E. 2009. *The grand strategy of the Byzantine empire.* Cambridge, Mass.

Luttwak, E. 2016. *The grand strategy of the Roman empire: From the first century CE to the third*, rev. ed. Baltimore.

Maas, M. 1992. *John the Lydian and the Roman past.* London and New York.

Malitz, J. 1984. Caesars Partherkrieg. *Historia* 33: 21-59.

Mango, C. and R. Scott (trans. and comm.) 1997. *The chronicle of Theophanes Confessor.* Oxford.

Matthews, J. 1989. *The Roman Empire of Ammianus.* London.

Mattern, S. 1999. *Rome and the enemy: Imperial strategy in the principate.* Berkeley and Los Angeles.

McDermott, W. 1982/83. Caesar's projected Dacian-Parthian expedition. *Ancient Society* 13/14: 223-31.

McGing, B. 1986. *The foreign policy of Mithridates VI Eupator King of Pontus*, *Mnemosyne* Suppl. 89. Leiden.

Métivier, S. 2006. La création des provinces romaines dans la *Chronique* de Malalas, in S. Agusta *et al.* (eds) *Recherches sur la* Chronique *de Jean Malalas*: 155-172. Paris.

Millar, F. 1992. *The Emperor in the Roman World (31 BC-AD 337).* Ithaca.

Millar, F. 1993. *The Roman Near East 37 BC-AD 337.* Cambridge, Mass.

Mitford, T. 2018. *East of Asia Minor: Rome's hidden frontier*. 2 vols. Oxford.

Morley, C. 2016. Interaction and contact between Roman and Sasanian empires in late antiquity, in H. Bertheleot *et al.* (eds) *Vivre et penser les frontiers dans le monde méditerranéen antique*; 117-26. Bordeaux.

Mosig-Walburg, K. 2002. Zur Westpolitik Shapurs II, in P. Huyse (ed.) *Iran. Questions et connaissances. Actes du IVe congres européen des études iraniennes*, I: *La period ancienne*: 329-47. *Studia Iranica,* Cahiers 25. Paris.

Mosig-Walburg, K. 2005a. Hanniballianus rex. *Millenium* 2: 229-254.

Mosig-Walburg, K. 2005b. Christenverfolgung and Römerkrieg. Zu Ursachen, Ausmaß und Zielrichtung der Christen verfolgung unter Šāpūr II, *Iranistik* 7: 5-84.

Mosig-Walburg, K. 2006. Der Armenienkrieg des Maximinus Daia. *Historia* 55.2: 247-55.

Mosig-Walburg, K. 2007. Die Christenverfolgung Shâpûrs II. Vor dem Hintergrund des römischen Krieges, in A. Mustafa *et al.* (eds) *Inkulturation des Christentums in Sassanidenreich*: 171-186. Wiesbaden.

Mosig-Walburg, K. 2009. *Römer und Perser von 3. Jahrhundert bis zum Jahr 363 n. Chr.* Gutenberg.

Müller, S. 2014. Bei Austreten Mord: Caracallas Tod in Partherkrieg , in C. Hoffstadt *et al.* (eds) *Mord und Totlach*: 11-24. Bochum and Freiburg.

Overtoom, N. 2012. A Roman tradition of Alexander the Great counterfactual history, *Acta Antiqua Academiae Scientiarum Hungaricae* 52: 203-212.

Paschoud, F. (ed., trans, comm.) 2000. Zosime, *Histoire Nouvelle*, I : Livres I-II, 2nd ed. Paris.

Patterson, L. 2013. Caracalla's Armenia. *Syllecta Classica* 24: 173-199.

Patterson, L. 2015. Antony and Armenia. *Transactions of the American Philological Association* 145: 77-10.

Peeters, P. 1951. L'Intervention politique de Constance II dans la Grande Arménie, en 338, in *Recherches d'histoire et de philologie orientales*: 222-50. Brussels.

Pelling, C. (ed.) 1988. Plutarch, *Life of Antony*. Cambridge.

Potter, D. 2013. *Constantine the emperor.* Oxford.

Prandi, L. 2012. New evidence for the dating of Cleitarchus (*POxy* LXXI. 4808)? *Histos* 6: 15-26.

Raisbeck, D. 2020. Grand strategy in antiquity: the case of imperial Rome, in F. Naiden and D. Raisbeck (eds) *Reflections on Macedonian and Roman grand strategy*: 79-106. Bogata.

Rapp, C. 2005. Literary culture under Justinian, in M. Maas (ed.) *The Cambridge companion to the age of Justinian*: 376-397. Cambridge.

Rance, P. 2017. review of Luttwak 2016. *Classical Review*: 67.2: 580-581.

Russell, D. and Wilson, N. 1981. *Menander Rhetor.* Oxford.

Sarris, P. 2011. *Empires of faith: the fall of Rome to the rise of Islam*, 500-700. Oxford.

Sauer, E., *et al.* 2013. *Persia's imperial power in late antiquity*. Oxford.

Schenk, D. 1930. *Die Quellen der Epitoma Rei Miliaris*, *Klio*, Beiheft 22. Leipzig.

Shean, J. 2010. *Soldiering for God: Christianity and the Roman army.* Leiden.

Sherwin-White, A. 1984. *Roman foreign policy in the East 168 B.C. to A.D. 1.* Norman.

Shahîd, I. (trans.) 1974. Themistius, *Epistula de re publica gerenda*, *arabice servata*, in H. Schenkel *et al.* (eds) *Themistii Orationes,* III: 73-119. Leipzig.

Smith, K. 2016. *Constantine and the captive Christians of Persia.* Oakland.

Sommer, C.S. and S. Matešić (eds) 2018. *Limes XXIII. Proceedings of the 23th international congress of Roman frontier studies, Ingolstadt 2015.* Mainz.

Sonnabend, H. 1986. *Fremdbild und Politik: Vorstellung der Römer von Ägypten und dem Partherreich in der späten Republik und frühen Kaiserzeit*. Frankfurt a. M.

Sonnabend, H. 1989. Pyrrhos und die 'Furcht' der Römer vor dem Osten. *Chiron* 19: 319-45.

Sonnabend, H 1998. Ein Hannibal aus dem Osten? Die 'letzten Pläne' des Mithradates VI. von Pontos, in U. Fellmeth and H. Sonnabend (eds) Alte Geschichte: Wege – Einsichten – Horizonte: Festschrift für Eckart Olshausen zum 60. Geburtstag, 191–206. Hildesheim.

Speidel, M.A. 2020a. Historiographical trends in Roman frontier studies, in S. von Reden (ed.) *Handbook of ancient Afro-Eurasian economies*, 712-727. Berlin.

Speidel, M.A. 2020b. Einsatz im Kaukasus (CIL XIII 8213), in G. Thüry (ed.) *Domi militiaeque Militär- und andere Altertümer: Festschrift für Hannsjörg Ubl zum 85. Geburtstag*: 138-41. Archaeopress Roman Archaeology 68. Oxford.

Speidel, M.A. 2021. *Provincia Armenia* in light of the epigraphical evidence. *Electrum* 28: 135-50.

Sturm, J. 1936. Nisibis. *Real-Encyclopädie der klassischen Alterumswissenschaft* 17: 714-57. Stuttgart.

Tillemont, L.S. de 1697. Histoire des empereurs et des autres princes qui ont régné durant les six premiers siècles de l'Église..., IV. Paris.

Thomson, R. (trans. and comm.) 1976. Agathangelos, *History of the Armenians.* Albany.

Thomson, R. (trans. and comm.) 1978. *Moses Khornats'i, History of the Armenians*, Cambridge, Mass.

Walbank, F. 1979. *A historical commentary on Polybius*, III. Oxford.

Wallinga, T. 1992. The date of Johannes Lydus' *De magistratibus*, *Revue internationale des droits de l'antiquité* Ser. 3, 39: 359-80.

Warmington, B. 1977. Objectives and strategy in the Persian war of Constantius II, in J. Fitz (ed.) *Limes. Akten des XI. Internationalen Limeskongresses*: 509-20. Budapest.

Watson, A. 1999. *Aurelian and the third century*. London.

Wellmann, W. 1900. Cornelius 82, in *Realencyclopädie der classischen Altertumswissenschaft*, 4.1: 1273-76. Stuttgart.

Wheeler, E. 1988. *Stratagem and the Vocabulary of Military Trickery*, *Mnemosyne* Suppl. 108. Leiden.

Wheeler, E. 1991. Rethinking the upper Euphrates frontier: Where was the western border of Armenia? in V. Maxfield and M. Dobson (eds) *Roman Frontier Studies 1989*: 505-11. Exeter.

Wheeler, E. 1993. Methodological limits and the mirage of Roman strategy, Part II. *Journal of Military History* 57: 215-240.

Wheeler, E. 1994-1996: A new book on ancient Georgia: A critical discussion. *Annual of the Society for the Study of Caucasia* 6-7: 229-76.

Wheeler, E. 1996. The laxity of Syrian legions, in D. Kennedy (ed.) *The Roman army in the East, Journal of Roman Archaeology*, Suppl. 18*:* 229-276. Ann Arbor.

Wheeler, E. 1997a. The chronology of Corbulo in Armenia. *Klio* 79: 383-97.

Wheeler, E. 1997b. Why the Romans can't defeat the Parthians: Julius Africanus and the strategy of magic, in W. Groenman-van Waateringe *et al.* (eds) *Roman Frontier Studies 1995*: 575-579. Oxford.

Wheeler, E. 1998. Constantine's Gothic treaty of 332: A reconsideration of Eusebius *VC* 4.5-6, in M. Zahariade (ed.) *The Roman frontier at the lower Danube 4th–6th centuries*: 81-94. Bucharest.

Wheeler, E. 2002. Southwestern Armenia as a Roman frontier: Sophene 188 B.C.-299 A.D., in R. Hovannisian (ed.) *Armenian Tsopk/Kharpert*: 87-122. Costa Mesa.

Wheeler, E. 2004. The late Roman legion as phalanx, Part I, in Y. Le Bohec, Y. and C. Wolff (eds) *L'armée romaine de Dioclétien à Valentinien Ier*: 309–58. Lyons and Paris.

Wheeler, E. 2009. Shock and awe: Battles of the gods in Roman imperial warfare, Part I, in C. Wolff and Y. Le Bohec (eds) *L'armée romaine et la religion sous le Haut-Empire*: 225-67. Paris.

Wheeler, E. 2010. Polyaenus: *scriptor militaris*, in K. Brodersen (ed.) *Polyainos. Neue Studien* - Polyaenus. New studies, 7-54. Berlin.

Wheeler, E. 2011a. Rome's Dacian wars: Domitian, Trajan, and strategy on the Danube, Part II. *Journal of Military History* 75 (2011): 191-219, 614-16.

Wheeler, E. 2011b. Hugo Grotius and Aristotle's lost Δικαιώματα πόλεμων: History's first monograph on just war. *Politica Antica* 1: 141-169.

Wheeler, E. 2012. *Notitia Dignitatum, Or.* 38 and Roman deployment in Colchis: Assessing recent views," in B. Cabouret *et al.* (eds) *Visions de l'Occident romain: Hommages à Yann Le Bohec*, II, 621-76. Lyon/Paris: De Boccard.

Wheeler, E. 2016. Parthian *auxilia* in the Roman army, Part I: From the late republic to c. 70 A.D.', in C. Wolff and P. Faure (eds), *Les auxiliaires de l'armée romaine. Des alliés aux fédérés*: 171-222. Lyon and Paris.

Wheeler E. 2017: Parthian auxilia in the Roman army, Part II: From the Flavians to the late empire. *Revue Internationale d'Histoire Militaire Ancienne* 5: 103–138.

Wheeler, E. 2021a. Warfare, in C. Baron (ed.) *The Herodotus encyclopedia*, 3 vols.: 1529-1535. Hoboken.

Wheeler, E. 2021b. Roman Colchis, Iberia and Alani: Some notes as apologia, in *Connecting the ancient West and East. Studies presented to Gocha R. Tsetskhladze*: 791-836. *Colloquia Antiqua.* Leuven.

Whitby, M. 2007. War, in P. Sabin, H. van Wees, M. Whitby (eds) *The Cambridge history of Greek and Roman warfare*, II: 310-341. Cambridge.

Whitby, M. and M. Whitby (trans.) 1989. *Chronicon Paschale 284-628 AD.* Liverpool.

Wiemer, H. 1994. Libanius and Constantius. *Classical Quarterly* 44: 511-24.

Wirth, G. 1990. Hannibalian. Anmerkungen zur Geschichte eines überflüssigen Königs. *Bonner Jahrbücher* 190: 201-232.

Wirth, G. 1993. Arsakes, Constantius und Rom. Spekulationen zu einem Nebenschauplatz der Geschichte im 4. Jahrhundert, in K. Dietz. *et al.* (eds) *Klassisches Altertum, Spätantike und frühes Christentum: Adolf Lippold zum 65. Geburtstag Gewidmet*: 361-92. Würzburg.

Youinou, F. 2008. Trois nations pour une ambassade: l'"énigme Métrodore'. *Latomus* 68: 149-165.

Ziegler, R. 2001-2002. Plante Kaiser Pupienus einen Feldzug gegen die Sasaniden? Bemerkungen zur Münzprägung von Tarsos in Kilkien und zur vita Maximi et Balbini 13,5 in der Historia Augusta. *Jahrbuch für Numismatik und Geldgeschichte* 51/52: 37-47.

Zuckerman, C. 1994. Les campaignes des Tétrarques, 296-298: notes de chronologie. *Antiquité Tardive* 2: 65-70.

Zuckerman, C. 2002. Sur la Liste de Vérone et la province de Grande Arménie, la division de l'Empire et la date de création des diocèses, in *Mélanges Gilbert Dagron, Travaux et Mémoires* 14: 617-637.

Roman Frontier Archaeology – in Britain and beyond gathers contributions by some 30 leading archaeologists and historians in honour of Paul Bidwell. In a wide-ranging career Paul has been one of the leading excavators and pottery specialists of his generation, admired for his ground-breaking work both in the south-west and the military north of Roman Britain.

Contributions reflect the wide range of Paul Bidwell's interests. Studies of samian pottery use, coins, carved stone pinecones, multi-piece bone dice and agricultural strategies shed light on the economy and everyday life of a Roman frontier province. For the civil southern part of the province there are studies of place-names and various aspects of the public baths of the Roman cities, as well as the impact of changing sea-levels on coastal topography. A number of contributions focus on the problems of the military north and Hadrian's Wall, including studies of the nineteenth century antiquarian pioneers and assessments of the purpose of the Wall, the possibility of destructive attacks by an enemy, the way in which Roman forts were designed, and the use of Iron Age tradition military gear by the Roman army. The papers also take us beyond Britannia to consider developments on and beyond Rome's Eastern, Danube and North African frontiers.

The collection will be essential reading for anyone with an interest in either the civil or military aspects of Roman Britain, or the frontiers of the Roman empire.

Nick Hodgson, formerly of Tyne and Wear Archives and Museums, is now an independent researcher and Honorary Research Fellow at Durham University.

Bill Griffiths is a Senior Manager at Tyne and Wear Archives and Museums.

Both editors are former colleagues of Paul Bidwell in the Archaeology Department of Tyne and Wear Archives and Museums. They have excavated and published widely on Roman Britain and the Roman frontiers.