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Current Approaches to Roman Frontiers: Proceedings of the 25th International Congress of Roman Frontier Studies

Enckevort, H. van; Driessen, M.J.; Graafstal, E.; Hazenberg, T.; Ivleva, T.; Driel, C. van

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CURRENT APPROACHES TO ROMAN FRONTIERS

HARRY **VAN ENCKEVORT**, MARK **DRIESSEN**, ERIK **GRAAFSTAL**,
TOM **HAZENBERG**, TATIANA **IVLEVA** AND CAROL **VAN DRIEL-MURRAY** (EDS)

LIMES XXV VOLUME 1

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Nijmegen

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Preface

The 25th Limes Congress was held in the Cultuurhuis Lindenberg in Nijmegen from 21 to 27 August 2022. Two days were used for excursions to important sites along the Lower German Limes (this volume). During the remaining five days 37 sessions took place with 246 papers presented on a wide range of topics related to the frontiers of the Roman Empire. In addition, 27 posters, in which limes scholars and students presented their research, were displayed for the participants to view. We are grateful to the City of Nijmegen for the unstinting financial and organisational support offered to make the Congress a success, up to and including this publication, thus emphasising their commitment to our Roman heritage. Preparations for the publication of the proceedings were put in place at the close of the congress, with first drafts expected by 1-12-2022. Thanks to the cooperation of the contributors, and in particular to the efforts of Harry van Enckevort, the four edited volumes could be submitted to the publisher by January 2024.

We are publishing 186 articles based on the papers and posters presented at the Congress in four separate, themed volumes. These were written by 300 authors (191 male, 109 female) in three languages: English (171), German (11) and French (4). The editors limited themselves to adapting the contributions to the guidelines and did not intervene in the content of the articles. The responsibility for the content of all articles lies entirely with the authors. This first volume begins with reports on the Congress and field trips. Seven themes are then covered. The first is frontier research by women scientists, followed by the use of modern methods and advanced techniques to better understand frontier evolution, and the challenges of computational modelling in Roman studies. This is followed by papers on the conservation, protection and community management of frontiers, and the opportunities, challenges and uses of 'citizen science'. Articles on Roman archaeology as national and transnational heritage, and World Heritage on three continents cover the next two themes. A separate theme is devoted to papers on the Great Wall of China and Hadrian's Wall. The volume concludes with an overview of the sessions and papers presented during the congress in Nijmegen.

We are saddened by the death of our colleague Dé Steures (1948-2024, see page 27, fig. 6 left) just before these volumes went to print.

Harry van Enckevort, Mark Driessen, Erik Graafstal, Tom Hazenberg, Tatiana Ivleva and Carol van Driel-Murray

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Figure 1. Willy Groenman-van Waateringe at work cataloguing leather in the early 1990's (University of Amsterdam ACASA, IPP-photo archive).

Willy Groenman-van Waateringe

We dedicate these four volumes to prof. dr. Willy Groenman-van Waateringe, in recognition of her leading role in the development of the Limes Congresses, and her great contribution to the development of Roman Frontier studies during her career at the former Institute of Pre- and Protohistory, University of Amsterdam (now AAC). Her first congress was Cardiff (1969) where she presented her innovative PhD research into Roman military leatherwork from Valkenburg that laid the foundations for much practical and experimental work on military equipment (fig. 1), thus widening the scope of future congress contributions. At the Carnuntum congress (1986) she chaired the first ever thematic session, which was so successful that a second session was held in the evening, also under her chairmanship. Thematic sessions came into their own three years later, at Canterbury, and have structured the congresses ever since. She attended almost every Congress, and her concise, closely focussed papers, here and elsewhere, often based on her own ecological research, heralded issues that have become normative in Roman frontier studies: we may mention *Urbanization and the North Western Provinces of the Roman Empire* (Stirling Limes Congress 1979) and *The Disastrous Effect of the Roman Empire* (1983).

Willy was also instrumental in bringing the congress to Rolduc in 1995, where she was president of the Organizing Committee. Incidentally, although she was the only woman on the committee, this was the only occasion she could recall that she was faced

Figure 2. Willy Groenman-van Waateringe and her colleague Willy Metz in front of information panels with photos and plans of the *castellum* Valkenburg (ZH) (University of Amsterdam ACASA, IPP-photo archive).

in: H. van Enckevort, M. Driessen, E. Graafstal, T. Hazenberg, T. Ivleva & C. van Driel-Murray (eds) 2024, *Current Approaches to Roman Frontiers. Proceedings of the 25th International Congress of Roman Frontier Studies 1*, Leiden, Sidestone Press (= Archeologische Berichten Nijmegen 9), pp. 11-12.
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with active discrimination: she was throughout studiously ignored by a national politician (who shall remain nameless, as shall his party). Other than this, she could only recall active comradeship, cooperation and respect from Limes Congress participants. Willy always encouraged beginners to take part, introducing them to the 'great names' and shepherding them to events: several of the present editors benefitted from her generosity in sharing the Limes experience, and we built on the Rolduc formula in the organization of the Nijmegen meeting in 2022. Characteristic for Willy is her openness to new ideas: the recent discoveries in Valkenburg and Velsen (the two sites with which she was most closely involved), confirm her long-held contention that, despite the intensity of research in this area, new excavations and the re-examination of previous work will continue to bring surprises. She was unable to participate in the Nijmegen Congress, but two questions intrigued her and can be offered for future consideration: that Valkenburg (*Praetorium Agrippinae*, as she had always argued) was a crucial transhipment harbour for sea/river transport (fig. 2), and that the Brittenburg was not a defended granary, but a massive lighthouse-cum-monument associated with the conquest of *Brittannia*.

The editors

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Part 1

REPORTS FROM THE CONGRESS AND FIELD TRIPS

The 25th Congress of Roman Frontier Studies in Nijmegen

Rebecca H. Jones and Andreas Thiel

The International Congress of Roman Frontier Studies in Nijmegen represented the 25th such gathering of limes scholars since the inaugural congress in Newcastle in 1949. Originally scheduled for 2021, the organisers felt that the nature of the congress, with its mix of academic sessions, posters, visits to key frontier sites and museums and networking opportunities would not do justice to the subject if it moved to an online platform, like many other conferences during the pandemic. The delay by one year enabled the congress to go ahead and the success of the congress demonstrated that this was the right decision.

The occasion of the 25th congress was marked by the publication of a volume on the History of the Congresses (Breeze *et al.* 2023; fig. 1). Thanks to sponsorship from the City of Nijmegen, the publishers, Archaeopress, were able to supply one complimentary copy to each delegate at the Congress and it is also available free Open Access through the Archaeopress website. In addition, delegates were also presented with copies of the latest five books in the Frontiers of the Roman Empire series edited by David Breeze and also published by Archaeopress.

We are delighted that the organisers of the XXV congress opted to go for a digital publication of the proceedings in order to increase the availability of the papers to a wide audience. We have an ambition to get as many past papers of the congresses online as possible, with Kai Juntunen having scanned them all and wonderfully made them provisionally available for download. In order for the congress to remain relevant and for our discipline to thrive, we want to encourage as many researchers as realistic to the congress, recognising that the different perspectives and expertise brought will drive our subject forward as well as encourage its relevance to the modern-day communities who live amongst the Roman frontier remains the length and breadth of the empire. This also ties in with some of the ideals of the Frontiers of the Roman Empire (FRE) World Heritage (WH) property (Jones 2021). We were fortunate to see some of the huge benefits that the Lower German Limes WH property has brought to local communities during our field excursions throughout the congress. Crossing the border on the first excursion, the Archäologischer Park Xanten is Germany's biggest archaeological open-air museum and has been interpreting and presenting the remains of the Roman *Colonia Ulpia Traiana* for over 45 years. The reconstructed amphitheatre provided the opportunity for the customary congress photograph (fig. 2), taken both within the arena floor and from a drone in the air. This visit, and others, enabled plenty of time for invaluable networking and discussions.

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Figure 1. Andreas Thiel, Tatiana Ivleva, Rebecca Jones & David Breeze celebrating the launch of the book on the History of the Limes Congresses at the Valkhof in Nijmegen on August 23, 2022, with the low-lying river Waal and Waal Bridge in the background on the left (Sven van Efferen).

Figure 2. Photograph of the congress delegates at the amphitheatre at Archäologischer Park Xanten, Germany, on the 23 August 2022 (Sebastian Held, Xanten).

Figure 3. 1. Jack Veldman addresses delegates in the arena of the Archeon prior to the signing of a letter of intent by politicians towards the realisation of a National Roman Maritime Museum 2. All those involved in signing the letter of intent, from left to right Monique Veldman (board member of Foundation Museumpark Archeon), Anouk Noordermeer (alderman of the Municipality of Alphen aan den Rijn), Jack Veldman (director of Museumpark Archeon), Liesbeth Spies (mayor of Alphen aan den Rijn), Arjan de Zeeuw (representative of the Department of Education, Culture and Science), Willy de Zoete (deputy of the Province of South Holland), Jan Jehee (board member of Foundation Museumpark Archeon), Rebecca Jones (co-chair of the International Congress of Roman Frontier Studies), Tom Hazenberg (curator of Foundation Museumpark Archeon) and Andreas Thiel (co-chair of the International Congress of Roman Frontier Studies) (1 Alexandru Flutur; 2 Hans Doderer, Museumpark Archeon).

The second field excursion (25 August) provided delegates the opportunity to visit Castellum Hoge Woerd (Utrecht) and either Fort Vechten or NIGRVM PVLLVM (Zwammerdam). Castellum Hoge Woerd was a tremendous presentation of the Roman fort in a manner sympathetic to the survival of the remains whilst ensuring a cultural resource for the local community: a site used for education (including the museum with its centrepiece of an original Roman wooden barge), theatre and music, a café and city farm. We were extremely fortunate to have Erik Graafstal describe and interpret the site for us. Those who visited NIGRVM PVLLVM saw the presentation of the site and visitor centre adjacent to the Ipse de Bruggen Care Institution who maintain and open up the site. All delegates ended up at the huge open air Archeon Museum Park in Alphen aan den Rijn where we wondered through reconstruction buildings of life in the Netherlands from early prehistory to the Middle

Figure 4. Memorial site at Saint Nicolas Chapel and drawings of Sebastian Sommer and Tom Parker by Esperanza Martin-Hernandez for the Valkhof Chapel In Memoriam (photo Roger White. Thanks to Esperanza for providing images of her drawings).

Ages although most of us spent the bulk of our time in the Roman section. It was such a hot day that many delegates cooled their feet in the Roman pool before attending an event in the arena which included the signing of a letter of intent by Dutch politicians towards the realization of a national Roman Maritime Museum (fig. 3) and the presentation of the Zwammerdam ships. We wish Tom Hazenberg and colleagues all the best with this exciting initiative.

The congress was the largest so far, with 441 delegates from 33 countries and four continents. For the first time ever, we had six sessions running concurrently (the previous record was four) – presenting participants with the difficulties of choosing from a wide range of excellent and stimulating sessions. We owed it to the foresight of the organizers in Nijmegen – and also to their persistence in collecting contributions – that well before the congress started, a 125-page script provided a 'session and paper overview' to help us finding our way through the plethora of presentations. In this context, we would also like to remind all colleagues that politeness alone demands that they also give their registered lecture in person, and in the event that they are unable to do so, at least send a timely cancellation to the organizers.

For those who attended and stayed over the week, the Lindenberg Cultuurhuis (Lindenberg Culture House) was an excellent venue and many of us will not be alone in remembering the colourful lecture rooms and the many cosy places for talks and *koffiemomentjes*. In addition to our unifying general interest in Roman frontiers, we have also our various specific academic interests, which are often shared by only a small number of colleagues. This opportunity for collegial exchange in small gatherings is of particular importance and has always been one of the strengths of our congress. When, at the end of each day, the 'daily recap' – a summary of the various sessions brilliantly hosted by Tom Hazenberg and Rozee van den Bosch – provided an extremely useful overview, one again may have felt how spoilt for choice we all were in deciding what to attend over the day, but could at least catch up on some of what we had missed.

Most of the congress sessions were thematic, covering a range of geographic areas, with some specific to regions of the empire (including desert areas) and some more general sessions. Given our location on the bank of the river Waal, part of the Rhine delta, it is apt that one of the longer sessions was on *Ripae et Litora*,

Figure 5. The face of Nijmegen sculpture on the Veur-Lent (Rebecca Jones).

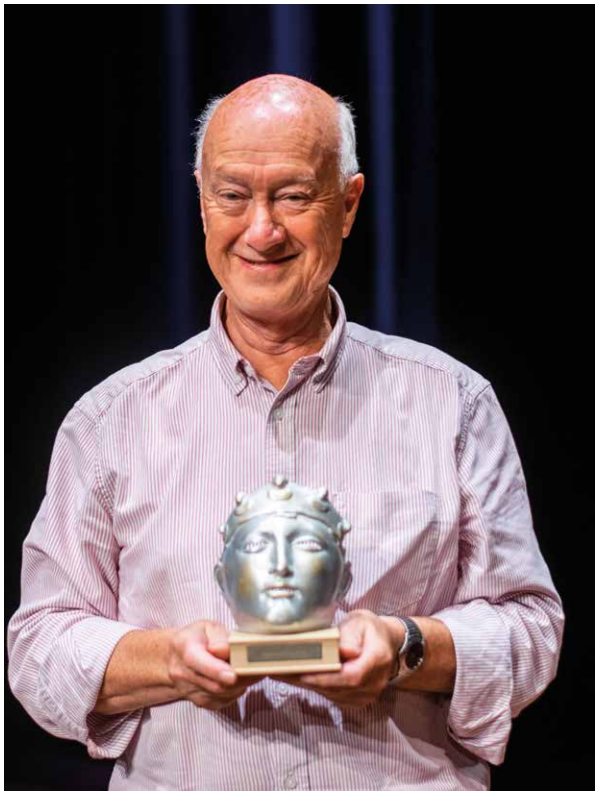

Figure 6. David Breeze receiving his lifetime achievement award (Sven van Efferen).

looking at the riverine and coastal edges of the empire. Others were on early frontiers, small finds and dress and adornment, materials, migration, narratives of Roman victory, *vici*, funerary and religion (see last part of this volume). Contemporary themes of the 21st century were captured in the topics of 'imperialism' and 'childhood' and, of course, the use of modern IT methods for the reconstruction of ancient worlds or the systematic analysis of the growing archaeological datasets. Since the establishment of the FRE, sessions on management and interpretation are now interwoven with other research themes, with sessions on a project between Hadrian's Wall and the Great Wall of China (this was one session that had remote presentations given some difficulties for Chinese scholars to come to Europe although we were fortunate that Yu Bing was able to attend in person), as well as digital data and the complexities of managing a WH property on three continents. For the first time, and fitting in with wider discussions on gender in archaeology at a range of international conferences, there was a session on research by and about women.

The gap of four years since the last congress in Serbia in September 2018 (Belgrade and *Viminacium*) not only saw the huge disruption of the Covid pandemic and the loss of many loved ones, but it also sadly saw the death of several key members of our limes community. We are extremely grateful to our Dutch organisers for arranging an In Memoriam time for reflection inside the over one thousand year old Saint Nicholas Chapel at the Valkhof where people could hand photos or cards of the deceased (fig. 4). At the risk of missing out some key colleagues, we do want to highlight three in particular. The late C. Sebastian Sommer, Chief Archaeologist for Bavaria, taken suddenly in late Summer 2021 was well known to many in the limes community for his humour, scholarship and leadership. He led the organisation of the congress in Ingolstadt in 2015 and was key in the successful nomination of the western segment of the Danube Limes for WH status, inscribed in the summer of 2021, shortly before his death. S. Thomas (Tom) Parker, Professor in North Carolina, was a limes stalwart who was internationally recognised for his work in the middle east, particularly Jordan. His encouragement for a congress in the area helped lead to the Jordan congress of 2000, during which he guided delegates at various site visits. Finally, Stephan Bender, archaeologist for Hessen and then Baden-Württemberg working on the Upper German-Raetian WH property, was researcher on the limes who made a major contribution to our understanding of gates and watchtowers.

Figure 7. The presenters, winners and runners up for best poster and presentation, from left to right: Kaja Stemberger Flegar, Catherine Teitz, Amy Baker, Tatiana Ivleva, Frederick Auth, Ştefania Dogărel, Rebecca Nashan, Ivana Kosanovic and Carol van Driel-Murray (Sven van Efferen).

Nijmegen is rightly famous for its Roman face masks (Willems 1992; Van Enckevort & Willems 2004; Meijers & Willer 2007), the most famous of which was found over 100 years ago in a gravel bed of the Waal river. We had the opportunity to see this cavalry helmet and others at a reception at the Valkhof Museum on the 24 August, together with an exhibition on 'Moving Stories. The Riches of the Limes', a thought provoking show of archaeology and art linking the movements of Roman soldiers, traders and craftspeople with stories of modern-day migrants. Most of us also took the opportunity during the congress to visit the new art installation on the headland of Veur-Lent, known as 'The Face of Nijmegen' and designed by artist Andreas Hetfeld (fig. 5). At the rear of the almost 6 m high mask are steps enabling visitors to climb up and look through the eyes of this giant face across to the *Ulpia Noviomagus* Roman city. At the closing ceremony, David Breeze was presented with a replica of the face of Nijmegen as a lifetime achievement award (fig. 6).

We also had a series of awards voted for by delegates, and presented by Tatiana Ivleva and Carol van Driel-Murray (fig. 7).

Best poster:
1st Sandra Schröer-Spang
2nd Stefania Dogarel
3rd Amy Baker

Best presentation by a delegate under 35:
1st Frederick Auth
2nd Rebecca Nashan
3rd Anique Hamerlink

Runners up: Kaja Stemberger Flegar, Catherine Teitz and Ivana Kosanovic.

The customary closing dinner saw not only dancing but a limes themed photo booth producing instant photographs which provided a memorable series of souvenirs of a memorable congress.

A number of delegates enjoyed the pre-congress excursion visiting several sites including the Museum and Park Kalkriese, one of the sites of the Varian Disaster, and the Neanderthal Museum in Mettmann. After the closing of the congress, a number went on the post-congress excursion to a range of limes hinterland sites in Belgium

Figure 8. The organisers of the Nijmegen and Batumi congresses after the closing ceremony in Nijmegen in August 2022. Second row, from left to right: Carol van Driel-Murray, Piotr Jaworski, Radek Karasiewicz-Szczypiorski, Natalia Lockley, Karolina Trusz, Tatiana Ivleva, Emzar Kakhidze, Martin Lemke, Harry van Enckevort, Mark Driessen. First row: Zaur Akhvlediani, Tom Hazenberg, Erik Graafstal, Lasha Aslanishvili, Maciej Czapski (Sven van Efferen).

and France. Others took advantage of a day trip to the National Museum of Antiquities in Leiden en route to the airport. Both tours were a wonderful conclusion to a highly instructive but also exhausting congress week.

We would like to thank everyone involved in the organisation of such a successful congress. From the book stands to the bus drivers, the organizing and scientific committees, students and the staff at the Lindenberg, all the people who provided guiding on the various tours, the sponsors, the museums, the Municipality of Nijmegen, it is an exhaustive list as befits a successful congress of this scale. In particular, we would like to thank Harry van Enckevort as congress leader for the excellent organization of the congress and his famous colourful shirts, almost outdone by the colourful venue. The In-Act marketing team kept everything running smoothly and we would like to thank Anne Otten and Peggy Kersten and colleagues. Pauline Jansen ensured the support of the city of Nijmegen and Harry was surrounded by a committee par excellence who split the various tasks between them: from organizing all the tours to the programme, the awards and this publication, to name just some of the activities undertaken. To Harry, together with Mark Driessen, Erik Graafstal, Tom Hazenberg, Tatiana Ivleva and Carol van Driel-Murray, we extend our gratitude.

The scale of this publication is a demonstration of the interest in and success of the congress. Its speed of publication is a testament to the authors for submitting papers quickly and the editing team for the mammoth job of editing over 185 papers (particularly given how few authors actually followed the guidelines).

The *History of the Congress of Roman Frontier Studies 1949-2022* (Breeze *et al.* 2022), outlines the success of this international meeting organized by archaeologists to present the results of their work on site to international colleagues. The future of the congress is something we wish to encourage and secure, ensuring that the congress remains attractive for scholars and Roman cultural heritage managers in all parts of their careers. That very first congress in Newcastle (1949) was later than first planned due to World War II. There have been gaps and postponements in the regular cycle of meetings due to wars and disruptions due to closed borders and visa issues in the following decades. At the Nijmegen congress, papers from Russian and Ukrainian colleagues were presented remotely, alongside several from China. We will endeavour

to keep the congress an 'in person' event recognising the importance of visiting excavations, authentic sites and museums of relevance to our research, interpretation and management. Although this represents an effort for the hosts that should not be underestimated, we nevertheless will encourage congress organisers to facilitate remote access when travel has proven impossible (usually for political reasons). In 2015, participants at the congress in Ingolstadt voted to pursue a three-year cycle and rotate the congress around the Roman Empire, with a preference for alternating between east and west whilst supporting the desire to take the congress to new locations when the opportunities present themselves. We also recognise that some venues will prove easier for delegates to attend than others, and expect a fluctuation in numbers depending on venue rather than expecting the congress to grow each time. But whether growth or reduction, the numbers are a testament to the success of the congress and a welcome that is extended to new participants by both hosts and all partners. Moving venues around the Empire enables interested delegates to attend, particularly those who may find it harder to travel for long distances due to the congress; and it also presents the opportunity for regular participants to see sites and exhibitions that they have not seen before.

The delay of Nijmegen by a year due to Covid led to the decision by the organisers of the 26th congress, the Universities of Batumi and Warsaw, to stick to the original timescale of 2024 leaving a two-year gap between the 25th and 26th congresses. We are excited that the congress will be going to Georgia for the first time and thank the organisers of Nijmegen for all the advice and support they have extended towards the organizing committee for 2024 (fig. 8).

As co-chairs, we are kindly supported in our work by an informal group of people who have led congress organisation in recent years and we thank all of those for their advice and guidance, especially David Breeze. We would also like to let future congress organisers to know to get in touch with us as we are interested in discussing exciting opportunities for future congresses.

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A record of the 25th Congress of Roman Frontier Studies

Mark Driessen, Erik Graafstal, Tom Hazenberg, Tatiana Ivleva, Carol van Driel-Murray and Harry van Enckevort

Many aspects of the congress in Nijmegen have already been covered in the previous contribution by Rebbeca H. Jones and Andreas Thiel. Here we will discuss some additional matters concerning the organization of the congress.

Preparations

In June 2015, the municipality of Nijmegen began initial preparations for the congress in 2021. The proposal to organise the 25th International Congress of Roman Frontier Studies (ICRFS) in Nijmegen was presented, and approved, on 20 September 2015 at the closing ceremony of the 23rd Congress in Ingolstadt. By autumn 2017, the basic grid of the congress was fixed: an opening session and introductory programme on the province of Lower Germany on Sunday; four congress days, on Monday, Wednesday, Friday and Saturday morning, with excursions on Tuesday and Thursday; a closing ceremony on Saturday morning. The traditional multi-day pre- and post-excursion would take place immediately before and after. A prominent reason to bring the Congress to the Netherlands was the World Heritage nomination of the Lower German Limes, scheduled for summer 2021. For the Dutch initiators, it was therefore clear from the start that the congress programme would have to provide space for themes specific to Lower Germany, such as the directed migration of tribal groups as part of early Roman frontier politics, the contribution of organic remains to our knowledge of Roman frontiers, and the logistics and infrastructure of river and coastal navigation.

During the continued preparations in 2019, a core organising group began to emerge, the later Scientific Committee of the Congress and the editors of the proceedings. Thanks are due to Jasper de Bruin, Julia Chorus, Monica Dütting, Paul van der Heijden, Rien Polak and Wouter Vos for their earlier contributions to the preparations. From mid-2019 onwards, the Scientific Committee was increasingly supported for practical matters by Peggy Kersten and Anne Otte of the Nijmegen-based organising agency In-Act Marketing & Organisation, which had been engaged by the municipality of Nijmegen in late 2018. They were assisted during the congress and field trips by Roos van Herkhuizen and Elles van Mullekom. Pauline Jansen ensured the support of the municipality of Nijmegen before, during and after the congress (fig. 1). In the meantime, the Lindenberg

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Figure 1. The closing session with from left to right Roos van Herkhuizen, Elles van Mullekom, Anne Otten, Peggy Kersten and Pauline Jansen (Sven van Efferen).

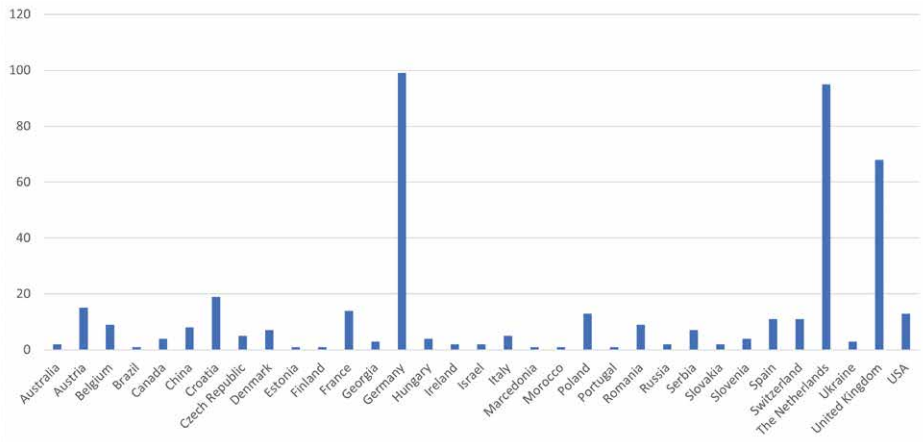

Figure 2. The numbers of attendees to the 25th Limes Congress per country (Erik Graafstal).

Cultuurhuis in the centre of Nijmegen had been chosen as the congress venue. Because of its six halls in three size classes, this venue had already suggested itself as the most suitable location. During the preparations, much attention was paid to providing a safe environment for congress participants. A Code of Conduct was drawn up by Rebecca Jones and Andreas Thiel to be posted on the congress website and shared with all participants upon registration. During the congress, staff members and volunteers paid attention to guaranteeing a safe environment for all attendees. With the congress website soon live, the call for sessions went out on 1 October. The first half of 2020 was used to harmonise and schedule the session programme, with a view to a planned call for papers on 1 October that year.

However, the Covid-19 outbreak disturbed our plans and asked for a drastic reconsideration. The travel restrictions that applied worldwide from February 2020 affected the organisation of the Congress in different ways. More and more congresses and similar events were being converted into a digital format. For a while, this was also considered for the Limes Congress. However, the organisers of the congress in Nijmegen, together with the ICRFS chairs Rebecca Jones and Andreas Thiel and the Municipality of Nijmegen, decided that a digital version would not contribute to what is perhaps the main objective of the congress: to strengthen ties between scholars and students from different countries through personal meetings, knowledge exchange and a shared social side-programme. Therefore, it was decided in spring of 2021 to postpone the congress by one year. We are grateful to the municipality of Nijmegen for supporting our decision and providing additional funding to enable this postponement.

Figure 3. Congress bag, programme booklet and water bottle (Peggy Kersten In-Act).

In order to maintain the connection with the international limes community in the regular year 2021, a digital sneak-preview conference entitled 'The road to Nijmegen 2022' was organised on 26 August and hosted by the National Museum of Antiquities (online recording: https://youtu.be/PKLd0bKRYo4). This programme was digitally opened by Hubert Bruls, the mayor of Nijmegen, and filled with contributions by several scholars from the Netherlands and Germany. The presentation was in the hands of three students: Rozee van den Bosch (Radboud University), Tatiana Crombeen (Leiden University) and Anna van der Weij (Utrecht University).

The congress

The 25th Limes Congress began on Sunday 21 August, almost exactly 27 years after the previous congress in the Netherlands, which had taken place at Rolduc Abbey in Kerkrade. In Nijmegen, 441 participants (168 female and 273 male) gathered from 33 countries, located on four continents (fig. 2). Some of them could not come to Nijmegen due to Covid-19 restrictions (China) or conflict (Russia, Ukraine) and presented their papers online. Thanks are due to the Municipality of Nijmegen, Frans Theuws (Leiden University) and the grant giving body of The Roman Research Trust and Roman Society: The Audrey Barrie Brown Memorial Fund & Donald Atkinson Fund for their financial support enabling several students from abroad to attend the congress. The congress was sponsored financially and in kind by the municipality of Nijmegen, provinces of Gelderland, Zuid-Holland and Utrecht, Nederlandse Limes Samenwerking (NLS), the municipality of Alphen aan den Rijn, LVR-Archäologischer Park Xanten, Radboud University Nijmegen, Museum of Antiquities in Leiden and Valkhof Museum Nijmegen.

During their registration, all participants received a congress bag, programme booklet and a water bottle (fig. 3). The congress opened with a day-long plenary session in the Lindenberg Hall. The morning session was chaired by Jeroen van Zoolingen, senior archaeologist at the municipality of The Hague. After a welcome by the chairman of the Scientific Committee, Harry van Enckevort, both presidents of the International Congress of Roman Frontier Studies, Rebecca Jones and Andreas Thiel, expressed their good wishes for the course of the congress. Deputy mayor of Nijmegen, Jean-Paul Broeren, welcomed the congress participants on behalf of the city and talked about the importance of the Roman past for Nijmegen's identity and city branding. Next, the programme manager of the Dutch Limes Cooperation, Jelmer Prins, spoke about the organisation and tasks surrounding the new world heritage site. His counterpart in Germany, Erich Claßen, director of LVR-Bundesamt für archäologische Denkmalpflege (and chairman of the Deutsche Limeskommission), then spoke about research and management of the world heritage sites in the Rhineland. The morning ended with two book presentations. Tatiana Ivleva explained the background to the creation of *A History of the Congress of Roman Frontier Studies 1949-2022* in the run-up to the congress. David Breeze announced no fewer than five new volumes

Figure 4. David Breeze calling to the stage all the contributors present to the Frontiers of the Roman Empire booklet series (Sven van Efferen).

Figure 5. Tony Wilmott (left) being interviewed by Rozee van den Bosch and Tom Hazenberg about his Wall-to-Wall session during the daily recap (Sven van Efferen).

in the successful Frontiers of the Roman Empire series (Upper Germany, the Eastern frontier, Dacia, Wales, and the Saxon Shore) and called to the stage all contributors to the series so far (fig. 4). The new volumes were available free of charge to congress delegates while stocks lasted.

The afternoon session, co-chaired by Jeroen van Zoolingen and David Breeze, was entirely devoted to the province of Lower Germania. Steve Bödecker and Erik Graafstal kicked off with a broad introduction to the province, entitled 'Rome's first frontier. An introduction to the Lower German Limes'. Municipal archaeologist of the congress' host city, Harry van Enckevort, next outlined the long historical development line of Roman Nijmegen. This was followed by a series of shorter presentations on highlights of the Lower German Limes: ship finds (Tom Hazenberg), organic find material (Carol van Driel-Murray and Silke Lange), the Portable Antiquities of the Netherlands registration scheme (Stijn Heeren), the battlefield at Krefeld/*Gelduba* (Boris Alexander Burandt), the legionary fortress at Valkenburg (Wouter Vos), the newly discovered sanctuary of Hercules Magusanus at Herwen

Figure 6. Attendees admiring the 'Find of the Day', in this case a helmet found recently on the bank of the river Waal east of Nijmegen (Sven van Efferen).

(Erik Verhelst), and temporary camps near Ermelo in the Veluwe region (Mark Driessen).

Scientific and social programme

The congress venue accommodated as many as six parallel programmes. Over the course of the four congress days, 37 sessions were delivered, 28 of them thematic, seven geographical and two general, providing space for a total of 246 papers. The full session and paper programme can be read in part 8 at the end of this volume. A new element was the daily recap by Rozee van den Bosch and Tom Hazenberg which took place on congress days at 17:30 in the central hall and provided space for highlights, short interviews and announcements (fig. 5). In parallel, the 27 poster contributors (see list at the end of this volume) were available for questions about their research. On congress days, there was a book market where Archaeopress, BAR Publishing, Nünnerich-Asmus Verlag and the Römisch-Germanische Kommission presented their recent Roman publications, while in the foyer the attendees could admire the 'Find of the Day', curated by Floris Reijnen (fig. 6).

The Lindenberg Cultuurhuis is located in the historical heart of Nijmegen, right next to the Valkhof (park) and the Valkhof Museum, and within the contours of the late Roman fortifications. This offered ample opportunities for an attractive social programme around the congress, and for entertainment on the participants' own initiative. On Sunday, there was a welcoming reception at 'Concertgebouw De Vereeniging' (fig. 7), where singer Judith Nijland surprised congress attendees with Latin versions of well-known songs from the light music genre. A selection of finds from the recently discovered Herwen-Hemeling temple complex was on display during the reception offered by the Valkhof Museum on Wednesday .

Public programme

During the congress, the Valkhof Museum and Radboud University offered a programme for Nijmegen residents under the name `Limes Festival 2022'. From 21 to 28 August, the public could choose from a very varied offer. Every day, archaeologists gave mini-lectures in the De Bastei Museum on topics such as 'The limes for Beginners; What is the limes; Why is it a UNESCO World Heritage Site?'. Both the Valkhof Museum and De Bastei Museum focused on the limes with guided tours of Roman top finds and Roman lunches. Both museums were also the starting point for tours of Roman Nijmegen and to attractions in the region such as Museumpark Orientalis in Heiligland Stichting and Tempel | Kerk Museum in Elst. The Valkhof Museum also displayed 'archaeological' objects made by schoolchildren from Nijmegen as well as the exhibition 'Sleeping Romans' by artist Bart Lunenberg. In the 'Huis van de Nijmeegse Geschiedenis' (House of Nijmegen's History) was the 'Expo Roman Graves'. The Limes Festival concluded at the Valkhof where the a busy Roman garrison town came to life with artisans, a medic, an astrologer and a roof tile kiln. The whole city was decorated with banners of the International Limes

Figure 7. Opening-session chair Jeroen van Zoolingen and a motley delegation of Roman re-enactors inviting the attendees to the welcoming reception at De Vereeniging (Erik Graafstal).

Congress and the World Heritage of the Lower Germanic Limes. Thus, the congress came to the attention of both residents and visitors of Nijmegen.

Closing ceremony

The conclusion of the congress took place on Saturday afternoon 27 August and was chaired by Erik Graafstal. Traditionally, this section included the award ceremony for the best poster and best presentation in the under-35 age group. Also following tradition, Martin Lemke, Radoslaw Karasiewicz-Szczypiorski and Zaur Akhvlediani presented the next congress location, Batumi in Georgia, with its rich range of excursion possibilities. A special moment was the presentation, by Carol van Driel-Murray, of a lifetime achievement award to the former president of the International Congress of Roman Frontier Studies, David Breeze. The prize consisted in a replica of the iconic face mask prepared by Maarten Seepers. To great applause, thanks were then expressed to the team of In-Act, the agency that had organised and facilitated the congress behind the scenes for all those years. After a farewell address by Harry van Enckevort, Rebecca Jones and Andreas Thiel gave their Vote of Thanks. After the formal closing of the congress, the traditional closing dinner and final party took place in microbrewery and Restaurant 'De Hemel'.

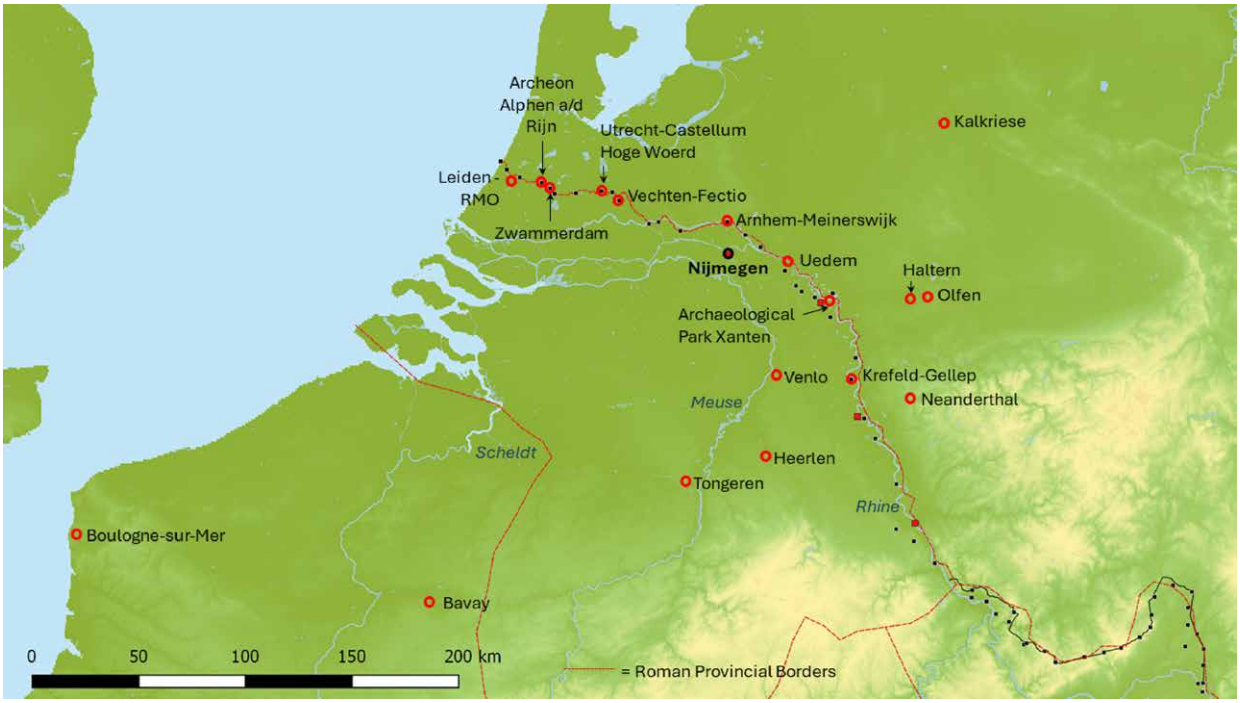

Figure 1. Map of the attractions visited during the excursions (Mark Driessen, background map Rien Polak).

The excursions

Mark Driessen, Erik Graafstal, Tom Hazenberg,
Tatiana Ivleva and Carol van Driel-Murray

The International Limes Congress 2022 had a rich excursion program (fig. 1), that consisted as traditionally of a pre-excursion, two excursion days during the congress, and a post-excursion. The pre-excursion focussed on some more remote sites in *Germania Libera* and the Lower German Limes south of Xanten, but the inspiring Neanderthal Museum was also included in this tour. On the two excursion days during the congress, we visited some of the top attractions along the Lower German Limes between Xanten (D) and Alphen aan den Rijn (NL). For the smaller post-excursion group, the Roman road from Tongeren to Boulogne-sur-Mer was on the program, ending with a visit to the National Museum of Antiquities in Leiden.

The pre-excursion (August 18-20th)

The pre-excursion started on Thursday with 33 participants in Kalkriese (fig. 2.1). The Varusschlacht Museum – Kalkriese Park was opened on the presumed site of the Battle of the Teutoburg Forest in 2002. Stefan Burmeister welcomed the delegates with a presentation on current research, after which Heidrun Derks took the group up to the museum's huge tower. This provided us with a panoramic view of the northern flank of the Wiehengebirge, adjacent to the lower area where the site of the Roman-Germanic battle was discovered. The museum below the tower displays a fine selection of the many Roman finds from the Kalkriese area, with an early Roman cavalry face mask being one of the highlights. The tour ended with a walk around the site of the battlefield (fig. 2.2).

The next morning Bettina Tremmel explained the early Roman presence along the Lippe, in particular during a visit to the recently discovered camp on the banks of the Lippe near Olfen (fig. 2.3). At the Römermuseum in Haltern am See, director Josef Mühlenbrock and his colleagues showed the group around the museum, after which the delegates could climb the reconstructed timber-earth wall and west gate of Haltern's Augustan fortress, experiencing a vivid impression of the imposing ancient architecture (fig. 2.4). After the lunch in the museum (fig. 2.5) the group headed south, crossing the Rhine Limes to visit the Burg-Linn Museum in Krefeld-Gellep, where Boris Burandt presented the amazing collection of finds from *Gelduba* and its rich late Antique and Merovingian cemetery (fig. 2.6). The former curators Christoph Reichmann and Hans-Peter Schlechtter showed the temporary exhibition *Heimat in der Fremde. Gelduba im Weltreich der Römer* (Home Abroad. *Gelduba* in the Roman Empire). This excursion day ended with a memorable and much belated diner at a local café-restaurant in Krefeld (fig. 3.1).

The last day of the pre-excursion started with rain (fig. 3.2). The inspirational Neanderthal Museum – located near the site where the first *Homo neanderthalensis* bones were found – was on the morning program. After a stroll through human history

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Figure 2. 1. Delegates assembled at the entrance of Museum and Park Kalkriese; 2. Walk around the museum grounds in Kalkriese; 3. Bettina Tremmel (centre) explains the landscape in Olfen; 4. The reconstruction of the wall of the timber fortress in Haltern; 5. The lunch in the museum in Haltern; 6. In Burg-Linn Boris Burandt (on the elevation on the right) explains a boat, dated to around 800 AD, during the tour of the museum's rich collection (1 Tom Hazenberg; 2-3 and 6 Harry van Enckevort; 4 Mark Driessen; 5 Eberhard Sauer).

Figure 3. 1.The belated dinner in Krefeld; 2. Tony Willmott with the umbrella given to participants of the 1995 Limes Congress; 3. René Ployer (left) and Harry van Enckevort (right) had a memorable encouter at the Neanderthal Museum; 4. On the way to the entrance of the Limburgs Museum in Venlo (1-3 Tom Hazenberg; 4 Eberhard Sauer).

in the museum (fig. 3.3), the delegates could focus again on Roman archaeology in the Limburgs Museum in Venlo. After a welcome by Bibi Beekman and lunch (fig. 3.4), the exhibition *Oevers vol Romeinen* (Romans on the Waterfront) showed several of the most intriguing artefacts discovered along the Lower Rhine Limes. The Limburg hinterland was represented by an exhibition on the recently published Roman villa of Voerendaal. Full of inspiration, the group reached Nijmegen to meet the other congress participants at the Cultuurhuis Lindenberg: the congress venue.

Excursion day 1 (August 23rd)

The first day of the in-congress excursions focussed predominantly on the German part of the northern Lower Germanic Limes. We took more than 300 participants in eight coaches on a rotating schedule along the Rhine in Gelderland (NL) and North Rhine-Westphalia (D). The only Dutch stop on this day – for half of the delegates – was Arnhem-Meinerswijk, starting with a reception at the nearby Hortus Romanus. The *castellum* at Meinerswijk was long thought to be *Castra Herculis*, known from historical sources, but according to the latest state of research this is probably the name of the Late Antique *castellum* on the Valkhof in Nijmegen. Arnhem's alderman Bob Roelofs and municipal archaeologist Martijn Defilet showed the congress delegates the current visualisation of the *castellum* at Arnhem-Meinerswijk, consisting of gabions suitable for the annual flooding of the Rhine (fig. 4.1); the last also happened in Roman days.

The other half of the delegates travelled directly from Nijmegen to Germany. At the Archäogischer Park Xanten (APX), they we were warmly greeted by the director Martin Müller (fig. 4.2), and other staff members, after which guided tours started around the eastern part of the park with all its intriguing and very informative reconstructions of the *Colonia Ulpia Traiana*. After a lunch in the coach this group went to the Fürstenberg near Xanten, where Marion Brüggler, Kerstin Kraus, Clive Bridger and Julia Obladen-Kauder guided the group around this moraine

Figure 4. 1. The visualisation of the *principia* of *castellum* with gabions at Arnhem-Meinerswijk; 2. Martin Müller welcomes the second group at the amphitheatre in the APX; 3. One of the smaller groups walks across the Fürstenberg; 4 Julia Obladen-Kauder explains in the Xanten-Birten amphitheatre; 5 The slight elevations of the ramparts of Camp 12 among the trees of the Hochwald; 6 The delegates gather at the gate of the APX; 7 The delegates walk towards the *mansio* for the buffet (1 and 3-4 Eberhard Sauer; 2 Tom Hazenberg; 5 Andreas Schaflitz; 6-7 Joep Hendriks).

with imposing views over the Rhine valley and the Lippe debouchment (fig. 4.3). The site (57 ha) comprised the remains of several phases of the pre-Flavian double-legion fortresses *Vetera* I, which played a historical role during the Batavian revolt (69-70 AD). After this the delegates visited the timber-earth amphitheatre of Xanten-Birten (fig. 4.4).

After visiting Meinerswijk and lunch in the coach, the first group left for the Hochwald near Uedem, where Steve Bödecker and Jens Wegman explained how they and their colleagues from the Landschaftsverband Rheinland discovered a large number of temporary camps here using LiDAR technology. During a walk through the forest, they showed Camp 12 which was clearly visible through the vegetation cover (fig. 4.5). This camp consisted in the best-preserved earth ramparts with the easily identifiable four *clavicula*-type gates. Then group 1 and 2 alternated. After that, they all went to the APX and visited the park and the museum on their own (fig. 4.6). Later that afternoon all delegates gathered in the city's amphitheatre for the traditional group photo (see page 16), after which they were hosted and sponsored by the Archäologischer Park Xanten to a very sumptuous Roman buffet in the *mansio* (fig. 4.7)

Excursion day 2 (August 25th)

The second in-congress excursion took the participants along two different routes to the delta area of the Lower German Limes. Because the River Rhine silted up in the early Middle Ages, the archaeological (organic) remains of the limes from the *castellum Fectio* to the North Sea – of which large parts remained below later water levels – are very well preserved. Through collaboration between archaeologists, governments and citizens, it has been possible to make the Roman limes visible in the modern (urban) landscape. This collaboration played also a role in broader societal correlation as community education, local tourism, strengthening social cohesion, and even healthcare: the so-called 'Dutch Approach'. At Bunnik-Vechten, Rien Polak and Tessa de Groot showed the delegates around the 2.6 ha fort *Fectio*, which was largely rebuilt in stone in the late 2nd century (fig. 5.1). It was preceded by at least six timber forts of uncertain sizes, and was partially damaged by the moat of the 19th century fort near Vechten of the Nieuwe Hollandse Waterlinie (New Dutch Water Defence Line), another World Heritage site!

The other half of the delegates went to Castellum Hoge Woerd in De Meern, the result of large-scale research preceding the construction of a new urban district, houses the archaeological museum in the province Utrecht with the Roman river barge De Meern 1 (fig. 5.2), besides a theatre, an urban farm, flexible workspaces and a restaurant. The archaeological research focussed mainly on the Limes infrastructure between the military installations and non-invasive methods, aiming to preserve the remains of the *castellum* and its *vicus*. In order to accommodate all the spatial components of the multi-utility heritage centre without damaging the archaeological remains below, a special construction was designed. The delegates were guided around by Erik Graafstal, Mark Driessen and Jan Modderman, and were offered a tasty lunch by Leen van Zwieten from the healthcare facility Ipse de Bruggen.

After lunch, the group left for Zwammerdam and was relieved by the group that had visited Vechten. In 1968 during the construction of the healthcare institution Ipse de Bruggen, the remains of the Roman *castellum Nigrum Pvllum* and the famous Zwammerdam ships were discovered. The welcome at Visitor Centre NIGRVM PVLLVM by Leen van Zwieten, with coffee and cake prepared by the clients of the institution, was followed by a tour around the site and in the Limes Visitor Centre given by the volunteers of 'Het Genootschap' (Eng. The Society). In the garden, the outlines of the *castellum* constructed in wood, concrete and stone were visited. The flags represent the southern gate, the benches visualise the walls of the *principia* (fig. 5.3).

The excursion day ended for all delegates in Museum Park Archeon in Alphen aan den Rijn, which houses an extensive collection of artefacts and reconstructed buildings based on archaeological research from all around the Netherlands. The professional guides and re-enactors took the participants around the exhibitions, the reconstructions (fig. 5.4) and the restoration sites. Several of the Zwammerdam ships are being restored here, and will hopefully be on a permanent display in the new museum. The pool at the bathhouse attracted many on this hot day (fig. 5.5). At the end of the afternoon, director Jack Veldman thanked the participants of the Limes Congress for visiting Archeon, followed by the signing of a declaration of intent for the new National Roman Maritime Museum. The excursion day ended with a delicious buffet provided by the municipality of Alphen aan den Rijn (fig. 5.6).

Post-Excursion (August 28-30th)

The morning after the closing session, 28 participants gathered at the bus for the post-excursion. The delegates

Figure 5. 1. The delegates listen to Tessa de Groot (left with map in her hands) who is standing on the concrete plinth with Roman sherds that represent the outline of *castellum Fectio*; 2. Erik Graafstal (centre above with pink shirt) explains the Roman barge in the museum; 3 The garden of Ipse de Bruggen; 4. The reconstruction of the Gallo-Roman temple of Cuijk (*Ceuclum*) at Archeon; 5. The pool near the bathhouse; 6. The buffet in Archeon (1 Andreas Schaflitzl, 2 Joep Hendriks, 3 Tom Hazenberg, 4 Sabine Hornung, 5 Martina Meyr, 6 Dorit Engster).

Figure 6. 1. Benoit Mater (second from left) led the participants along the wooden paths through the Roman bathhouse of Heerlen; 2. Some delegates had the urge to climb the tumulus of Koninksem; 3. The *cryptoporticus* in Bavay; 4. The exposition in the Forum Antique in Bavay (1-2 Tom Hazenberg, 3-4 Mark Driessen).

travelled south to the Roman bathhouse of Heerlen, following further roughly the important Roman road from Cologne to Boulogne-sur-Mer.

A warm welcome awaited in Heerlen with the explanation from Karen Jeneson and Benoit Mater on the new construction plans of the Thermen Museum, followed by a tour through the museum (founded in 1977) and the remains of the Roman bathhouse (fig. 6.1). These are some of the best-preserved Roman *thermae* in north-western Europe. The bathhouse sat in the heart of *Coriovallum*, a small Roman town on the crossroad of the two most important roads connecting *Germania inferior* with the rest of the Roman empire.

The group continued its route to Tongeren in Belgium, where they were welcomed at the Gallo-Roman Museum by curator Guido Creemers and Alain Verhoeven, former curator/city archaeologist and expert on the Roman history of Tongeren. The town – the oldest Roman city in Belgium – was known as *Atuatuca Tungrorum* and the administrative capital of the *civitas Tungrorum*. The permanent collection of the Gallo-Roman Museum proves that Roman culture took root in the region of Tongeren. There are impressive architectural fragments, elegant pieces of jewellery and a wide range of Roman statues of several deities. The wealth of artefacts from tumulus graves also appeals to the imagination. The temporary photo exhibition – *Imperium Romanum*, *The Roman Empire Through the Lens of Alfred Seiland* – provided wonderful pictures of well-known, hidden, or vanished major sites and landscapes once belonging to the Roman empire, and evoked discussions on the struggle to protect these cultural assets. When leaving Tongeren, the famous *tumulus* of Koninksem was visited (fig. 6.2). This Roman burial mound is not far from the road leading to Bavay.

On the second day of the post-excursion, Pierre Antoine Lamy welcomed the delegates at the Forum Antique de Bavay. Bavay, the Roman *Bagacum*, was an important hub and became one of the most important urban centres of *Gallia Belgi*ca, with the well-known *cryptoporticus* of its *forum*. External 3rd-century threats resulted in the building of

Figure 7. 1. Roman sculpture in the Musée Château in Boulogne-sur-Mer; 2. Group photo with alderman Claude Couquet at Boulogne-sur-Mer town hall; 3. The sarcophagus of the Lady of Simpelveld explained by Jasper de Bruin; 4. The end. The final group of the XXVth Limes Congress in front of the Taffeh Temple in the entrance hall of the State Museum of Antiquities in Leiden (1 Dorit Engster; 2 City of Boulogne-sur-Mer; 3 Mark Driessen, 4 Tom Hazenberg).

fortifications to secure the city, which were also constructed around the *forum*. Delegates had free access to the *forum* and *cryptoporticus*, which have recently been covered for better protection (fig. 6.3). The objects discovered in the *forum* and the region of *Bagacum* – displayed in the museum – vividly illuminate city life in Roman times (fig. 6.4).

The next stage took the participants to the furthest destination of the 25th International Limes Congress: Boulogne-sur-Mer, the terminus of the Roman army highway and the main port through which the Roman army could cross to *Britannia*. Boulogne-sur-Mer housed a base of the *classis Britannica*, with a port overlooked by a fortress established on the site of the post-Roman fortified town, which retained its layout. In the first decades of the 2nd century a rectangular 12 ha fort was constructed, of which parts are intact in the basement of the Medieval castle, now the Musée Château. Director Elikya Kandot and municipal archaeologist Angélique Démon provided tours through the castle cellars with a unique collection of tombstones, inscriptions of the *Classis Britannica* and architectural elements from the port of *Gesioriacum* (fig. 7.1) This excursion day ended after an informative walk along the medieval city wall with a reception accompanied by alderman Claude Couquet in Boulogne-sur-Mer's stately Hôtel de Ville (fig. 7.2).

On the final day of the post-excursion the group headed back to the Netherlands, ending with a visit to the National Museum of Antiquities in Leiden. Jasper de Bruin, curator of the collection Roman period in the Netherlands, welcomed the assembled guests and showed them around some special objects as the Late-Roman gilded silver cavalry helmet of Deurne, the 'sarcophagus' of the Lady of Simpelveld (fig. 7.3) and the Nehalennia altars (fig. 7.4).

Part 2

FEMINISTS AT THE GATES

FRONTIER RESEARCH BY FEMALE ACADEMICS

Feminists at the gates

Feminist approaches to Roman frontiers

Anna H. Walas and Rebecca H. Jones

Traditionally, Roman frontier archaeology acquired a reputation as a field led by brilliant men. Research by women has broadly tended to focus on topics such as analysis of finds assemblages, study of literary sources, approaches to leisure on the frontier and, more recently, the study of environmental material. Gendered differences in the choice of subjects studied often mirrored the division of roles during the excavation of archaeological sites. Conversely, the voices leading on tackling the 'bigger picture' questions, addressing issues of frontier systems, structural archaeology of frontier installations and tackling chronology and phasing of individual sites has mostly been accomplished by male scholars. The purpose of the 'Feminists' session at the 25th Limes Congress was to provide an opportunity to reflect on the work by female scholars in our discipline.

Finding women on frontiers

It was the work of pioneer female archaeologists in the latter part of the 20th century that led to wider recognition of the presence of women in forts and around the Roman military. In particular, the work of Lindsay Allason-Jones and Carol van Driel-Murray served to highlight an area hitherto largely ignored – the presence of women and children. On one occasion, harking back to a more traditional view, the presence of leather shoes of a variety of shapes and sizes on the Antonine Wall was seen to indicate the presence of a trader's stock rather than wives and children within forts (Keppie 1982, 106). This echoed the sentiments of the original excavators of Bar Hill Roman fort (on the Antonine Wall) in the early 20th century (Macdonald & Park 1906). In much of the anglophone Roman frontier studies scholarship of the period, the extended military communities, and especially their women, were regarded at best as a necessary evil impairing the mobility and security of the armies (MacMullen 1963, 127; Watson 1969, 135).

Yet, women have always been hidden in plain sight on Roman frontiers. Visible on numerous funerary monuments (*e.g.* Carroll 2006) and identified by name on many inscriptions including altars and military diplomas (Greene 2015), they were largely absent from study, perhaps unsurprising when a major research focus was on the excavation of structures and monuments. Did it take women scholars to find Roman women?

It was the work of Victorine von Gonzenbach in the early 1950's which helped recognise the presence of women at *Vindonissa* (Fellmann Brogli & Meyer-Freuler this volume). At *Vindolanda*, the possibility of the presence of families was first raised in passing in the mid-1970's as part of the discussion of the excavation of the *vicus* (Birley 1977), and later (Birley 2000) in the context of the presence of civilians on site. The first sustained treatment of women was Van Driel-Murray's (1995, 1997, 1998)

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investigations of the shoes from the period 3 *praetorium* and the period 4 barrack block that showed quite clearly that women and children were in residence in the fort spaces and caused quite a stir among the establishment of Roman Army Studies. Greene's (2013a) discussion on the presence of women and children in the earliest periods of the site and a discussion of women and non-combatants in the tablets (Greene 2013b) added to the robust picture we have of the women in the *Vindolanda* community. Beyond Europe, work on finding women on frontiers is ongoing, for example through literary and legal texts as well as inscriptions in the context of the provinces of North Africa (Benseddik 2017). In the Near East, work on Dura-Europos (Klaver 2019) has provided insightful results regarding the place of women in the regional provincial society. Yet overall, there is little published work on women in frontier societies outside of European contexts. In the last few decades in Roman frontier studies, there has been a marked increase in the quantity of research produced by female scholars; perhaps there is no surprise that our knowledge of the women surrounding the Roman military has expanded exponentially.

The contribution of theory

The establishment of the Theoretical Roman Archaeology Conference (TRAC) in 1991 in Newcastle has played a major role in the expansion of research by women into Roman archaeology, including Roman frontier studies. Since its inception, advocacy for gender aware research and gender equality in academic praxis were an important concern of TRAC (Scott 1993, 2). Eleanor Scott's reflections on the origins of TRAC, made some 21 years later, included the comment that "back in the day, [it was] frequently possible to be the **only** female speaker at an entire Roman archaeology conference" (Scott 2012, 1). The fact that she reports that this was met with startled laughter just goes to show how far the discipline has come since then. Indeed, the Women's Classical Committee recently published a set of professional guidelines for avoiding 'manels' (all-male panels) at conferences (Women's Classical Committee 2017), signalling a wider recognition of the issue among academic communities.

TRAC has itself played a key role in enabling early career researchers to find their voice, many of these being female. In the context of gender, an important aspect of this is that of having females on the organising committee. Although by the time of Scott's retrospective, parity had not been reached, Scott was right in noting that "we should never underestimate, or overlook, TRAC's achievement in creating an egalitarian vehicle for men and women alike" (Scott 2012, 1). Some five years later, the 'TRACking Diversity' initiative revealed that deliberate efforts to address gender imbalance resulted in the growth of female attendance at TRAC (Lodwick *et al.* 2017; Garland 2021, 6). One of the authors of this paper (Jones) was on the organising committee for the Roman Archaeology Conference (RAC) in Edinburgh in 2018; there was one other woman on that RAC organising committee, Dr Joanne Rowland, a specialist in prehistoric Egypt. It was only when the Edinburgh TRAC committee joined in with joint meetings that gender balance was reached.

This increase in visibility of female researchers has also coincided with an increased interest in gender studies in archaeology. This is part of a wider movement to recognise gender studies as a viable and significant discipline. Although, the road to take up of gender-aware perspectives in theoretical approaches to Roman archaeology has not been easy, as exemplified by Patty Baker's (2003) session at TRAC 2002 (Canterbury) on 'Interdisciplinary approaches to Roman Women' which only attracted two submissions. By the early 2000's, the situation in the wider field of Roman studies was such that there was not much published material on the subject (Baker 2003, 141). The situation was well recognised outside of TRAC circles, with Hill (2001) concluding that women at the time were rarely mentioned or considered as important elements and they generally tended to be overlooked. It is worth noting that against this backdrop across the wider field of Roman studies, Roman frontier work provided some of the pioneering archaeological studies of the presence of women (Van Driel-Murray 1995; 1997; 1998; Allason-Jones 1989, 1999). In the mid-2000's, Allison and Becker broke barriers through a series of works on artefact distribution analyses tackling the question of identifying the presence of women on military sites in Germany (Allison 2006a-b; 2008; Becker 2006), with some of the work presented at Limes Congresses (Allison 2005; 2009). By the 2010's, it was recognised that work on marginalised groups, such as women, was a valid 'sub-field' of Roman archaeology and that the agenda should move beyond 'hammering away' at the fact that women were present on military sites (Allason-Jones 2012, 7).

Studies such as Revell's (2010) feminist critique of Romanization have pushed the envelope further, showing that an appraisal of male bias, and integration of the question of gender, needed to be integrated into the standard narratives of Roman archaeology. This is very much the approach taken by Catherine Teitz in relation to a gender informed re-reading of spaces at Corbridge and *Vindolanda* (Teitz this volume). Teitz transcended the civil-military typology through the application of an urban approach, revealing how the sites adapted to a variety of needs for their inhabitants. Such work is needed further to ensure that gender informed perspectives do not remain a subfield of Roman frontier enquiry, leaving the 'normal' field of study limited to a male gaze. Equally, we must not be tempted to create normative barriers by taking women as the epistemological starting point of enquiry into gender

on the frontiers, as has been well shown by Ivleva's (2020) work on non-normative identities.

So where do we go next? There are many routes forward, but 'feminist curiosity', an approach coined by Enloe (2004) and explored in the context of gender relations on modern military bases (Enloe 2014) seems particularly insightful as it investigates gender as an organising societal principle. After all, the Roman military reproduced an overtly gendered, male social order, which was dependant on the masculinised Roman citizenship and institutionally sanctioned control of violence by men. If, then, the primary aim of Roman military bases was to ensure efficient functioning of the military, achieving this goal depended on the subjugation of women playing social roles of miliary wives, sex workers and female service and goods providers. Enloe (2000, 3) defines militarisation a process by which a person or a thing becomes progressively controlled by the military, or come to depend for their well-being on militaristic ideas. Such persons come to accept military needs and ideologies as normal, which involves institutional, cultural, ideological and economic transformations. The notion of transformation on joining the military in the Roman setting is not new (James 1999), but what if we extended the enquiry to incorporate the impacts of militarised ideologies on women? During fieldwork at RAF Akrotiri, one author (Walas) had the chance to witness militarisation cross cutting the gender spectrum in modern settings, with military stickers and slogans found stuck to step boards on buggies, and regimental pins on children's backpacks. Some questions could include: What patterns of gender relations did Roman military societies produce? How did women's labour underpin frontiers? How did women find their social and economic place in openly militarised environments? A further, lesser explored, but important area is that of the violence-producing practices of the Empire, its militaries, local frontier communities and individuals. Redfern's (2008; 2020) bioarchaeological work is at the vanguard of this enquiry in the context of frontier violence against women. This area is particularly important, as popular representations of Roman women on the Romano-British frontier tend to rest on the evidence of high-status individuals, such as Vindolanda's Sulpicia Lepidina. Yet, her experience did not reflect the dominant realities of being a woman in a frontier society, putting us in danger of reproducing a sanitised and comfortable image of frontier gender relations, which are inaccurate and have little value for raising cross-historical awareness.

Gendered praxis of archaeology

In 2008, in response to the theoretical changes and the question of participation, the Archaeology and Gender Studies in Europe (AGE) Community of the European Association of Archaeologists was established. With an ambitious series of aims, this has articulated a grounding required to ensure gender equity in archaeology. Whilst covering all periods, this is especially the case in the study of the Roman military, frequently previously seen as the preserve of male scholars. A recent publication by AGE looking at gender stereotypes in archaeology explores some of the career inequalities faced by women (Mina 2021).

An illustrative early example of such gender stereotypes in frontier archaeology is presented to us by Baird (2018) through the story of Susan and Clark Hopkins, a married couple who both worked at Dura-Europos. Clark, working for Yale University, was involved in the excavation of Dura-Europos since the second season, and by the fifth season in 1931 became the site director (Baird 2018, 10-11). The fifth season also marks a significant improvement to the quality of recordkeeping on site, with Clark keeping a field diary and Susan (fig. 1), his wife, who was degree trained in Greek and Latin, keeping a detailed finds register whenever she was present on site and keeping an orderly photographic archive. Beyond record keeping, Susan travelled with her husband to Dura-Europos whilst performing several roles, such as cleaning coins, identifying papyri, transcribing inscriptions, cleaning frescoes, compiling catalogues, but also running the staff kitchen.

She accomplished all this whilst looking after the couple's baby daughter, who is frequently pictured in Susan's photographic archive (Baird 2018, 12). Susan would frequently call herself a cataloguer, a job she didn't always enjoy as it tied her to the finds hut and prevented her from being on site (Goldman & Goldman 2011, 206). Neither Susan, nor any of the female archaeologists on the Yale team, were paid for their work, although they provided "absolutely crucial, but unrecognised forms of labour" (Baird 2018, 41). Susan was also little acknowledged in the Dura-Europos publications, until Clark's much later work in the 1970's (Hopkins 1979, 120).

Margaret Crosby (fig. 2) was one such unpaid graduate student who worked on the graffiti (Baird 2018, 43). Unlike male students, she had to pay for her own travel and received no salary in what Hopkins later termed as "an experiment in having a woman in her own right in the camp", meaning not as somebody's wife (Hopkins 1979, 120). Mikhail Rostovtzeff seemed to have been more just. He acknowledges that "she is a fine scholar in her own right", and "though she looks very thin and not very strong, she is very strong and able to stand all sorts of hardships" (Rostovtzeff 1932). Susan is responsible for the most complete and detailed record of artefacts from Dura-Europos that exists to date, whilst Margaret went on to excavate in the Athenian Agora, and later work for US central intelligence, including working as a cryptographer, perhaps influenced by her experience of reading

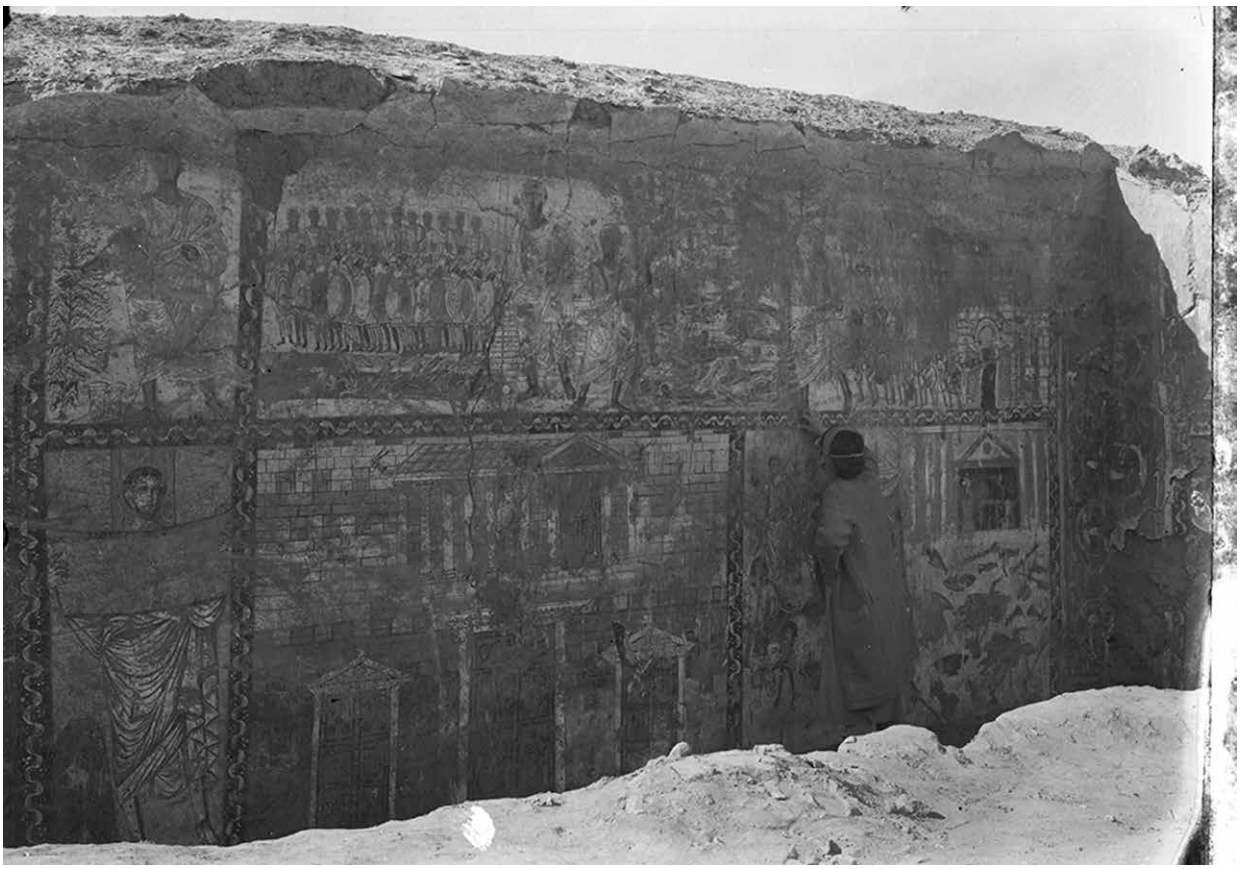

Figure 1. Susan Hopkins cleaning the Dura-Europos synagogue paintings (Yale University Art Gallery, Dura-Europos Collection, negative number dura-fII26~01).

Figure 2. Margaret Crosby at Dura-Europos synagogue Excavation (Yale University Art Gallery, Dura-Europos Collection, negative number dura-fII26~01).

Figure 3. Graffiti art inspired by Vibia Pacata as part of the Rediscovering the Antonine Wall project.

documents excavated at Dura-Europos (Baird 2018, 44), and paralleling the intelligence carriers of the more famous male military scholars, such as Eric Birley. Susan's letters have been published recently, bringing her experience to light (Goldman & Goldman 2011).

The work of Victorine von Gonzenbach at *Vindonissa* has already been mentioned. She also worked with Elisabeth Ettlinger, another pioneer whose research into Roman pottery led to her co-founding the Rei Cretariae Romanae Fautores (Roman pottery studies research group) with Howard Comfort. She later became its President (Fellmann Brogli & Meyer-Freuler this volume; Zabehlicky-Scheffenegger 2013). Elsewhere in the session organised in Nijmegen, Iva Kaić & Mirna Cvetko (this volume) have highlighted the long tradition of significant Roman frontier research in Croatia by women, particularly Danica Pinterovic and Mirjana Sanader (herself the recipient of a well-earned festschrift in 2020, Tončinić *et al*. 2020).

Ancient women

Even a glance at the Roman history and archaeology of Britain reveals significant women. The Boudiccan revolt of AD 60 is well known, together with her destruction of *Camulodunum* (Colchester) and the burning of *Verulamium* (St Albans) and *Londinium* (London). The province of *Britannia* is depicted as a female warrior goddess with a spear and shield on Roman coins, with similarities to the Greek goddess Athena and Roman goddess Minerva (Kseniya Danilochkina this volume). She has become a patriotic symbol of more modern times, with a continuity of appearance on coins (including special editions by the Royal Mint) as well as the statue of the UK annual music ('Brit') awards.

Rachel Pope (2022) has recently argued for the need to recognise the status of matrifocal society in European prehistory. The Iron Age may have seen very different social constructs to the male-dominated system of Rome, yet it is through the patriarchal Roman lens that much of the archaeological record has been interpreted until very recently.

Hiding in plain sight can take the form of women in the epigraphic record. Joanne Ball (this volume) explores their visibility on the Roman frontier in Britain. Anna Mech (this volume) highlights the evidence for women through religious artefacts from *Dalmatia*. One such votive inscription is by Cornelia Tertia to Jupiter Optimus Maximus found in *Aenona* (Nin, Croatia; https://edh.ub.uni-heidelberg.de/edh/inschrift/HD034584; Anna Mech, personal comment).

In Scotland, the Roman fort of Westerwood produced an altar to Silvanus and to Quadruviae (the goddess of the Crossroads), dedicated by Vibia Pacata and her husband Flavius Verecundus, a centurion of the Sixth Legion. Legal and army documents enable us to follow some of her travels through the Roman Empire, potentially stretching from *Pannonia* and North Africa to Scotland (Wright 1968; Birley 1971). Lien Foubert (2013; forthcoming) has studied the travels of Vibia Pacata and other Roman women, looking at the politics of women travellers.

Vibia Pacata is one of the few women recorded on the Antonine Wall and evidence for her has been used to create a 'character' intended to aid with the interpretation of the Wall to a wide audience, part of a 'living wall' approach within the Rediscovering the Antonine Wall project (Weeks 2020) and most recently featuring as a piece of graffiti art (fig. 3).

Emphasising the diversity within the Roman army is vital if we seek to ensure the relevance of Roman frontier heritage to the world in the 21st century. Presenting stories of women in Roman forts increases interest in the subject. Roman heritage has many strong tales to tell of diversity, migration and population mobility, stories which will resonate with many modern communities and present a sense of connection within the present and the past and present an international dimension to local heritage (Jones 2021). Another project through the Rediscovering the Antonine Wall work has sought to engage disadvantaged communities and minority groups, including Syrian refugees, using different approaches including utilising the evidence for Syrian soldiers stationed in the fort on Bar Hill (McMorrow this volume).

Women and the Limes Congress

During research for the History of the International Congress of Roman Frontier Studies (Breeze *et al.* 2022), the authors sought to identify many of the people visible on the early photographs of the Congress. One photograph from the first Congress in 1949 depicted 38 people, nine of whom were women. This is a rather different picture from the Congress proceedings (with the publication of 11 papers, only one of which was by a woman). Rather than dismiss these visible woman as 'wives and other family', seven of the women have been tentatively identified (six confirmed). These include Anne Robertson, the only female speaker at that congress, lecturer and later Professor at Glasgow University. Also Margerie Venables Taylor, Secretary of the Society for the Promotion of Roman Studies (later first female President) and editor of the *Journal of Roman Studies*. She studied at Oxford University but at a time when women weren't awarded degrees. Another woman was Jocelyn Toynbee, who two years later became (the first and only female) Laurence Professor of Classical Archaeology at Cambridge University. A third was the Dutch anthropologist Guda van Giffen-Duyvis. The women identified in the photograph made important contributions to archaeology (Ivleva & Jones 2022).

Additional work by Tatiana Ivleva for the History volume involved analysing the gender of individual presenters at the congress since the Rolduc Congress of 1995 (Breeze *et al.* 2022, 166-167). This has shown a gradual move from a gender proportion of male to female towards 6:3 (an improvement of 7:3 from the earlier ones in this 23 year study). But there are additional biases inherent in these statistics. Firstly, women are less visible as researchers at the limes on certain frontiers (particularly the British, Near Eastern and North African frontiers). This is not to say that there are not plenty of women undertaking research on frontier subjects in these areas, but a notable lack of visibility at the Limes Congresses. She also noted a lack of female speakers on the more military subjects, particularly fort architecture, the army and the purpose of frontiers. The latter was particularly noticeable at the 2018 Congress in *Viminacium* where a debate-style session on the purpose of frontiers featured short presentations by eight men (Breeze *et al.* 2022, 145).

Yet progress is being made. The Roman frontiers research community is renowned for its openness and collegial support. The session on 'Feminists at the Gates. Frontier research by female academics' in Nijmegen was well attended and led to a productive debate. It is to be hoped that this is a sign of more equitable and balanced Congresses to come.

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The (in)visibility of women in stone-cut personal inscriptions from fortresses in Roman Britain

Epigraphic absence, or earlier scholarship bias?

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Until the later 20th century the subject of women in Roman Britain in general was not well-explored. Romano-British scholarship, from its antiquarian origins in the 16th century to the mid-20th century largely failed to engage with the subject of Romano-British women. It has subsequently been acknowledged that women were present in and around Roman military bases in provinces like Britain, and that they were in fact an important part of frontier communities (Allison 2013). However, it is only in the last few decades that the widespread presence of women in these military contexts has been fully recognised, in no small part due to the excellent work done through (gendered) small finds studies. Ostensibly, the earlier failure to recognise the presence of women in ancient history was due to the lack of clearly visible evidence, particularly a lack of inscriptions mentioning female names.

However, it is crucial to determine whether or not women were really epigraphically invisible to earlier scholarship. And if they were not, how are we to account for earlier scholarship's failure to identify their presence, and the marginalisation of women in Romano-British studies from this period? This paper reassesses the frequency of female names in stone-carved inscriptions from three fortresses in Britain – York, Chester, and Caerleon – focusing on 'personal' epigraphy, predominantly funerary (tombstones, cinerary urns, coffins) and votive (altars, religious statue bases) dedications. It reconsiders whether women were actually as 'invisible' as their lack of prominence in earlier scholarship would suggest, observing that female names are actually present on a significant proportion of the inscriptions from these sites which still bear identifiable names. It then considers why, if the epigraphic evidence for the presence of women was clearly visible in the archaeological record, their presence was not commented on by earlier scholars, suggesting that confirmation bias on their part may have played a significant role.

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Gendering Roman inscriptions

On the surface, women appear to have played relatively little role in the epigraphic tradition of Roman Britain. Epigraphy in Roman Britain, and indeed the wider Empire, is seen as a largely military habit, with most surviving examples from the province coming from military sites (Allason-Jones 2012, 470; see also Hope 1997). Of the small fraction of inscriptions from Roman Britain which survive to the modern day, only around 10-15 % can be positively identified as containing at least one female name (Allason-Jones 2005), amounting to a few hundred examples in total. In many cases, the name itself is the full extent of the information about the woman in question, particularly in the case of 'ownership' tags on artefacts such as pots. Between the relatively low absolute number of female names in inscriptions from Britain and the fact that epigraphy was held to be a largely military concern, it was apparently easy for earlier scholarship (16th-earlier 20th century) to miss the evidence pointing to the presence of women in military communities.

Identifying how involved women were in the 'epigraphic habit' more widely in Roman Britain is not the concern of this research, as the focus is instead on how later scholarship processed and interpreted the surviving examples of female-related dedications. Nevertheless, it is worth briefly considering the broader involvement of Romano-British women in epigraphy. As with their male counterparts, the practice of women dedicating personal stone inscriptions appears to have been predominantly, if not exclusively, in the military zones of Britain. Many had direct connections with the Roman army as the wives, daughters, sisters, mothers, aunts, and nieces of soldiers, although there are numerous examples of female inscriptions where no such relationship is mentioned, it is likely that at least some of these women were also connected with the army in some manner. Almost all can likely be safely identified as belonging to the wealthier classes, albeit not necessarily the 'rich' as such, and were evidently sufficiently 'romanised' for this form of permanent commemoration in stone to have a social value that matched its financial cost (Hope 1997, 248-250). Some of the inscriptions, particularly tombstones, are large and elaborate, featuring a lengthy inscription and sometimes even a portrait of the woman mentioned in the text, often a standing portrait or a depiction at a funerary banquet. Others are simpler, limited to the carved inscription with little or no further decoration. In some cases of female-related inscriptions the woman is named, in other cases she remains anonymous, only referred to by her relationship to someone else mentioned in the text (usually a man, often her husband).

The minimal presence of women in the epigraphic record from Roman Britain as a whole is dictated in part by the implied presumption that unless the surviving portion of an inscription specifically contained a female name, it is almost unconsciously expected not to have originally contained one. However, many of the stone-carved inscriptions from Britain, and indeed the Roman Empire more widely, contain only a fraction of the original inscription, with little grounds to suggest that they did not originally contain a female name beyond the circular argument that women were less engaged in the epigraphic process. Yet it is clear from more complete examples that the linguistic formulae used on tombstones and altars did not differ significantly between male and female dedicants/recipients. *E.g.* a soldier's epitaph does not vary depending on whether it was dedicated by his (male) comrades, his heir, or his wife or children. It is therefore in many cases close to impossible to determine from a partial inscription without names what the gender of the individuals originally mentioned were.

Methodology

This paper looks at the stone-cut personal inscriptions from three fortresses in Britain – York, Chester, and Caerleon – discovered at any point up to the beginning of the Second World War. These sites were chosen due to the longevity of their occupation, and the fact that their occupation spanned a period of time which preceded and succeeded the marriage ban on Roman soldiers. The study is limited to inscriptions which survive in sufficiently complete state to be able to say with reasonable security whether they originally contained a female name or not. The aim of setting this limit was to ensure that inscriptions mentioning women were compared on a like-by-like basis with those mentioning only male names, excluding fragments for which it was not possible to assign a gender either way. Efforts have been made not to overestimate the number of female-related inscriptions. In cases where a tombstone can be independently dated to the 1st-2nd century AD it is assumed that soldier tombstones will not mention a wife, despite the evidence for illegitimate military marriages prior to legalisation, and it is assumed that any unnamed 'heir' is male, despite the legal possibility that they could have been a woman. In the absence of a name, dedicants of votive altars offered to predominantly male-associated gods (*e.g.* Mars) have also been assumed to be male.

York

Eboracum (York) is the most northmost of the fortresses examined in this research. Founded *c.* AD 71, the fortress was occupied by the *IX Hispana* and *VI Victrix* legions, with military occupation likely until at least the later 4th century AD. Of the inscriptions found in York prior to 1939, 46 survive in sufficient condition to satisfy the parameters of this research, an assemblage comprising 17 votives (all altars) and 29 funerary dedications (23 tombstones, 5 coffins, 1 cinerary urn).

Five votives found in York have been excluded as they do not sufficiently identify the gender of the dedicant, often referred to simply as 'I'. Two further tombstone fragments have also been excluded as they similarly lack a clear indication of the gender(s) involved due to their fragmented condition. Of these 46 total examples, 20 inscriptions contain one or more female names/ references to a female relative.

Only one of the 17 altars is associated with a female name: an altar to Fortuna dedicated by Sosia Juncina, identified as the wife of Quintus Antonius Isauricus, the imperial (legionary) legate (RIB 644). By contrast, 19 of the 29 funerary inscriptions contain a female name (14 tombstones, 4 coffins, 1 urn, RIB 670, 676-677, 682-696 and 705). Two of these inscriptions contain two female names, one refers to a named women and her unnamed infant daughter, while in another an unnamed mother dedicates to her named daughter. Four dedications were made by women to the dead, 16 to women as the dead, with one example with a female as both dedicant and deceased; in one case, the surviving text is not sufficient to tell. Every funerary inscription from York which refers to a woman does so by name, with one possible exception (693), where a fragmented tombstone part contains a reference to a 'wife' who was likely named on the lost upper part of the monument. A range of familial relationships are recorded in the funerary inscriptions containing female names, including husband to wife (3), father to daughter (3), husband to wife and daughter (2), wife to husband (2), father and mother to daughter (1), mother to ungendered child (1), freedman to the former wife of his master (1), and heir to patron (1); in five examples, the relationship between the dedicant and deceased is not mentioned. Three inscriptions explicitly mention the relationship of the women to a soldier, one a husband to his wife, one a father to his daughter, and one both to wife and daughter. Five of the tombstones contain depictions of the female(s) commemorated, including three funerary dining scenes (682 and 688-689), one standing portrait of four-person family (685; the deceased woman, two deceased children, and surviving husband), and one standing portrait of a woman and child (686).

Chester

A different picture emerges in the inscriptions from *Deva Victrix* (Chester), a fortress founded in the AD 70's by *Legio II Adiutrix* and occupied until at least the 4th century by *Legio XX Valeria Victrix*. The data sample from Chester is over twice that of York, comprising a total of 109 inscriptions which fit the parameters of the research, comprising 14 votive dedications (12 altars, 1 statue base, 1 plaque; one further example (RIB 456) has been excluded from the dataset as it gives no clues to the gender of the dedicant.), and 95 funerary inscriptions (all tombstones). From this assemblage 13 inscriptions include a female name or identifier.

None of the 14 votive dedications from Chester can be associated with a woman, either by name or relationship. Of the 95 funerary inscriptions from Chester, 13 can be associated with women (RIB 491, 505, 507, 526, 543, 554 and 562-568). Most are dedications to or by a single female, except for one example which is dedicated to two young girls by their parents (566). This is the only female-to-female dedication from this site, from an unnamed mother to the two named daughters, Restita and Martia. In total five dedications were made by women, and there are a further eight dedications to deceased females (the Restita and Martia example has both). In two cases (567 and 568) a female has been identified as the recipient in the absence of accompanying text on the basis that a woman is shown in an accompanying funerary portrait. In one case (543) it is impossible to determine who the dedicant was. In ten of the examples it can be definitively stated that the woman was originally named, and in a further two examples (567-568) where the woman was almost certainly originally named, but this section has subsequently broken away. Only one example (526) contains a reference to an anonymous woman, in this instance the wife of the deceased. As at York, a range of familial relationships are recorded in these tombstones, including wife to husband (3), husband to wife (1), parents to daughters (1), a female heir to a man (1), an ungendered heir to a woman (1); in six cases, there is insufficient evidence to determine the dedicant. Three of the inscriptions note the relationship of the woman to a soldier (505, 507 and 526), two of which are dedications by a wife to her soldier/veteran husband, and one from a serving soldier to his wife. Eight of the tombstones contain a depiction of the female referred to on the tombstone, with six funerary banquets (562-563 and 565-568) and two standing portraits (543 and 564), both of these alongside a male figure, likely the husband named in each example.

Caerleon

Like both York and Chester, the fortress at Caerleon was first established in the AD 70's, and occupied until at least the later 3rd century AD, and possibly later. It was the base of *Legio II Augusta* during that period. The data sample of personal inscriptions from the site numbers 29, including ten votives (all altars) and 19 funerary dedications (all tombstones). Of these inscriptions, 16 contain a reference to a female name or other identifier.

One of the ten votive altars from Caerleon was jointly dedicated by a woman, Julia Belismicus, and her husband to the deities Bonus Eventus and Fortuna (RIB 318). The altar bears a standing image of the two deities on either side of a small altar, holding items associated with their worship; the image may also have been intended to represent Julia Belismicus and her husband.

A total of 15 tombstone inscriptions from Caerleon cite at least one female name (RIB 356, 358-361, 363, 369, 371-377 and 382). All are dedicated to or by a single woman, with the exception of one (369) which is dedicated by a woman to her mother and brother jointly. In two cases women are both the dedicator and recipient; one from a daughter, Tadia Exuperata, to her mother, Tadia Vallaunius (369), and another dedicated by Flavia Flavina to her 16-year-old daughter, Julia Iberna (377). Overall eight of the tombstones contain dedications from women, while nine contain dedications to women, with two inscriptions containing references to both (367 and 377). A female name is mentioned on 12 of the tombstones, with only three excluding the name of the woman (356, 359 and 361). In all three of these examples the woman is the dedicant rather than recipient, and each unnamed female was the wife of the man being commemorated; one of whom was a serving soldier, and the other two being veterans. It is unclear why, as the individuals involved in commissioning the tombstones, the women chose or allowed their names to be left off the inscription. Based on the other examples from the site it was not necessarily common practice to do so. The relationships recorded between the dedicators and recipients include wife to husband (6), husband and son(s) to a wife and mother (2), husband to wife (1), daughter to mother and brother (1), son to mother (1), and mother to daughter (1), with three examples where the relationship is unknown. Six of the inscriptions directly connect the woman mentioned to a serving or veteran soldier (356, 358-361 and 363), each time as a wife, while another (373) can be associated with the army due to an earlier inscription dedicated by the woman to her veteran husband. A further example (369) can probably be associated with the army due to a reference to a 'German expedition' mentioned in the context of the death of the brother being commemorated by his sister. None of the tombstones from Caerleon bear the image of a woman, making them generally simpler in form than those from York or Chester; this is also true of the non-female examples from the site.

Discussion

The personal inscriptions from the three fortresses suggest some interesting insights into the archaeological visibility of women in the Romano-British epigraphic record. In total, 49 eligible inscriptions from these sites contain at least one female name, from a total assemblage of 184 examples, meaning that overall 26 % of the inscriptions were either dedicated to or by a woman. Although the prominence of women in the epigraphic record does vary across the sites, it is clear that overall they are certainly visible in the epigraphic archaeology.

A total of 20 of the 46 eligible inscriptions from York contain at least one female name, 43 % of the total from this period. Females are poorly represented among votive dedications, with only one coming from a woman, representing only 5 % of the excavated total, although the woman in question is the dedicant of the altar in her own right. However, in terms of funerary dedications the picture is significantly different, with 19 inscriptions from a total of 29 mentioning a female name or unnamed female, 65 % of the total funerary dedications. In four cases, or 26 % of examples, the woman is named as the dedicant of the funerary inscription. Across the inscriptions from the site as a whole, women are named dedicants in 13 % of the total, the high proportion within the funerary descriptions impacted by the near absence of women in votive dedications. Women thus emerge as prominent figures in the epigraphic record from York, particularly in funerary inscriptions, where they are not just found as the subjects of male-commissioned offerings, but as dedicants in their own right.

However, the assemblage of female-related inscriptions from Chester is significantly smaller both numerically and proportionally to that from York. Just 13 of the 109 eligible inscriptions mention a female in any way, just under 12 % of the total assemblage from the site. Women are particularly poorly represented among religious dedications, with no examples recovered from the site. Among the 95 funerary dedications, the 13 examples which refer to a woman represent just under 14 % of the total from the site, around statistically average for the province as a whole. Of these 13 examples, five are dedicated by women, representing 38 % of the total that refer to females, a greater proportion than seen at York. However, across the assemblage from the site as a whole, female dedications represent just 4 % of the total, much lower than seen at York. However, Chester is the find-spot for some of the most ornate female-associated tombstones, with over half (53 %) bearing a portrait of the women cited in the text: six funerary banquet scenes (all dedicated to women) and one full-length standing portrait (dedicated by a woman to her husband, pictured alongside her). The frequency of the funerary banquet tombstones from Chester likely reflects the presence of a workshop in the settlement dedicated to producing this kind of funerary monument (Hope 1997, 254; there was also a similar workshop at York, from where several similar examples of funerary banquet tombstones have been excavated; see Mattern 1989 for discussion.). Although less female-related inscriptions have been recovered from this site than the others, those which do survive attest to a level of wealth not so clearly demonstrated at the other sites.

Although Caerleon presents the smallest dataset in absolute terms, it is in many ways the most intriguing; 16 of the 29 eligible inscriptions from the site include a female name or identifier, which at 55 % of the total assemblage is the largest proportion from any of the three fortresses

studied. While only one of the ten votive dedications from the site mentions a woman (10 %), 15 of the 19 tombstones contain reference to a female dedicator or recipient, meaning just under 79 % of the funerary inscriptions from Caerleon were either dedicated by or to a woman. Within the funerary assemblage, eight contain a dedication by a woman, over half the total, while 60 % contain a dedication to a woman (allowing for two examples which contain both female dedicants and recipients). Including the altar, there are 9 inscriptions from Caerleon which mention a female dedicant, representing 31 % of the entire assemblage from the site. As at York, the overall prominence of women in the assemblage as a whole is impacted by the general absence of women in the context of votive altars. However, in contrast to the assemblage found at Chester none of the female-related tombstones from Caerleon carry an image of the deceased.

In the surviving epigraphic assemblages across all three sites, women are clearly more associated with funerary inscriptions than votive dedications, with just two altars associated with a female recovered across all three sites. By contrast, there are 47 funerary dedications made by or to women, mostly tombstones (with the exception of three coffins and one cinerary urn from York). The 47 funerary inscriptions mentioning females represent nearly a third of the total assemblage of 143 such dedications from these three sites. Although there is significant variation across the sites, comparison across all three demonstrates the general and perhaps surprising frequency with which female names appear in surviving inscriptions. Most of the dedications are by or to individual women, suggesting that these were not co-dedications made on a woman's behalf by a male relative, and 19 of them (13 %) were dedicated by women, representing 40 % of the entire female-related epigraphic assemblage. Where women were the recipients of funerary dedications, they were largely made by husbands and children, although in several cases it is not clear who the dedication was made by. In the majority of cases the woman is named in an inscription, and there are just four instances of an anonymous 'wife'. On some examples, the name of the female cited is not known because the portion of the text containing it has not survived, but it was clearly once there. Although the women in these inscriptions lived within the military communities of the fortresses, the relationships between them and the soldiers is not explicit in all the inscriptions.

A total of 12 inscriptions mention a connection to a serving or veteran soldier, in most cases as a wife, but also on several occasions as a daughter. However, the majority of female-citing inscriptions from these sites do not refer to a relative in the Roman army. Although this does not necessarily mean that no such connection existed – women not married to a soldier might still have been a daughter, sister, or even mother to one – but that it was not made explicit in the text, perhaps especially in the 1st-2nd century when military marriage proscriptions made such unions 'illegal' (Hope 1997, 256). There is clear variety in the research sample regarding the depiction of women on tombstones, with a far higher occurrence at Chester than the other two sites, despite the low number overall of women appearing in the inscriptions from this site. However, it is clear that women were not just named on tombstones from Roman Britain, but were also pictured on them. Hope (1997, 251-256) demonstrates that across Roman Britain as a whole women were regularly depicted on tombstones, particularly in funerary banquet scenes, as well as standing/sitting portraits, generally outnumbering male depictions of the same (with the obvious exclusion of cavalry portraits), and argues that the higher number of female tombstone portraits from the province cannot be explained away by the 'chance' of archaeological survival.

This re-examination of votive and funerary inscriptions from fortresses aims to assess whether or not women were relatively marginal figures in the epigraphic record (as has been proposed by antiquarians and archaeologists prior to the mid-20th century) once inscriptions which could not be conclusively gendered either way were excluded from consideration. The research clearly demonstrates that women were in reality prominent amongst burial inscriptions, as both dedicants and recipients. So why was this not recognised in earlier scholarship?

A case of confirmation bias?

One potential reason that the prominence of woman in the epigraphic record of Roman Britain was not recognised by earlier scholars is their own cultural backgrounds and attitudes, reflecting the place of women more generally in their own societies. The period from the 16th century through to the Second World War was not one in which women generally had much power or influence, and thus their involvement in archaeological scholarship was often minimal. Women, in these times, were present but less socially visible than their male counterparts, and generally not active in many aspects of public life. There was therefore likely to have been an implicit belief that women in Roman Britain served a similarly invisible role thereby putting scholars at risk of missing evidence to the contrary through the process of confirmation bias.

In confirmation bias, an individual "selectively gathers, or gives undue weight to, evidence that supports one's position while neglecting to gather, or discounting, evidence that would tell against it", leading to "unwitting selectivity in the acquisition and use of evidence" (Nickerson 1998, 175). It is not always a conscious selection, but one which nonetheless reflects the social context of the person affected, they see only what they expect to see. In the case of women in the epigraphic record of Roman Britain, earlier male scholars may not have expected

to find females featuring prominently in inscriptions, and as a result, may not have seen them even when the evidence was clearly in front of them, as it did not fit their pre-existing conceptions about the role of women in a society. The idea that a significant number of women would have enjoyed and exercised the agency required to create inscriptions, particularly in the complete absence of males, may have been inconceivable. The lack of women working in the field of Romano-British studies at this time may have exacerbated the situation, although it is difficult to know for certain if they would have been able to see what their male counterparts could not.

Fortunately, as the demographics of scholarship have shifted in recent decades, so too have attitudes towards the study of women in Roman Britain. As more women have entered the field of Romano-British studies, their scholarship has contributed significantly to the recognition of the presence of women in Roman Britain, and reconstructing their lives. Re-evaluation of the epigraphic evidence demonstrates that women were prominent, influential, and integral figures in the creation of personal monuments, particularly tombstones. These Romano-British women were never invisible, but only now are they being fully seen.

Abbreviation

RIB: *Roman Inscriptions of Britain*

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Fathers and daughters, mothers and sons

The presence of women on the Dacian Limes

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Far from trying to bring to light any new evidence regarding the marriage of Roman soldiers, this paper provides a glimpse at the attitude of and towards the women connected to the army in *Dacia*. Some debate was stirred in the past few years regarding the accessibility of women and other civilians within forts (Vass 2010; Teodor & Nicolae 2013). Statistics were drawn in order to prove the existence of military families and their commemorative patterns (Varga 2016), but little was said about the overall attitude seeping through what can be interpreted at first as a mere performance of duty. Since the discussion regarding the marriage of Roman soldiers does not need any new evidence today (Phang 2001), it is safe to move the discussion towards a more in depth look at the sentiments circulating among family members and, particularly, at how women related to soldiers were remembered for posterity.

What first strikes from these snapshots into familial lives is that women's existence is secondary to men. Their entire life is marked by events related to their status as daughter, wife, mother and widow and, by extension, their relation to men (Parkin 2011, 280). Although it is impossible to assess how genuine any of the feelings expressed in these commemorations and praises were, it is undeniable that Roman men and women aspired to loving and caring relationships (Dixon 2011, 257), not only between husband and wife, but among the extended family as well.

As opposed to elite women, who managed to make a name for themselves, ordinary women lived in the shadow of their husbands, fathers and brothers, and were praised and appreciated for their domestic virtues: chastity, obedience and piety. Presence of women is best seen in funerary inscriptions, where only their prominent roles of mothers, wives, sisters and daughters are represented. However, some honorary inscriptions discovered in *Dacia* are the exception to the rule, being not only fewer, but also the only times that a woman is praised for something other than being a caretaker.

In order to best exemplify this, some inscriptions were chosen from various locations on the Dacian limes, strongly connected with either active soldiers or veterans. Further on, depending on the general touch of the texts, they were divided into three categories, which best reflect the sentiments expressed among the family.

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Respectful commemoration

Army men performed their duties and commemorated their wives and female kin. Sons commemorating mothers or brothers commemorating sisters appear less frequent,

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since these situations would only appear when the *pater familias* had passed away and his son remained the sole authority of the family (Kelley 2012, 17). Below one can observe this particular situation (IDR III/2 432, *Ulpia Traiana Sarmizegetusa*):

D(is) M(anibus)
MARIA SECUN-
DINA
VIX(it) AN(nos) LIII
[et?] AURELIA SATUR-
NINA VIX(it) ANN(is)
XVIII
AUREL(ius) INGENUUS
MIL(es) LEG(ionis) XIII G(eminae)
ANTONINIANAE
MATRI ET SO-
RORI POSUIT

The feeling of kinship obligation resonates the strongest from this text where the reader is offered only minimal information regarding the deceased. While a tragic situation for a man who, it can be assumed, lost his entire family, no notion of grief is reflected from the text of the epitaph and the women are reduced to their name, age and position inside the family. Wives are lauded in simple terms for their dutiful qualities; married women are valued mostly for their chastity and obedience, as proved by the extensively used variants of *coniugi benemerenti* (IDR II 44 from *Drobeta* (Drobeta-Turnu Severin); ILD 714 from *Porolissum*; IDR III/2 425 from *Ulpia Traiana Sarmizegetusa*) or *pientissimae* (ILD 444 from Brâncoveneşti). Since *pietas* is ordinarily a reciprocal feeling of both affection and obligation among the members of a family (Saller 1988, 399), one can only speculate regarding the actual sentiments these people nurtured towards one another, as the formulaic praise is widely similar.

It is usually lack of means that leads to somewhat 'moderate' displays of affection, with the text comprising the name, relation and an epithet to indicate how well-thought-of the person was. Women are usually listed first in an inscription only when they were deceased, but not even this is a rule with no exception. To some degree a rigid sense of duty penetrates this display of affection, particularly when the dedicator turns a commemoration for a deceased wife into a personal life story. Although his position in the army was an important part of the soldier's identity (Speidel 2014, 326), this behavior casts a shadow on the actual main character of the dedication, as can be seen in an inscription from *Sucidava* (Izvoarele, IDR II 204):

D(is) M(anibus)
C(aius) CRISPINUS
C(ai) FIL(ius) CLAUDIA (tribu)
FIRMUS ASPE-
NDO V(eteranus) LE(gionis) I IT(alicae)
AURELIAE SE-
VERAE CO(n)I-
UGI V(ixit) AN(nis) XXVI
ET NEPOTIBU-
S AUR(elio) PRIM-
ILLAE S(uis) BEN(e)
ME(rentibus) POS(uit)

In IDR III/5-2 612, from *Apulum* (Alba Iulia), below, the attention is once again turned away from the deceased towards the husband, who Ulpia Victorina was 'most obedient' to. The age of her death is not included, but the man's position in the military is.

[d(is)] MANIBUS
ULP(iae) VICTORINAE OMNI
OBSEQUI[io] MAR[it]ali
C(aius) IUL(ius) IUL[ianus] [a] M[i]LIT(iis)
MARITUS [et iulia] URSULA
FI[lia]

On both inscriptions the information provided would have been relevant for their identity, yet the social position of the husband prevailed by being put into the spotlight.

Affection

Included in this section are those inscriptions that overcome the rigidity of duty and exude tenderness more than obligation. Although the quality of an epitaph depends not only on the legitimacy of the feelings expressed, but also on the financial means of the dedicator, a separation can be drawn between kinship obligation and fondness. Husband-to-wife dedications are, of course, common, but they usually betray a feeling of austere appreciation towards an obedient wife, as the typical expression *coniugi benemerenti* reveals more of a statement than a praise. Two beautiful exceptions are the dedications made by Marcus Ulpius Marteialis (IDR III/2 391 from *Ulpia Traiana Sarmizegetusa*) and Lucius Valerius Rufus (IDR III/3 259 from Beriu) to their wives:

D(is) M(anibus)
AURELIAE
DONATAE
VIX(it) ANN(is) LV
M(arcus) ULPIUS
MARTEIALIS
VET(eranus) ET DEC(urio) COL(oniae)
SARM(izegetusae) METR(opolis)
CONIUGI
RARISSIMAE

[d(is) m(anibus)]
[- – -]ttia C[ara?] VIX(it)
[anni]S XXVIII [- – - – -]
[? Ge]MINIAN[us vet(eranus)]
[ex – -] LEG(ionis) XIII [Gem(inae)]
[lib? Et] CONI[ugi]
[caris]SIMAE P[(ro) p(ietate)]
[po]SUIT

The rather unconventional term used by Marcus Ulpius Marteialis surrounds the dedication in an aura of mystery, as the qualities that make Aurelia Donata 'the rarest of wives' are not laid out for the reader to know, while [- – -]ttia C[ara] is not only called 'dearest wife', but her dedication is also made as a 'gesture of piety' from her husband. In any case, their domestic virtues do not appear in the foreground, but rather *coniux* is merely used here as an indicator of the relation.

Maecius Domitius (IDR II 36 from *Drobeta* (Drobeta-Turnu Severin)), a *centurio* of *legio V Macedonica* goes a step further in the tribute paid to his deceased wife, with an almost uxorious attitude seeping through, proving once more that obligation and affection can intermingle (Saller 1994, 98):

D(is) M(anibus)
[f]LAVIAE
[va]LENTI
[n]AE SIRM(io)
[vi]X(it) ANN(os) XL
[d(ies)] XVII CONI(ugi)
[ca]RISS(imae) ET PI
[e]NTISS(imae) ET DIG
[ni]SS(imae) OB PRIN
[ci]PIUM CAS
[t]ITATIS
[M]AECIUS DO
[m]ITIUS (centurio) LEG(ionis)
V MAC(edonicae)

A woman much appreciated was Valeria Maximilla (ILD 511 from *Potaissa* (Turda)), whose epitaph united her entire family in commemoration:

D(is) M(anibus)
VALERIA MAXIMIL-
LA VIX(it) AN(nos) XXIX M(enses) VII
VAL(erius) MAXIMUS VET(eranus)
EX [7?] PATER ET VALER(i)A
MARCELL[in]A MATER
FIL(iae) PIENTISSIMAE ET
P. AEL(ius) TERTIUS VET(eranus) EX DEC(urione)
CONIUGI OPTIMAE
ET PIE(n)TISSIMAE
ET TERENTIUS ET VALERIA
MAXIMIANUS FIL(ius)
MATRI CARISSIMAE
FEC(it)

The dedication above proves once again that, in a world where other spheres of activity were largely inaccessible to them, women would throw themselves into the role of domestic matron as best they could. This is reflected in their commemorations: lacking other achievements, they will forever be remembered for the care shown for their husbands, parents and children. Wives commemorate husbands more often. According to Varga (2016, graph 1), out of 106 epitaphs from *Dacia*, 11.30 % are dedications made by wives for their soldier husbands, while only 6.60 % are dedications from soldiers to wives. This pattern is simply because they married younger and, therefore, outlived their husband. Since family and social structures are very well established in the Roman world, it is also understandable why presence of women is only traceable, while men are easily visible. This way, military careers are used as a means of social promotion, leading to a blend between a woman's identity and that of her soldier husband, as seen in IDR II 41 from *Drobeta* (Drobeta-Turnu Severin):

D(is) M(anibus)
C. IUL(ius) MELCI-
DIANUS VET(eranus)
[e]X B(ene)F(iciario) CO(n)S(ularis) LEG(ionis)
[v] <<m>>AC(edonicae) VIX(it) AN(nos) LX
<<u>>LP(ia) MARCEL-
[l]INA CONIU[gi]
PIENT(issimo)
B(ene)M(erenti) P(osuit)

Even when they are commemorating their soldier husbands, these women speak of themselves in the same terms of good wives to equally good husbands. The terms of endearment used are the same, and their maritorious attitude is best seen in epitaphs where they highlight their own devotion. In an example from *Apulum* (Alba Iulia, IDR III/5-2 558), the dedicator chose to present herself with an assumed dutiful, but also affectionate attitude towards the deceased, whom she considers well-deserving:

D(is) M(anibus)
MUCASENU-
S CE(n)SORINI
{a}EQUES EX SIN-
GUL(ari) CO(n)S(ularis) VI-
XIT ANNIS XX
RESCUTURME
SOI(a)E CO(n)IUX
PIENTISSIMA
POSUIT
B(ene) M(erenti)

Praising

Too often one encounters honorary inscriptions for men rather than for women, and the Dacian Limes is no exception, with only two such inscriptions to women known. The first example is the altar through which Titus Aurelius Emeritus honors his mother-in-law (IDR III/2 127 from *Ulpia Traiana Sarmizegetusa*):

[v]ALE[ri]AE
L(uci) FIL[iae]
FRON[tin]AE
STOL[ata]E
[t(itus) a]UREL(ius) EMERI-
[tu]S (centurio) L[eg(ionis)] VI
[v]ICTRIC(is) SE[v]ERI-
ANAE S[o]CRUI
DIGNISS[im]AE
L(oco) D(ato) [d(ecreto) d(ecurionum)]

We see here a *centurio* who, surprisingly enough, does not include his wife in the dedication made *socrui dignissimae*. However, it is a fine example where the woman is not deceased, yet she is the main character in the dedication. In an honorary inscription, usually the most important part is the one in which the deserving deeds are being laid out for the whole community to see, so as to attribute a specificity to that particular text and to encourage other such deeds from other influential members of the community. What is noticeable is that there are no traditional epithets used here, such as those referring to domestic qualities of the woman. Neither is Valeria Frontina associated with some other deserving member of her family, except for the dedicator. In fact, the term *dignissima*, with which she is described, is usually associated with a patron, who was in the majority of cases a man and who was particularly financially generous towards the community (Forbis 1990, 501). Therefore, it can be assumed that this is what Valeria Frontina was honored for, especially if we keep in mind that there was no social pressure on women to get involved in the goings on of their community (Mohler 1932, 117).

PUBLIAE AELI-
AE IULIANAE
MARCELLAE S(plendidissimae) P(uellae)
FIL(iae) P(ublii) AEL(ii) IULIANI
EQ(uitis) R(omani) FLAM(inis) ET IIVI-
RAL(is) COL(oniae) APUL(ensis) ET AD-
OPTIV(a)E P(ublii) AEL(ii) MAR-
CELLI V(iri) E(gregii) EX PR
AEF(ecto) LEGG(ionum) VII CL(audiae)
ET I ADIUT(ricis) DADES
ET FILETUS ACTOR(es)

Publia Aelia Iuliana Marcella is honored as *splendidissima puella* in the above honorary inscription (IDR III/5-2 441 from *Apulum* (Alba Iulia). While the inscription is dedicated to her solely, it does not mention any of her merits. Her 'merit' might actually be her filiation: she was the daughter of a man of equestrian rank and the adoptive daughter of another man of the same rank, who was also *ex praefectus* of two legions. Two things strike here. First is that these women were not praised with the usual epithets that pointed towards their 'domestic' virtues. Second is that their merits were not fully spelled out. Therefore, the reason why they were praised could simply be their connection to a senatorial or equestrian family. This seems to be valid in the second case, where the term *puella* indicates that Publia Aelia Iuliana Marcella was only a child.

Conclusions

There are no patterns regarding dedications, but one certain thing that can be observed about these women is that they lived in the shadow of the army men in their family. Although we know very little about them now, their affectionate love for their family is what stands out most from their commemorations. They were mostly engaged in their family life and it would appear that their persona was centered around their domestic roles. Epitaphs are usually considered some of the most valuable sources for understanding life expectancy, social and family relations and life course in general. Presence of women is best seen in these inscriptions, where their roles as mothers, wives, sisters and daughters were represented and understood. These women seemed to live a simple life, their domestic virtues being the most valuable. Out of all types of inscriptions, epitaphs are the best source of information concerning military families. Besides the structure of the family, the attitude of and towards these women can be understood through these commemorations, where not only what was said about them matters, but also what was omitted. And since women had less opportunities for a career, their role in society fused with their position inside the family, of which they seemed to be very much aware.

Abbreviations

IDR II: Pippidi & Russu 1977
IDR III/2: Pippidi & Russu 1980
IDR III/3: Pippidi & Russu 1984
IDR III/5-2: Piso 2001
ILD: Petolescu 2005

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Britannia Romana

Ambiguous image of a province

Kseniya S. Danilochkina

Ancient authors who wrote about the province of *Britannia* made its image ambivalent. The purpose of this paper is to consider how this image was reflected in ancient literature, what kind of influence made this dualism possible and what the dualism influenced on in its turn. Speaking about the image, we will keep in mind the reconstruction of stable stereotypes and recurring motifs that were given to the province by both Roman authors and masters who created certain images on various items (coins, small objects *etc*.).

Britannia Barbarica

Among the most significant ideas that formed the basis of the image of the province was the perception of it as a country of so-called wild barbarians. Such an attitude can be traced in various examples relating to the period preceding the conquests, or right after the establishment of Roman power. According to such ideas, people who inhabited unknown lands were represented in a way that differed as much as possible from everything precepted to be common. And this idea of unknown was often accompanied by a set of qualities, among which we may see ignorance and savagery (A huge amount of scientific literature is devoted to the discussion of this issue in its specifics, and we will see references to this otherness from the time of the texts of Herodotus. This very otherness was the indicator that defined the group. And at the same time, it served to define the culture to which the author of the text belonged. That is, considering what was 'wrong', he thereby pointed out the characteristic features familiar to his own culture. See Jensen 2018; François 1988; Hall 2000; Milnor 2002). By this, Romans who thought of themselves as of the cultural ones probably understood the differences in how everyday life was arranged, the cult sphere, *etc*. In general, this can be understood as an indicator that we have a description of otherness, that is, barbarism. Moreover, in some moments, even condescension can be noted in it.

For example, Cicero (*Epistulae ad Atticum* 4.17.6), writhing about the Britts in one of his letters to Atticus, doubts the education of the inhabitants of the island, thereby emphasizing the obvious superiority of the Romans to him. "*Etiam illud iam cognitum est neque argenti scripulum esse ullum in illa insula neque ullam spem praedae nisi ex mancipiis. Ex quibus nullos puto te litteris aut musicis eruditos exspectare*." (Besides, it is already known that there is not a *scripulum* (gram) of silver on this island, nor even a hope of profit, except to get slaves; [but] I think you should not expect that any of them are educated or into music). Despite Cicero's scepticism, almost at the same time Caesar in his notes presented his victories in Britain as something extraordinary and deserving of all honours. He not only turned out to be the discoverer of the

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island for the Romans, but also described his invasions with undisguised pride, although the outcome of his campaigns, as many noted, was not overly successful. This attitude to his own victories distinguishes the entire text and style of the *Commentarii de Bello Gallico* (4.20), in which Caesar considered military intervention necessary and linked it to the political situation. Since he believed that it was from the island that reinforcements for the Gauls on the mainland came. "*Tamen in Britanniam proficisci contendit, quod omnibus fere Gallicis bellis hostibus nostris inde subministrata auxilia intellegebat*." (But he decided to go to Britain, because he understood that almost in every campaign help had been sent from there to Gaul.) In order to strengthen his position and also as a decoration for the text with unusual details, Caesar also writes about what Britain was like, becoming, thanks to this, those who create the first image of the Britts. Moreover, it is easier to trust his descriptions due to the fact that the passage about the island is not a retelling of someone's stories, but a completely independent view of what happened there. But at the same time this story is ambivalent. Caesar pursues his own goals, describing Britain exactly as it seems to him most correct. It is represented as a wild and dense country in which old customs reigned, and their perception was not without prejudice. The strangest of them, for example, war paint and incestuous marriages, he (5.14) mentioned as a demonstration of the morals of the island inhabitants. "*Omnes vero se Britanni vitro inficiunt, quod caeruleum efficit colorem, atque hoc horridiores sunt in pugna aspect*." (But all the Britts covered themselves with woad, which makes the color blue, so that they were more hideous in appearance in battle.) Such a description of the way of life was supposed to demonstrate the underdevelopment of the island in comparison with the Roman culture, so this description takes the form of a representation of the contrast of two cultures with benefits for Rome.

In addition to the texts of Caesar himself, his meeting with the Britts was also captured by Strabo (Geographica 2.5.8). "*ἣ πρὸς ἄρκτον πρόκειται τῆς Βρεττανικῆς πλησίον, ἀγρίων τελέως ἀνθρώπων καὶ κακῶς οἰκούντων διὰ ψῦχος, ὥστ᾽ ἐνταῦθα νομίζω τὸ πέρας εἶναι θετέον*". ([*Ierna*], which is located north of Britain, the habitat of wild peoples who have become such because of living conditions, in my opinion should be considered the limit of [the world]). He connected the obvious (for him) savagery of the Britts with the geographical position that they occupy. This location of the island, the status of the penultimate stronghold of life before the very edge of the *orbis terrarum*, makes all the inhabitants of this place wild, which corresponded to the ideas about the structure of the *ecumene* in antiquity as a whole. And in this context, we can also recall Virgil, who even in the *Georgica* (1.30) wrote about the conquest of the extreme [island] of Fula, '*ultima Thule*' (extreme *Thule*) implying thereby the conquest of the whole world. And since the Romans did not find lands further than these islands, Britain remained this limit. But an important fact was that the standard of living changed with the arrival of the Romans, and therefore the attitude towards these lands, which after the conquest became part of the Empire, albeit one of the most remote and marginal, had to change.

Even a few centuries after the conquest, Britain did not completely get rid of this image. In this case, we are talking about an event that occurred in 367 that was called *Barbarica conspiratio* (Frend 1992). The most important thing to note here is the fact that the conspiracy was called barbaric, since it was primarily associated with representatives of communities living outside the wall, that is, outside the Roman Empire. Such an epithet should have immediately indicated the nature of the conspiracy and at the same time made it clear that this phenomenon is peculiar to savages and occurred from the outside. That is why those who participated in it, despite their belonging to the Roman province at least geographically, changed their characteristics and also became barbarians (in the meaning of the word with a negative assessment). That is, participation in the *conspiratio* made them external enemies who opposed Rome by uniting with tribes located abroad. Thus, Britain, having become a province, could still be barbaric within itself, but unlike the first century of conquest, this was rather an extraordinary event.

Similar 'barbaric' characteristics were possessed, of course, not only by the Britts, but also by other peoples and tribes that the Romans encountered. So, Britain became just one of such examples. Depicted as barbaric and savage, it was part of the entire Roman tradition of historiography of remote lands. This approach is the evidence of how the tradition as a whole treated descriptions of the unknown, of what did not belong to the Greco-Roman culture. All the above evidence suggests the presence of pre-known expectations, as well as the constant repetition of those epithets that ancient authors could use in descriptions applicable to the Britts, but it was this 'barbaric' trait and community that formed the basis of their image.

Individual characters

The formation of the image was also strongly influenced by characters that were created based on real people of the province, especially those who had power (Cunliffe 2004, Mattingly 2011, Grahame 1998). Such heroes made it possible to create personalized representations, since such humanization made it possible to endow the province with those characteristics that could then be attributed to the entire island of Britain.

As part of the report, it is difficult to take into account all the cases, so this paper will focus on the two most striking ones. The first one is the image of Calgacus, the warrior, who became a part of history thanks to the speech presented in Tacitus (*Agricola* 29). "*Cum inter pluris duces virtute et genere praestans nomine Calgacus apud contractam multitudinem proelium poscentem in hunc modum locutus fertur…*" (When, as they say, one of the leaders, distinguished by valor and origin, named Calgacus, so addressed the crowd preparing for battle…). In that speech it is possible to see a reconstruction of how the historian presented the Britts to his readers. Despite this, it should be said that when writing this passage, Tacitus' goal was not only to show the Britts, but also to present Agricola's opponent in a such a way, so that each of the details of the description could and should have served for a more complete and improved depiction of the character or actions of the governor. Given this fact, we can still identify some features and traits that are important for the image of Britain. Calgacus was described as one of the numerous British leaders, but his speech contains a description of those qualities that from the Tacitus' point of view were considered as necessary for the Britts: love of freedom, valour and with them he highlighted their zealous insubordination. Thus, it is a portrait of the members of the community who did not consider themselves residents of the Empire and sought independence, a special way for the island, separate from Rome, despite internal contradictions. And this is also evident from the words of Calgacus, who hoped for the possibility of uniting against the invaders. The main motive of his speech is the resistance to Roman slavery and the struggle for the liberation of the island despite all the failures, therefore, to pronounce such words, Tacitus chose a certain person who would best represent the views of his fellow tribesmen similar in origin and worldview.

The second character is Boudicca. The story of the uprising under her leadership was most fully reflected in several ancient sources. In the narrative of Tacitus and Cassius Dio, she appeared to readers as a strong and brave woman, who at the same time remained a savage in the eyes of the authors, and therefore the Romans. And for the Romans, for example, her status as a female ruler testified to barbaric customs too. In this regard, Boudicca can be perceived as a kind of Amazon, and they, as is known, also possessed a certain image in ancient literature (for more information about the role of Amazons in culture and history, see Blok 1995; Davis-Kimball 1997; Mayor 2014, *etc*. For more about Boudica see Hingley & Unwin 2006). In this, among other things, one can see the reason why her image turned out to be so vivid and continued to exist not only within the framework of Roman culture, but up until now.

In the way of describing historical characters, we see a reflection of the image of the entire province, which was not homogeneous, despite the first impression. The various communities and tribes that inhabited the island both before the arrival of the Romans and after the conquest did not become a single and consistent group, because at different moments in the history of Britain we see both: those who actively resisted power from the outside, and those who used the support of Rome, becoming their ally. At the same time, in the features of individual figures described by ancient authors, we see how they were seen in Rome. Indications of external features or striking character traits were supposed to distinguish them from the Romans, while in some aspects, mainly military, the barbarians turned out to be almost equal to those Roman men who, by their status, should have shown the best qualities.

Animalistic representations and coins

Among the images that became symbols of the island, it is worth mentioning the animalistic representations and those specific details that also represented the internal division of Britain. To a greater extent, images of animals can be seen on images, figurines or jewelry, for example, brooches. We can recall that in the 4th century AD, Claudian, a Roman poet, wrote about Britain (Coombe 2018). Not quite Roman, but about the part that was not conquered, which was represented by *Caledonia* at that moment. In the work 'On the Consulate of Stilicho' (Claudius Claudianus *De Consulatu Stilichonis* 2.247-249) he writes about the island as a character similar to a ferocious predator. The text mentions the skin of the Caledonian bear, which presents to the listener a terrible and wild image of a bear, which Britain demonstrated as a trophy, since this skin was part of the clothes worn by the hero. "*Inde Caledonio velata Britannia monstro ferro picta genas, cuius vestigia verrit caerulus Oceanique aestum mentitur amictus*." (Then [spoke] *Britannia*, covered with the skin of the Caledonian beast, with cheeks painted with iron (tattooed), whose blue robe sweeps the tracks pretending to be a wave of the Ocean.) By itself, the image of a man dressed in fur and also with tattooed cheeks seemed unusual and uncharacteristic for Rome, but this is exactly the poetic representation of the island. The feminine gender of the word, which represents *Britannia*, not only does not soften this situation and description, but even more distinguishes it from the image of a real Roman, *vir bonus* (Brinton 1983). Despite the fact that this is now the image of the part that remained beyond the control of Rome, we see a perception in which it is more profitable, including for outlandish descriptions, to use not the conquered Britain, but the one that still aspired to freedom and independence.

The importance of bears for the Britts can also be noted also by examples of the features from some burials. In a recent study, Nina Crummy (2010, 74-77)

pointed out the importance of figures depicting a bear in the graves of children. They were discovered during excavations near *Camulodunum* (Colchester), as well as in some other places. After studying and comparing the features of the cult with the finds, the researcher suggested that they served as amulets for those children who went to the afterlife, since the image of the bear was also associated with the image of a nursing mother or a mother goddess whose help was needed by the buried.

Finally, Britain owes another famous image to the Roman numismatic tradition. And it is in this form of sources that Britain appears to us in the form of a woman (Mattingly & Sydenham, 1926, 412, no. 577a; 1930, 121, no. 744, *etc*.). But undoubtedly, the iconography of the image in the numismatic collection of Roman times deserves a separate study. Nevertheless, it should be noted that it is the images from the coins that are most known.

Conclusions

The image of Roman Britain was not built up at once, but for a long time, and moreover, it continues. Thus, the island, developing along its own path, turned out to be embedded in the Roman world. From the point of view of the British population, this period can be called a period of struggle for their own land and with it for the selfhood, which underwent significant changes with the advent of Roman power and culture. Gradual integration turned the exclusively Celtic-British world into a Romano-British world, created an image not just of Britain, but of Roman Britain as one of the provinces, which, having common features with all others, also had its own peculiarities.

The Britts themselves were not a homogeneous mass but divided into various groups, among which were those who sought to fit into the Roman world (mainly local nobility), those who resisted, preferring to remain free. However, it should be noted that at the same time there was a significant part of the island, in particular, the rural population, which continued to live without changing the way of life. Being representatives of a more traditional society, they followed the everyday or sacred customs of their ancestors, and therefore represented a special stratum of the population. However, it was their image that ancient authors left almost without attention, as a result of which it is difficult to fit representatives of this group into the image that literature has created.

Almost all ancient authors described the islands as barbaric, wild and uncultured, which was typical for the period when the descriptions of the opponents of Rome were based on the contrast of the developed Roman culture in the centre and the alien and backward world on the periphery. At the same time, it is typical for descriptions of Britain to demonstrate this savagery as noble, since from the point of view of the conquerors, the local tribes seemed to be a worthy rival. The annexation of the island as a province opened a new stage in the development of the image, when it gradually became its own from an alien, rebelled, resisted, but then obeyed. In addition, a fairly large part of the story is occupied by female characters, who had to face during the capture and attempts to subdue a new province. Even the personified image of Britain turned out to be feminine, while at the same time militant.

The image of Britain as a woman could also leave an imprint on perception, since women in the culture of antiquity and antiquity as a whole embodied duality. They were the guardians of the hearth and the family, but at the same time they were the 'inevitable evil', which Hesiod wrote about when telling the myth of Pandora. Moreover, this is possible not only because of the grammatical gender of the word, but also because of the images that we see on coins or epithets and metaphors that the authors used when describing it. So, the dual and more archaic way of representing women echoes the way the province appears.

Dividing the island by walls into parts, the Romans created new *Britannia*, one that fit into the Empire and became one of its parts, and the one that remained outside the sphere of influence of Rome, which means that in their eyes it received the features that the island as a whole was previously endowed with. Thus, the dual Britain – wild, but having the status of a worthy opponent, friendly in some aspects, but resisting – has remained an unexplored part of the world, but still Roman.

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Figure 1. Left: The council members of the Gesellschaft Pro Vindonissa 1912 in front of the Vindonissa-Museum. Right: The caretaker, probably in the 1930's, in front of the Vindonissa-Museum (Kantonsarchäologie Aargau / Gesellschaft Pro Vindonissa, Brugg).

A snapshot of two pioneering female archaeologists in Switzerland

Elisabeth Ettlinger and Victorine von Gonzenbach in *Vindonissa* around 1950

Regine Fellmann Brogli and
Christine Meyer-Freuler

In contrast to other countries, only a small amount of research has been carried on women as archaeologists in Switzerland. In the last few years, we have been trying to fill this gap. In doing so, we have started to realize how important it is to look at both men and women as professionals in order to fully understand the development of the state of research in Provincial Roman Archaeology. For this undertaking, *Vindonissa*, the only fortress in present-day Switzerland makes for a good point of departure, as systematic archaeological research started here as early as 1897.

In the following we would like to present two female pioneers both active at this site around 1950: Elisabeth Ettlinger and Victorine von Gonzenbach. Furthermore, we will address the following questions: How did these women get into contact with *Vindonissa*? What were their special interests? How did they shape the scientific discourse? And finally, were they able to pursue their own research agenda which in turn may have been informed by their own female perspective?

Vindonissa. A short look at its history of research between 1897 and 1935

The fortress of *Vindonissa* was built around 14/17 AD and was occupied by three successive legions (*Legio XIII*, *XXI* and *XI*). *Legio XI* left *Vindonissa* in 101 AD and the fortress was abandoned (Trumm 2015). Scientific interest in the site started in the late 18th century. In 1897 the antiquarian society 'Antiquarische Gesellschaft von Brugg und Umgebung' was founded by a group of local men, all amateurs who worked full-time as a teacher, priest, instruction officer or director of the local psychiatric clinic. Samuel Heuberger (1854-1929), Theodor Eckinger (1864-1936), Victor Jahn (1865-1936), Conrad Fels (1855-1936) and Leopold Frölich (1860-1933) immediately started with systematic excavations in *Vindonissa*. In 1906 they changed the name of the society to 'Gesellschaft Pro

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Figure 2. Elisabeth Lachmann (later Elisabeth Ettlinger) as a student in 1936 in *Vindonissa* together with the excavation crew (Kantonsarchäologie Aargau / Gesellschaft Pro Vindonissa, Brugg).

Vindonissa'. The increasing amounts of finds, coming from the excavations, led to the construction of the Vindonissa-Museum in Brugg (CH), which was inaugurated in 1912 (Fellmann Brogli & Wertenschlag 2009, 97-102). During this period, women were only active in the background, as the caretaker of the Vindonissa-Museum, as the wife of the guard of the amphitheater of *Vindonissa*, or as a patron, like Countess Wilhelmina von Hallwyl (1844-1930) from Stockholm (fig. 1).

In Switzerland, it wasn't until the 1930's when women began to emerge as researchers in their own right. One of the earliest examples was Maria Renate Berger (1908-1993). Berger was a student of Hans Dragendorff (1870-1941), professor at the University of Freiburg in Germany and it was on his advice that Berger was to work on the *terra nigra* from *Vindonissa*. The Gesellschaft Pro Vindonissa, however, was interested in a more comprehensive study of the pottery of *Vindonissa*. For this reason, Maria Renate Berger's doctoral thesis was never published, and she subsequently disappeared from scientific memory. (Her unpublished thesis is available in the library of the Institut für Archäologische Wissenschaften, Abteilung für Provinzialrömische Archäologie, Albert-Ludwigs-Universität, Freiburg (D). Information kindly provided by J. Trumm, Kantonsarchäologie Aargau / A. Heising, Universität Freiburg).

Elisabeth Ettlinger's path to *Vindonissa*

In contrast to the case above, Elisabeth Ettlinger (1915-2012) left a substantial legacy and is one of the few Swiss researchers who is mentioned in publications concerning female archaeologists (Rogger 2016, 190-194). In 1936, still as a student, she catalogued the finds from a large-scale excavation in *Vindonissa* (fig. 2). This was only possible with the help of Rudolf Laur-Belart (1898-1972), who had been president of the Gesellschaft Pro Vindonissa since 1936, professor at the University of Basel since 1941 and was thus one of the main protagonists of Provincial Roman Archaeology in Switzerland up until 1970.

Ettlinger (née Lachmann) was German of Jewish ancestry and had begun to study Art History, Ancient History and Classical Archaeology in Zürich in 1934. After 1938, her assets were blocked and then later confiscated. Her German citizenship was also revoked.

Despite this perilous situation, as she could have been deported at any time as a stateless person, she continued to study at the University of Basel with Ernst Pfuhl (1876-1940), finishing her doctoral thesis in 1942. 'Die Keramik der Augster Thermen' was finally published in 1949 (Ettlinger 1949). In 1951 she was finally given Swiss citizenship along with her husband Leopold Ettlinger (1914-2008) and her two sons.

Victorine von Gonzenbach's path to *Vindonissa*

Victorine von Gonzenbach's journey to *Vindonissa* was quite different. Being Swiss and the daughter of a professor of medicine at the Swiss Federal Institute of Technology (ETH) in Zurich, she studied Classical Archaeology, Prehistory and Ancient History at the University of Zurich. In 1946 she graduated with a doctoral thesis in prehistory under Emil Vogt (1909-1974), professor at the University of Zurich (Von Gonzenbach 1949). In 1947 she got into contact with Laur-Belart as his temporary assistant in Basel.

Two years later, in 1949, when Christoph Simonett (1906-1981), curator at the Vindonissa-Museum in Brugg was given leave of absence, Von Gonzenbach was contacted by Laur-Belart to fill the vacant position. She was not Laur-Belart's first choice, because he simply did not believe a woman would be able to manage all the tasks required, especially the excavations. However, since no male colleague could be found at the time and as Von Gonzenbach had been recommended to Laur-Belart, the choice fell to her. She quickly got started in *Vindonissa* and, despite initial reservations, Laur-Belart allowed her in her first year to direct a large emergency excavation in *Vindonissa* comprising of 40 Late Roman/Early Medieval graves (Von Gonzenbach 1949/1950). The excavation gave her the opportunity to apply her methodological excavation expertise in which she had been trained in during an excavation of a Bronze Age settlement at Cazis (CH) directed by Vogt.

Von Gonzenbach was not a specialist in Provincial Roman Archaeology and had only little practice in the field when she started work in *Vindonissa*. She had however solid basic knowledge at her disposal thanks to her studies in Classical Archaeology and Ancient History. Once she had realized that she was second choice for the curator's position in *Vindonissa*, she fought with great commitment for acceptance and recognition (fig. 3).

Figure 3. Victorine von Gonzenbach in the Vindonissa-Museum around 1950 (private collection).

A joint excavation project and the end of Von Gonzenbach's employment in *Vindonissa*

The next step was for Laur-Belart and the exclusively male board of the Gesellschaft Pro Vindonissa to put Von Gonzenbach in charge of the stratigraphic excavation of the so-called 'Schutthügel', the large rubbish dump of *Vindonissa* in 1950. Together with Ettlinger, who was in charge of the pottery, and another young German colleague, Elisabeth Schmid (1912-1994), who was charged with sedimentological analyses, the three female researchers were able to test new excavation methods and present interdisciplinary results. This was undoubtedly new at the time. The results were published jointly in three preliminary reports (Ettlinger & Von Gonzenbach 1950/1951; 1951/1952; 1955/1956). A final report, however, never appeared (fig. 4).

At the end of 1951, the Gesellschaft Pro Vindonissa had engaged a male colleague as a new curator. We do not know whether Von Gonzenbach was not interested in the permanent position or whether she was not offered the job. However, she did remain friendly with Laur-Belart, the Gesellschaft Pro Vindonissa and especially with Ettlinger. To mark her birthday in 1991, Von Gonzenbach was honored by the Gesellschaft Pro Vindonissa with an anthology of several of her published articles on *Vindonissa* (Von Gonzenbach 1991). This was most definitely initiated by her friend Elisabeth Ettlinger, as she had been president of the Gesellschaft Pro Vindonissa since 1970.

Figure 4. Victorine von Gonzenbach around 1950 excavating at the 'Schutthügel' in *Vindonissa* (private collection).

Roman pottery. Ettlinger's special interest

Let us now turn to the question concerning the fields of interest of both female scientists and the projects they were pursuing in *Vindonissa* around 1950. After the Second World War, the excavations in *Vindonissa* were interrupted, mainly for financial reasons. The scientific undertakings of the Gesellschaft pro Vindonissa concentrated on its upcoming 50th anniversary in 1947. Various activities were planned to mark the occasion, such as the publication of a museum guidebook.

Another important project was the publication of the pottery of the 'Schutthügel' of *Vindonissa*, which had been started by Simonett in the 1930's. It had been somewhat fortuitous that Laur-Belart was able to recruit Ettlinger for this project in 1946, all the more so as she had agreed to 'continue the work in her spare time' due to her obligations as a mother, resulting in a very low income. Using the typological order of the pottery as a point of departure, she established a framework for dating the 'Schutthügel' that was new for the time using statistical methods and distribution maps. Thanks to her previous work on the pottery from *Augusta Raurica*, she noticed that in the case of the Roman Army the supply flow of goods was quite different. With sure instinct, she highlighted the special

Figure 5. Elisabeth Ettlinger in 1952 in her home in Zurich (private collection P. Ettlinger).

characteristics of the so-called pottery of *Legio XI*, a topic which is still controversially discussed today (fig. 5).

With the two publications 'Die Keramik der Augster Thermen' published in 1949 (Ettlinger 1949), and 'Römische Keramik aus dem Schutthügel von Vindonissa', published in 1952 (Ettlinger & Simonett 1952), Ettlinger became an outstanding specialist in Roman pottery due to her new methodological approaches. She soon attracted wide recognition in Switzerland and abroad due to her fundamental research on Italic Sigillata and the foundation of the Rei Cretariae Romanae Fautores together with the Classical Archaeologist and Philologist Howard Comfort (1904-1993) in Brugg in 1957, just after the 3rd Limes Congress in Rheinfelden and Basel (CH). As early as 1956 she was elected a full member of the German Archaeological Institute (DAI). In 1977, in honour of her 60th birthday, all of her published essays were united in a volume of the Fautores Acta (Berger *et al*. 1977).

Roman hairpins and the question of women and the Roman army. Von Gonzenbach's special interest

Von Gonzenbach was particularly interested in small finds and selected a group of figuratively decorated hairpins from *Vindonissa* for her first material study (Von Gonzenbach 1950/1951). While discussing these objects Von Gonzenbach was very much aware of the questions regarding the presence of women in *Vindonissa*. Might we therefore assume, that she had, as one of the earliest researchers, a female perspective on this topic? To answer this question, we first must look at how the question of 'women and the Roman army' was discussed in *Vindonissa* up to 1950. The scope of this paper does not allow for too detailed a discussion, but we can acknowledge that there was a very interesting discussion taking place. During previous excavations of the 'Schutthügel', various objects

had been recovered pointing to the presence of women within the fortress (for the current state of research on this topic see Trumm & Fellmann Brogli 2008).

In 1922, a bronze plaque with the inscription *Marti v*(otum) *s*(olvit) *l*(ibens) *m*(erito) / *Fidelis Frontonis liberta* (for Mars, Fidelis, freedwoman of Fronto, has gladly fulfilled the vow) was identified (Eckinger 1922). Oskar Bohn (1853-1927) concluded that Fidelis was a freedwoman of a soldier but must have resided outside the fortress (Bohn 1926, 1-2). In 1928, a writing tablet with the inscription *dabis Belic*(a)*e* / *con*{*c*}*t*{*o*}*ra balneu*(m) (give (this letter) to Belica, opposite the baths) came to light. Laur-Belart believed that Belica, as a woman could only have lived outside the fortress and the bath mentioned on the writing tablet must therefore be looked for *extra muros* (Laur-Belart 1929, 182). Only shortly afterwards, after having identified the legionary baths in the centre of the fortress in 1929/1930, Laur-Belart changed his opinion. He now thought of the possibility of soldiers being allowed to have female slaves within the fortress (Laur-Belart 1931, 232). In 1942 the question of the presence of women and children in the fortress resurfaced when a couple of women's and children's shoes were discovered in the 'Schutthügel' (Gansser-Burckhardt 1942, 67).

In 1947 Simonett (37, 61 and 69) summarized the then-prevailing opinion in the new guidebook to the Vindonissa-Museum. He admitted that Belica must have been living within the fortress, but for him her presence was absolute exception. He also mentioned the women's and children's shoes without going into detail of what this could mean for the fortress. Finally, he interpreted the hairpins, themselves decorated with miniature women's heads as love gifts for soldiers. Against this background, it seems quite possible that Von Gonzenbach's article on hairpins may be understood as a reaction against Simonett's opinions. She was the first to point out that the presence of women in a fortress is a distinct possibility, at least temporarily, and that this question must be discussed in a larger context.

Ettlinger and Von Gonzenbach. Factors for a successful career

Both Ettlinger and Von Gonzenbach made profitable use of the opportunities offered to them by their engagement in *Vindonissa*. It is particularly noteworthy that Ettlinger and Von Gonzenbach were entrusted with excavations. However, this was only possible because they were supported by male archaeologists in key positions, such as Laur-Belart and Vogt, despite their initial reservations. Ettlinger and Von Gonzenbach realized that they had to make themselves visible with publications. In Switzerland, where voting rights for women were not introduced until 1971 and the perception of gender roles changed only slowly, it was anything but a matter of course for women to pursue an academic career. For Ettlinger, who in 1946 was already a mother of two sons, this would hardly have been possible without the support of her husband Leopold, a professor of microbiology at the Swiss Federal Institute of Technology (ETH) in Zürich. Von Gonzenbach was a single woman during her time in *Vindonissa* and therefore depended on earning a living. She fought repeatedly for increases in salary, while Ettlinger, as a married woman, received a very modest remuneration for her engagement.

This paper has aimed to call attention to some aspects of the careers of two outstanding personalities: Elisabeth Ettlinger and Victorine von Gonzenbach. However, this discussion must take place without diminishing the work and achievements of their contemporary male colleagues, as well as acknowledging the underlying conditions surrounding them – as is still the case today.

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Female archaeologists and Roman military research in Croatia

Iva Kaić and Mirna Cvetko

The development of archaeology in the 19th century and during the first half of the 20th century is tied to field research primarily led by male archaeologists (Conkey 2003, 868). Female archaeologists were not expected to participate in nor lead the archaeological excavations but instead were encouraged to study the archaeological finds or museum artifacts (Conkey 2003, 868-869). Starting from this initial idea that the beginnings of limes field research in Croatia were in the domain of male archaeologists, our study actually showed quite the opposite, the major impact on the limes field research in Croatia has come from female archaeologists. Therefore, the aim of this paper is to show to what extent and in which ways female archaeologists shaped our present-day knowledge about the Roman army in Croatia through their field research of Roman military sites and the study of Roman military equipment as well.

The territory of today's Croatia in the Roman period was a part of the Roman provinces of *Pannonia* and *Dalmatia*, with the region of Istria being a part of the Tenth Italic region. The continental part of Croatia, or today's Slavonia region, was a part of the Danube Limes, while in *Dalmatia* two fortresses of *Tilurium* and *Burnum*, together with several auxiliary forts formed the so-called Delmataean Limes. Very early on prominent archaeologists were interested in possible locations of these sites, especially of those mentioned in the ancient literary sources, which referred to the Octavian wars in *Illyricum* and the later *Bellum Batonianum* (for the general state of research on the Roman army in Croatia, see: Zaninović 2015; Vukmanić 2018; Radman-Livaja 2022, 31-60, note 1). Continuous interest in the Roman military sites in Croatia was mainly expressed in the study of epigraphic monuments connected with the Roman army. But, apart from the several early dated archaeological excavations of the potential Roman military sites, systematic archaeological excavations of these sites sadly lacked. For example, at the end of the 19th century, excavations were carried out in Muć (possible *Andetrium*), while the fortress *Burnum* was excavated in 1912 and 1913 (for excavations at Muć see Mirnik 2010, for excavations at *Burnum* in 1912-1913 see Zabehlicky *et al*. 1979).

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Female archaeologists and field research in Croatia from the second half of the 20th century until today

The 5th international Limes Congress (fig. 1), held in 1961 in several cities of the former Yugoslavia, played a decisive role in initiating the study of the Danube Limes in Croatia (Novak 1963). *Quintus congressus internationalis limitis romani studiosum* was held in

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Figure 1. Danica Pinterović holding a lecture at the 5th international Limes Congress in 1961 (taken from Kovač 2018b, 71, fig. 6).

September 1961 in Celje, Ptuj, Varaždinske Toplice, Zagreb, Osijek, Novi Sad, Sremska Mitrovica and Belgrade. Fifty years earlier, in 1911 to be exact, professor Viktor Hoffiler (1911) published the book 'Equipment of the Roman Soldier in the First Age of the Empire (Oprema rimskoga vojnika u prvo doba carstva)', which for many years remained a reference work for finds of Roman military equipment from Croatia.

A year later, in 1962, an Interacademic Committee for the Research of Limes in Yugoslavia was established. The goal of this Committee was to conduct, promote and coordinate scientific research on limes in the former Yugoslavia. Within the framework of that program, all research of the Croatian section of limes was led by the then already retired director of the Museum of Slavonia in Osijek, Danica Pinterović (Kovač 2018a, 39-40; Vukmanić 2018, 78). It is interesting to mention that in 1970 D. Pinterović, who was already seventy years old at the time, visited sites along the Rhine and Danube Limes as a result of the scholarships she received. As a curator she devoted most of her scientific work to the research of ancient Mursa, a Roman colony which is believed to have been part of the Danube Limes. Her most significant contribution was the publication of the book 'Mursa and its area in ancient times (Mursa i njeno područje u antičko doba)', even today the most frequently cited work in scientific papers about the Roman Mursa (see Pinterović 1978). However, as the head of the Interacademic Committee for the Research of Limes in Yugoslavia, she also devoted herself to the study of the sites on the Danube Limes. She remained in that position until 1978 (see Kovač 2018b, 70-71; Vukmanić 2018, 78). She dealt with Roman sites along the Danube, on the stretch from Batina to Ilok, and by analyzing the archaeological finds, she placed the sites of Lower Pannonia in a wider context. This led to the archaeological excavations on Gradac hill in Batina in 1970 in collaboration with the Smithsonian Institute and various prominent researchers from Yugoslavia and abroad (for more details about her research on limes with a list of a bibliography, see Vukmanić 2018, 77-89).

Limes continued to be researched mainly through cabinet work and the occasional publication of random small finds. Rare field surveys carried out due to the need for protective research were forwarded to the Office for Protection and unfortunately, most of them remained unpublished. The reports from the archaeological field surveys as well as those from the rescue excavations are kept in the archives of the Regional Institute for the Protection of Cultural Monuments in Osijek (Koprolčec *et al.* 2018, 91-98). Systematic archaeological excavations were not carried out, which is why we still do not have information about the architecture of the Roman forts along the Danube. For this reason, discussions about the Croatian part of the Danube Limes are based on data from ancient itineraries (*Tabula Peutingeriana*; *Itinerarium Antonini*; *Notitia Dignitatum*). However, we should note that some of the sites listed in those itineraries have not yet been confirmed in the field, so we are still not sure where exactly for example *Aureus Mons*, *Albanum*, *Donatianae* and *Ad Labores* were located. On the other hand, Roman military finds have been recorded on several sites (Dragojlov brijeg, Lug, Kopačevo, Sarvaš, Aljmaš, *etc.*) that could not have been connected to the Roman forts mentioned by ancient literary sources (Pinterović 1968, 55-82; 1969, 53-69; Sanader 2003b, 464).

Figure 2. Mirjana Sanader at Bratislava Group workshop in Koblenz, 2003 (the second one from the right).

Archaeologist Kornelija Minichreiter worked from 1970 to 1992 at the Regional Institute for the Protection of Cultural Monuments in Osijek. In that position, she was in charge of the documentation of the archaeological cultural monuments of Slavonia, Baranja and western Srijem, which means also the sites on the Danube Limes. During that period, she carried out several field surveys on the limes route, including protective research in 1987 on the site of Kneževi vinogradi (Minichreiter 1988, 55-57; 1989, 102-103). On the route of the Danube Limes, there is also the site of Zmajevac with a Late Antique necropolis that was successfully researched from 1999 to 2008 by Slavica Filipović, curator of the Arch aeological museum in Osijek (Filipović 2010). In 2009 and 2010, Daria Ložnjak Dizdar and Mirela Hutinec conducted field survey of Sotin, the former area of the auxiliary fort of *Cornacum*, which they regularly reported on (Hutinec & Ložnjak Dizdar 2010; Ložnjak Dizdar & Hutinec 2014, 9-13).

The turning point in the study of the Roman military, Roman borders and the limes in Croatia took place in the early 1990's when Mirjana Sanader started her academic career at the Department of Archaeology of the Faculty of Humanities and Social Sciences in Zagreb. After matriculation at the classical high school in Split, studies of classical archaeology and history of art at the Leopold-Franzens-Universität in Innsbruck, and promotion at the Institut für Klassische Archäologie with her doctoral dissertation Kerberos in der Antike, Sanader began a successful academic career at the Department of Archaeology of the Faculty of Philosophy at the University of Zagreb. During her working life, she dealt with various problems and topics of Roman Provincial and Early Christian Archaeology. She is the author of more than fifteen independent books (and several more with her collaborators), as well as almost three hundred articles (for her full bibliography see Kaić 2020a, 13-30).

In 1997, she began the systematic archaeological excavations of the Roman fortress *Tilurium*, which directed her research work towards military and border issues (after her retirement in 2019, Domagoj Tončinić became director of the excavations at *Tilurium*). Due to a large number of published texts, we divided her own contribution to the research of Danube and Delmataean Limes, as well as to general issues of the Roman military, into three groups. First related to her excavations of the fortress *Tilurium*; second related to her participation at the Limes Congresses, and the third related to her active role at the project The Frontiers of the Roman Empire (fig. 2).

The first bibliographic group, which is the most numerous, is comprised of papers related to the archaeological excavations of the Roman fortress *Tilurium*. This former military encirclement today is located under the houses and fields of the village of Gardun near the town of Trilj, which is about 30 km from *Salona*, the former capital of the province of *Dalmatia*. The archaeological research project *Tilurium* was started in 1997 by Sanader. *Tilurium* was a site where there had been no archaeological excavations before, so all knowledge about it was based on stray finds. Until then, it attracted the interest of experts mainly thanks to the numerous

tombstones of soldiers of *Legio VII* (Tončinić 2011). For this reason, from the first research season in 1997, it came into the focus of interested experts, because it turned out that the site is of exceptional importance, both for national and international archaeology. During the twenty-year excavations of *Tilurium*, Sanader, independently and with collaborators, regularly published preliminary reports, and in five-year intervals, books with the results of archaeological research as well as analyzes of all small finds (Sanader 2003a; Sanader *et al.* 2014; 2017; 2021). Regular publications as well as the constant dissemination of the results, of course, required the diligent cabinet work of a large number of collaborators, among whom there were several female archaeologists. Ultimately, that research team produced not only a large number of scientific papers and lectures at international conferences, but also a series of doctoral theses based on the findings from *Tilurium*. Here we would like to mention Zrinka Šimić-Kanaet, Iva Kaić, Vinka Matijević and Mirna Cvetko from the University of Zagreb, as well as museum advisors Sanja Ivčević and Zrinka Buljević from Archaeological Museum in Split as archaeologists who specialized in the analysis of ceramic, stone, glass, metal and other small finds from military sites. They participate both in archaeological excavations of *Tilurium* and in analysis of the small finds from *Tilurium*, either excavated or being part of various museum collections (selected bibliography: Buljević 2003; 2014; 2017; 2021; Šimić-Kanaet 2003; 2010; 2017, 2021; Kaić 2010; 2014; 2015; 2018; 2020b; Ivčević 2014; 2017; 2021; Vukov 2018; 2020a; 2020b; Šimić-Kanaet & Matijević 2020; 2021; Tončinić & Cvetko 2021a-b). Ina Miloglav contributed with her skills to the development of the methodology of archaeological research not only in *Tilurium* and the Croatian part of the Danube Limes, but also on other sites, which she regularly reported on at the Scientific Conference Methodology & Archaeometry, established in 2013.

Nothing on this scale would have been possible without the financial support regularly insured by Sanader from three sources. She expertly and well-foundedly designed projects related to the topic of research, which then enjoyed support from the Ministry of Science, and on the other hand, from the Ministry of Culture. The third source was the local community, *i.e.* the town of Trilj, which participated in financial support from the very beginning. In addition, the city of Trilj, in cooperation with the Ministry of Culture, supported her idea and helped to realize the project of establishing a museum, which then housed archaeological finds from *Tilurium*. Today, museum has grown into a living center of cultural events in the city of Trilj and its surroundings and has become an indispensable address in the cultural and tourist offer.

Furthermore, it is worth mentioning that in 2010, Sanader organized the Roman Military Equipment Conference in Zagreb, together with her colleagues, and was one of the editors of the conference proceedings, which was published in 2013 (Sanader *et al.* 2013).

Legio VII is a legion that remained the longest period in *Tilurium*, until the second half of the 1st century when it moved to *Viminacium* in Upper Moesia. This encouraged Sanader to initiate the cooperation between the researchers of *Tilurium* and *Viminacium*. This cooperation was also supported by the scientific research project 'Monuments of the VII. legion in the provinces of Dalmatia and Moesia'.

The research of the fortress that Sanader conducted for more than twenty years led to regular participation at the renowed Limes Congress, and the papers she published in the Proceedings of the Limes Congress were placed in the second bibliographic group of works dealing with the topics of the Roman army and the borders of the Empire. All papers she published in the proceedings either present, analyze or problematize the material remains of the fortresses *Tilurium* and *Burnum* (Sanader 2002; 2009; 2015; 2017; Sanader & Tončinić 2005). Already at the 18th International Congress in 2000 in Amman, and the first Limes Congress in which she participated, she drew attention to the narrative of the Delmataean Limes, which, according to some researchers, stretched between the only two Dalmatian fortresses, *Burnum* and *Tilurium* (Sanader 2002). About twenty years later, determined to finally solve the problem of the Delmataean Limes, she received funding for the project 'Understanding Roman Borders. The Case of the Eastern Adriatic', results of which are presented in the second volume of this proceedings.

Since 2003 Sanader has been actively involved in the preparation of the Croatian part of the Danube Limes for the implementation in transnational UNESCO World Heritage Site named 'Frontiers of the Roman Empire' through working group called Bratislava Group. The group, named after the capital of Slovakia where the group met in March 2003, was established to provide professional and technical advice concerning the proposed project, including, in relation to the definition of the World Heritage Site, its mapping and management as well as dissemination of information about Roman frontiers. The group consists of representatives of those state parties which are already part of the World Heritage Site, or have nominated their section of the frontier, what Sanader made for Croatia by being included in the UNESCO tentative list in 2005. Following the activities of the Bratislava Group, she actively participated in the workshops that took place in Koblenz (2003), Györ (2004), Amersfoort (2005) and in Paris (2006). Inspired by that extremely important

project, which had and still aims to provide professional and scientific assistance in declaring the material remains of the borders of the Roman Empire as world cultural heritage, Sanader published several works dealing with the topic of the Croatian part of the Danube Limes. One of the latest papers published with her collaborators deals with an extensive field survey of selected areas along the route of the presumed limes on the Danube (Sanader *et al.* 2021, 119-136). These tasks were set as some of the goals in the research project 'Between the Danube and the Mediterranean. Exploring the role of the Roman military in the mobility of people and goods in Croatia during the Roman Era'. As a result of the scientific research on that project, a large number of scientific and professional papers was published (Sanader 2018; Cvetko 2022). Also, Sanader mentored the preparation of doctoral thesis of I. Vukmanić entitled 'Danube Limes in Croatia', which was defended in 2017 and which brought a lot of new light to the previous knowledge about the Croatian part of the Danube Limes (Vukmanić 2017).

Conclusion

The study of the Roman army was in the early days of archaeology a somewhat male-dominated field of research. However, the research of the Croatian part of the Danube Limes began back in 1960's with the activities of Danica Pinterović, a deserved curator of the Museum of Slavonia in Osijek. She was followed by many other female archaeologists, who left their mark in that field. Since mid-1990's Roman military study in Croatia received new impetus through the work of Mirjana Sanader, whose research projects aimed at providing new knowledge on the Roman army within the territory of Croatia. In course of these projects, several monographs and more than a hundred research papers were published. The scientific and general public were acquainted with the projects' results, which broadened our current understanding of the Roman borders in Croatia.

Female archaeologists in Croatia showed no hesitance in dealing with research on the Roman army and taking part in archaeological excavations of Roman military sites. At the end of this review on the contribution of Croatian female archaeologists to the research of the Roman army, we can conclude that it was significant in every regard.

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Women and Roman religion in the provinces. Case study *Dalmatia*

Anna Mech

Among all the scientific questions concerning history and archaeology of Roman provinces, those concerning women have gained more and more popularity during the last several decades. As a result of recent developments of theoretical frameworks, interpretative tools and – last but not least – improvement of archaeological methods, tracking women's activity in everyday life is more possible than ever. We can observe not only their presence, but activities and agency or individual choices as well. This paper makes an attempt to analyse the research perspectives and present the framework for studying female presence in religious life of Latin-speaking Roman provinces, using *Dalmatia* as a case study.

Research limitations and background

A traditional historical approach has excluded women from the Roman world for many years – with exception of those from emperors' families or those known from Roman legends such as Lucretia (Livius *Ab Urbe Condita* 1.57-60), Virginia (3.44-46), who were known only because of their female virtues, or Tarquinia (1.11) – in opposition to previous ones, presented as a traitor. But was their situation in Antiquity better? Not at all! Any information concerning women presented in literary sources is mostly from Rome itself, rarely from other cities in *Italia*, not to mention the provinces. Another issue is authors – Latin texts were written mostly by male members of aristocracy and centred on them, so the exclusion of women seems to be quite intuitive. This situation is even worse when we stick to religion. Thanks to the literary sources there is a place for analysing some forms of female religiosity but no other than specific, prescribed roles, like the female priesthoods. This concerns especially Vestal Virgins or other priestesses known from Rome such as *flaminica dialis*. Considering all the mentioned circumstances, among modern researchers there appeared a need to take a totally different perspective for studying women's life and customs outside Rome (Pomeroy 1976; Huet 2008; Ahearne-Kroll *et al.* 2010; Holland 2012; Hemelrijk 2015; 2021; Pavón 2015). Groups which were marginalized both by ancient authors and modern historians have finally regained their own voices. Moreover, recent studies (Rüpke 2013; 2015; 2016; 2018; Fuchs & Rüpke 2015; Raja & Rüpke 2015; Ammerman 2016) are often centred on the activity or agency of individuals – what is reflected also in studies of religion in the Roman Empire. We are now much better equipped with the interpretative tools to re-analyse the available already-known evidence. Our material evidence – in this case especially votive and funerary inscriptions – which

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have been rejected for many years, now are successfully used, and provide valuable information not only on individual religious acts but also on people mentioned in them. This approach creates an opportunity for a long-due re-evaluation of female provincial religiosity. The chosen case study – *Dalmatia* – seems to be especially promising: a relatively rich (compared to other European Roman provinces) epigraphic material in which women are represented was found there. In the course of analysing it, there appeared some questions and problems which can be also transferred to the situation in other provinces, and which needed to be discussed to propose a possible framework for further studies of women and religion in the Roman Empire.

Evidence

For analysing religion in Roman provinces and female participation in it, we should turn to epigraphic material (*e.g.* Rives 2015). The first choice will be – without any doubt – votive and building inscriptions. Though they have been analysed for many years and used to studying religion, they traditionally provided information on particular gods and less attention was given to the dedicants. Thus, I propose to change the perspective and analyse votive inscriptions from the dedicants' point of view to look for some particular persons, their individual history and – in this case – religious motivations and intentions. Also important are funeral and honorific (but this case is very rare) inscriptions which mention some priestesses. Besides the name of the god, it is possible to derive other information from all these types of inscriptions' texts: in some cases, it is the dedicator's origin, family or position in society. Nevertheless, to draw further conclusions we should be careful and keep in mind that the surviving inscriptions are certainly not a perfect reflection of ancient reality. Their number and state of preservation depend on some conditions in Antiquity (for example the material used for their creation) and several modern circumstances such as chance finds, the number of excavations conducted in particular areas, the display context (in a museum or as reused material), and publishing. Moreover, we must be aware that the data provided by dedicatory inscriptions concerns only a particular, wealthier segment of the population (*e.g.* Keegan 2014, 4). Inscriptions, even these of lower quality, cost substantial amounts of money and were therefore beyond most people's means. Also, the epigraphic habit was a predominantly urban phenomenon (MacMullen 1982, 241; Beltrán Lloris 2015, 144), thus inevitably we marginalize the rural population.

Dalmatia. A complex and ideal case study?

In Antiquity *Dalmatia* was one of the most ethnically diverse provinces, with three leading groups of people such as the *Iapodes*, the *Liburni*, and the *Delmatae*, as well as the Pannonians, several smaller Illyrian tribes, the Thracian and Moesian-related peoples, some Celtic groups, not to mention the Greek settlers on the coast and – of course – all the migrations after the Roman conquest. All of them had different origins, as well as positions in the society, including their legal status and wealth. Moreover, they had their own religious systems, which entered into various relations with the Roman customs and practices, creating a multilevel provincial religiosity. *Dalmatia* was also a peculiar province, located very close to *Italia* and Rome itself but separated from it by the Adriatic Sea. Thus, on the one hand *Dalmatia* was a kind of periphery for the Romans, on the other – studies of religion in Roman Empire were traditionally based on literary and epigraphic sources which originated in Rome. Moreover, both ancient and modern history makes this province challenging to explore. The territory of the Roman *Dalmatia* is situated nowadays in six countries: Croatia, Bosnia and Herzegovina, Montenegro, Kosovo, Serbia, and Albania, thus local literature about this province is fragmentated because of – among others – languages and alphabets (for further reading on the whole province: Wilkes 1969; Sanader 2009), and the state of research is greatly varied.

From Roman *Dalmatia* altogether over 130 votive and building inscriptions are known which were set by a woman alone or with her husband or family, 3 funerary ones and one honorific inscription mentioning priestess – what makes this province the one (among European provinces) where the highest number of Latin inscriptions connected with religion with a name of a woman on it was found. All of the monuments are dated to the Principate. These are the results of a query in epigraphic databases such as Epigraphic Database Heidelberg and Epigraphik-Datenbank Clauss-Slaby, in museums in Bosnia and Herzegovinia, Croatia, Montenegro and Serbia, also in scientific literature and excavation reports. The great majority of these inscriptions was found in secondary contexts in Dalmatian cities – especially along the coastal area, altogether on 34 archaeological sites. Nevertheless, to avoid generalisations which run a higher risk of being skewed by post-Ancient realities, I propose to concentrate our attention on particular individuals and analyse their motives and agency in a quasi-biographic approach.

Taking all these factors the example of female religiosity in the province of *Dalmatia* may become a perfect case study for further discussions concerning the local gender dynamics of the various processes of cultural transfers in the different parts of the Roman Empire. Moreover, it may help analyse the social structure of the provincial society, including Romanisation, acculturation, as well as local innovations in the sphere of religion.

Examples. Step by step

For the purpose of this paper, I selected three examples of inscriptions to present a proposal of conduct of research. The first one is a funerary inscription from ancient *Asseria* (Benkovac in Croatia) – one of the developed Liburnian cities in northern part of *Dalmatia*. The monument was discovered in 1911 in a secondary context, by the main city gate (Giunio 2007, 145). The inscription is on a characteristic, local funerary monument – *cippus* (AÉ 1991, 1293 = AÉ 1993, 1260 = AÉ 2010, 1151):

IULIAE TURI
F(iliae) TERTUL[lae]
SACERD[oti]
DIVAE A[ugustae]
ARRUNTI[a – - -?]
SEVERA MA[ter?]

The monument was made for Iulia Tertulla, who was the daughter of Turus and related to Arruntia Severa, who set up the monument. Probably she was her daughter, but it is also possible that she was the mother, as on the preserved fragment of inscriptions only the letters MA are preserved, so it could be both MA[ter] (Kurilić 1999, 214, footnote 320) or MA[tri] (Fadić 1988, 82; 1990a, 254). What is the most meaningful about her is her position in local society – she was a priestess of Diva Augusta, the deified empress Livia (Fadić 1990b). She lived probably around the mid-1st century AD (Fadić 1990a, 243) – her priesthood was established after Livia's official deification, which took place in 42 AD (Kurilić 2006b, 10; Panciera 2006, 134; Stafford 2013, 42; Brännstedt 2016, 260). There is some evidence that in provinces Livia was worshipped before her official deification in Rome (Brännstedt 2021, 167). Iulia Tertulla probably was born in *Liburnia* – her father's name is typically local (Kurilić 2006b, 11). Regarding her relative, the gens Arruntia was characteristic for Roman Italy (Kajanto 1982, 292; Alföldy 1969, 308), but it was also quite frequent in *Asseria* (Fadić 1990b, 232; Kurilić 2006b, 11). This woman's social status is puzzling. Her father did not use typical Latin nomenclature but – on the other hand – Iulia's name is typically Latin, so it could mean that her father obtained citizenship during his lifetime, or she was born from a relationship with an Italian immigrant (in *Asseria* there were some Italian immigrants who may have reached there from Iader (Wilkes 1969, 215). It has been believed that priestesses of imperial cult were always elected from the highest level of a particular society (*e.g.* Giunio 2007, 145), however the situation was far more complex. The social status of a priestess is confirmed only if it is mentioned directly (Hemelrijk 2005, 159; 2015, 72). We can be sure about the honour and prestige which brought for a woman this the highest public function like being a priestess of the imperial cult.

For the second example, I chose a building inscription with an apostrophe to the goddess. This time the monument with inscription comes from the island with the ancient name *Brattia* (Brač, the closest island to Split, Croatia). There was a Roman settlement near a large quarry (Wilkes 1969, 229). Like the first example, it was found in a secondary context – in a wall of a building whose surroundings are impossible to excavate properly, since it is partially covered by a modern cemetery. Yet, most probably this wall was not a part of a Roman temple (Vilogorac Brčić 2010, 203). The monument is dated to the 2nd century AD (Vilogorac Brčić 2010, 202; Turković *et al.* 2014, 81) and the text of the inscription is as follows (Gjurašin 1990, 252; Kurilić 2006a, 141, no. 90[1]; Vilogorac Brčić 2010, 202-203; Turković *et al.* 2014, 79-80):

M(agnae) M(atri)
MESCENIA P(ubli) F(ilia)
TERTULLA PORTICU(m)
F(ecit) D(e) S(ua) P(ecunia)

Mescenia Tertulla – a daughter of Publius – built a portico for Magna Mater using her own money, which she clearly emphasized in the text. Both the name Mescenia and the father's name Publius have Italian origin (Alföldy 1969, 99), thus there is a possibility that this woman (or her family) was an Italian immigrant; also, Mescenius and Mescenia are present in epigraphic material in *Dalmatia*, mostly in *Salona* and *Narona* surroundings – altogether 14 times. This Mescenia Tertulla without any doubt was a wealthy woman who was devoted to Magna Mater. Emphasizing her financial contribution, she wanted to express her status and be perceived as – somehow – independent. The other interesting issue is the place where this inscription was found. On the island of Brač, there is not any other evidence – both epigraphic and archaeological – of the cult of Magna Mater. On the contrary the nearby *Salona* (the capital of the province; nowadays near modern Split, Croatia), probably was some sort of a local centre of the cult of this goddess in the whole of *Dalmatia* (Nikoloska 2010, 8), regarding the number of inscriptions recording persons who had a sanctuary of Magna Mater built, restored, or were in some other way benefactors of the cult of the goddess (Šašel Kos 1994, 780-781; 1999, 81-82). Moreover, in Split in a secondary context in the cathedral another inscription was found, mentioning – possibly – Mescenia as MESC TERT (CIL III,1972) which poses a question: could it have been the same person?

The analysis of the last example raises many questions. This monument was found far from the coastal area – in *Delminium* (Tomislavgrad/Duvno) in Bosnia and Herzegovina, in a secondary context, in a modern cemetery. Thus, the dating of this monument is challenging: Karl Patsch proposed the half of 2nd century AD (Patsch 1897,

235), on the other hand, Veljko Paškvalin (1963, 136) – even 3rd century AD. The text of the inscription (CIL III.14320,1; ILS 4880; Patsch 1899, 223-224, no. 6; Imamović 1977, 414, no. 180; Pandža 2017, 128) is the following:

ARMATO S(acrum)
SEST(ia) ONE
SIME EX
VOTO POS(uit)
L(ibens)

A woman named Sestia Onesime has fulfilled her sacred pledge by erecting (probably) an altar for the god Armatus. The formula *voto posuit* or similar *votum solvit libens merito* are common and were used frequently in the whole Roman Empire. But what information concerning the woman can we derive from the text? The name Sestia/Sestius was used in Italia, but Géza Alföldy suggested that in *Dalmatia* it was a rather local one (Alföldy 1969, 120). On the other hand, Onesime/Onesimus was popular in the whole Empire, but especially among freedwomen and freedmen. Thus, the origin of this woman is enigmatic, and it is impossible to determine if she was indigenous or a migrant. Another puzzling issue is the god to whom Sestia Onesime addressed. This inscription is one of two with the attested name Armatus in the whole Roman Empire, the second one was erected by another woman, also in *Delminium* (CIL III.14320, 2; Patsch 1899, 224, no. 7; Imamović 1977, 414, no. 181; Pandža 2017, 130), thus we can suppose that Armatus was worshipped locally. Nevertheless, we cannot be sure about this deity. Is Armatus a name or rather an epithet? Was he local or originally from Italia or some province? Was his name a translation of an Illyrian god? The meaning of his name is connected to weaponry and arms but both known monuments were set up by women – is it merely a coincidence? And finally: was he worshipped in *Delminium* by indigenous people or foreigners?

What should we do next. A framework for re-evaluation

A framework for re-evaluation of the role of women in Roman provincial religion, especially in Roman *Dalmatia*, can be proposed as based mostly on analysing votive, building and – sometimes – funerary inscriptions. Besides the name of god or goddess for whom such monuments were set up, we can derive information from the text of inscriptions that would otherwise be completely unavailable. The most crucial question that needs to be answered is who the religious women were. It is possible to derive some information from the texts of the inscriptions, such as the dedicant's name, which – in certain circumstances – may indicate her origin. Sometimes a woman founded the inscription together with her husband of even the whole family. Also important is the determination of the status of these women, for example if they were priestesses or did they directly mention their expenses on an altar or some part of a temple (if they did some renovations). Sometimes also the form and size of the monument provide information on the means at the disposal of the woman. All of these insights are essential for describing the religious landscape in the provinces and are likely to highlight the problem of religious diversity on an ethnic and regional basis. The context is just as important as the data provided about the monument itself. We should consider where a monument was set up and if it was in a public place such as a temple, as well as what were the social interactions behind the erection of the monument. Taking together all of these elements, it will be possible to analyse these women's position in the provincial society and also their religious agency and maybe individual intentions. The final aim is to compare all the inscribed monuments set up by women and find answers to the question if the monuments from one part of the province differ from the others and what are these differences if they existed. The results will also shed light on the role of religion as a social phenomenon in the context of the Roman provinces.

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Abbreviations

AÉ: *L'Année Épigraphique*
CIL: *Corpus Inscriptionum Latinarum*
ILS: *Inscriptiones Latinae Selectae*

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Walls don't stop women

An urban approach to frontier sites

Catherine Teitz

This paper responds to the larger questions – who participates in Roman frontier archaeology and how gender has influenced the field – raised in Session 6 'Feminists at the Gates' through a case study from my dissertation research. My dissertation examines the British frontier sites of Corbridge and *Vindolanda* as urban spaces, using structural evidence and the modern city planning framework of Everyday Urbanism. While Hadrian's Wall is rarely what comes to mind when discussing Roman urbanism, I have found that settlements of all sizes along the frontier benefit from an urban perspective. Urbanism offers a way to reframe and study sites' long-term development, and to move beyond the traditional expectations for their structures and spaces to serve expressly military functions. The first part of this paper presents my modern theoretical approach and the second applies it to archaeological examples. In particular, it is an opportunity to explore the feminist elements of Everyday Urbanism, which was developed by a group of architects and planners for interpreting contemporary urban spaces, and how its unique insights can expand our possibilities for interpreting Roman frontier sites.

This work would not be possible without the reevaluation of military and frontier communities over the last several decades. Scholars including Carol van Driel-Murray, Lindsey Allason-Jones, Penelope Allison, and Elizabeth M. Greene have expanded the frontier community to include not just soldiers but women, children, enslaved peoples, and others (Van Driel-Murrary 1995; Allason-Jones 1999; Allison 2013; Greene 2016). The next phase is to consider where and how the larger and more complex community lived. The plans, including building identifications, still widely used for frontier sites were created in an era when military function of these settlements was the primary focus of the archaeologists documenting them. These building do not have the room, literally or figuratively, to accommodate the greater community, and yet it has been clearly demonstrated that the community was present. In my work, I argue that we can make that space through a careful re-evaluation of familiar structures specifically through an urban perspective.

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Roman Urbanism

Roman Urbanism, with capital letters, brings to mind a particular sort of city complete with monumental elements and social structures that reflect its status. When considering urbanism, lower case, I prefer the perspective articulated by 20th-century sociologist Louis Wirth that urban life is not confined to cities, but is relative to the place (Wirth 1938). If the place is larger, denser, more complex, heterogeneous compared to its surroundings, it can be considered urban within its landscape. A place can still be urban according to

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this definition, even if it does not fulfill the many different requirements proposed for defining a city (see examples in Childe 1950; MacDonald 1986; Hanson 2016).

When applying this broader definition in a Roman context, many more settlements can be considered urban, and thus analyzed with the nuances of the designation. While it creates a useful shift in perspective on the settlements, that alone is not specific enough to be actionable. Instead, I sought a theory that guided how we look at space, and particularly one that foregrounds the agency of each inhabitant.

Everyday Urbanism

Everyday Urbanism, a theory and approach developed in the 1990's, critically examines space and agency. It emerged from the LA School, a group of postmodern urban planners who were reacting to the dominant planning philosophies of the 20th century. 20th-century planning theory was, fundamentally, top-down, rationalist, technocratic, and male (LeGates & Stout 2011; Spain 2014); however, in the 1960's, feminism entered the urbanism debate. A generation of planners like Jane Jacobs, who campaigned against neighborhood destruction in New York, and Dorothy Mae Richardson, who combated racist housing policy in Pittsburg, fought to include the needs and experiences of women and other marginalized social actors – communities of color, elderly people, disabled people, children – in the design of urban spaces (Jacobs 1961; McClaughry 1978).

The creators of Everyday Urbanism, Margaret Crawford, with John Chase and John Kaliski, wanted to connect spatial design with social meaning. Specifically, they wanted to understand how different social groups shaped shared space to reflect their experiences (Chase *et al.* 2008). This wasn't something they could find in 'designed' space or capital-A Architecture, but in the everyday, in-between, shared space of buildings and streets. The framework they developed to read and critique these places is grounded in the feminist belief that space is made by everyone, not only able-bodied men (Mehrotra 2005; Chase *et al.* 2008).

Four fundamental principles can be drawn from Everyday Urbanism (Teitz in press):

1. It considers the intersection between the city and the individual in spaces of public activity that are not necessarily planned or monumental.
2. It is inclusive – everyday space is the meeting place for multiple publics and the spatial transformations reflect the changing social dynamics.
3. It looks for the middle ground, where top-down design and bottom-up interventions collide to shape a place.
4. It seeks to take a space at face value and to understand "the built environment as it is rather than yearning for some other set of circumstances" (Mehrotra 2005, 64).

Everyday Urbanism cannot be applied directly to archaeology without making some concessions. It is impossible to observe a space over the course of day or to conduct interviews with the inhabitants, as modern planners are accustomed to do. However, the importance of structural details remains consistent. Through site reports, plans, photographs, and structural analysis, I can study how the physical fabric of the place is shaped by, and reflective of, the needs of individuals and groups. While modern Everyday Urbanism is short-term, archaeologically it becomes a study of socio-spatial change over generations. Modifications to the structural form show how the users, particularly those who were not the designer's intended group, adapted the space for their own purposes, sometimes fundamentally transforming a building's role.

On the frontier, I use Everyday Urbanism not only to reconsider the interpretations of buildings, how they were used and how they changed, but also to foreground the range of people who lived and worked there. It is a framework that embraces the creative possibilities of interpretation rather than positivist analysis, and while that is uncertain, and therefore often uncomfortable, it is also an opportunity to set aside our preconceptions about space on the frontier.

Two structures that benefit from this broader approach are Site 11 at Corbridge and the *principia* at *Vindolanda*. Corbridge and *Vindolanda* are located south of Hadrian's Wall. Both were well-known to antiquarian scholars, but the modern, scientific excavations began in the 1930's with Eric Birley and Ian Richmond. This history not only shapes the available evidence but contextualizes their interpretations relative to the present.

Corbridge

Corbridge was extensively excavated from 1906-1914, with the results published as annual reports in 'Archaeologia Aeliana'. Its scale, architecture, and the quality of the finds meant it was identified as significant, though the outbreak of the first World War cut short the excavations. In 1933, a small center portion of the site was gifted to the Ministry of Works, now English Heritage, and it was re-excavated it for public display. Birley and Richmond oversaw this work, but their site reports focus on the legionary vexillation to the south of the Stanegate (E. Birley & Richmond 1938; 1940). The interest in the military history of Corbridge drove the excavations after the war and was more thoroughly published (Bishop & Dore 1988), with many aspects of the civil settlement overlooked, including Site 11.

Site 11 has been difficult to interpret since it was first excavated. The foundations outlined and could have supported a massive structure, but its role at the site was uncertain. It was initially called the *forum* (Forster & Knowles 1911), then the storehouse (E. Birley & Richmond 1938), and recently a *macellum* (Hodgson 2008).

The archaeology shows construction stopped suddenly after the foundations were laid, yet the research has focused on what it was designed to be or what pre-dated the structure, rather than how this massive central space was actually used.

Looking closely at the architectural evidence, I propose that a different type of structure is built atop the Site 11 foundations in the 3rd century. Rather than understand its role in the landscape as a closed, monolithic structure, it should be treated as a series of related smaller buildings connected by shared space. Each of the four ranges – north, south, east, and west – developed into a different architectural form and use; this paper will review only the evidence from the north and south.

The foundations for the south range suggest that it was intended to be a series of chambers accessible from a courtyard. The courtyard and chambers themselves were connected to the Stanegate road by a central passageway (Forster & Knowles 1911). Yet when the south range was built, it was oriented the opposite direction of the original design. Rather than facing an inward courtyard, the chambers opened onto the road, and the western ones have a series of bases to support a portico (Forster & Knowles 1912). These were likely small commercial spaces, serving soldiers specifically as well as the wider community.

The disconnect between original design, as interpreted from the foundations, and use, evidenced by the structure itself, is underscored by the road and drain in the south range entrance. While the design called for a unified facade with an entrance that controlled access, these features suggest that the south range may have become two separate buildings. There was a substantial drain built with the foundations to join the courtyard with the Stanegate road drainage, but it was never connected (Forster & Knowles 1911). Instead, it was covered by multiple levels of road surface which extend into the courtyard area and lacked threshold stones to support a door or gate. When excavated, no evidence of a collapsed superstructure was recorded on the road surface. Perhaps rather than the single arched entrance to the massive courtyard building, as Site 11 is often reconstructed, there were two smaller structures on either side of an alley. Not only would this change the architectural form of Site 11, but it vastly expands its potential role in the larger Corbridge community. It shifts from being a restricted structure, more an extension of the military compound across the street, to a space accessible to many different people.

While the south range has a clear architectural distinction between design and use, the north range underscores the influence of archaeological biases. The north range is the most poorly preserved and documented of the four. In the original excavations, it was drawn as a single undivided area between the corner rooms (Forster & Knowles 1911). However, on site and in plans today, it has been divided into multiple chambers. Their excavation may have occurred during the work in the 1930's, but they do not appear in site plans until the publication of the 1954 edition of the guidebook (E. Birley 1954). These foundations support the idea of a symmetrical design for Site 11, with chambers oriented around a central courtyard. Given their absence from any of the original excavations (Forster & Knowles 1911), however, it seems far more likely that no walls were built directly atop these foundations. Instead, Birley himself reports, in letters to the Ministry of Works and in the original site guidebook, finding a later hypocaust building over the foundations (E. Birley 1935). There is one drawing of the building, in an unfinished sketch (Hadcock 1937). Birley was uncertain of its use, and it never appears in published drawings or in formal site reports. The contrast in treatment between this late building and the foundation walls subdividing the north range speaks to the particular focus of Birley and Richmond in their Corbridge excavations, the narrative of the site they developed, and the importance of the distinction between design and lived reality.

Although the interpretation of Site 11 as solely a massive monumental structure is established and familiar, the relationship between the foundations and the built structure calls that into question. Instead of a closed and restricted monolith, Site 11 was an accessible, multi-use area that was central the larger settlement. It provided commercial space onto a busy street in the south range and other less trafficked spaces within the courtyard as part of its distinct sections. The Everyday Urbanism approach emphasizes importance of moving beyond the proposed design and considering how the space was lived and used by the community.

Vindolanda

The *Vindolanda principia* draws on other aspects of Everyday Urbanism, particularly the collision between the top-down intentions of design and the bottom-up reality of use. This approach can drive a re-evaluation of the structure's phasing from what was published following its excavation by Birley and Richmond 1932-1935.

Birley and Richmond assigned two construction phases for the *principia*, Constantinian and Theodosian, following the Wall Periods framework of the time (E. Birley *et al.* 1936; Gillam & Breeze 2022). The building's first phase is now considered part of Stone Fort II, and the Constantinian phase has been shifted to the early 3rd century while the Theodosian remains in the mid-late fourth (R. Birley 2009). Aside from expanding the post-Roman use, the interpretation has remained consistent since 1936 (A. Birley & Alberti 2021). After a review of the drawings, the archival photographs, and the standing structure, I propose to refine the chronology and add a phase to the

building's the late Roman period. In doing so, we gain a better understanding of how life in the *principia* and at *Vindolanda* changed from the beginning of Stone Fort II through end of the 4th century.

In their description of the *principia's* first phase, Birley and Richmond emphasize that in their report that the building's plan was not standard (E. Birley *et al.* 1936). I propose that the building appeared this way because some elements that they included in the first phase, particularly the veranda and walls creating rooms in the northern courtyard, were not part of the original construction. Instead, the *principia* might have been a simpler form, where the northern facade aligned with the adjoining buildings and the road surface, and the courtyard was a relatively open peristyle.

These unusual walls that Birley and Richmond identified are instead part of a new middle phase of construction in the early 4th century. The occupation of *Vindolanda* has a gap in the last quarter of the 3rd century, and many of the fort's buildings are reconstructed in the early 4th (R. Birley 2009; A. Birley 2013; A. Birley *et al.* 2016). At the *principia*, I would argue that this includes the addition of the veranda walls, built with large stones from the extramural settlement, to create a permeable but sheltered space cutting into the *via principalis*, as well as the internal walls and drain within the courtyard. Although the *principia* remains the center of the fort, the for itself has changed dramatically with the abandonment of the extramural settlement and the shift of the entire community inside the walls. The changes to the *principia* both draw it into the shared road and increase its functionality as the demand for space within the fort grows. It exemplifies the middle ground between intention, as designed, and use, as social pressures demand change.

The Theodosian changes to the *principia* building parallel the larger social shifts in the late 4th century. It begins to transition from an administrative space to a residential one (E. Birley *et al.* 1936; R. Birley 2009; A. Birley & Alberti 2021). The veranda is enclosed, and along with the courtyard rooms, converted to storage spaces with raised floors for ventilation. The open chambers along the cross-hall are enclosed and converted to accommodations with their own latrine attached. This work is contemporary with major changes to the *praetorium* and reflective of the larger social and organizational changes in the later Roman period.

A reassessment of the *principia* phases, and by extension how it functioned within the fort, contributes to a better understanding of *Vindolanda's* 4th century. The addition of an early 4th-century phase for the *principia* situates it as part of the larger pattern of central range redevelopment in the early 4th century. It also, following the Everyday Urbanism framework, emphasizes how the demands of use and changes to community identity both influence and are reflected by the built environment.

Conclusion

In terms of design, both *Vindolanda's principia* and Corbridge's Site 11 could exemplify idealized Roman military architecture. Yet following a closer investigation of the structural details as they were built and modified, it is clear that design alone is insufficient. The principals of an Everyday Urbanism approach – especially inclusivity of multiple publics and taking the built environment as it was, rather than as it could have been – may seem simple, but they have profound implications on the interpretation. Everyday Urbanism is a framework within which even the most familiar structures can be rethought and the traditional narrative challenged.

The case studies at Corbridge and *Vindolanda* not only illustrate how a feminist approach can change the archaeological interpretation, but they also reflect some of the larger themes, and challenges, of gender in frontier archaeology. I am fortunate to undertake this work in 2022: topic in frontier studies pioneered by women over the past 30 years have given voice to the larger frontier community that I now seek to understand spatially, and I have the opportunities to pursue the work, regardless of my gender. In the historical dynamics of archaeological research, particularly in the 1930's when the majority of this data was produced, my place in this discussion would have been unlikely to nonexistent. Perhaps I might have been allowed to draw or even excavate, but social norms would have prevented me from interpreting the evidence or questioning the existing narrative. Despite the richness of their archives and their influence on Romano-British archaeology, Eric Birley and Ian Richmond have cast a long shadow over my work and the interpretation of the frontiers more broadly. Although I might not always agree with their conclusions, I seek to build upon and to expand their work. I also aim to read their research mindful of their particular life experiences and how that could influence their perspectives. As men who lived through and served in world wars, these experiences undoubtedly shaped their views of Roman frontier archaeology. My experience as a woman working nearly a century later is fundamentally different, and as such, I offer another perspective. Relying on individual differences in perspective, however, is not sufficient to produce broadly inclusive results in the study of the Roman frontiers. Everyday Urbanism, itself a reflection of feminist ideas and consciously aware of how diversity shapes space, can drive alternative interpretations and challenge the established narratives of frontier space.

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Part 3

DIGITAL LIMES

THE USE OF MODERN METHODS AND ADVANCED TECHNIQUES FOR A BETTER UNDERSTANDING OF THE FRONTIER DEVELOPMENT

Digital Limes

Introduction to the session and a discussion of temporary camps in the Netherlands to illustrate the use of modern methods and advanced techniques for a better understanding of the Roman frontier development

Wouter K. Vos, Roeland Emaus,
Jeroen Oosterbaan and Maarten Sepers

A growing number of archaeologists are working in one way or another with what is conveniently called 'digital technology'. LiDAR, aerial photography, GIS, remote sensing, photogrammetry, 3D modelling, big data, machine learning and citizen science are terms and techniques that are emerging and becoming common in the discipline. There are many fine examples of the recent past, however, these digital applications are not completely new and have been around for a couple of decades (Frischer 2008; Cowley 2011; Hesse 2013). The session Digital Limes held at the Limes Congress at Nijmegen was attempted to explore whether these 'new' technologies have really changed the way we study the limes.

Without being a specialist in digital techniques, most Roman archaeologists know that combining different techniques provides important data that was difficult to obtain using the more conventional analogue methods. The techniques promise many opportunities for new research possibilities, but the question is whether we use these methods exhaustively enough to ask the right, and perhaps new research questions. Roman archaeologists and 'digital archaeologists' seem to speak each other's language but is that good enough or are we multiplying the uncertainties of one's own discipline with those of the other? (Sahlins 1972, 47). Searching for answers with these new techniques may follow an old-fashioned way of thinking with – perhaps – blinkers on, but Roman archaeologists should be sufficiently equipped to explore the full possibilities of the 21st century (Verschoof-van der Vaart 2022).

Therefore, three questions have been formulated that are central to the purpose of this session. The first is whether research has changed because of new techniques; in other words, has research taken a different turn with the advent of a new digital toolbox. The second is the question of whether new techniques only answers 'old' questions. In that case, only the methods have changed and nothing new emerges through the application of 21st-century technology. The final question is whether there is enough potential in the combination of using the new techniques, and probably more importantly, what are the opportunities and limitations of using these techniques for a more sophisticated interpretation of life at the Roman imperial frontier.

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By new techniques we mean the applications mentioned above with which most Roman archaeologists are more or less familiar. The aim of the papers in this session is thus not to focus on individual sites or methods used to present the limes, but to address the main question of whether using new technology will lead to better knowledge and understanding of the limes in general.

Contributions to Digital Limes

The contributions of the session's participants clearly reflected this aim and showed great diversity, not only in terms of topics, but also in the origins of the various speakers. Contributions covered Germany, the United Kingdom, Italy, Austria and the Netherlands, and doing so were spread across 'Roman' and 'Barbarian' Europe. This indirectly made it clear that applying and implementing the techniques mentioned above has now become commonplace in archaeological communities almost everywhere, and this observation is also seen in several publications from many different countries and institutes (*e.g*. Evans 2016; Kokalj & Hesse 2017). The session Digital Limes started with the introduction paper concerning research aimed at temporary Roman camps in the Netherlands. The subsequent lectures presented in this sessions covered broad and very diverse scopes.

The first topic was presented by Jennifer Schamper on the geophysical, non-destructive research project on the Upper German-Raetian Limes in which *c*. 100 ha have been geomagnetically surveyed. The results were combined with aerial photographs and LiDAR and collectively provided wonderful answers to questions about Roman landscape planning and strategy.

The second paper addressed the question of how to organize a huge data collection that cannot be analyzed by one or two archaeologists alone. This Big Data case on the epigraphic archive of more than 50,000 amphorae from Monte Testaccio in Rome was presented by Arnau Lario Devesa, in which he highlighted the complexity of computer software programs and the tasks of scientists to get the right answers by asking the right questions.

A third contribution to the session was made by Kamil Kopij on acoustic and proxemic analysis of speaking platforms (*pulpitum*) in the headquarters of several Roman fortresses including *Carnuntum*, with the aim of reconstructing the number of soldiers who could actually hear their commander's speech and see the speaker's gestures.

Finally, a fourth paper on the new techniques commonly used in the gaming industry, was presented using a mystery game produced by researchers at *Vindolanda* and Newcastle University. Claire Stocks and Barbara Birley showed that serious gaming tools can be used for archaeological purposes and provide learning opportunities through entertainment ('edutainment') to enhance history education but also contribute to learning literacy, numeracy, and archaeology, even by playing the game at home on the computer during the covid pandemic.

The study of temporary camps in the Netherlands

A fine example of gains to be made when combining different digital techniques is presented here as a case study. The subject is currently being carried out by staff and students of Saxion University of Applied Sciences in Deventer. Our case study deals with a well-known phenomenon within the Roman army, temporary camps. We know of many examples from within the Roman period as stated *e.g*. in Spain (Blanco *et al*. 2020), Wales (Davies & Jones 2006), Scotland (Jones 2009; 2011), Czech Republic and Slovenia (Groh *et al*. 2015), Germany (Bödecker 2015a; 2015b) and recently also in Switzerland (Koch *et al*. 2022).

These camps' functions vary, and their classification is based on marching, practice, siege and construction functions (Jones 2011). Perhaps there is a fifth function that could be a crossover between marching and exercising (personal note in lecture by Rebecca Jones at Saxion University of Applied Sciences, November 2022). Clearly, the structures tell us something about the Roman army on campaign, about the army manoeuvring – inside and outside the Empire – and about the soldiers in training by setting up temporary camps. So, in fact, these are soldiers on the march in the frontier zone for all kinds of reasons, and by studying these particular structures, a better understanding can be gained about the activities of soldiers and the strategy of the Roman army.

Just across the Dutch Border near Xanten and Bonn, dozens of these temporary camps have been recognized using LiDAR, geophysics and aerial photographic surveys. A characteristic of the camps found closest to the Dutch borders, is not only that they are related to fortresses, but also that they were located at short distances of up to 9-10 km from these fortresses. Furthermore, an explanation for the differences in the size of the temporary camps in the areas around Bonn and Xanten has been identified and published by Bödecker (2015b). Drawing on Hyginus, among others, who writes about the layout of temporary camps, as well as the siege camps from Masada (Richmond 1962) where legions bivouacked, Bödecker then calculates the space required for a legion or auxiliary troops in a Roman camp. He concludes that a legionary force would need a minimum of about 4 ha, so the smaller camps could represent auxiliary troops. The smallest category of camps, measuring about 20 by 20 m, are believed to be real training camps, *e.g*. for new recruits, quickly erected to practice the building of entrances and the digging of ditches. All the defensive structures of the temporary camps consist of a V-shaped ditch and a bank or rampart. They all have entrances and usually special features such as *claviculae* and *tituli*.

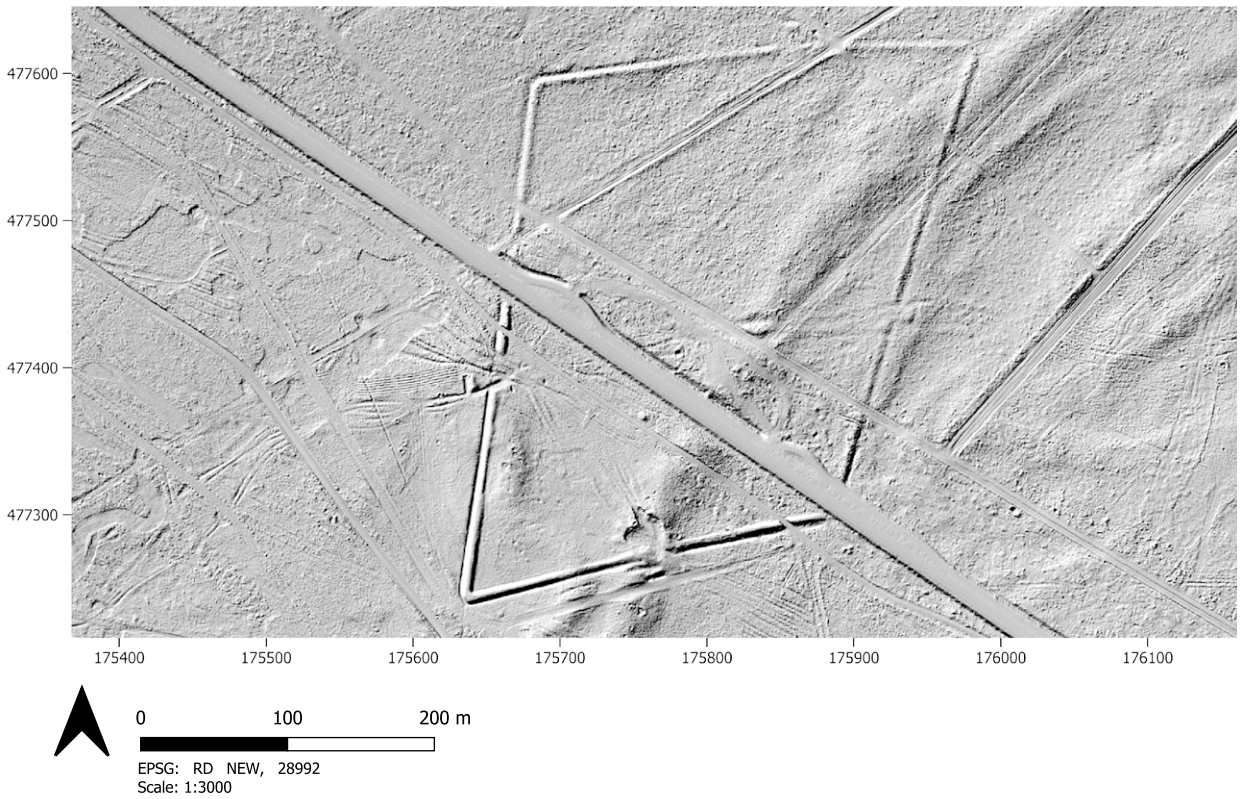

Figure 1. LiDAR image of Ermelo-Leuvenum (www.ahn.nl).

Figure 2. V-shaped ditch of a possible temporary camp at Herwen (Van Renswoude & Van Kampen 2019).

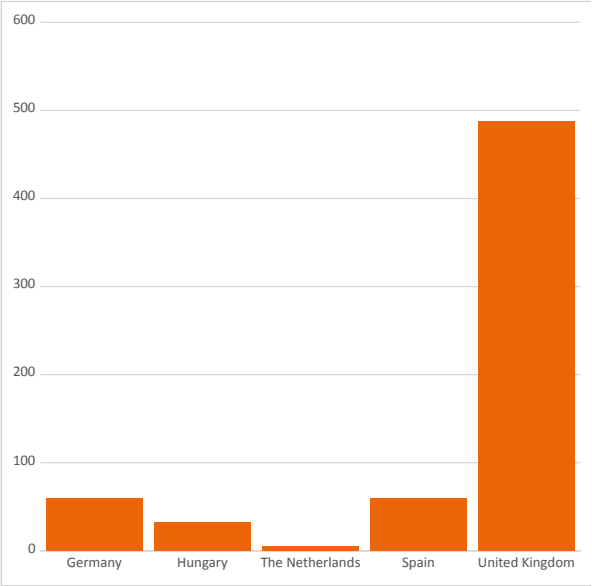

Figure 3. Number of temporary camps in several countries.

The temporary camps are found both inside and outside the Roman frontier zone, but most remarkable is that they are hardly known from the Netherlands. Only one obvious specimen is known (fig. 1), which is Ermelo-Leuvenum (Hulst 2007). However, in the last few years, several potential new sites have been discovered, of which Ermelo-Indianenbos (Verschoof-van de Vaart & Driessen in the fourth volume of thes proceedings), Tiel-Medel (Habermehl *et al.* 2019), The Hague-Ockenburgh (Van Zoolingen 2019) and Herwen (Van Renswoude & Van Kampen 2019) are good candidates to be interpreted as a temporary army camp as well. Occasionally, a temporary camp is found more by chance than by systematic investigations, such as the Roman camp located in Ermelo at Indianenbos was only discovered when the LiDAR imagery of the area was being studied for prehistoric burial mounds.[1] But more often it is found by chance during excavations (Herwen and Medel), when suddenly V-shaped ditches (fig. 2) appear in an otherwise mostly non-military landscape. Be that as it may, it leaves the Netherlands with only five (possible) examples. Given the number of camps identified in all of the surrounding countries, it would be hard to maintain that this reflects the numbers of temporary Roman camps within the present-day Dutch borders (fig. 3).

Dutch researchers have access to the same techniques as the German colleagues in the Rhineland. However, in the hinterlands of Bonn and Xanten, they spring up like mushrooms, while Dutch examples are very sparse indeed. Therefore, the questions are: what causes this big difference in numbers, and how can we possibly mitigate the Dutch situation? To this end, we have formulated some explanations and tried to clarify how it is possible that these camps are largely absent in the Netherlands to this day.

First, it must be said that the temporary camps in Germany are usually found near fortresses. More fortresses are known in Germany than in the Netherlands, where a fortress has only been attested in Nijmegen and Valkenburg. However, temporary camps could occur near auxiliary forts as well, and Bödecker (2015b, 44-46) has argued that precisely the small temporary camps could also be attributed to auxiliaries rather than legionnaires. About 15-20 auxiliary forts of this kind are also known (or suspected) in the Netherlands, but there, too, the temporary training or practice camps of the Roman army are so far missing.

Secondly, soil type may be debit to the absence of the camps in Dutch territory. The dynamics of the mostly Holocene deposits in the river area along the limes have caused significant sedimentation off some sites and erosion of others; both are certainly not conducive to the detection, because of a lack in preservation or surface visibility of temporary camps in the Netherlands. Only the Pleistocene sandy soils near Nijmegen and the Veluwe district seem to be suitable places where ancient features can be traced in the present-day terrain.

The difference in modern land use between Germany and the Netherlands may also be mentioned as a third cause. In the Netherlands, much land has been profoundly worked following the large-scale land consolidation programs from the 1960's onwards. Additionally, nearly all of the Netherlands has been brought under the plow at some point in its history for either agricultural or silvicultural purposes. Because of this, the original Dutch landscapes have not been well preserved, and the (top) soils even less.

A fourth and final reason why temporary army camps have been treated poorly is a lack of scientific interest in the subject. Dutch researchers have focused their attention on the forts, the so-called permanent camps, of which distinct physical features could be found, leaving the remains of the temporary camp Ermelo-Leuvenum as a curiosity in Dutch archaeology for a long time. On top of this, the scientific framework of Dutch archaeologists has been somewhat limited to marching camps; that is, the idea that temporary camps were mainly related to marching routes and expeditions into Barbarian country and not with the notion that this type of camps, albeit in a different form and function, could also be found inside the Roman Empire near the permanent military structures. However, much knowledge has been gained here in recent years, and the attention to these types of military works has significantly increased, partly due to the impressive results in Germany.

1 The complete surface of the Netherlands is periodically mapped with LiDAR and available to the public via Actueel Hoogtebestand Nederland (www.ahn.nl).

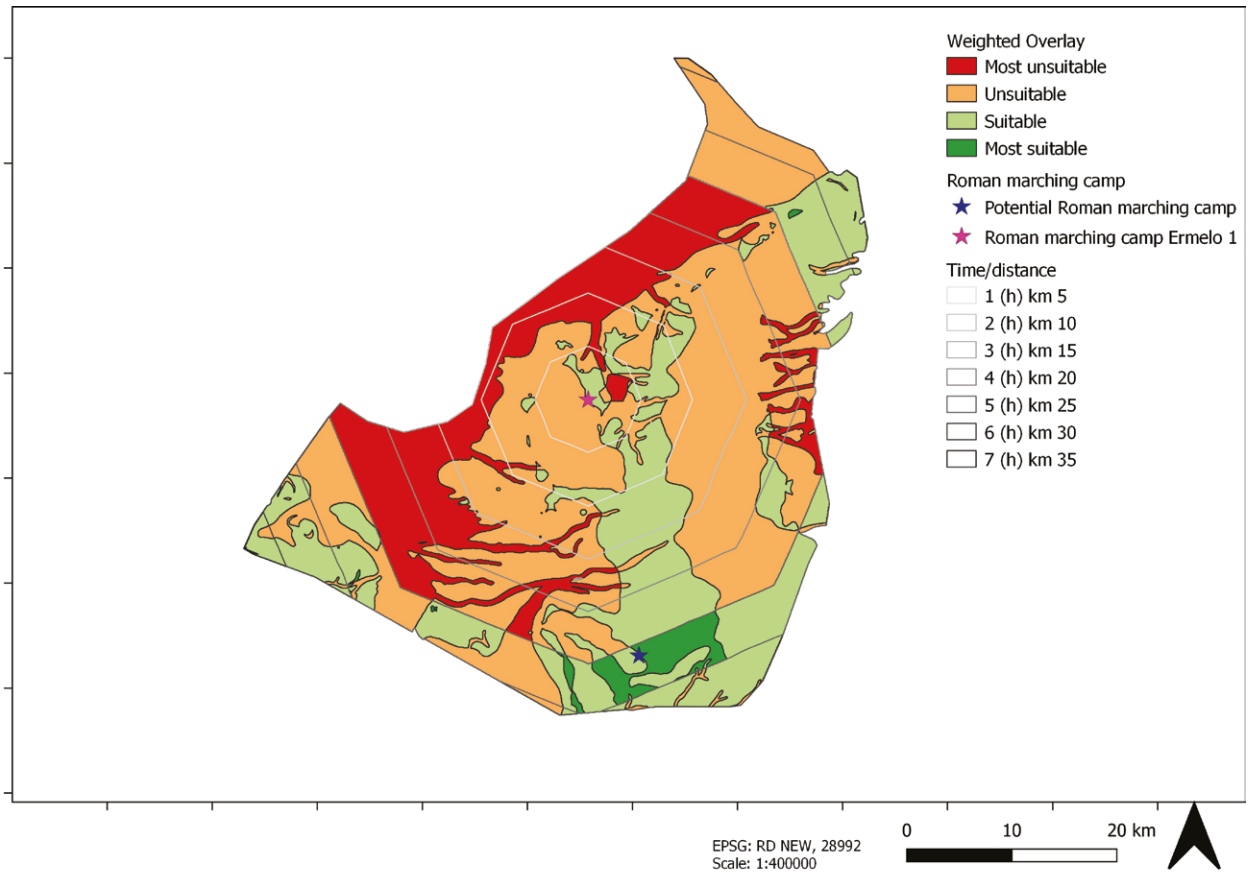

Figure 4. Model with underlying (un)suitable landscape where, based on time and distance a Roman soldier can travel from a known temporary army camp, a possible new next camp can be predicted (Goeree 2023).

From digital logic to analogue proof

Saxion University of Applied Sciences will tackle this subject as part of the overarching research program called 'Constructing the Limes', funded by the Dutch Research Council (www.c-limes.nl). With the list of technical methods quoted above, we plan to discover more temporary camps, and find out by what logic the specific locations of the various types of temporary camps within our country were determined, especially in the Eastern River area near Nijmegen, on the Pleistocene sandy soils of the Veluwe and possibly further north. Using various methods and appropriate techniques is essential, and moreover, the combination of tools and methods. Saxion is, after all, a technical University, so all GIS- and statistical analyses, remote sensing methods (drones, infrared, NDVI, geophysics), will be used and taught to the students, in addition to the more traditional methods like field surveys, coring and trial trenching. We are convinced this is where the advantage lies, in using a broad technical package.

It also remains important to continue combining this technical input with archaeological sources and assumptions to recognize patterns and form predictive models. One aspect has already been illustrated, *i.e.* the presence and relationship between permanent forts and fortresses and temporary camps in the frontier zone. Other parameters are primary and secondary Roman routes as connectivity patterns, combined with the orientation of prehistoric and (early) medieval routes. Next to this are the ancient writers as a source for plotting military activity in *Barbaricum*. In addition to that, there are interesting hypotheses about the possibilities of detecting and predicting a Roman camp by studying the average walking range of a Roman soldier (fig. 4) in combination with the (paleo-)geomorphological opportunities of the landscape (Goeree 2023).

A case study site has been identified in a large nature reserve (Veluwe) between roughly Nijmegen and Ermelo because the chances of finding a temporary camp there are high due to the soil conditions. The aim was to use different digital methods and by combining them to get a more differentiated and well-thought idea about the site. First, satellite-imagery was interpreted, where especially the photographs of the last dry summers provided much information. Second, we used the database with aerial

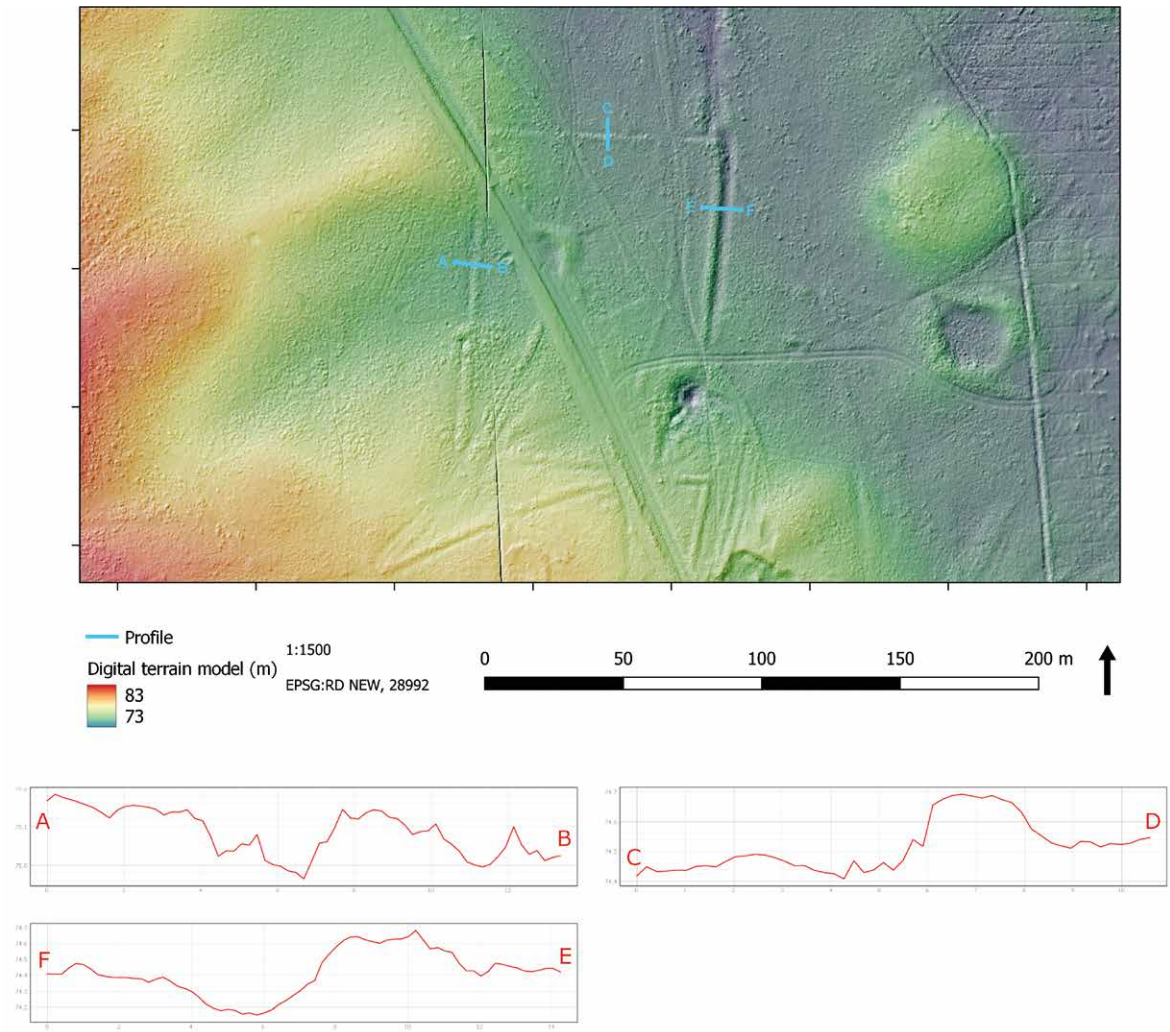

Figure 5. Virtual cross-sections on a local relief model in the case study area on the Veluwe.

images from the Second World War made by the Royal Airforce that show the situation from before the land consolidations of the 1960's and later (https://www.wur.nl/en/library/special-collections/aerial-photographs.htm). Third, the nationally available LiDAR images were studied. The LiDAR data was analyzed using hill-shade tools and other digital visualization techniques. Fourth, an aerial survey was conducted on the site using a drone that was equipped with a standard (RGB-red, green, blue) camera as well as an infrared camera. By using photogrammetry, this resulted in a high-resolution terrain model as well as various false-color image and vegetation indices. The multispectral imaging can be used to recognize patterns in the current vegetation. Disturbances in the soil can influence a plant's health, the color of its leaves, and how light is ultimately reflected differently in the various parts of the electromagnetic spectrum. Using the Normalized Difference Vegetation Index (NDVI), patterns of sub-soil features, otherwise not visible on the surface, can be recognized through differences with the surrounding vegetation. However, the applicability of these techniques depends on the current land use, vegetation type and accessibility of the terrain. In a later stage, the results will be combined with other geophysical data from the ground-penetrating radar (GPR) and electromagnetic (EM) research.

In the case-study area specific data was generated by making virtual cross-sections of the digital terrain model (fig. 5). Clear differences are observed between the supposed rampart and the ditch, and perhaps that could be a positive identifying feature for a temporary camp. When we zoom into where the typical entrances to temporary camps should be present, the so-called *claviculae*, there are indications in the digital cross-section of two elevations, possibly the two rampart sections, and one deeper section that likely can be labelled as an eroded V-shaped ditch.

The advantages of combining the different methods and tools seem obvious for the study of Roman temporary camps; and more results can be expected when the already gathered GPR and EM data are processed and interpreted. Cautiously we may assume that there is a structure here, possibly a temporary camp. The only pressing question is, is it Roman? The next step in the research will be to check this with traditional methods like a fieldwalking survey, metal detecting and trail trenches to draw more definitive conclusions.

In this way, potential locations and areas in the Netherlands are explored, especially near Nijmegen where a fortress was in use between AD 71-104, but also on the sandy soils like the Veluwe. If possible and available, aerial photographs from different seasons are included because these occasionally show different patterns of old traces in the subsurface. The same is true about the study of crop marks in the field.

In addition, when more temporary camps are detected within the Netherlands other techniques can be used to determine area's where more temporary camps could be suspected. One of these methods concerns the walking range of a Roman soldier in different time and distance variables as mentioned above, the idea being that the next suitable spot should be in walking range of the soldier from one camp to another. This is a work in progress for the coming years, and hopefully it will lead to an increasing number of temporary camps in the Netherlands.

Conclusion

Finalizing on this paper, and on this session, we might come to the following general conclusion, and perhaps also a point of caution. The common denominator of the session is not necessarily in the use of new techniques, especially since some have been around for a while as mentioned before, however, in all the papers it was the speed in which the data was processed thanks to better computers and greater accessibility to data. An important consequence of this is that much larger areas or larger datasets can be processed and queried than before. In most cases this yields not only more data (Big Data) but also more complex data that can only be efficiently processed by computers. It is up to archaeologists and historians now to dare to ask new, more complex questions and eventually also to formulate new thoughts on their subject that can provide a more differentiated picture at the end of all kinds of aspects along the limes.

An additional factor in the discussion about digital techniques and improving and expanding datasets is that precisely by combining 'new' techniques, more variation and detail in archaeological data also emerges, which previously could not be observed with a single research technique alone. The gain, therefore, is in the combination of the techniques and a consequently changing and richer archaeological perspective on these data.

As we adopt more methodologies and technologies, we also involve more and more specialists. As we have seen, there is a need for specialists in the field, specifically for questions or adjustments on our 3D-models, our drone-imagery or our statistical analysis. However, perhaps there is a growing separation between the IT-crowd and the domain specialists, between those who are familiar with the complexities of the methodology and those familiar with the complexities of the dataset. The question is how to ensure that occasional assumptions and presuppositions of the data-scientist do not end up somewhere in the conclusions. In some applications this will be more obvious than in others; the misplaced house numbers in 3D game design are obvious for everyone, but what about assumptions in statistical models about march distances, or the effects of the clothes soldiers wore on the acoustics inside a fortress?

Returning to the three questions at the beginning, based on our own experience with the temporary camps, and summarizing what we have heard from the other contributions in this session, we think we can provide at least some partial answers. Has research changed because of the new techniques? We think so, but at the same time not. On the one hand it has, because much more data can be processed simultaneously by, for example, faster, better and bigger computers. On the other hand, it has not, because we still make lists and organize data just like we did long ago in old-fashioned programs like DBASE3+. We still superimpose all kinds of image and map material, only it has all become much faster, more advanced, and detailed.

As to the question of whether we only give modern answers to old issues, the answer is a bit ambiguous. Some questions have not changed, and the answers are given by modern means in terms of technical choices and improved applications. On the other hand, new questions do arise, mainly because of the increased number of possibilities, the larger selection, the larger scope and therefore a greater amount of data from which new questions can arise. This is also the case for our temporary camps, as we can now process more landscape data than ever before.

Thirdly, we can be clear and short about the possibilities of the new techniques. Yes, there are definitely possibilities and certainly in the combination of the use of techniques, but that is probably a bit of an open door. All in all, the conclusion regarding our topic, the absence of temporary camps in the Netherlands, is that through the combined use of different techniques, together with well-considered archaeological principles, much progress can be made; more than we could dream of five or ten years ago, and thus a step towards the final goal has been made: a better understanding of the limes in our country.

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Tactics or topography?

Interdisciplinary studies on the course of the Upper German Limes. A preliminary report

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After some 180 years of intensive research on the Upper German-Raetian Limes and the numerous publications this has seen, one might have assumed that almost everything is known about this section of the frontier of the Roman Empire. However, thanks to modern, non-invasive prospection methods there is now a chance to explore archaeological monuments without the need for expensive archaeological excavations. Methods such as aerial photography, airborne laser scanning or geophysical survey are just a few examples. Each method on its own has brought, and continues to bring, new and exciting results, while when used in combination they can produce such complete insights that we are forced to reconsider things.

In 2018, the Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie, Außenstelle Koblenz began a large-scale geophysics project along the limes. The aim was to record precisely the course of the limes where it is no longer visible above ground today. Since it is still prominent and very well preserved today in the forest, the measurements concentrated on fields and meadows. In addition to the course of the limes, the locations of towers were also to be verified.

The sites of previously unknown watchtowers (Schamper 2019, 59) and fortlets could be located, and the course of the limes verified over long sections. In some areas, however, there are substantial divergences between the course assumed by the Reichs-Limeskommission and the course that has now been identified. This phenomenon has already been observed on other sections of the limes (Mückenberger 2022). When looking at the geophysical results, questions arose as to why the limes runs exactly along a particular line and in a particular area, without it being possible to identify any topographical reason. This concerns above all the sections in which the course of the limes is best described as curvilinear, although when viewed today there is no apparent reason not to assume a straight course.

On the basis of the results of the geomagnetic prospection, during which the areas in front of and behind the limes line were also examined, of a review of find reports and old excavations, as well as on-site inspection, it was already possible in some cases to explain the very unusual course of the limes. It became apparent that in many places prehistoric funerary monuments and groups of tumuli were taken into account during the construction of the limes, and that this can explain at least some of the curves in its otherwise straight course in such sections (Henrich & Schamper 2021). In other areas

in: H. van Enckevort, M. Driessen, E. Graafstal, T. Hazenberg, T. Ivleva & C. van Driel-Murray (eds) 2024, *Current Approaches to Roman Frontiers. Proceedings of the 25th International Congress of Roman Frontier Studies 1*, Leiden, Sidestone Press (= Archeologische Berichten Nijmegen 9), pp. 103-108.
DOI: 10.59641/3d278gp

examined in this preliminary report tactical reasons are suggested, or even problems in surveying, for what at first glance appears to be an unusual course of the limes.

A more detailed analysis of the reasons for the almost meandering course of the limes over long stretches has not yet been possible using only traditional archaeological research methods. For this reason, a cooperation project between the Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie and the Bonn Center for Digital Humanities at the University of Bonn was initiated. The Bonn Center for Digital Humanities conducted the evaluation of the Airborne Laser Scan (ALS) data for the areas along the 75 km long limes section in Rhineland-Palatinate. In addition, structures in the hinterland between the limes and the Rhine, but also on the 'non-Roman' side, were surveyed and evaluated. In the following, the first working hypotheses of the still ongoing project will be shortly presented.

The first consideration concerns the course of the limes. It is often stated that the corridor that formed the first construction phase of the limes was laid out without regard to the topography of the area. This may certainly be true for some sections, for example the 80 km of the limes in Baden-Württemberg between Welzheim/Haghof and Walldürn (Schenk 2020). But in Rhineland-Palatinate it could be clearly demonstrated that the limes in fact meandered through the landscape and quite often did take the topography into consideration. Since there was already dense pre-Roman settlement in the Middle Rhine area, it is quite possible that the Roman construction teams used parts of the prehistoric network of paths connecting pre-Roman settlements that already existed. Although not many settlements have been found yet, either because modern activity overlies them, or very few excavations or research projects have been carried out there, we are aware of numerous groups of burial mound related to the settlements that were located along the paths.

One of these numerous burial grounds extends over a length of about 450 m between the watchtowers 2/4 and 2/6 near the fortlet of Becheln. In the Airborne Laser Scan it can clearly be seen how the limes passes through this vast burial ground without destroying any of the tumuli (Henrich & Schamper 2021, 200, fig. 2). The same can be observed only a few hundred metres further west between watchtowers 2/11 and 2/13 near the small village of Dornholzhausen (Henrich & Schamper 2021, 201, fig. 3). Here the limes winds its way over a length of almost 2 km through an extensive group of tumuli without touching any of the numerous mounds. The Roman construction teams seem to have followed already existing paths and avoided destroying the tumuli. The situation near watchtowers 1/46 and 1/47 near Heimbach-Weis is different. Coming from the south, the limes crosses a large group of burial mounds here, destroying at least two of them (Henrich & Schamper 2021, 199, fig. 1).

The fact that the limes in many places passed through or close to burial grounds suggests that the Roman construction teams continued to use pre-existing routes from the pre-Roman period. This would fit the idea that already in pre-Roman times imposing funerary monuments and tumulus groups were built along important routes and connections. To test this theory, a path network reconstruction was performed using the R-package Least Cost Path (Lewis 2021). First, the reconstruction was performed using Tobler's Hiking Function (Herzog 2013; Güimil-Fariña & Parcero-Oubiña 2015), which is the most widely used algorithm in approximating the difficulty of moving across a landscape. The function estimates the time it takes to cross a surface and is based on the slope of the terrain. Other features of the landscape that affect human movement, as well as other functions used to calculate pathfinding, will be included in subsequent steps in the study presented here.

For our study, we used a digital terrain model with a resolution of 10 m that we derived from the current ALS-data. Due to the extent of the terrain we studied, the reduction of the resolution was inevitable in order to allow the calculation of longer sections of the route. After adjusting the model, we will attempt to compute smaller sections at a higher resolution to analyse the resulting deviations. A fundamental problem of the approach is the limitation of the analysis to only the terrain, since we lack other data on the nature of the landscape from the period under investigation. Likewise, we must keep in mind that the morphology of the landscape has also changed over the past centuries as a result of erosive processes and human intervention, and thus our model, even under optimal conditions, can only be understood as an approximation of the shape of the prehistoric path network postulated here (Verhagen & Jeneson 2012; Verhagen *et al.* 2019). As nodes for our analysis we used the watchtowers and connected every tenth one with the function described. Figure 1 shows the course of the limes between watchtowers 1/12 and 1/32 near the Niederbieber fort. The brown line marks the line the limes followed, the red dotted line the result of the analysis with Tobler's Hiking function. Between the watchtowers 1/13 and 1/20 the limes followed the path constructed by the algorithm almost exactly.

A completely different picture emerges on the section of the limes near the fortlet of Anhausen between watchtower 1/39 and watchtower 1/45. Here the limes runs on the heights above the deep valley of the Aubach about 1 km north of the path constructed by the analysis. The deviation can be explained by the fact that the path constructed with the help of Tobler's Hiking function runs through the valley. The terrain here has almost no gradient and thus represents the easiest and fastest connection between two points. However, following the higher ground ensured a better overview of the surrounding terrain,

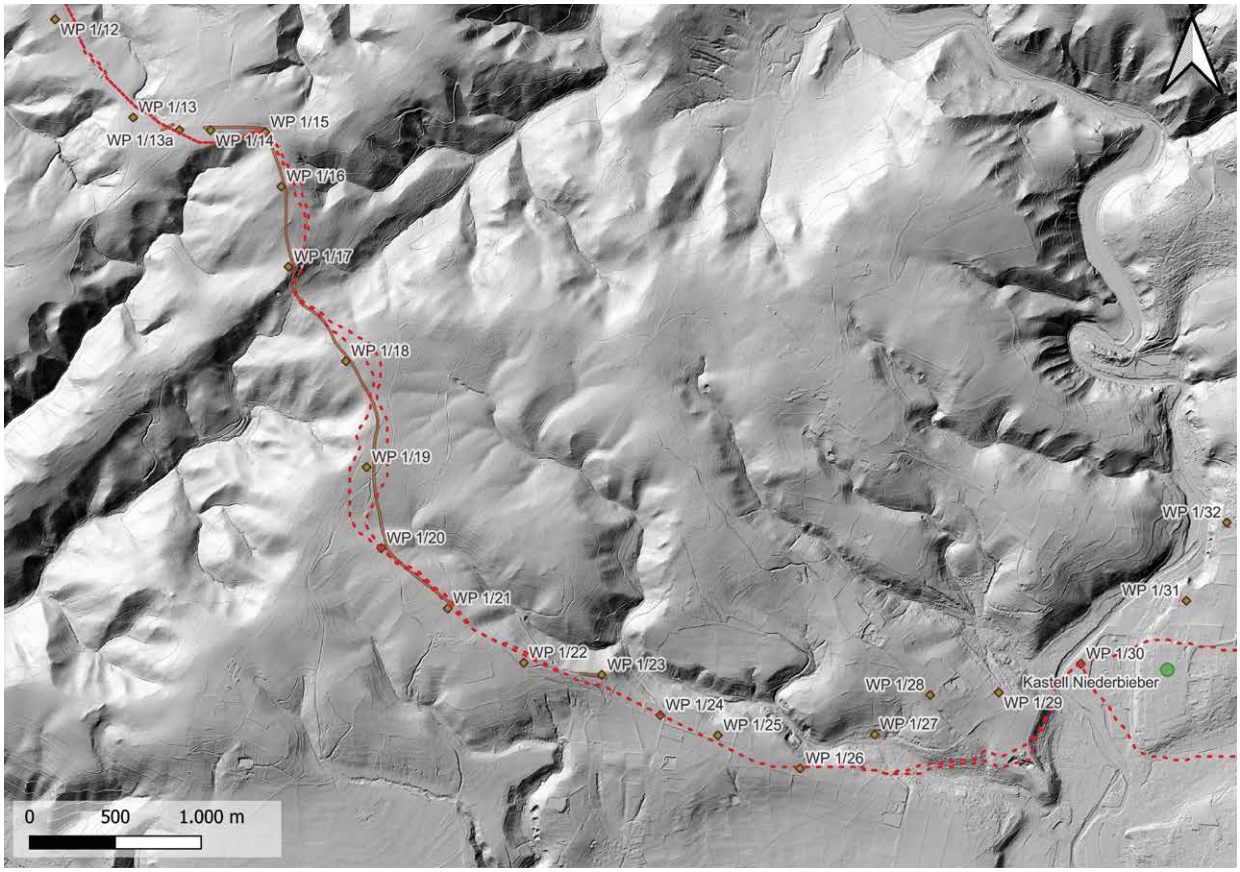

Figure 1. Limes section between watchtowers 1/12 and 1/32 (Graphic: Matthias Lang; base map: © GeoBasis-DE/ LVermGeoRLP <2021>).

especially the deep valley cuts of the many streams on this section of the limes, such as the Aubach, Wied, Saynbach or Brexbach. This also explains why there was usually a Roman watchtower at the highest points in the area. For tactical reasons, the Roman planners surely deliberately decided against using the supposedly easier route.

In the area of the fortlet of Anhausen, the constructed path follows a series of four sunken tracks, some of which certainly date back to the pre-Roman period. However, the limes does not follow this path, but makes a wide arc to the north, which cannot be explained topographically (fig. 2). Here, too, tactical reasons probably tipped the scales in favour of the route, since the arch blocked the sunken tracks and thus closed the most important connection to the Neuwied Basin, which was valuable to the Romans.

In addition to blocking the presumably pre-Roman route from the Rhine to the more distant areas on the right bank of the Rhine through the limes, this important east-west connection was additionally secured by the fortlet of Anhausen. The importance of Anhausen is also demonstrated by the fact that the fort continued to be used until the late period of the limes, albeit with only a reduced size or garrison (Reuter 1996, 76-77). The last two examples show that one reason for what from today's point of view is a 'senseless', or better incomprehensible, because not economical, course of the limes, is to be sought in the control and protection of goods and passenger traffic on pre-Roman supra-regional trade routes.

Within the framework of the large-scale geomagnetic surveys it was also possible to answer questions concerning the surveying and realization of the limes. The magnetogram for watchtower 2/15 near the small village of Berg shows the wide ditch and the trench for the palisade of the limes, as well as the wooden tower, as clearly visible anomalies. The area in the centre is now extensively disturbed due to modern agricultural development at the site. Nevertheless, one can clearly see that the line of the limes coming from the north and that from the southeast do not meet directly. Obviously, we are dealing here with a place where two construction crews met, whereby one of the surveyors seemingly made an error. The line coming from the southeast meets the one from the north obliquely, with the latter apparently continuing south for a short distance before stopping (fig. 3). However, this is so far the

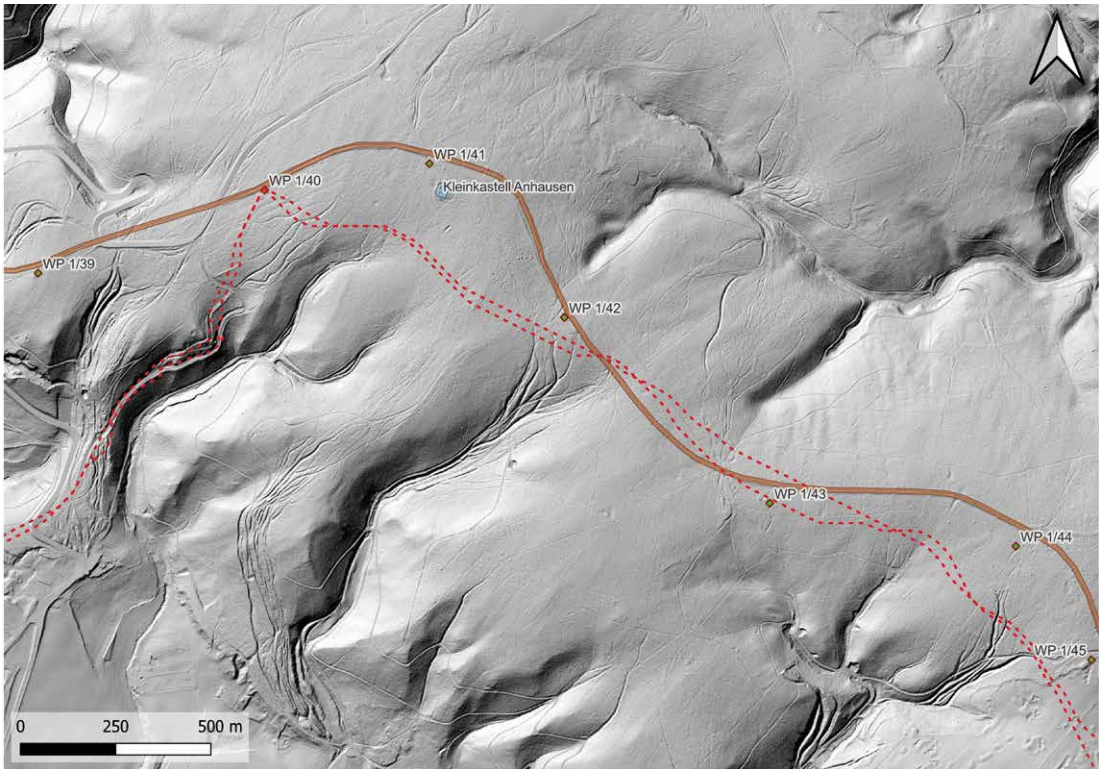

Figure 2. Limes section in the area of the fortlet of Anhausen. Limes: brown line. Constructed path: red dotted line (Graphic: Matthias Lang; base map: © GeoBasis-DE/LVermGeoRLP <2021>).

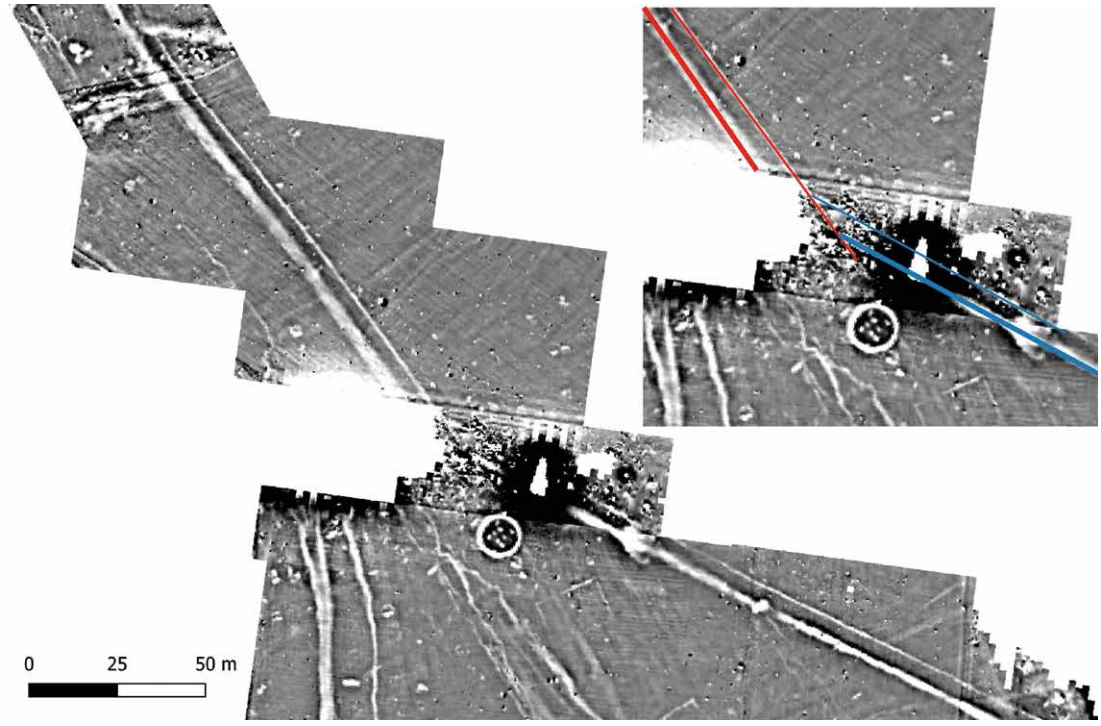

Figure 3. Course of the limes at watchtower 2/15. Top right: Close-up showing that the lines do not meet directly (Graphic: Jennifer Schamper; data base: Posselt und Zickgraf GbR).

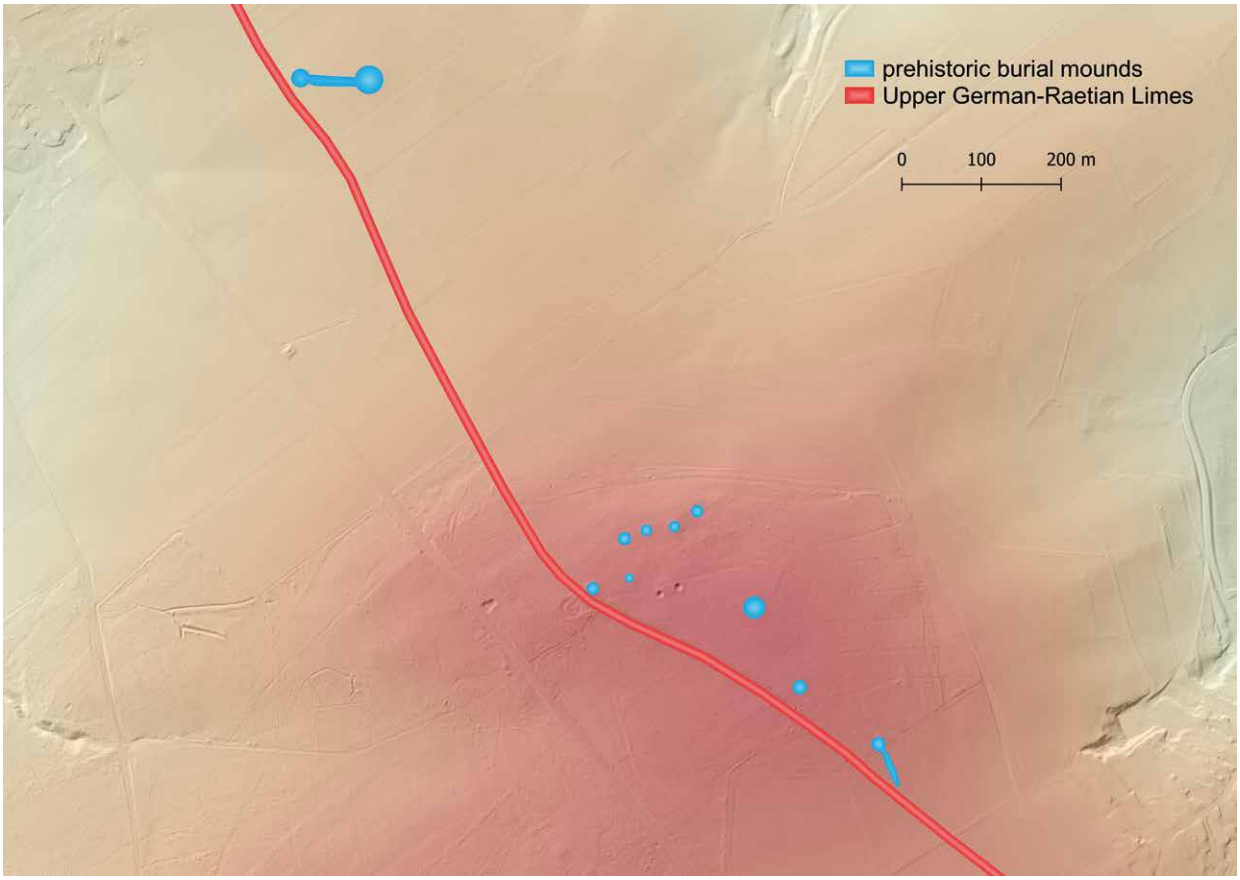

Figure 4. Pohl/Obertiefenbach. It is clearly recognisable that the limes passes by the funerary monuments (Graphic: Achim H. Schmidt, GDKE; base map: © GeoBasis-DE/LVermGeoRLP <2022>).

only place on the Rhineland-Palatinate section of the limes where such a survey error could be detected.

In the limes section south of the fortlet at Pohl, attention can be drawn to several interesting aspects concerning the planning and construction of the limes. Near watchtower 2/26, the limes emerges from the woods of the Pohler Wäldchen near the village of Obertiefenbach. Directly at the edge of the woods a prehistoric funerary monument is visible in the magnetogram. It lies to the south of a large group of tumuli through which the limes passes. One can clearly see that the limes makes a small bend at the southern corner of the long ditch of the tumulus and passes by without touching it. The distance between the palisade ditch and the corner of the funerary monument is only 1.60 m (Henrich & Schamper 2021, 204, fig. 6). Approximately 1.2 km further north, two burial mounds were discovered during the geomagnetic survey which were connected by a long ditch. Due to intensive agricultural use, nothing is visible of the mounds above ground. Coming from the south, the limes, which is again clearly visible here, forms a bend and passes the two burial mounds to the west (fig. 4).

Looking further in the direction of Pohl, it is quite clear that the course of the limes was only changed out of consideration for the burial mounds. It is also evident at this point that the construction teams who built this section of the limes worked from the south. The terrain slopes steeply from south to north, so that the barrows were clearly visible from the heights and so the route could still be changed spontaneously. It can also be assumed that these prominent land markers were used by Roman surveyors to mark out the route.

Conclusion

In summary, it can be said that the large-scale campaign of geophysical prospection along the line of the limes in Rhineland-Palatinate has revealed important new aspects of the Roman survey work and the function of the limes, which had previously been formulated as theses but could now be confirmed on the basis of concrete research results. Only the use of various non-invasive methods over a large area and their combined interdisciplinary evaluation made it possible to make further statements about the planning and construction of the limes. Thereby

it becomes apparent that statements often made in traditional research on the limes about the straight line of its course are no longer tenable in this form. Rather, it can be demonstrated that the line of the limes was adapted to the topography and to pre-Roman routes, as well as serving to control the supra-regional traffic of people and goods. The preliminary results of the research project presented here can also be used to investigate the course of the limes more closely in areas where clear archaeological finds have so far been lacking. Nevertheless, it has become clear that we are far from knowing everything about the limes and its surroundings, and that modern methods that are constantly developing can help us to close research gaps, as well as to identify new research questions.

Acknowledgements

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Supplying the *Limes Britannicus*

An approach from network science and archaeology

Arnau Lario Devesa and Jordi Pérez González

Amphorae studies in the Roman frontier

The first researchers on the limes did not pay much attention to amphorae, despite the fact that Dressel, the father of Roman amphorology, published a synthesis of his results in German over a century ago (Dressel 1894). Half a century later, Nesselhauf drew attention to the need to study the amphoras on the Roman border (Nesselhauf 1960). Modern studies of amphorae in the Roman limes began with the works of Heukemes (1958), Ettlinger (1977) or Remesal Rodríguez (1986). Among the amphorae known in that area, Betic oil containers, Dressel 20, are those which offer the greatest opportunities for delving into that matter. They are present in most military camps and are the amphoras with which the greatest amount of epigraphic data is associated (Remesal Rodríguez *et al*. 2019).

The choice of that amphoric type is not fortuitous. During the first three centuries AD, the rivers Guadalquivir and Genil were used as an export route for the amphorae carrying olive oil produced in the *Baetica*, which was sent to many areas of the Roman Empire, especially the western limes and the city of Rome (Aguilera 2002). Today it is in the latter, and in particular in Monte Testaccio, an ancient Roman-era state landfill (Remesal Rodriguez 2022), where more information has been recovered. The unusual conditions of preservation in this site have allowed for a better understanding of a system of stamps, graffiti and *tituli picti* that is far more elaborate than any other known amphoric type.

The majority of the studied amphorae were stamped on one or both of their handles with a short sequence of letters and/or symbols, mostly describing one or more *tria nomina* of individuals who were tied to the trade of that product. However, it remains difficult to assess what was the role of this person in the process of production, filling and transporting of the vessel. As they are not unique, those codes can be found in different and usually mutually distant places, so they seem a reliable **proxy** for studying the long-range commercial relations in the ancient world (Rubio-Campillo *et al*. 2018a-b; Coto-Sarmiento & Rubio-Campillo 2021). The study of the trade routes for Baetican olive oil and of the possible influence of the provincial system in its distribution has led to the following hypotheses being established (Rubio-Campillo *et al*. 2018a-b):

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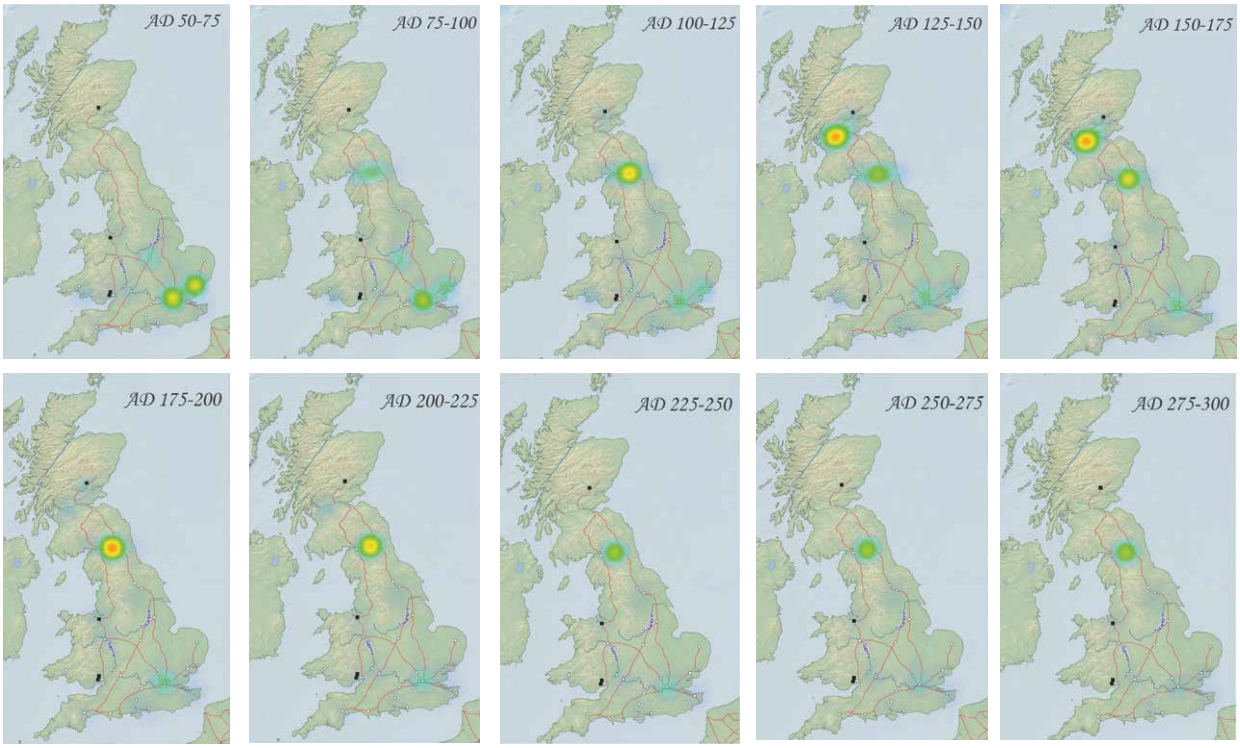

Figure 1. Heatmap of the presence of Dressel 20 oil amphoras with epigraphy found in *Britannia* (Pérez González 2022, 123, www.romanopendata.eu).

1. The settlements of the same regions share similar amphoric stamps;
2. There are groups of regions whose stamps are more similar than others found in other parts of the *Britannia*;
3. Sites receiving products via different trade routes would be supplied by different agents, so some divergences are to be found within the same site.

These hypotheses have been put to test in various cases involving Roman trade (Prigano *et al.* 2017; Pons & Pérez González 2018; Pérez González 2022). Proceeding from a broader to a narrower perspective, the main case-study is the entire Empire, which represents one of the first and most demanding tests for our methodological approach.

Roman *Britannia*, a key case study

From the conquest of the Roman province of *Baetica*, the latter stood out as one of the most important producing regions of this product (Berni Millet 2008; Moros Diaz 2021a). The most widespread amphoric type in the interprovincial trade was the Dressel 20, amphora that could contain about 70 kg. and whose production was extended from the 1st to the 3rd century AD (Berni Millet 2017). To date, there are more than ninety potteries known along the river Guadalquivir that produced it. In general, there is a preferential production of the *conventus Hispalensis* (Seville/*Hispalis*), 2/3 parts, ahead of the *conventus Astigitanus* (Écija/*Astigi*) and the *conventus Cordubensis* (Córdoba/*Corduba*). It was normal that these amphorae carried various types of epigraphy, such as stamps, graffiti and *tituli picti*.

The study of the amphoric epigraphy allows us to know the place of production of these amphorae. Its presence in *Baetica* allows us to establish a relationship between the place of production and the place of consumption. The use of new analytical techniques such as the development of humanities networks allows us to know the different food supply routes (Prignano *et al.* 2017; 2022). The visual representation of the network of the different stamps found in *Britannia* allows us to recognize a series of patterns related to the use of the various trade routes, as well as of the different phases of its commercialization (fig. 1).

The mobilization of the army needed new routes for its supply during the years in which the frontier was advanced. A large number of these amphorae can be related to initial phase of the conquest of the frontier belonging to the Hadrian's Wall. The later advance of the border placed the limes in the line of the Antonine Wall, and the food supply advanced indirectly until that line. This network may be a reflection of the control of the

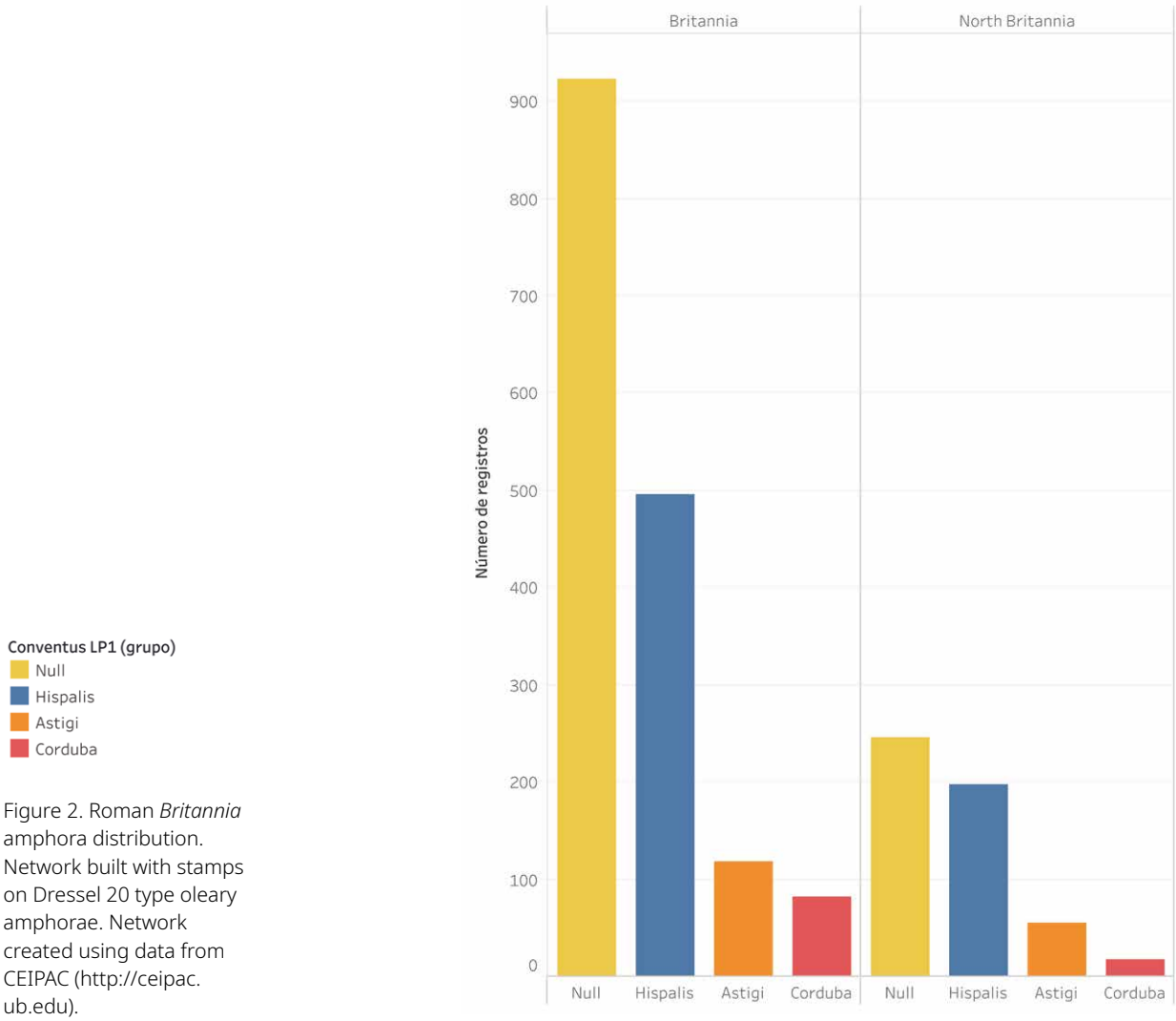

Figure 2. Roman *Britannia* amphora distribution. Network built with stamps on Dressel 20 type oleary amphorae. Network created using data from CEIPAC (http://ceipac.ub.edu).

Roman State over a given product supplied to the military personnel within a war economy.

Later, the pressure of the northern tribes on the frontier caused the withdrawal of the troops to the first defensive line in the Hadrian's Wall. It was during these years that the emperors of the Severan dynasty, in an attempt to secure the frontier again at this point, reactivated the olive oil supply to the troops there destined. The food supply reached similar levels to those of the first phase of the conquest and creation of the frontier.

The use of these methods offers a series of results that would corroborate the use of a series of hubs in the Hadrian's frontier, with Corbridge, Vindolanda and Carlisle as centers of reception, storage, consumption and redistribution of these foods. The security of its location in the Stanegate allowed a better functioning of the food supply network to the smaller forts distributed in the first line of combat (Ayllón Martin & Pérez González 2014; Ayllón Martin *et al.* 2019; Pérez González 2022).

The interdisciplinary collaboration between network scientists and experts of the case study provides, arguably, the most interesting and reliable results. One of the results of the collaboration between Humanities (History and Archeology), Physics and Mathematics was developed throughout the EPNet project (Remesal Rodríguez & Pérez González 2022), the results of which have allowed us to know the different production systems of the amphoric industry (*e.g.* Rubio-Campillo *et al.* 2018a-b; Remesal Rodríguez & Moros Diaz 2019; Coto-Sarmiento *et al.* 2018; Moros Diaz 2021a), as well as the various food distribution routes (Rubio-Campillo *et al.* 2018a-b).

The construction of the following networks elaborated with data from the CEIPAC database reveals visually some of the hypotheses with the greatest impact developed within the EPNet project. Thanks to the new data science in the Humanities, it is possible to generate the necessary datasets to capture the economic dynamics of the Roman Empire from a multiscalar perspective, beyond specific

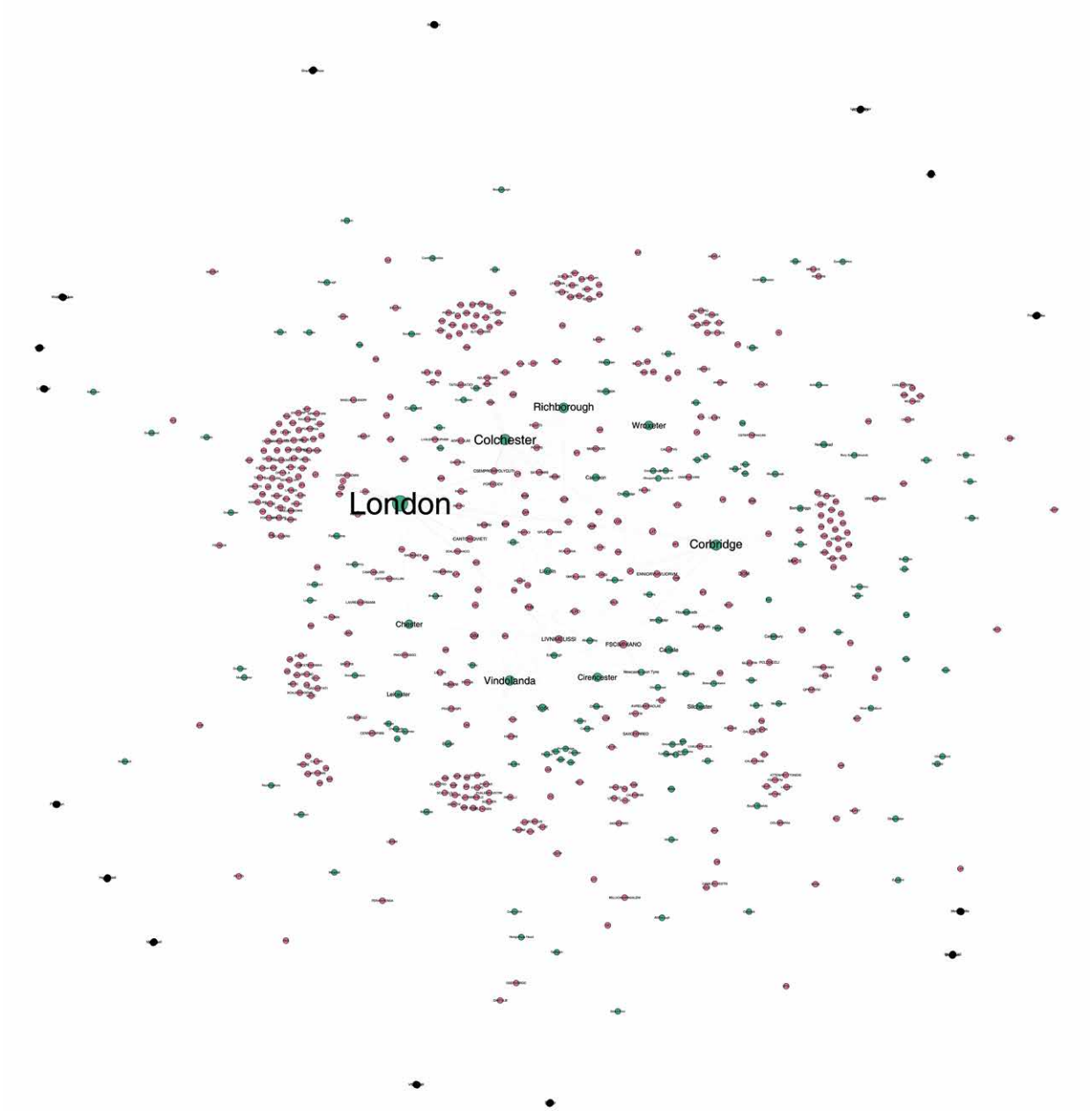

Figure 3. Roman *Britannia* amphora distribution (Capture). Network built with stamps on Dressel 20 type oleary amphorae. Network created using data from CEIPAC (http://ceipac.ub.edu).

case studies (*e.g.* Brughmans & Wilson 2022). So far, many of the databases in the Humanities highlighted by the cumulative nature of them and thanks to the realization of these projects we can analyze for the first time thousands of data, converting them into intelligible visualizations to researchers, who testify more easily the similarity (or other) between the various communities that make up the network. Continuing with the classic construction developed in several works of EPNet where the 'Places of Finding' and 'Epigraphy' were found (in this case 'Stamps'), we can prove through these networks some results of the project and transfer the question to other productions (Prignano *et al.* 2017; Pérez González *et al.* 2018).

Building the networks

The presented network features places (sites) and stamp types (categorial attributes). Each node representing a place (in **green**) is connected to stamp types (in **pink**)

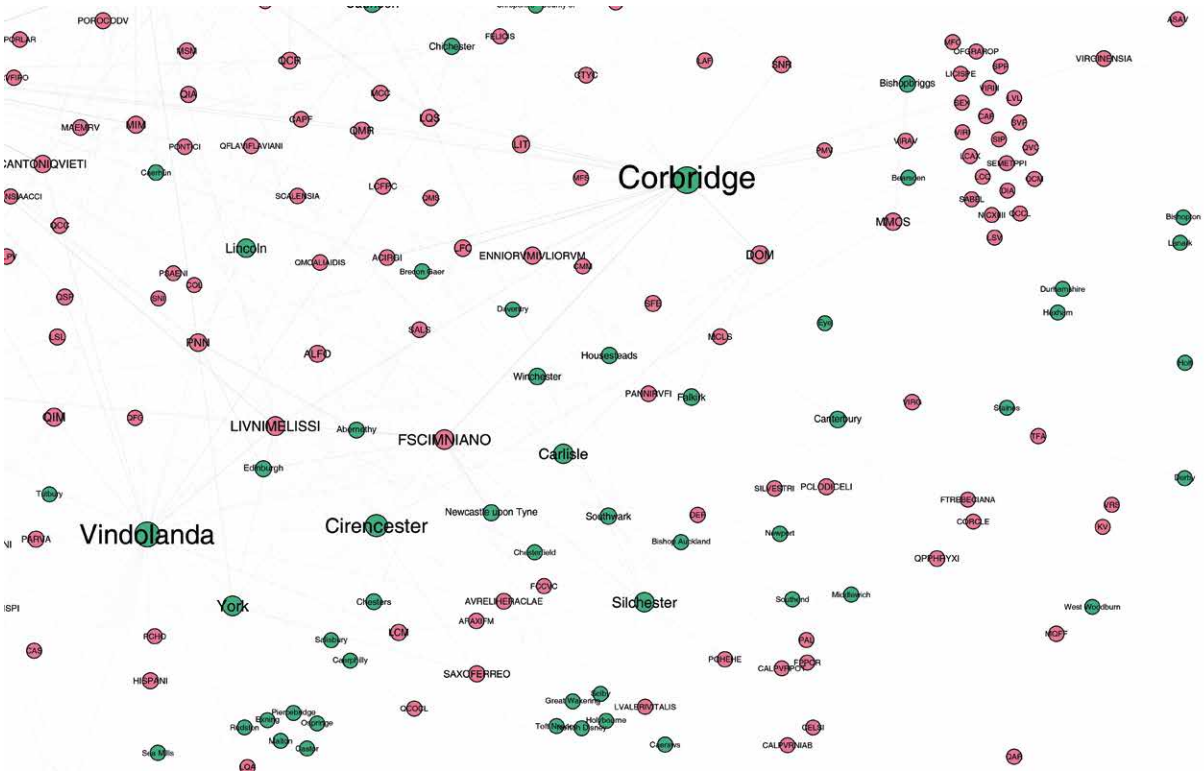

Figure 4. Roman *Britannia* amphora distribution. Network built with stamps on Dressel 20 type oleary amphorae. Network created using data from CEIPAC (http://ceipac.ub.edu). With filter (weight 2 = greater connection between stamps-places).

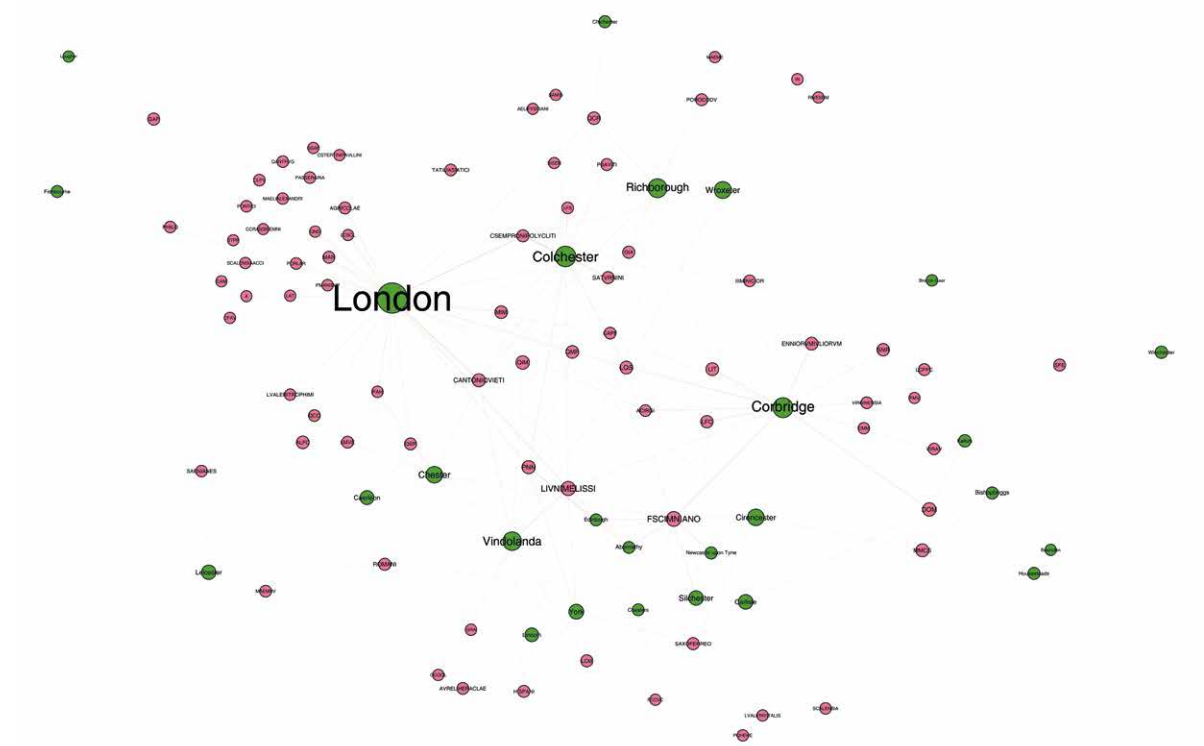

Figure 5. Graph of comparative tables of the *Baetica* conventus linked to the stamps found in *Britannia* and specifically in the north.

that have been found in its assemblage and its size is proportional to the total number of elements (stamps) in it (fig. 2-5). The size of nodes representing place-types is proportional to the number of stamps in that category. The thickness of the links is proportional to the number of stamps of a given stamp type that have been found in a certain place.

As we have already illustrated in previous works, the analysis of the epigraphy related to the Dressel 20 olive oil amphorae allowed us to reconstruct the routes by which the olive oil produced in *Baetica* was redistributed during the 1st to 3rd centuries AD (Remesal Rodríguez 1986; Funari 1996; Carreras & Funari 1998). Although this work was developed using an approximation based on null hypotheses, the present networks would come to validate the results already obtained (Rubio-Campillo & Coto-Sarmiento 2022).

Thus, the groupings of materials by similarity in these networks show how the settlements of the same province or region share similar inscriptions. In the present study we highlight the grouping or similarity of a series of nodes that represent the different places of discovery of Dressel 20 amphorae in *Britannia*. The prominent group would be representing the northern border of the Roman Empire, territory that expands from the Hadrian's Wall to the Antonine Wall. The representation of this general network would show the groupings of these materials by regions, key for the development of the hypotheses of their distribution.

The results of this case study confirm that the provincial structure had a relevant, if not decisive, weight in the organization of the olive oil trade. Particularly important is the pattern of similarities between the limes region, in contrast to the supply route that would have the rest of *Britannia*, perhaps the result of the advance and relocation of the conquest to new regions and the maintenance of the walled borders in the north. In turn, it should be noted that, since Carreras & Funari (1998; Carreras 2000) made the epigraphic emptying of the known materials of the province, there are no new reference works that renew the statistical content of the province, a fact that is not due to other parallels, we believe. The general tone of the distribution and consumption dynamics that we already know would not change in depth (Remesal Rodríguez 2018), even so, we encourage future generations of researchers to continue with these studies, who have in *Britannia* a territory to explore in detail.

Network science studies in Ancient History

Over the past few decades, archaeological sciences have forged ever closer and more frequent relationships with a wide range of disciplines, some of them very distant in terms of methodology and fields of knowledge. Nowadays, it is common knowledge that archaeology has analysis techniques based on physics, chemistry, and geology to know the age, provenance or other characteristics of all types of evidence. In general, collaboration with specialists within the STEM (science, technology, engineering and mathematics) disciplines is usually relegated to a very specific phase of the investigation, ideally located between the collection of material evidence and the more genuinely intellectual effort of putting the pieces together and extrapolating conclusions (Silva *et al.* 2022).

The rise of data science opens the door to all types of structured information to be subjected to the application of a variety of statistical techniques and machine learning, allowing patterns to be extracted and classifications to be proposed. Meanwhile, the language of complexity, which emerged during the 1970's, has been doing a slow yet valuable job, building bridges between diverse fields of knowledge, and is beginning to also establish itself as a widely used tool in archaeology. The two paths are not mutually exclusive, but are based on somewhat opposite assumptions. Of all the sciences of complexity, network science, a specialty that studies complex relational data, is becoming more prevalent in archaeology, albeit with some difficulties. Network science, or complex network science, emerges from studies carried out in different disciplines and, in short, is made up of a formalism, an analysis toolbox, and an abundance of concrete results (Prignano *et al.* 2022).

Its object of study is complex systems (Brughmans 2021; Romanowska *et al.* 2021), namely any portion of reality from which we can define limits or borders with the sole requirement of being composed of multiple connected elements (Prignano *et al.* 2022). The peculiarity that defines the complex networks approach is that connections prevail over components. A complex network is nothing more than a mathematical representation of a system in which the components are mapped into abstract objects called nodes (or vertices) and the connections that unite them into links (or edges), regardless of the nature of either. From here on, network science forgets the concrete reality of the system under examination and works with abstract objects. This is why formalism is the common denominator of any research, theoretical or applied, ascribable to this branch of complexity sciences. The typical procedure foresees that, after building the mathematical representation of the system, a characterization of it is carried out by means of the computation of metrics defined expressly for it. Which metrics are most appropriate depends on the context. The most basic ones include the mean number of links per node (degree), the mean minimum length of the path separating two nodes in terms of number of links (average shortest path length), the fraction of closed

triangles present in the network with respect to the total of those that could exist (grouping coefficient) and other similar metrics. In the majority of archaeological studies, nodes are representations of the context, *i.e.* the archaeological evidence, which can be grouped together according to their relative location (Golitko *et al.* 2012; Mills *et al.* 2013; Fulminante *et al.* 2017; Radivojević & Grujić 2018; Prignano *et al.* 2019). But what happens when we work with geographically scattered or decontextualized remains, such as amphoric types or ceramic compositional groups? In this case, cluster analysis algorithms can help to classify or group objects based on their individual properties.

The application of network analysis in archaeology has not been standardized as an integral part of this field of knowledge, but has nonetheless become quite widespread, especially over the last decade, with a growing number of publications in specialized journals. There are several overviews of network approaches in archaeology and Roman economy studies (*e.g.* Peeples 2019; Verhagen *et al.* 2019; Brown 2020; Caro *et al.* 2020; Ahnert *et al.* 2021).

Although complexity sciences as a whole, and network sciences in particular, have great potential to overcome the rigidity of traditional multidisciplinarity in the interactions between STEM disciplines and archaeological sciences, in practice, the obstacles obviously do not disappear simply because this overcoming is theoretically possible (Prignano *et al.* 2017; Brughmans *et al.* 2019; Brughmans & Wilson 2022). For archaeological data to enter the virtuous circuit of network science, the road is by no means smooth. Knowledge of the discipline is necessary, because deep understanding is achieved not only from the new data available, but also with all the previous knowledge of the context, to which must be added a strong specific motivation directed at a certain case of study, assuming a strong initial investment of time and the risk of failure. The proposed case consists of a continuous background of nearly fifty years for a discipline that originated at the end of the 19th century.

Discussion

The results presented here are similar to the theoretical models of appraisal and coinage flows by Keith Hopkins, which were developed by John K. Davies for the Roman Empire, who displayed this model graphically with a simplified diagram of three circles, one within the other, symbolising geographic space divided into regions, which derive their significance from political spheres: 'centre', 'middle zone' and 'periphery' or 'frontier' (Hopkins 1980; Davies 2005). For this, we must understand the supply of olive oil as a tax-exchangeable product, where *Baetica* must be recognized as a producing province of the middle zone, destined to first supply the food needs of the citizens of the capital of the Empire – the centre – to control its political influence, and then the limes – the periphery – where thousands of soldiers secured the Roman territory, as in the two northern borders highlighted in the representations of networks. Rome, like all empires, benefited from exploiting the resources of the territories they conquered, integrating them as producing and consuming provinces.

For this reason, the study of the amphorae material offers a new perspective: the survival of the limes depends on the supplies that arrived from other provinces. The task that we have set ourselves to present here is to delimit the following: which regions, and at what time, formed the base of support for the limes; what relations were established between the different areas; how they were related to each other; what role the imperial power played in the relations between the various territories; and how each of them influenced the political evolution of the Empire. Undoubtedly, the sample presented, allows us to know the intervention cycles of the Roman borders from the supply of food to its protagonists, the soldiers. The proposals for the design and stabilization of the Hadrian's and Antonine frontiers allow obtaining a clear image of the guaranteed food distribution flows through the different main and secondary settlements. Even the final attempt of the Severus period to keep the territorial limits of Rome in this province well defined − again on Hadrian's wall − can be observed through the discovery of amphoras from the period (*e.g.* LIVNIMELISSI, FSCIMNIANO or PNN stamps), the result of a food supply policy guided by the military campaign of the new emperor in *Britannia*. In parallell, we must add Severus' policy of confiscations in the region that produces these amphoras, thus organizing all the traceability of the *Baetica* olive oil (Moros Diaz 2021b).

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Research on the effects of relative sea-level change on the river Exe estuary in the mid-1st century AD (South-West Britain)

Stephen J. Kaye and John Pamment Salvatore

Relative Sea-Level (RSL) change since the mid-1st century AD places limits on the locations of Roman ports on the river Exe (fig. 6). Supplies from Northern Gaul, destined for the Neronian fortress at Exeter and its dependent civilian sites, may be demonstrated to have been unloaded downriver from the fortress at Exeter. Utilising a combination of available historical and archaeological data, glacial isostatic adjustment and estimated RSL over the past 2000 years, confirms that Roman sea-transports or river barges could not have reached the Exeter fortress on the tide. Furthermore, on the basis of the estimated tidal reach and depth of the river Exe in the mid-1st century AD, limitations may be placed on the location of both sea-port and barge-quay facilities, thus allowing the areas of search for these installations to be narrowed (Kaye & Salvatore 2022).

Relative Sea-Level (RSL)

The values of RSL can change due to both eustatic sea-level variations and Glacial Isostatic Adjustment since the last glacial event. 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 to -20 m Ordnance Datum (OD) some 12,000 years ago, meaning that the land surface was that much higher than it is today. By the 1st century AD, the RSL is at *c.* -2.5 m OD and the land continues to subside to this day. The consequences for the fluvial and tidal regimes are considerable, effecting 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.

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Historical information

The first reference (Delagarde 1840) to the tidal regime occurs at the end of the reign of Edward the First (AD 1272-1307) when John Hooker writes in the 'Haven of Exeter' that: "The river Exe is naturally only navigable for large vessels as far as Topsham, on the left bank of the river [east], four miles below Exeter. Smaller craft, however, and large barges,

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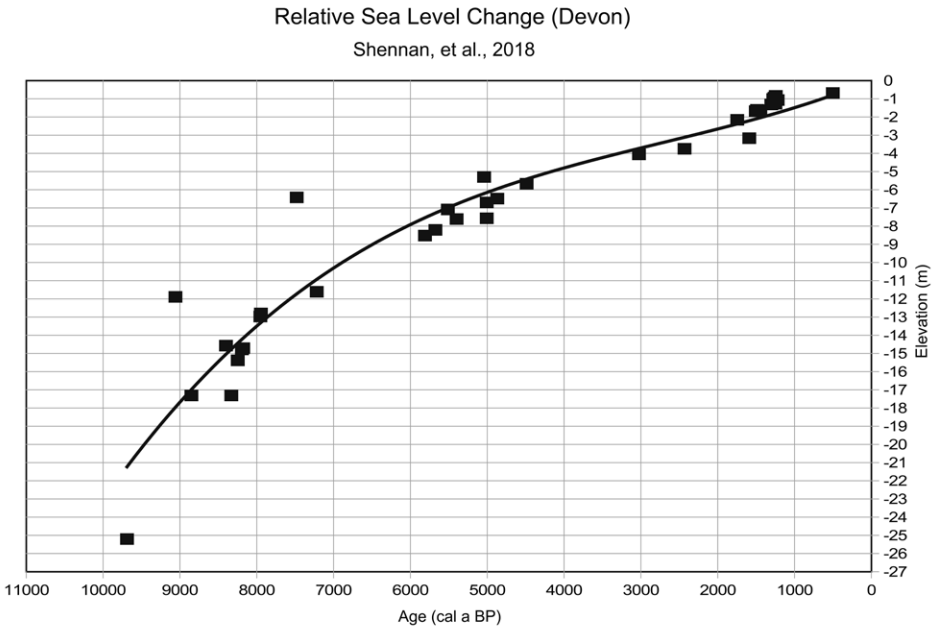

Figure 1. Age-elevation plot of sea-level index points for Devon (data from Shennan *et al*. 2018).

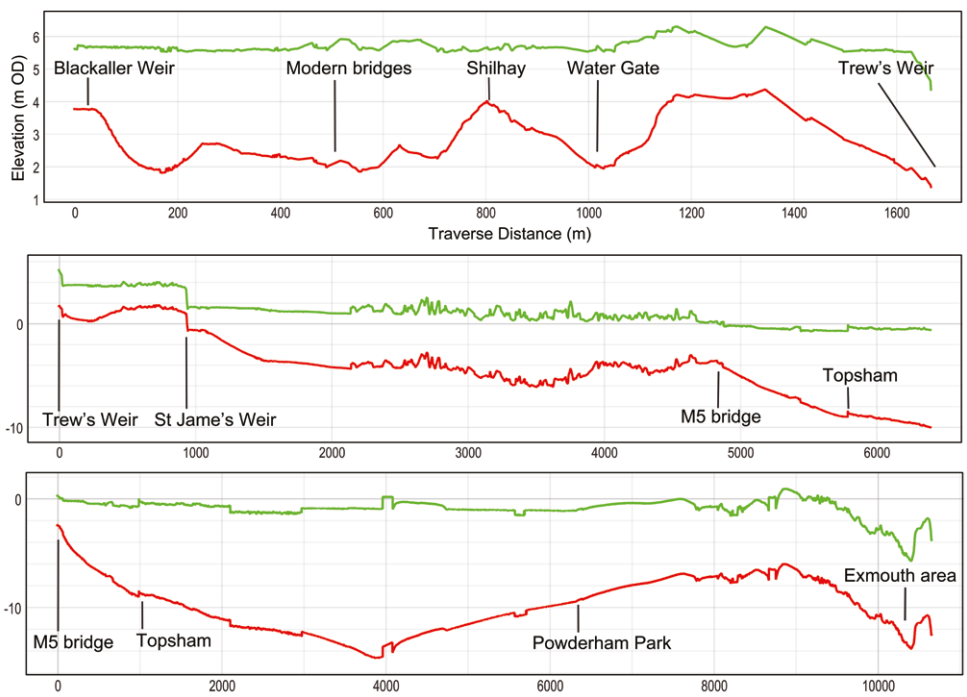

Figure 2. Present-day bedrock (red line) and overburden (green) profiles along a North to South transect of the river Exe.

could with the tide ascend to the water-gate of the city, in sufficient numbers to supply the wants of the inhabitants." Subsequently, in about AD 1300, a weir was constructed upstream of Topsham which blocked the tidal ingress and barge transport to the city.

Modelling of Relative Sea-Level change

The pre-AD 1300 tidal head at Exeter and the sea-port at Topsham were used as data anchors to ask the question: how much further south – the differential fall distance – would those locations have been in the 1st century AD? Topographic slopes down the Exe river and estuary were calculated: the best estimate was 0.02 degrees. These slopes were used to calculate the differential fall distances due to the RSL changes (best estimate -1.5 m) since the 1st century AD, *i.e.* how far has the tidal body fallen down the slope as time retrogressed to the Roman era (table 1)?

Table 1. Differential fall distances (m) from AD 1300 to the 1st century AD 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 AD 1300/1st century	-0.5/-1.5 m	-1.0/-2.0 m	-1.5/-2.5 m	-2.0/-3.0 m
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

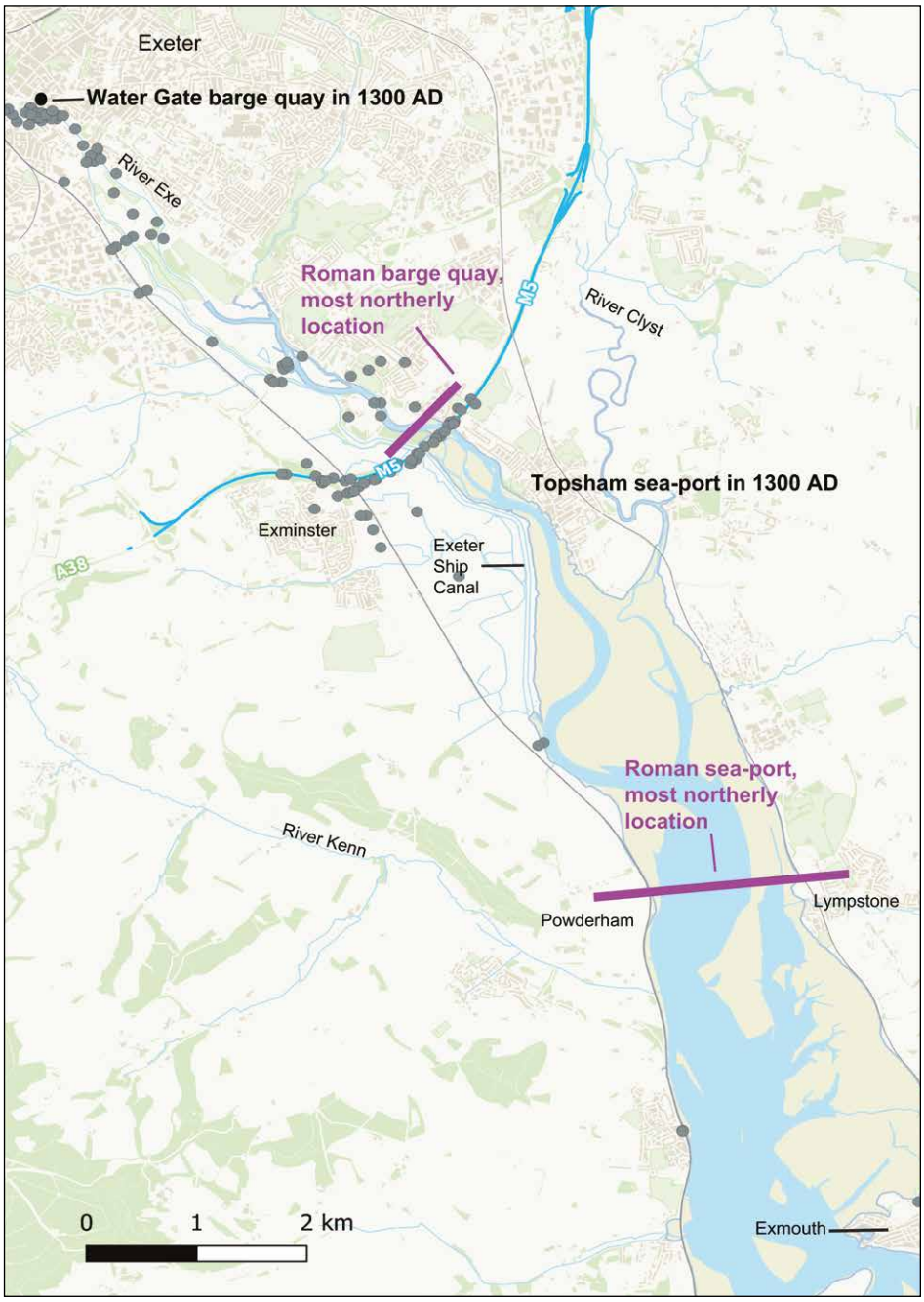

Figure 3. Map of differential fall distances to the most northerly locations in the 1st century AD for the AD 1300 barge-quay located at Exeter and the sea-port at Topsham. The differential RSL and slope values were the best estimates at -1.5 m and 0.02 degrees, respectively, resulting in a differential fall distance of 4,297 m. See figure 4 for the locations of all the differential RSL and slope values from the present-day to the 1st century AD.

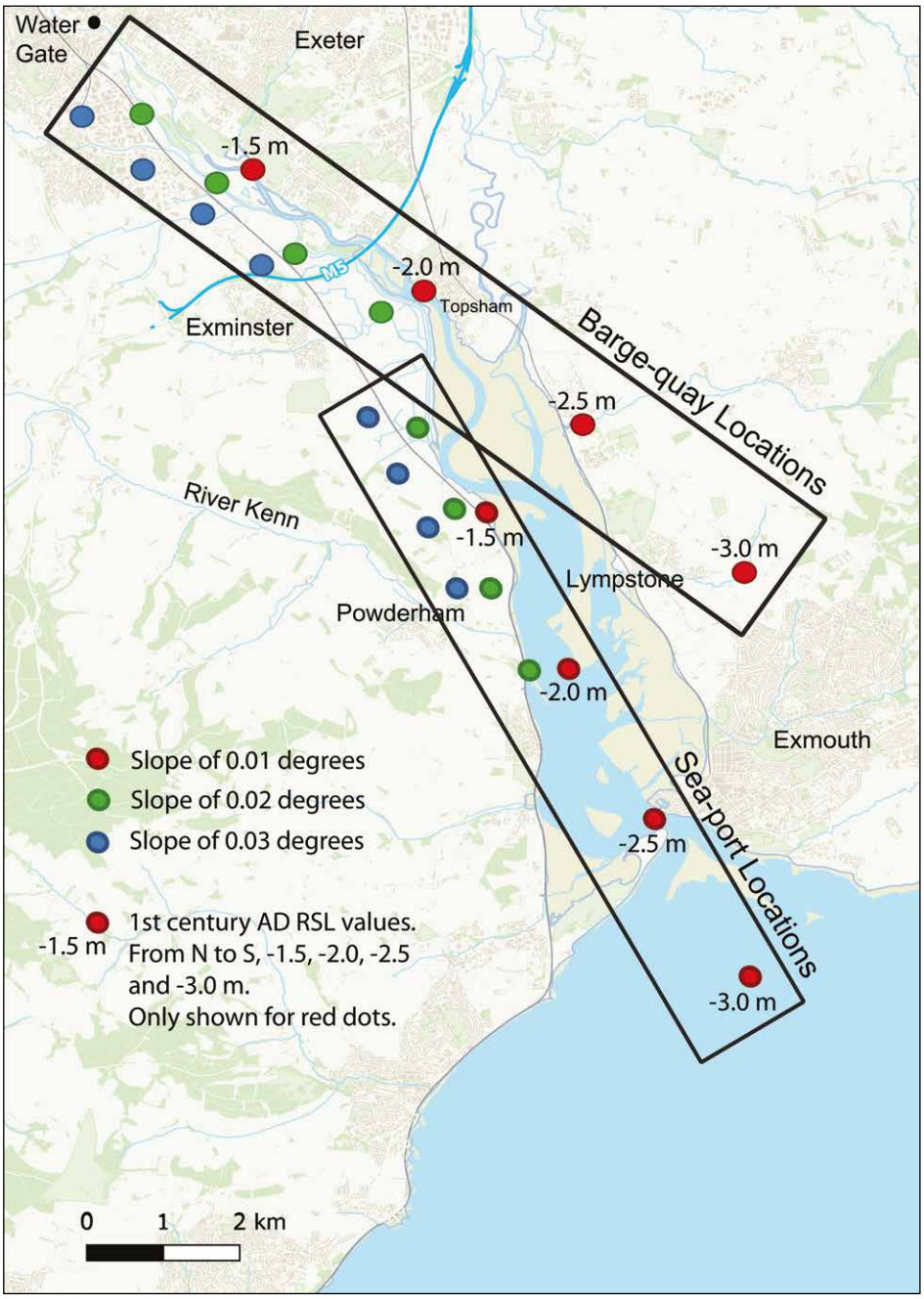

Figure 4. Map of the most northerly, or upstream, limits of 1st-century AD barge-quays and sea-ports. Differential fall data, from the present-day to the 1st century AD. For any combination of slope and RSL value the barge-quay or sea-port could not be placed further upstream or north than the relevant coloured dot.

Taking the best estimates of slope and differential RSL, 0.02 degrees and -1.5 m respectively, the fall distance was 4,297.18 m, that is, any AD 1300 tidal datum location might have been over 4.2 km further south in the 1st century AD (fig. 3). Demonstrably there was no barge-quay at Exeter in the 1st century AD because the tide did not reach that far upstream. Instead, a barge-quay may only have been located as far north as the vicinity of the M5 Motorway bridge (figs 3-4). Furthermore, assuming that the AD 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 (figs 3-4).

Tidal inflow simulation

A simulated tidal inflow into the Exe estuary and river valley was performed; it supported the findings of the previous RSL examinations with an additional set of limits on the positioning of the 1st-century AD sea-port and barge-quay. First, the extant boundaries to tidal inflow were eroded and partially breached in the tidal modelling of the present-day regime (fig. 5A). Second, 1st century AD

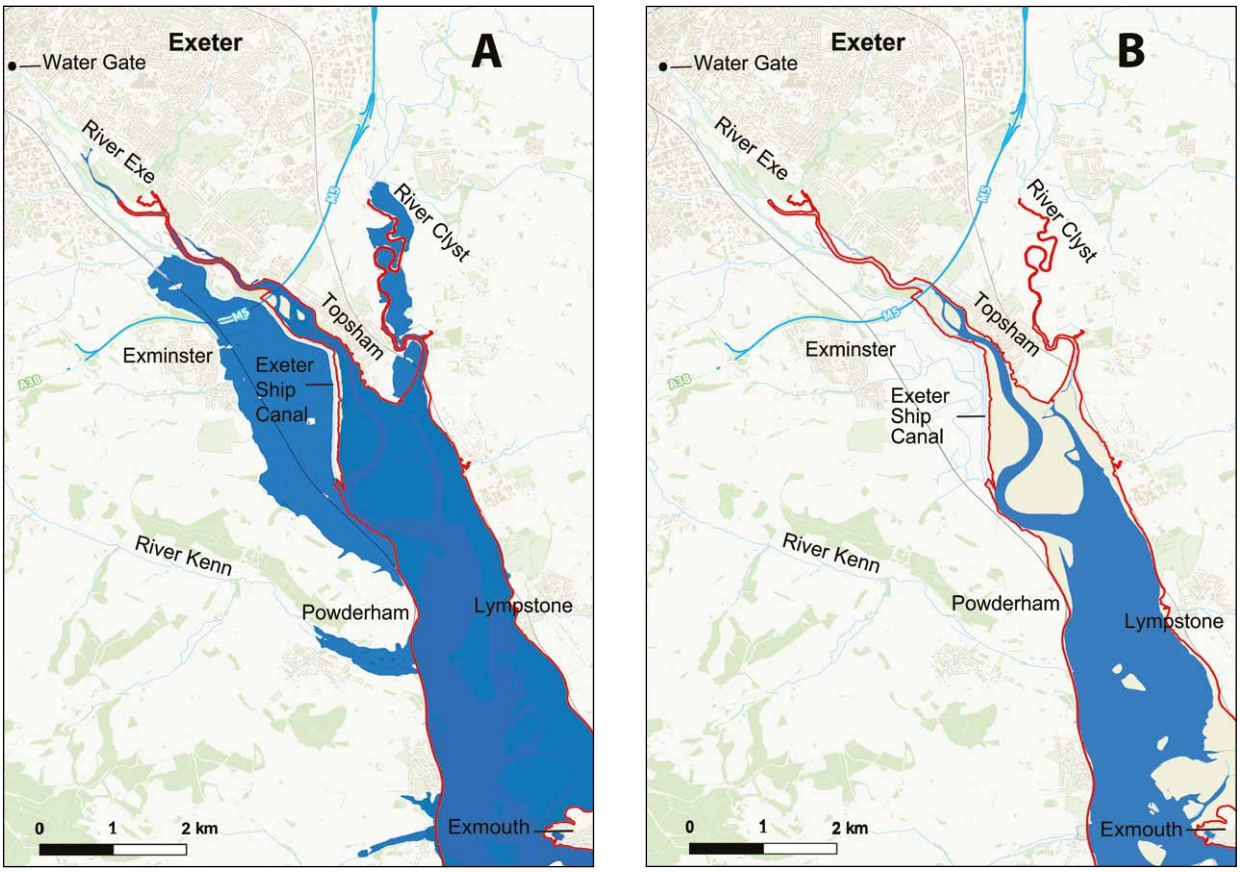

Figure 5. A. Simulated tidal influx for the present-day after the partial removal and breaching of anthropogenic structures. Red line is the Ordnance Survey High Water Mark. Grey lines are of the railways. B. Simulated tidal influx for the 1st century AD. RSL -2.0 m. Note that the modern anthropogenic 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.

modelling was achieved by raising the topography by only 2 m, *i.e.* imitation of a -2.0 RSL (fig. 5B). As a result, the tidal head was downstream of the M5 bridge and at Topsham the tidal water depth was *c.* 0.5 m. The results suggest Topsham was not a Roman sea-port but may have been a barge-port.

Archaeological context and conclusions

A mid-1st-century AD fortress at Exeter in SW Britain (constructed *c.* AD 50-55) is known from excavation to have been occupied by *Legio II Augusta* until perhaps the greater part of the legion was transferred to Caerleon in Wales around AD 75 leaving only a reduced garrison (Bidwell 2021, 154-156). Subsequent to the identification of the fortress in 1971, many contemporary civilian sites, dependent upon the fortress for their existence, have been discovered alongside or straddling the known Roman road leading from the south gate of the fortress to a location near the head of the river Exe estuary some 5.2 km south-east of Exeter (Bidwell, 2021, 140-149). These sites, include buildings associated with the *canabae legionis* (Salvatore 2021); a defended civilian settlement (*vicus*) at the former St Loye's College, 2.6 km south-east of the fortress (Salvatore *et al.* forthcoming); parallel strip buildings (possibly warehouses) at the Aldi supermarket site close to the head of the estuary just NE of Topsham (Garland & Orellana 2018) and a rectangular (row-type) building close to the Aldi site on the route of the M5 (Jarvis & Maxfield 1975) (fig. 6).

Paul Bidwell (2021, 138), the excavator of the military bath-house at Exeter has stated: "Looking across the whole sweep of the European frontier from Scotland to the Black Sea, Exeter is now known to have the largest series of dependent sites amongst fortresses dating to between the Augustan and early Flavian periods." The extent of potentially the largest of these dependent sites (the St Loye's settlement) is unknown but at least part of it was enclosed by military-style defences which included an outer V-shaped ditch and an inner Punic ditch. The pottery evidence, including copious amounts of amphorae sherds, suggests that St Loye's was occupied by civilian traders engaging in the supply and distribution

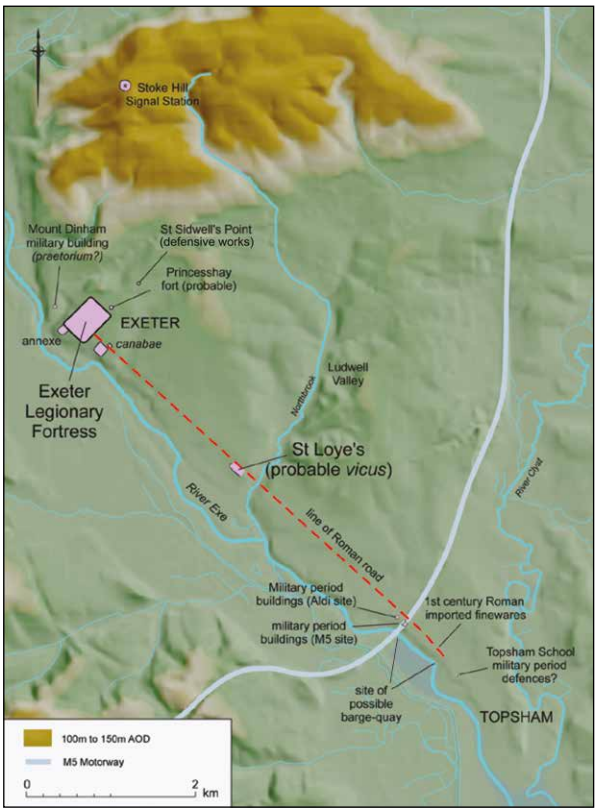

Figure 6. Roman military period sites located between the fortress at Exeter and the Topsham School site showing the approximate site of the possible barge-quay.

of imported goods and food stuffs from Gaul to the Roman garrison at the Exeter fortress and the auxiliary forts beyond.

The presented research offers some insight into the supply of goods from the Continent via cross Channel shipping. Namely, that tidal constraints within the Exe estuary would have prevented sea-going vessels (or even barges) from reaching the Exeter fortress itself. Whilst the cargo could have arrived at a sea-port on the estuary south of Lympstone, no evidence exists of a Roman military presence that far south. The current, favoured explanation is of a transhipment of goods from sea-going vessels to barges on the lower reaches of the Exe estuary; with those barges then travelling up-river to a barge-quay south of the mid-1st-century tidal reach of the Exe in the Topsham area; thenceforth, transport was by road (fig. 6).

Acknowledgements

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Roman camps of Villamontán de la Valduerna

A military complex close to Via XVII. *Item a Bracara Astvricam*

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These brief lines describe the archaeological work carried out in the Villamontán de la Valduerna enclosures during the years 2021-2022. It included excavation work, aerial and ground prospection as well as non-invasive geophysical prospecting (ground-penetrating radar, electrical resistivity and magnetometry) with the aim to characterise these structures. They consist of a group of Roman camps discovered in recent years thanks to satellite and aerial orthophotography and in which, unfortunately, the activity of metal detectorists has left archaeologists with almost no evidence of metallic remains (fig. 1).

The group of enclosures is located 1 km south of the modern village of Villamontán de la Valduerna, following the road known as the 'Calzada del Obispo' which runs along the old Roman road (*Itinerarium provinciarum Antonini Augusti*, *Via XVII*) that linked *Asturica Augusta* with *Bracara Augusta* through the Zamora valley of the river Tera. The site is located on a large plain, part of the northern sub-plateau on the northwest edge of the Duero Basin, in an orographically flat landscape with some well-preserved, very wide river terraces and a river system. These flat areas are geologically characterised by Tertiary sediments that filled in the pronounced relief; later, these sediments were moulded and, together with the Palaeozoic sediments, covered by Quaternary deposits (IGME 231 12-11 La Bañeza, 1984).

The complex of Roman camps is found in detrital sedimentary materials that fill the Duero Basin, dating to the Pleistocene and Holocene. These sediments are mainly made up of gravels and pebbles in a sandy-loamy soil (terraces), provided by either the Duerna, which flows to the north, or the Jamuz, which flows to the south.

The environment of the studied sites

The archaeologically most significant feature recognised in the area is the Roman road from Astorga to Braga along the Tera (from *Astvrica* to *Veniatia*), which is listed in the *Itinerarium provinciarum Antonini Augusti* as *Via XVII*, *Item a Bracara Astvricam*. In the section between Astorga and the Portillo de San Pedro de las Herrerías it was successfully recognised and identified by the engineer Enrique Gadea in 1874 and has recently been

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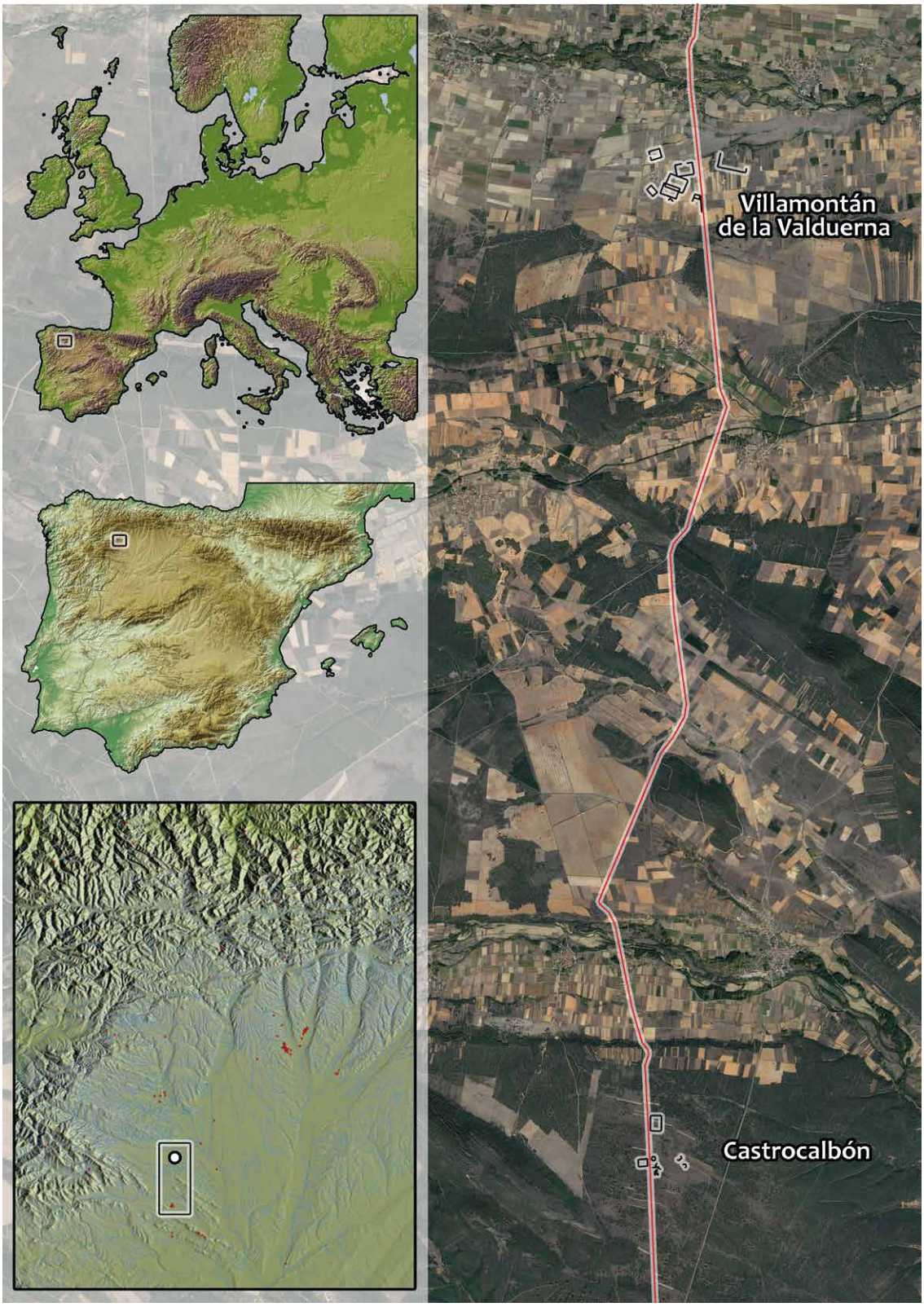

Figure 1. Location, within the Iberian Peninsula, of the area of Villamontán de la Valduerna, in the province of León. Bottommost left, location of other military sites and settlements with Roman militaria in the surrounding area. Right, location of the *Via XVII* and the camp complexes of Castrocalbón and Villamontán de la Valduerna.

re-studied by Isaac Moreno (Project for the Identification, Diagnosis and Technical-Constructive Analysis of Roman Roads in Castilla y León: https://www.viasromanas.net; Moreno Gallo 2011). In the study area the road is nowadays known as Calzada del Obispo or Camino de Santa Marta. Numerous intermediate points along it have been recognised and identified. In the study area a settlement called *Argentiolum* is suspected to be located. The identification of which is still controversial. In the municipality we are studying several archaeological sites have been identified.

Road from Braga to Astorga via Chaves:

2. *Item a Bracara Asturicam m.p. CCXLVII*
3. *Salacia m.p. XX* Vilaseca
4. *Praesidio m.p. XXVI* Vila da Ponte
5. *Caladuno m.p. XVI* Pindo
6. *Ad Aquas m.p. XVIII* Chaves
7. *Pinetvm m.p. XX* Vale de Telhas
8. *Roboretvm m.p. XXXVI* Nunes
1. *Compleutica m.p. XXVIIII* Castro de Avelas
2. *Veniatia m.p. XV* San Pedro de las Herrerías
3. *Petavonivm m.p. XXVIII* Rosinos de Vidriales
4. *Argentiolvm m.p. XV* Villamontán de Valduerna
5. *Asturica m.p. XIIII* Astorga

The existence of this road undoubtedly caused the emergence of several of the surrounding settlements. Although they have not been excavated, these are clearly recognised as being from the 1st and 2nd centuries AD, judging by the materials recovered from the surface. Thus, Campo del Medio would have been situated on the edge of road XVII and was identified as a possible city or settlement due to the existence of abundant remains of common pottery, *tegulae*, *imbrices* and bricks that densely concentrate over an area of 2.6 ha. According to the results we present here, we now know that the space occupied by the supposed city corresponds to our camp enclosure number 2.

The site at San Miguel, next to the Reguero de la Azaya, to the south of Miñambres and between the road that starts to the southwest of this locality and the Calzada del Obispo (*Via XVII*), was identified as the *mansio* and city of the Asturians *Argentiolum* (*Argentiola* according to Ptolemaeus), given that there are abundant Roman remains in an area of about 10 ha. They consist of *tegulae*, *imbrices*, bricks and a lot of pottery, mainly occupying the highest part of a small hill. However, other nearby sites have also been identified as the *mansio* of *Argentiolum*, such as the uninhabited area of Castrillón in Villamontán, Herreros de Jamuz, Destriana, Castrotierra and Castrocalbón, also cited in the *Tabla de Barro of Astorga*, no. IV and in Ptolemaeus (*Geographia* 2.1.6.28; Rodríguez Fernández 1970; Rabanal Alonso 1988). Roldán Hervás (1975) proposed that if the distances of the *Itinerarium provinciarum Antonini Augusti* were true, *Argentiolum* would have to be sought some 21 km from Astorga. Following the Roman road, San Miguel is situated 20 km from *Asturica Augusta*.

Somewhat further away is Castrillón, immediately to the northwest of Posada and Torre de la Valduerna, on a slight elevation of the terrain and about 5 m above the river. Nowadays it is difficult to recognise remains on its surface due to intense cultivation, the extraction of earth and the proximity of the buildings to the east of the site. Gómez Moreno mentions the discovery of building foundations, ashlars, pottery, metal, coins, ashes and bone remains (deer antlers) without further details. More recent surveys have confirmed the presence of ceramic material from Soteño from the 1st Iron Age and evidence of late Roman occupation. Some authors, including Rodríguez Fernandez (1970), have linked El Castrillón with the *Argentiolum* site.

Recent studies

The site under study here is a group of possible camp enclosures (table 1). The first survey was carried out by Alejandro Valderas Alonso, who published it together with Jesús Celis Sánchez and Fernando Muñoz Villarejo (Celis *et al.* 2015). As a consequence, the site was protected by the Territorial Commission of Cultural Heritage of León (Act No. 12/2015, p. 306) on 24 November 2015. Up to the present, no archaeological activity has been carried out, apart from reconnaissance by satellite imagery. Unfortunately, the site has been heavily despoiled, and we have heard from the farmers that various groups of professional and amateur 'treasure hunters' have come to the site. On several of the fields, particularly those at the sides of the Roman road, only ten years ago, explicit earth-moving work was carried out with tractors paid for by the detectorists to get hold of metallic material. One of the farmers, when questioned about the places of plundering, pointed out without hesitation all the camp sites recognised in the satellite images, saying that they were the places where most of the material was obtained.

On the ground, the recognition of evidence is fairly complex, and most of the fields affected are currently being ploughed, so their level of preservation is not homogeneous, with some of them being considerably lowered. This affects the ability of the LiDAR analysis and other techniques to yield good results (Ronchi *et al.* 2020; Luo *et al.* 2023). Some ceramic fragments can be seen on the surface, although they may have come from the removal of nearby sites. The position of the camps along the *Via XVII* (which can be considered one of the main backbone axes of the west of the Iberian Peninsula) and around the exits of the Eria and Duerna valleys, the gold mining valleys par excellence in this part of the

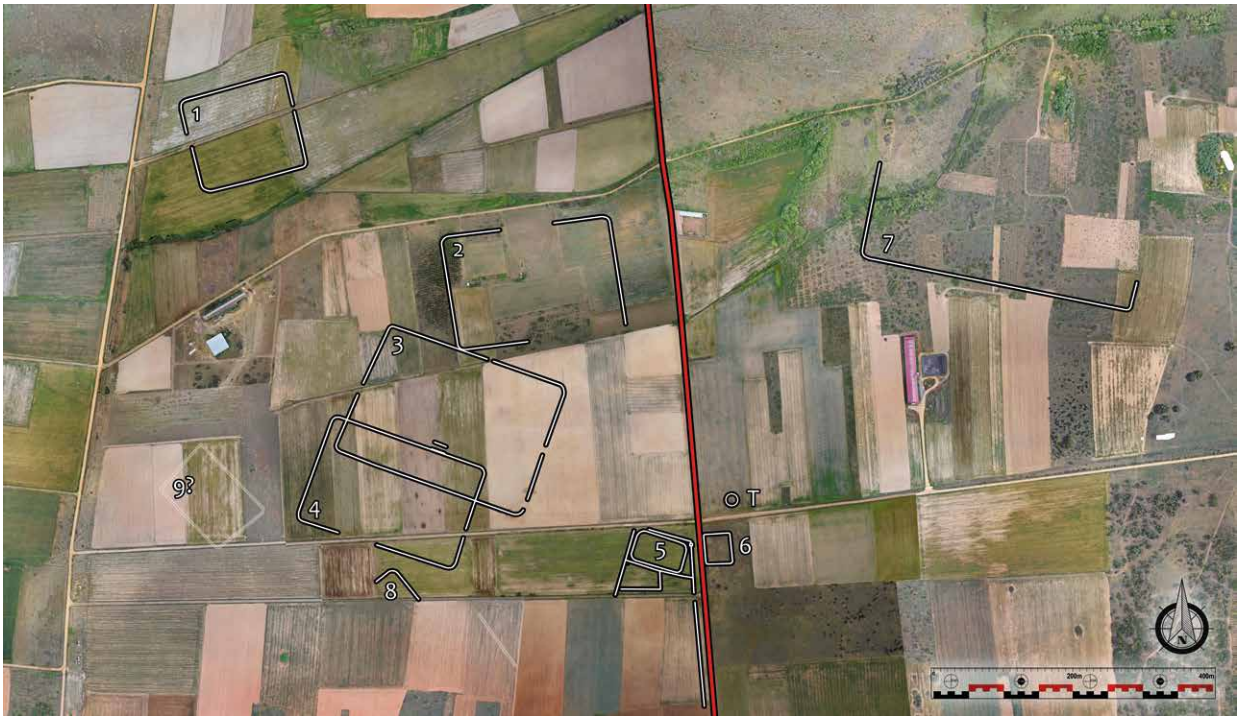

Figure 2. Photo interpretation of an orthophotograph taken on September 2022 of the different enclosures documented in Villamontán.

province of León, suggests some kind of relationship with the infrastructure for the mining operations.

The remote sensing and excavation work carried out recently allowed us to add new enclosures to the four already known as well as to obtain archaeological material and charcoal samples, which are currently under study. The camp complex consists of at least six entities, two of them superimposed, of great extension, and three other doubtful, more blurred entities, which could correspond to smaller structures or are more difficult to perceive in the satellite images as those are on recently uncultivated land.

We offer a table of values and measurements of the different enclosures in order not to lengthen their description excessively, as it seems evident that all of them have a rectangular shape with rounded corners, and only the sizes are quite variable (table 1). From a 2009 satellite image, the presence of a *titulum* on the north side of camp no. 3 can be roughly seen. Within the group two clearly different orientations can be made out, the first more or less parallel to the road (enclosures 1, 2 and 6), the second with a striking northwest-southeast direction (enclosures 3, 4, 5 and 7). The overlapping of some of these structures points to their non-coexistence in time and the great variety of sizes could be indicating the adaptation of the original model to the needs of each unit.

The enclosures located further southeast are two smaller-sized ones, the westernmost one barely 0.36 ha in size. The fact that in no. 6a recent ditches blur the original layout means that the interpretation of its measurements may be slightly distorted. In fact, we question the form given for this enclosure no. 6 after our survey and the coinciding of the modern ditches with the drawing made on satellite imagery. No. 5 is clearly aligned with the larger ones (3, 4 and 7), with rounded corners and a linear structure at its northern and western ends, while no. 6 is aligned with the road and could therefore possibly be related to it.

Finally, it is worth mentioning that a *turris* of circular ground plan and approximately 20 m in diameter possibly existed to the right of the *via* (fig. 2T). We will not discuss here the nature of this structure, which is only barely visible in some of the pictures taken during the aerial surveys. We accept Loewinsohn's 1965 proposal of a tower in Castrocalbón since this type of structure in a landscape as flat as the one we are dealing with here could fit with a signalling and control function needed for a road in such an environment. The size seems to correspond with some parallels documented in the north of the Empire (Woolliscroft 2001).

The different vegetative growth allows us to identify the presence of defences, possibly a *fossaque agger*. It is difficult to see evidence on the surface, so for the moment it can only be seen from the air and in certain meteorological conditions. The epigraphic evidence of Villalís is located

camp	width (m)	length (m)	perimeter (m)	area (ha)	ratio
1	138	163	587	2.21	1.2
2	167	253	831	4.31	1.5
3	203	286	964	5.83	1.4
4	160	242	789	3.91	1.5
5	48	78	230	0.36	1.6
6	41	44.5	166	0.17	1.1
7	±269	414.47	±1300	±11.6	?
8	35 preserved	62 preserved	?	?	?
9	93	139	458	1,24	1.5

Table 1. Some characteristics of the camps.

Figure 3. Aerial view from the north of enclosures no. 5 (on the left), 4 and 8 (on the right). Their trenches cross enclosure no. 3. Bottom left: some of the coins recovered by local residents.

very close to the Villamontán camps. These monuments were dedicated by the military administration itself when *Legio VII Gemina* and its auxiliary units such as *Cohors I Gallica* and *Cohors I Celtiberorum* were formed (Gómez Moreno 1909; Diego Santos 1986, 51; Rabanal Alonso & García Martinez 2001), although on other occasions it has been proposed that the remains are related to *Cohors IV Gallorum*.

Thanks to the discovery of epigraphic evidence such as the *Itinerario del Barro*, the location of *Argentiolum*, one of the main *nuclei* of the *Luggones* (Fernández-Ochoa *et al.* 2012) already mentioned by Ptolemaeus (*Geographia* 2.6.28), can be identified with the site of San Miguel, in Viñambres de la Valduerna (León) (*Tabula Imperii Romani* K-29; Mañanes & Solana Sainz 1985, 79) or in the nearby hamlet of El Campo del Medio (Villamontán de la Valduerna). There the *mansio* may have been located next to the route of the road itself (Fernández-Ochoa *et al.* 2012, 169). Without further investigation, it was assumed that the ancient *mansio* of *Argentiolvm* was built in this area, next to the road where it had abundant water resources and good grazing plains in the area.

Results

The plots are currently under cultivation, therefore the months with no agricultural work were selected to carry out both the surveys and the excavation work. Even so, the surface of the land is notably blurred by the plough marks,

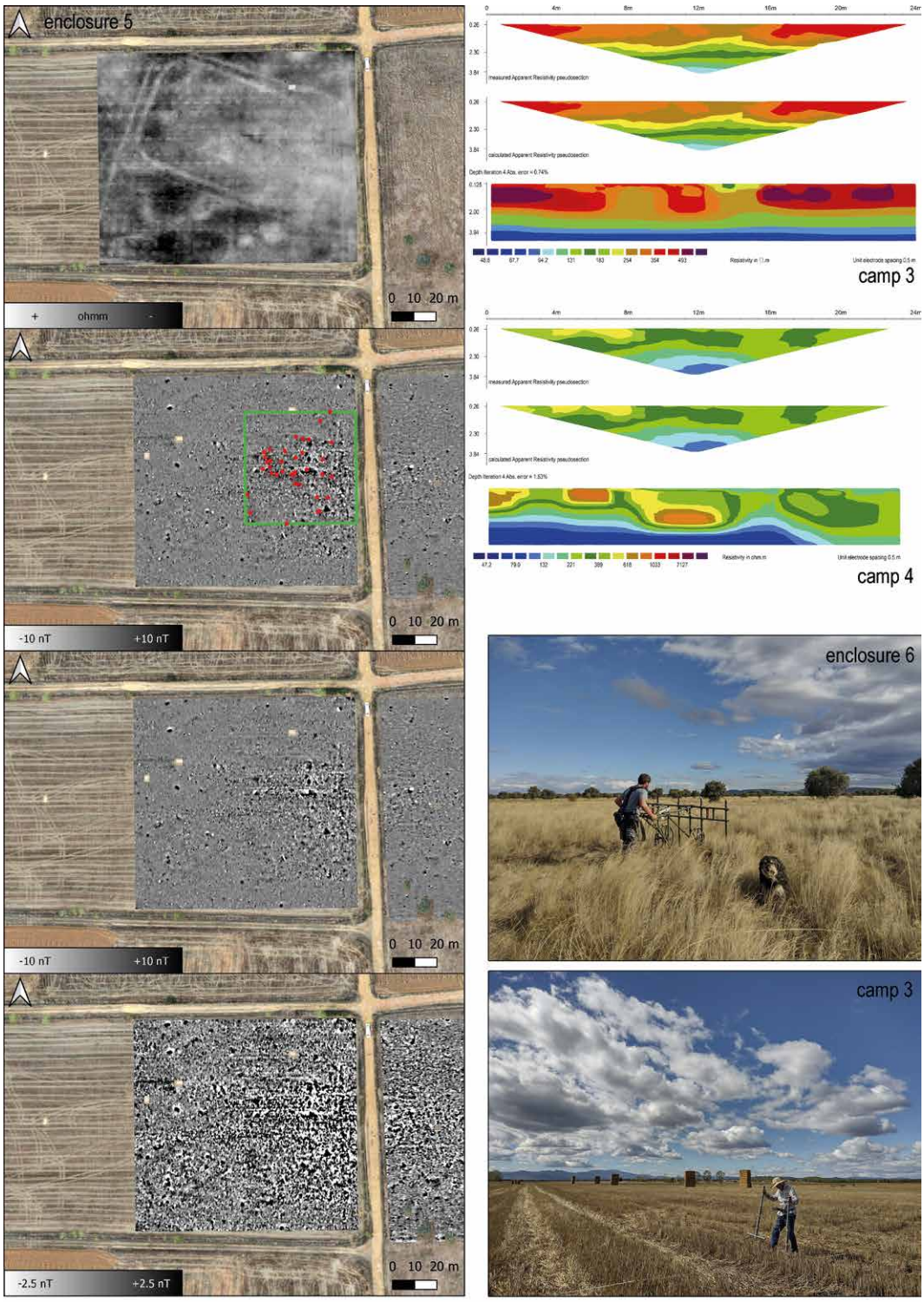

Figure 4. Left: Enclosure no. 5. Comparing ER data (above), magnetometer data and distribution of visible surface soil intrusions (presumably due to illegal excavations with detectors and/or stones removed by ploughing), measured in the central 50 × 40 m sector. Right: ER Profiles 1 and 2, each in the order Dipol, Schlumberger, Wenner mode. Profil no. 1 (first three images) is a northeast-southwest section in sector MAG-2, cutting the two profiles of camps 3 and 4 identified at 7 and 12 m. The one at 7 m appears to be covered by a higher resistivity layer. Profil no. 2 (images 4-6) shows a east-west section through the Roman road with its rudus, identified between 4 and 14 m. Bottom: two images of the field data collection.

making the results of some techniques, such as LiDAR and photogrammetric analyses (fig. 3), which have not yielded any new results, hardly readable or even productive. The ploughing of the land means that it has not retained its original morphology, and even ancient surface aquifers have disappeared. Many authors have already pointed out this issue (Opitz & Cowley 2013), which in the case of the Villamontán enclosures is more than evident.

This has not been the case for the satellite imagery of the whole area. For logistic reasons, only four flights were made at different times of the year, but this allowed the discovery of three new enclosures (1, 2 and 7) and the existence of two other possible ones (8 and 9). The cropmarks evidenced by different vegetation growth are quite evident in summer when crops such as wheat and barley start to grow and develop more strongly over the ditch fill. For the geophysical prospection, we carried out electrical resistivity with a twin electrode system (ER), geomagnetic (MAG) and ground-penetrating radar (GPR) measurements (fig. 4). We also employed resistivity tomography (ERT) in two profiles: one in the pit area of one of the enclosures and the other in the road. We will not describe the different methodologies here, as they are well-established techniques and have been described in detail for this type of site elsewhere (*e.g*. Schmidt *et al*. 2015; Teichner *et al*. 2020; Teichner & Hermann 2022).

Due to the apparently more organic fill it has been possible to identify the existence of the camp ditches with magnetic prospecting, even though they generally show only very shallow readings. In enclosure no. 3 the continuous layout with the interruption of the entrance and possible pits in the interior could be detected. At the same time, the ditches in enclosure no. 5 also show a very weak magnetic contrast, the inner ditch being more explicit than the outer one. The eastern edge of the outer ditch, visible in the satellite image, shows a very high magnetisation that can be explained by a filling of material with high susceptibility (bricks?).

In addition to the known ditches, also parts of other ones, apparently not related to the camps, have been identified. There are also areas of high 'magnetic noise' on both sides of the Roman road. They seem to be due to thermoremanent objects in the soil such as bricks or non-sedimentary stones, and in the western part (enclosure no. 5) oriented along linear or rectangular axes. This leads to the suspicion that one or several buildings from the High Imperial period with roofs of *lateres* existed near the earlier camps. Abundant *tegulae* and early *terra sigillata* can be found on the surface (Teichner *et al*. in press).

Resistivity measurements were carried out exclusively on enclosure no. 5. The readings show the different ditches of the interlaced structure. Noteworthy is the fact that the ditches here have higher resistivity values compared to their surroundings, while in the ERT profiles this is inverted. In enclosure no. 5, a ground-penetrating radar prospection was also carried out at the site of the possible High-Imperial building that covers part of the previous camps. This prospection did not detect any linear or rectangular elements that are characteristic of walls. However, based on the resistivity profiles, the destruction of a large part of the archaeological structures as a result of agriculture, illegal activities and clandestine excavations could be assessed. Next to the road there is a very compacted area of strong reflections with clear outer edges that defines a rectangular area of *c*. 27 × 25 m indicating an intense presence of fragments of Roman bricks that could indicate a building. Local informants have pointed out to us the presence of ancient stone blocks in the area, which were removed from the plots because they impeded the agricultural use of the fields. Once the non-invasive methods had been used, we proceeded to carry out three archaeological excavations in order to verify the existence, shape and contents of the ditches as well as a surface survey on foot with metal detectors. The survey with metal detectors yielded almost no finds as had to be expected due to the excessive plundering described above.

Three test trenches were cut, one of them had to be moved to a different location due to the discovery of unknown plastic hydraulic infrastructure in the subsoil of the first location. It was possible to confirm the great deterioration suffered by the camp ditches due to the agricultural overprint, with only a maximum depth of 40 cm remaining in the deepest one. Taking into account the 1.2-1.4 m width preserved in the upper part of the pits, a rough estimate can be made of the original dimensions, which would have been about 2 m wide and 1 m deep (fig. 5). Particularly significant is the presence of a striking step in the documented profiles at a depth of at least 25 cm from the base on at least one of the sides. This could be a construction practice or the creation of a step for the insertion of wooden elements such as *cervi* or others with similar functions. Finally, the lack of river pebbles in the backfill of the pits is striking. They were apparently filled with selected material.

At present, the pollen and archaeometric analyses of the backfills of the ditches are in the process of being carried out. Therefore, the dates that can be offered are based exclusively on the find material obtained on the surface. As mentioned above, very notable quantities of single-flanged *tegulae* and concentrations of common pottery have been documented as well as High-Imperial *terra sigillata* from the Ebro Valley workshops and at least three fragments of thin-walled pottery that can be dated to the Julio-Claudian period. Two flint microliths have also been found, which is not unusual given their use and reuse in the threshing boards centuries ago. Metallic material is barely existent, as mentioned earlier, due to

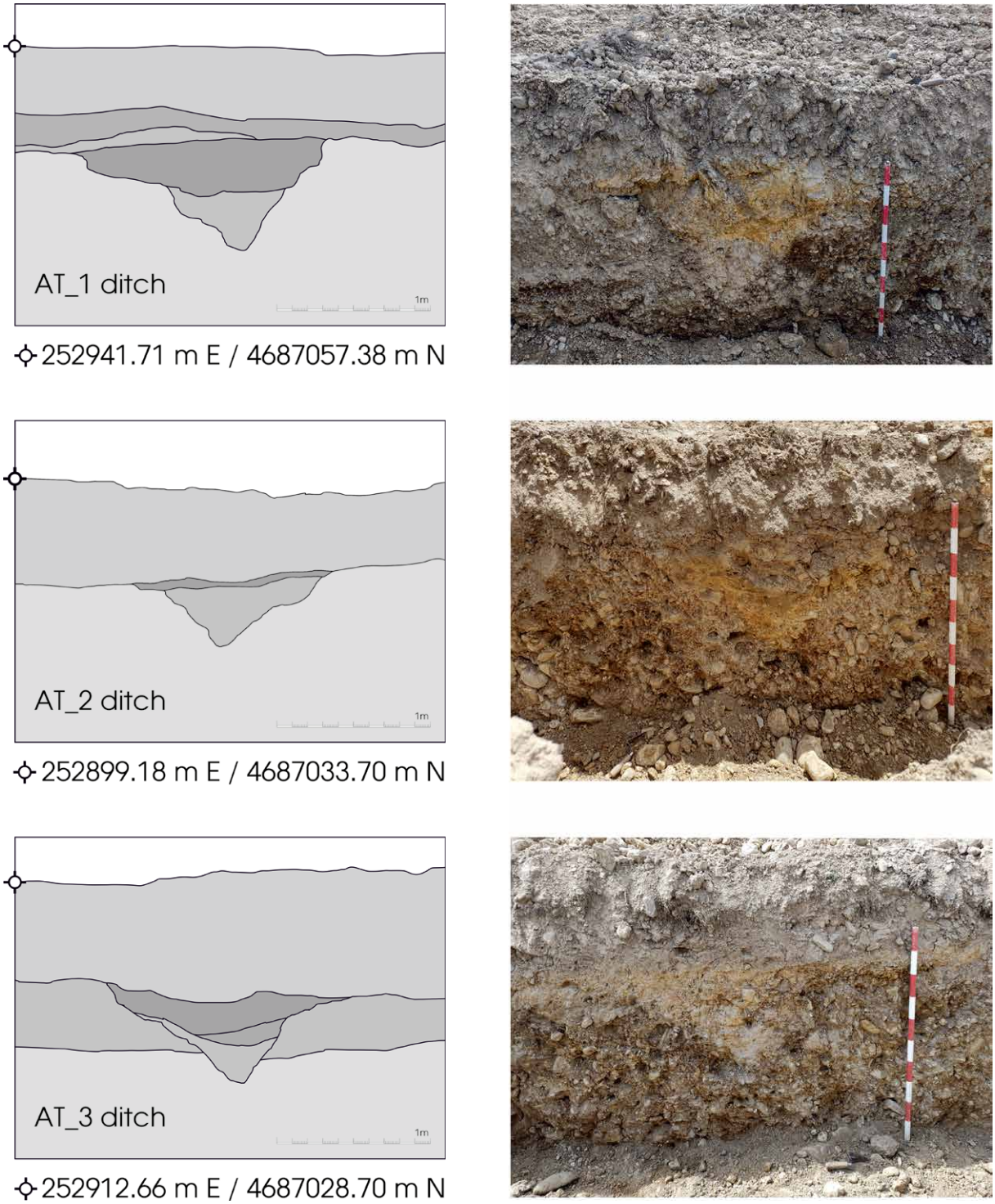

Figure 5. Section and photograph of the pit profiles documented during the excavation.

the repeated presence of detectorists. However, it was one of these detectorists who, some time ago, allowed us to consult some numismatic material (various people have mentioned the presence of Flavian coinage, but we have not seen these specimens and therefore do not consider them in this study), supposedly from the area (fig. 3), namely some coins from the Principate of Tiberius, all dated to 14-37 AD:

1. *Clunia*, Tiberius
2. *Lepida-Celsa*, Tiberius (RIC I², 279)
3. *Graccurris*, Tiberius (RIC I², 429)
4. *Calagurris*, Tiberius (RIC I², 448)

We are therefore faced with a large group of military enclosures, regular in shape and datable – apparently and prior to an in-depth investigation – to a time after the conquest of the entire territory, around a known road artery and superimposed on one another in several places. The material documented on the surface seems to coincide chronologically with the nearby milestones of *Cohors IV Gallorum* from the Claudian period. Possibly the most interesting aspect of this camp complex is its very nature. Its layout around *Via XVII* cannot fail to remind us of the Castrocalbón complex, studied by different authors (Loewinsohn 1965; Jones 1976; Del Olmo Martín 1995; Costa García 2016) but not excavated so far and from which it is only 9.5 *milliaria* (14 km) to the south. It is interesting that Jones (1976, 59) dismissed a stable military settlement and pointed to practice camps, given the non-existence of material remains inside the enclosures of Castrocalbón. The presence of very abundant material remains and evident overlapping in Villamontán seems somewhat different from this and to point to a continuation of the occupied space, if not in a single phase, then at different times. The existence of two different orientation models seems to support the hypothesis of formation at, at least, two different moments in time.

In this case, we do not think that we are dealing with practice camps here, but rather with temporary marching camps arranged in an orderly fashion along a road. Thanks to the advancing knowledge of Roman castrametation in recent years in *Hispania*, we know of different groups of possible practice camps in settlements such as *Legio*, *Asturica* or Herrera, where dozens of enclosures have been documented. They are characterised by the reproduction of military models on different scales, with an emphasis on the creation of characteristic elements such as the clavicle-shaped doors or the rounded corners in the form of a playing card (Davies & Jones 2006, 67-69). All these assemblages are located at more or less regular distances and never more than 6 km from the main settlement (Martín Hernández *et al.* 2020; Menéndez Blanco *et al.* 2020; Morillo *et al.* in the second volume of these proceedings). Different Augustan *termini* are present in the surroundings of the studied area as well as the other evidence, such as ensigns of the emperor's *avctoritas* that epigraphically monumentalise the frontier as an occupation of space. In this case, the limits between the *prata* of the cohort and the *territorium* between the city of *Bedunia* and *Luggonum* indicate the importance of this area for the *exercitus hispanorum* and point to a new place as a possible seat of *Cohors IV*, the exact location of which in the time of Claudius is still debated today.

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Abbreviation

RIC I²: Sutherland 1984

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Part 4

SIMULATING THE LIMES

CHALLENGES TO COMPUTATIONAL MODELLING IN ROMAN STUDIES

Lost and found on the frontier

Predictive modelling and Late Roman forts in *Scythia Minor* (4th-7th centuries AD)

Nathaniel F. Durant

During the period of Late Antiquity, the Roman province of *Scythia Minor* was repeatedly overrun by a series of subsequent migrations and invasions primarily from its northern and western regions. The geography of the province, comprised of a series of low hills, plateaus and plains bounded by the Black Sea and the Danube, made the region a natural access point to the interior provinces (fig. 1). Thus, it is hardly surprising that many northern peoples chose this province as a means to enter Roman territory, avoiding the more difficult and lengthy routes through or around the Carpathian mountains to the west (Whitby 1988, 60-66). Between the 4th and 7th centuries, the ancient sources paint a complex view of these movements and the corresponding methods that the Romans took in controlling the frontier. Even accounting for the bias and propaganda inherent in many of these authors, there is clearly a strong contrast made between the extensive building programs of the 4th and 6th centuries and the more chaotic and persistent invasions of the 5th and 7th centuries. Prompted by the distinctive economic and military conditions in each of these periods, one might expect some change in military strategy that could be reflected through both the choice of sites and whether to reoccupy or rebuild existing fortifications or construct new and additional frontier installations. This project sheds light on some of these question by observing how the frontier of *Scythia Minor* developed between the 4th and 7th century through a series of predictive models. By focusing on some of the different factors that likely played a significant role into determining the placement of frontier installations, these models can determine if these factors have changed over time and thus might represent a change in strategy or occupation.

In Late Antiquity, images of ravaged and plundered settlements and a limitless and unstoppable throng of foreign aggressors pouring across the frontier to devastate the provinces became the standard archetype in historical narratives with *Scythia Minor* and its neighbouring provinces often at the centre. Despite this doom-and-gloom attitude stressed by historical authors, modern scholars have started to question this portrayal, acknowledging the impacts of foreign incursion, but also noting periods of relative peace and prosperity, and the successes of the Roman army in repelling the invading forces (Whitby 1988; Sarantis 2016; Kardaras 2019). Central to this stability were the frontier instillations, both located along the edges of Roman domain as well as in the interior of the province, that allowed for consistent surveillance and control of the surrounding

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DOI: 10.59641/3d278gp

Figure 1. The location of *Scythia Minor* within the Eastern Roman Empire *c.* 300 AD.

areas as well as communication with other neighbouring forts. But what factors determined the ideal placement for these fortifications?

Perhaps unsurprisingly, the topography of a location and its suitability for function serves as one of the most enduring principles attributed to frontier forts within the imperial Roman literary record. Arriving to the site of Phasis on the modern Georgian coast, the military commander Flavius Arrianus (*Tactica*) remarks how the fort "seemed to [him], owing to the nature of the site, to be very secure, and to lie in the most convenient spot for the safety of those who sail this way." The series of inscriptions from Lower Pannonia during the time of Commodus all also contain a reference to forts placed "along a suitable place" (*per loca opportune*) to combat raids and intrusions (Kovacs 2008, 127). This trend persists into the 4th century as Ammianus Marcellinus' account of Valentinian's strengthening of the Rhine frontier in the 360's notes how the emperor was "erecting high fortresses and forts, and towers in frequent intervals, in suitable and convenient places for the whole length of Gaul" (*castra extollens altius et castella turresque assiduas per habiles locos et opportunos qua Galliarum extenditur longitude*, Ammianus Marcellinus *Res Gestae* 28.2.1).

Indeed, one of the best descriptions of the parameters and procedure that go into determining the ideal location for a frontier fort may actually come from the period of Late Antiquity. Although filled with flowery language, Themistius' (*Orations* 10.137b-d; Heather & Matthews 1991) tenth oration convincingly describes the creation of a new frontier installation by the emperor Valens during his campaigns against the Goths in the late 360's, possibly the fort identified as *Gratiana* in *Scythia Minor*, likely named after the emperor's nephew and co-emperor (Zahariade 2011, 146-147).

"[Valens] was not, however, unequal to the demands of the terrain. He discovered in that land a narrow peninsula which extended into the lagoon and terminated in a high mound from which the whole surrounding area could be observed. There he raised anew a fort, following a trace of walls which a previous emperor had laid down because of its advantages but had discontinued because of the difficulty involved. In a place where there was no stone near at hand nor easily available supplies of brick and mortar, but where everything had to be transported over however many miles on countless pack teams, who would not excuse those who had abandoned the venture as impracticable? But the emperor surpassed the skill which Amphion showed in the fortification of Thebes. You would have declared that the stones moved of their own accord, the bricks likewise and that the wall went up without masons or carpenters, so great was the soldiers' compliance and such their ability to cope with the difficulties."

Even accounting for the rhetorical license, the importance of a secure and tactical location for a fortification often trumped any reservations or difficulties surrounding its construction. Clearly, the placement of a fort on accessible high ground that provided the ability to survey the surrounding area while having an appropriately defensible position (in this case, on a peninsula) was of considerable importance along the

Roman frontier and the significance of these factors will later be confirmed through the work of this dissertation. Despite the variety of topographies and layouts of the Roman frontiers, it is possible to hypothesize additional parameters for the placement of frontier installations based on the archaeological excavations and surveys within these regions. As mentioned previously, in addition to serving as the *de facto* boundaries for large portions of the Roman Empire, rivers and coastlines likely offered important incentives towards the placements of frontier fortifications (Breeze 2012, 18). They allowed for a greater degree of communication and transportation of goods, services, and troops as well as providing easy access to water for drinking, bathing and other practices.

Additionally, access to major rivers and the coastlines, such as those along Mediterranean or Black Sea, allowed for military and logistical support from the Roman navy that could often prolong or aid the defense of a fortification and prevent the settlement from becoming isolated. While fast moving rivers can offset many of these issues, the variable courses of some of the major rivers in the Roman world including the Rhine and Danube, likely led to the creation of extensive floodplains and marshes. Nevertheless, the benefits of nearby bodies of water, particularly those with access to the sea, seemed to vastly outweigh any anxieties surrounding flooding or disease when determining the placement of a fort.

As seen above, multiple spatial and topographic features seem to have played a significant role in a fort's location and these factors will serve as the parameters for the models developed in this study. However, it is also worth addressing several elements that may have influenced the placement of a frontier installation but remain more difficult to quantify due to limited available data, incomplete representations of the ancient landscape, and other factors. As one of the primary purposes of frontier fortifications was the prevention of raiding and maintaining a high degree of security for the Empire, one would expect the placement of these forts to counter the most likely path of entry, be it mountain passes, river fords or flat floodplains. To a certain extent, this practice is visible in the forts of the major riverine frontiers. In his analysis of the Lower Danube frontier, Karavas notes how the placement of forts responded to the predicted direction of any invasions or incursions with the disposition of the units also planned out to maximize their effectiveness in the various topographies present in the landscape (Karavas 2005, 193). Sommer (2009, 112) also observes this trend within the Middle Danube, noting how forts were typically placed "at points of change in topography," locations that allowed efficient control over access into the Roman territory while ensuring adequate communication between each other as well as with sites in the interior of the provinces. However, the locations and focuses of barbarian raids were subject to change, especially due to the significant migrations in the 3rd century and onwards, signifying that that the Romans must have had to adapt and respond to these shifting threats, possibly creating new sites and abandoning old ones in order to provide the best possible measure of security.

Finally, while the Romans often created new sites within acquired territories, typically in the form of military colonies for veterans, the Romans also simply took advantage of preexisting fortifications, settlements and other constructions in the frontier provinces. As a result, numerous sites within the Roman frontier can owe their initial occupation (and by extension, their placement) to the peoples that first inhabited these areas. This detail may seem to undermine the agency of Roman military strategy as other nations were first responsible in taking advantage of the topographical landscape, but this is merely an illusion, as the deliberate selection and choice of such sites by the Romans in fact further acknowledges the placement of these sites as strategic and tactically valuable. Indeed, as seen below, this reuse of fortifications emerges in late antiquity as major invasions and incursions into the frontier provinces and the considerable troop shortage that followed these wars forced the Empire to identify, reconstruct and reoccupy those sites still deemed important while neglecting ones with limited value.

Before the predictive models were constructed, a choice of both model and geographical parameters needed to be established. As NASA's Shuttle Radar Topographic Mission (SRTM), provided nearly complete global elevation coverage at one arc second resolution (about 30 m per pixel) in the form of a Digital Elevation Model or DEM, this would prove to be the best baseline layer from which the geographical parameters could be obtained (Rabus *et al.* 2003, 241). The fact that nearly all of the fortified frontier installations analysed in this study have dimensions larger than 30x30 m indicates that the DEM would be largely appropriate for the current study. After the area of *Scythia Minor* was cut out of the DEM, the site locations of all 60 frontier installations were georeferenced (*i.e.* placed into their geographical position) and placed the newly created map (fig. 2).

The best model to represent the presence or absence of fort location was determined to be a binary logistic equation as this method is well utilized in archaeology especially when the dependent variable (in this case, the location of a fort) is binary (yes/no) (Wachtel *et al.* 2018, 29). In order to create the 'absence set' (*i.e.* the dataset that represented fort absence), an equal number of random points within the study area were created, a method also employed in a number of other studies, and a buffer zone of 1 km was created around all of the known sites in order to ensure that none of these points fell upon an actual fort (Agee *et al.* 1988).

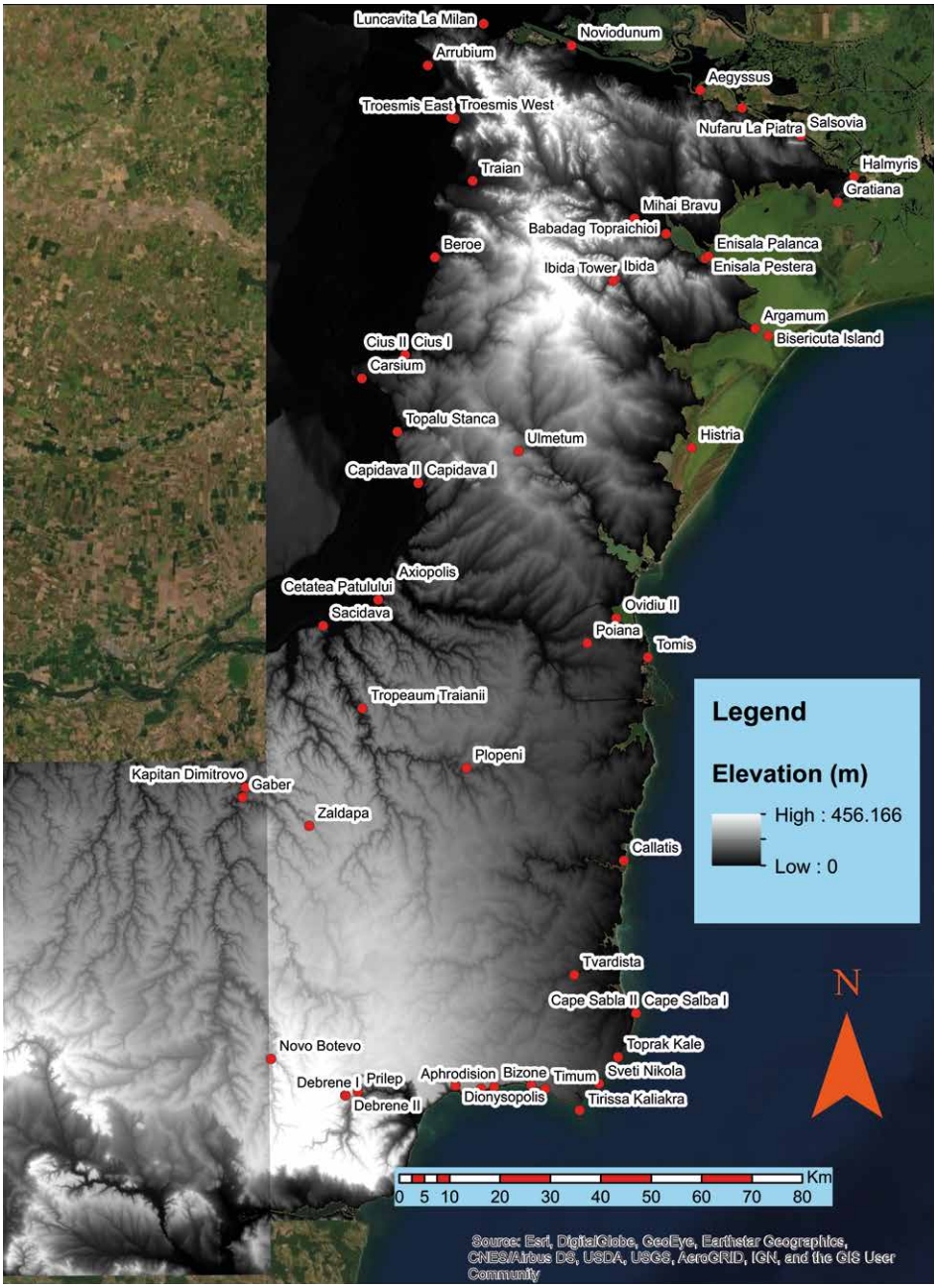

Figure 2. The location of known *Scythia Minor* frontier installations.

Overall, 22 separate topographical parameters were created for 120 distinct sites (60 known and 60 unknown) drawn completely from the DEM. These parameters included base elevation, slope, relative elevation, and distance from water bodies. Nearly all spatial parameters were divided into three subcategories: minimum, maximum and average to allow for forts that demonstrated local variability between multiple pixels. While baseline elevation and slope were both simply taken directly from the DEM, relative elevation was obtained through two different means: ArcGIS' neighbourhood statistics and Topographic Position Index or TPI. ArcGIS created two relative elevation maps by determining the average elevation around each individual pixel and then subtracting this value from the elevation of each pixel, creating a map that represented how high or low a pixel stood above or below its immediate neighbours. Two relatively short range areas were selected: 3 × 3 pixels (approximately 90 × 90 m) and 5 × 5 pixels (approximately 150 × 150 m) with minimum, maximum, and average values for each range. Alternatively, TPI values also represent the difference in elevation between a central pixel and a surrounding neighbourhood but employ a different

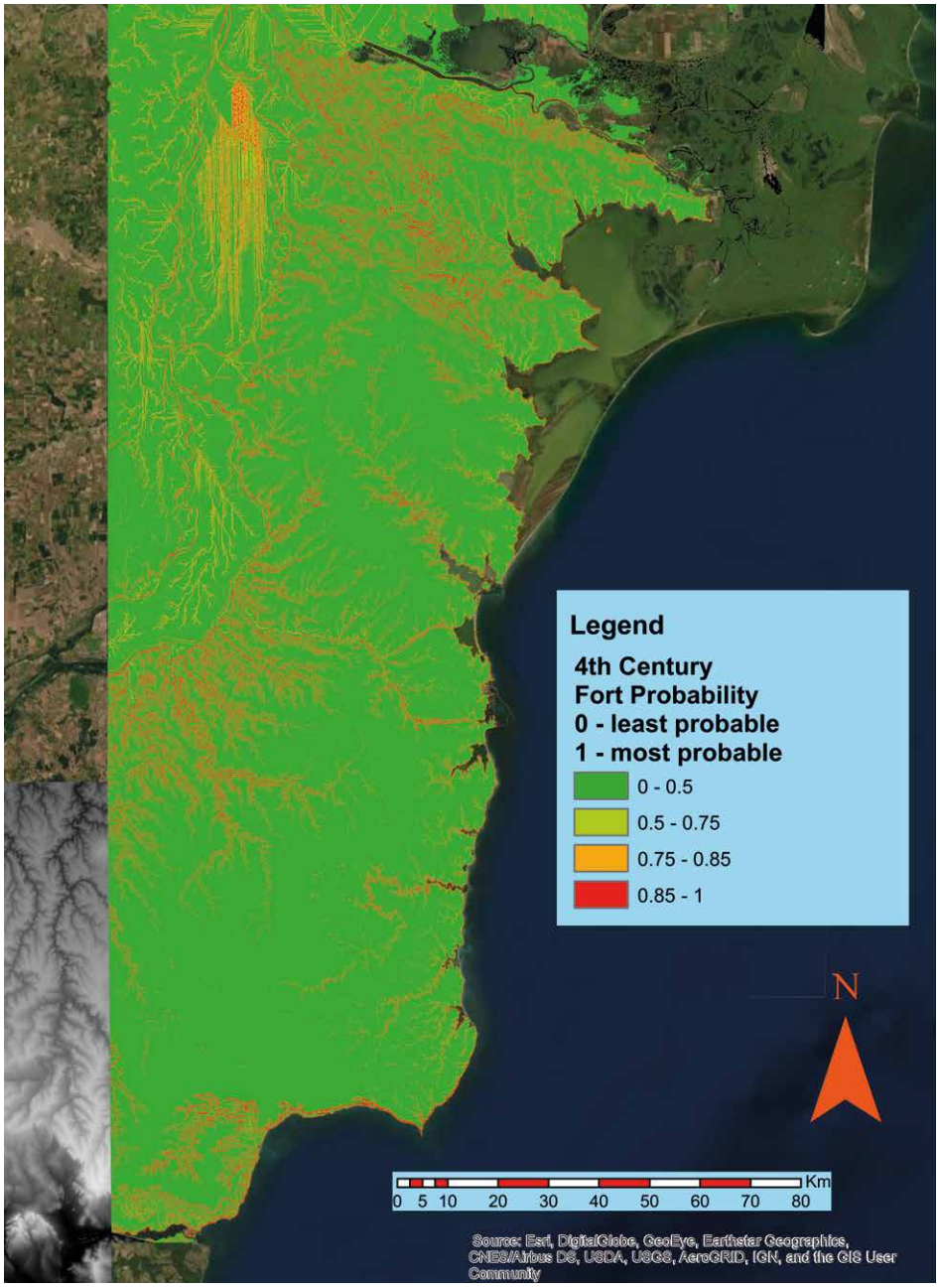

Figure 3. Predicted location of forts in the 4th century in *Scythia Minor*.

algorithm (discussed at length by Weiss 2001), and can be combined with slope to create a series of landform classes including ridges, valleys and shallow slopes (De Reu *et al.* 2011, 3442; Tagil & Jenness 2008, 914-916). TPI maps were developed for 5 × 5, 10 × 10, 15 × 15 and 20 × 20 pixel neighbourhoods and divided into two categories: those based on the maximum elevation points in the fort and those based on the average elevation values for the entire site.

Finally, the distance of a location from nearby water bodies served as the last group of spatial parameters. Unfortunately, as paleo-landscape reconstruction in *Scythia Minor* was largely limited, the current paths of the smaller rivers in the region must serve as their closest proxy to the rivers during Roman times. However, extensive scientific studies of the water levels of Black Sea and the Danube Delta have resulted in a good understanding of the placement of the ancient coastline, suggesting that the water level was largely 2 m higher than the present sea level by the time of the Roman occupation (Romanescu 2013, 237). Likewise, the greatest extent of the Danube could largely be determined based on the extreme variations in elevation between the floodplain and the surrounding regions. ArcGIS'

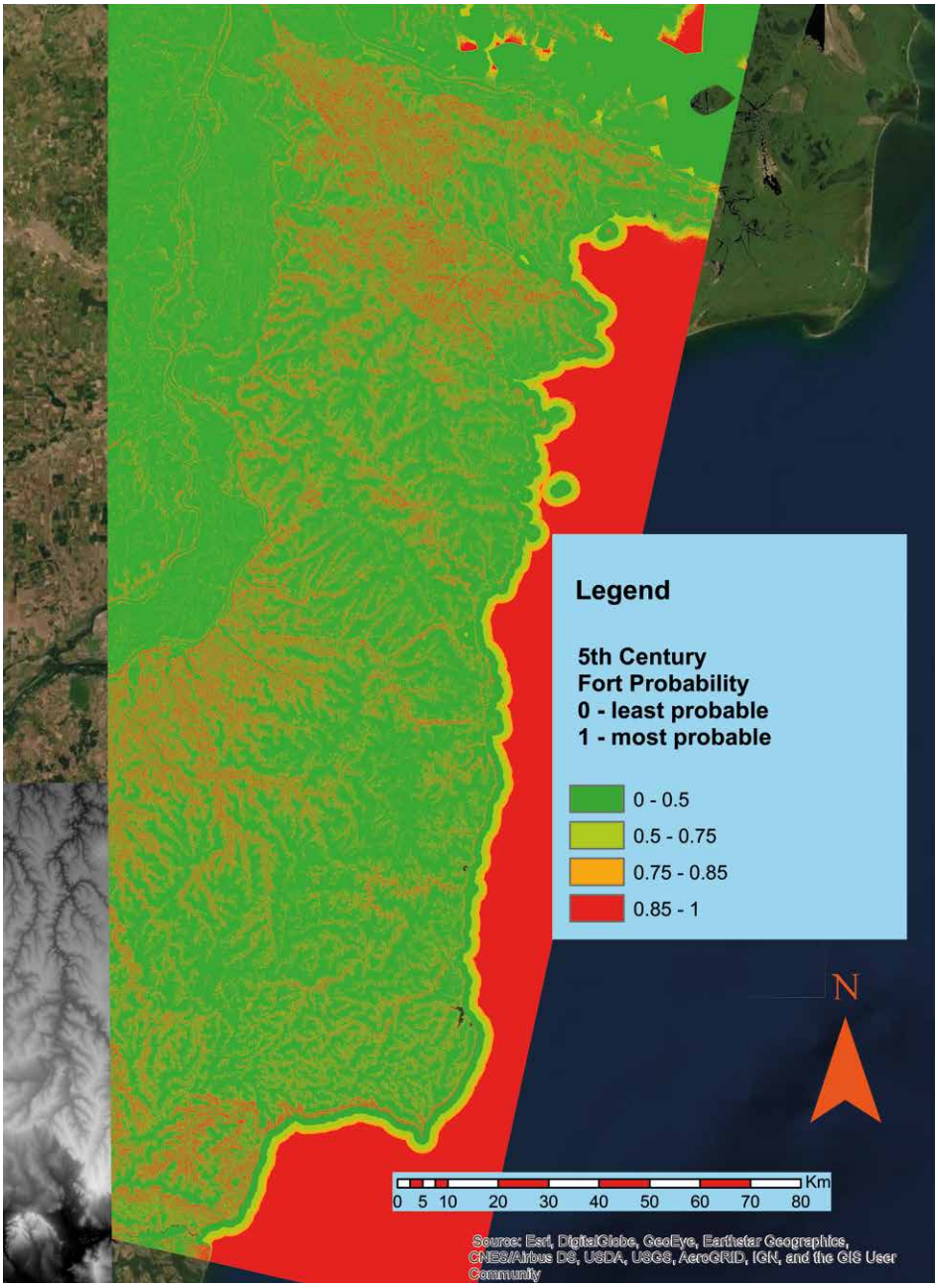

Figure 4. Predicted location of forts in the 5th century in *Scythia Minor*.

hydrological tools were employed to determine the calculated four different stream thresholds that could best model the different sizes and scales of the provincial rivers ranging from 0.05 km^2 to 4.5 km^2 (Tarbaton *et al.* 1991, 81; Olivera *et al.* 2002, 73; Reddy *et al.* 2018, 103). Four maps of water bodies (0.09 km^2, 0.45 km^2, 0.9 km^2, and 4.5 km^2) were created to represent this variance from larger and more significant rivers to seasonal streams or even swampy depressions.

Overall, all of these points were placed into IBM SPSS statistical software to determine which factors bore statistical significance. However, due to the similarity of many of the spatial parameters, not all of the factors could be incorporated into a single model. Thus, six models (designated as Max, Average, Split1, Split2, MinMax, and MinAvg) were created to cover the entire range of combinations between specific factors (*e.g.* Maximum, Minimum, and Average). The models were split based on chronology with forts that were occupied in the 4th, 5th and 6th centuries serving as separate datasets (unfortunately the low number of sites with a clear and definitive occupation during the 7th century (10) prevented the creation of a proper statistical model for this period).

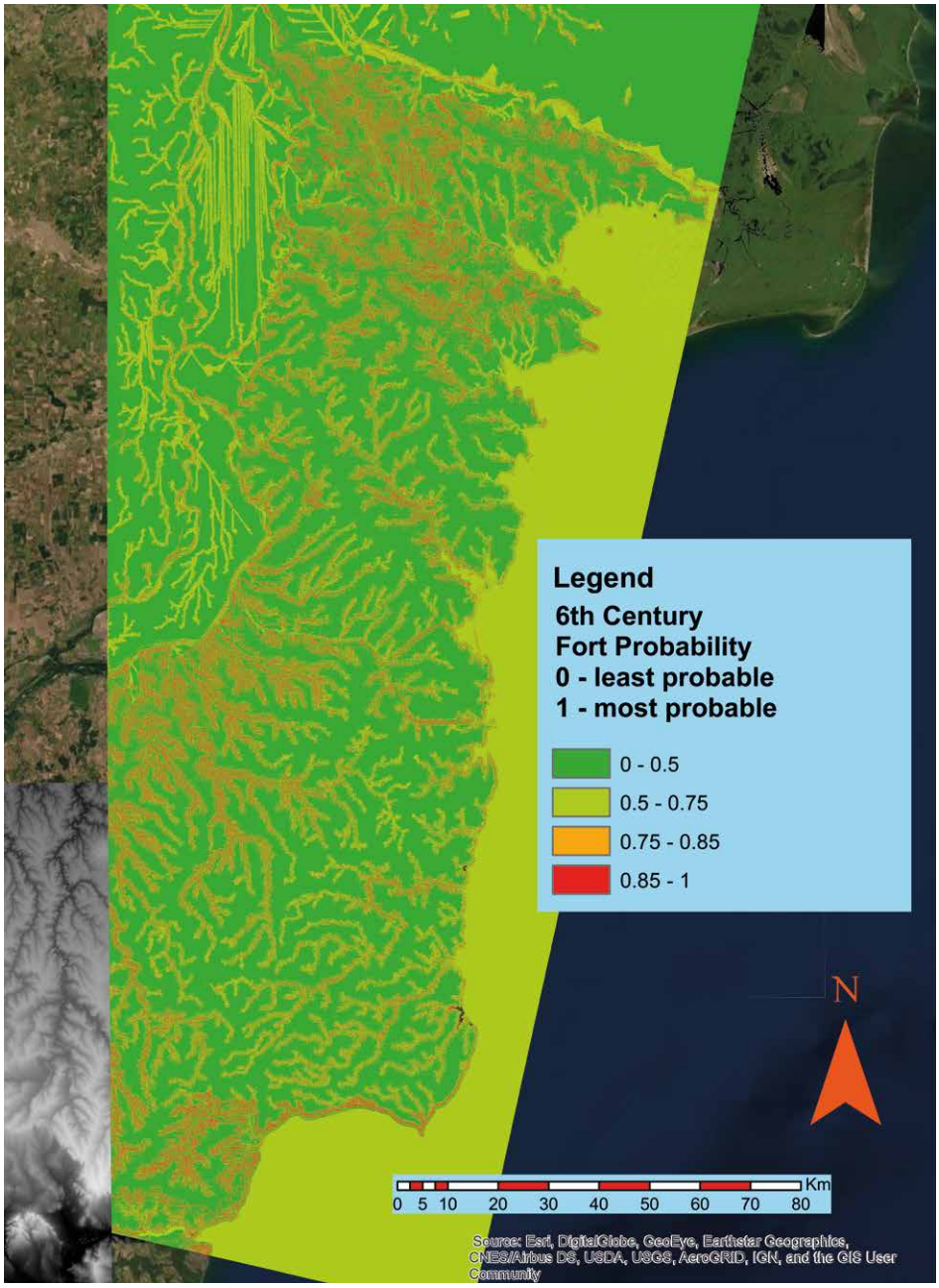

Figure 5. Predicted location of forts in the 6th century in *Scythia Minor*.

The most startling initial revelation that can gleaned from this project is that no overarching change in strategy between the 4th and 7th centuries in the placement of a fort in *Scythia Minor* as the same factors that governed the preferred location of frontier installations remained statistically significant throughout the life of the province. Forts were more likely to be placed at lower elevations compared to sea level and at slightly higher slopes. However, even at these heights closer to sea level, in general forts were still more likely to be placed on higher average elevations than the surrounding landscapes, allowing them to survey and control both the immediate area of the fort as well as regions further afield. Maximum points of elevation in the landscape (*i.e.* hilltops or ridges) seem to have also been important concentrations for fort construction, perhaps even serving as the locations for towers or other means of surveillance that allowed the Romans to take full advantage of these prominent positions. It should be noted that there is a degree of variability between the two methods of determining relative elevation (Neighborhood statistics and TPI) due to the lack of overlapping pixel area values and hopefully this discrepancy can be corrected through further testing. Access to water was clearly an important factor in military

operations as forts were much more likely located near to major bodies of water including the Black Sea coast, Danube river and other major interior rivers of the province. However, the smaller river valleys or seasonal riverbeds seem to have been unappealing natural characteristics as the dataset revealed a negative association between these features and the placement of a fort.

However, the predictive maps of each century suggest that even if forts from the 4th, 5th and 6th centuries all valued the same spatial parameters, the weight placed on these factors varied from century to century. Forts in the 4th century are predicted only along the lines of the coast, major rivers and their immediate tributaries with very limited possibilities in the lower elevations of the southern half of the province (fig. 3). Conversely, forts in the 5th century show a much greater variety in predicted location, ranging from smaller river tributaries across the province as well as a huge preference for the elevated regions in the northern half of *Scythia Minor* (fig. 4). Finally, forts in the 6th century return again to a much more restricted range of areas that is largely dominated by the river and coastal regions throughout the province (fig. 5). Unfortunately, the limited number of forts (ten) with definitive occupation in the 7th century prevented any century-specific model from being developed.

Created in the late 3rd century, the frontier province of *Scythia Minor* lasted over four centuries until its abandonment in the mid-7th century, and served as one of the most important frontier zones in the Late Roman Empire. A comprehensive set of predictive models based around topographical characteristics of forts revealed that frontier installations built in this period were placed near major bodies of water and along high slopes at lower base elevations and in general, these installations were positioned on prominent features in the landscape that allowed for effective surveillance and control of the surrounding terrain. The fact that this practice largely continued between the 4th century building programs all the way up until the mid-7th century suggests a certain level of continuity between how the Romans viewed the strategic importance of their forts and the features of the landscape that were necessary for their tactical efficiency. The primary differences in fort location between the 4th, 5th and 6th centuries seem to have been not in the choice of spatial factors, but rather in which topographical parameters was seen to be more important. The significant variations in the appearances of the predictive maps between these three centuries may point to changes in frontier strategy as access to water and control of the landscape were deemed more or less important at various points in Late Antiquity. An additional benefit of these models is that they can also act as starting points in effectively identifying the locations of missing or expected frontier sites. An example of these sites can be found in the 6th-century work *De Aedificiis* (On Buildings) by Procopius lists which mentions dozens of fortifications in *Scythia Minor* whose locations are still unattested in the archaeological record.

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Dealing with changes in qualitative and quantitative aspects of the imported Roman metal objects within the Marcomannic settlement zone in the era of metal detecting

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Introduction

The issue of amateur metal detecting in the last decades has significantly impacted the archaeology of the Roman period in the Czech Republic (Komoróczy *et al.* 2014; 2020; Komoróczy 2022). Due to the absence of their of any form of (central) organisation, the number of active detectorists can only be estimated between 15 to 30 thousand people. Likewise, the number of finds is unknown, as a central register of at least part of the detector finds is currently being created, so their number can only be modelled at tens, perhaps up to a hundred thousand artefacts per year. The only way to ensure the accessibility to such a significant amount of data is by creating networks of cooperating detectorists connected to individual archaeological institutions or persons. Currently, our team maintains a form of controlled voluntary cooperation with approximately 150 detectorists who are active in large part of the south Moravian region, where our research activities also take place. The authors' department systematically documents all their reliably located archaeological finds, which constitute a solid information base for subsequent research (Komoróczy *et al.* 2014; Goláňová *et al.* 2020; Vlach *et al.* in press). In this paper, the aim is not only to outline some general characteristics of the collections obtained in this way but also to point out some general methodological issues and, with the help of selected examples, indicate specific methodological issues in some categories of the so-called Roman imports.

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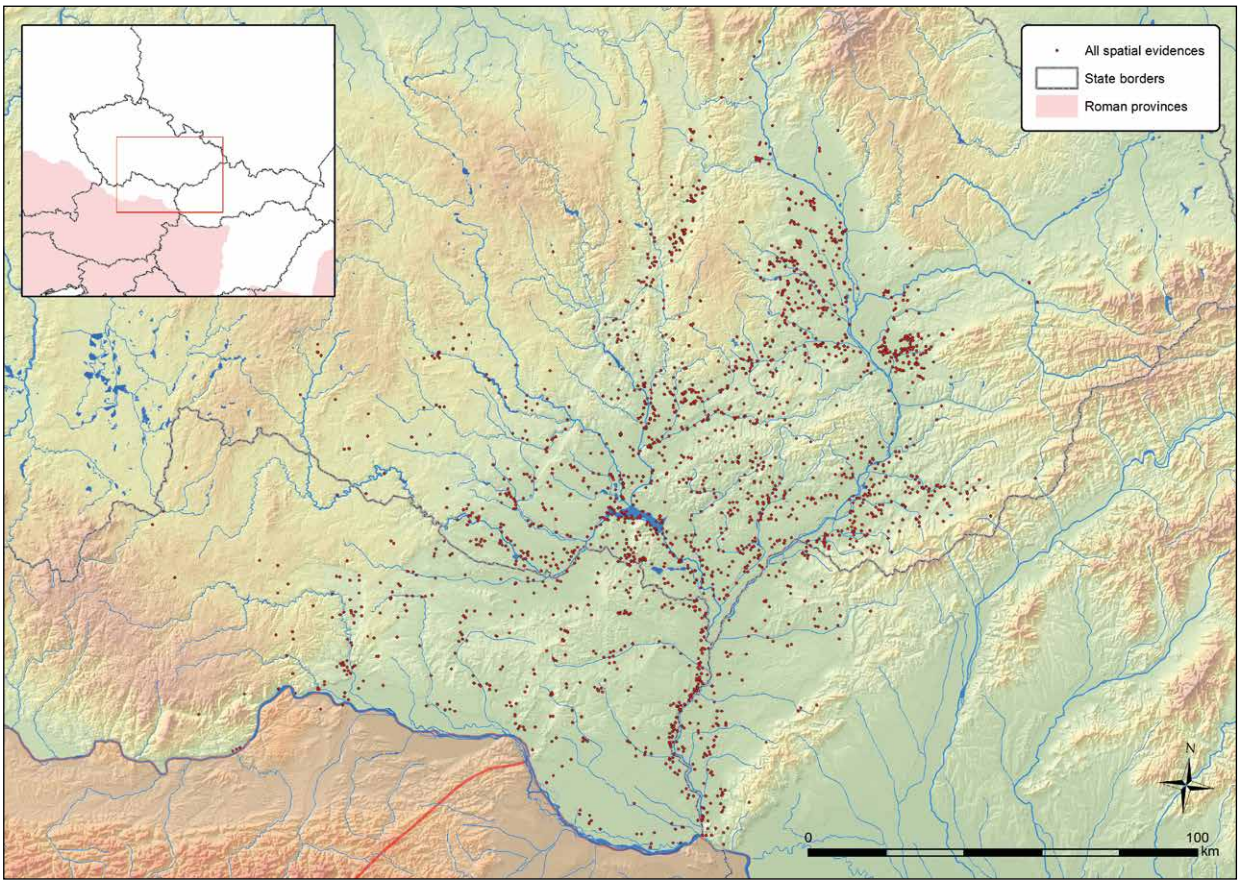

Figure 1. The outline of the study area ("Marcomannic" settlement zone) within the Middle Danube region and the distribution of all the evidence within the dataset MARCOMANNIA.

It is necessary to outline some of the general aspects of these data. The main problem is the already mentioned absence of a central register of finds that would allow for a more precise determination of how many artefacts have already been collected at a given location and in which collections they may have ended up. Thus, we cannot determine what proportion of the total volume of collected artefacts is represented through available finds at a given moment. The quantitative representation of individual chronological groups and artefact types among the detector finds have to be perceived as distorted, and their relevance concerning the particular sites has to be verified with additional research methods. A significant selection is usually carried out during amateur detector surveys, primarily focusing on artefacts made of non-ferrous metals. Another selection is reflected in the tendency to pay more attention to easily diagnosable finds such as coins and brooches. For the archaeology of the Roman period, this leads to a certain underrepresentation of, for example, non-diagnostic fragments of bronze vessels or small parts of military equipment. Despite these methodological issues, detector finds provide a representative amount of data that archaeology cannot ignore (see an extensive inventory of detector finds in Zeman 2017).

The paper aims to put some detector collections from the categories of Roman imports into the context of currently available (published) data (fig. 1), both from the present-day Moravia and the entire Marcomannic settlement zone west of the Lesser Carpathians (Rajtár 2014, 111; Komoróczy *et al.* 2020, 176). The traditional view of this region of about 1,100 known settlements (residential components based on the latest data collection, see below), based on low number of excavation cases, indicates the absence of a socially and economically structured society. The only marker of such differentiation are burial grounds, especially the so-called rich graves with numerous Roman imports. However, their chronological and geographical frequency is a subject of various biases and is significantly conditioned by the state of research and knowledge within the individual regions in the study area (Vachůtová & Vlach 2011).

		Moravia				Bohemia	Slovakia	Poland	
Absolute chronology	Eggers 1955	Tejral 1975, 1968	Year span	Aoristic weight	Time steps	Droberjar 1999	Kolník 1964, 1971	Godlowski 1994	Wielowiejski 1970
-30 - -20	A	A (LtD2b)	20	0.044	-30 - 0	A -35/25 - 10/5	A	A	
-20 - -10									
-10 - 0		B1a	40	0.089		B1a - 10/5 - 20/30	B1a		
0 - 10	B1				0 - 50				
10 - 20									B1a
20 - 30						B1b 20/30 - 50/70	B1b		
30 - 40		B1b	20	0.044					
40 - 50									B1b
50 - 60	B2	B1c	50	0.111	50 - 100		B1c		
60 - 70						B2a 50/70 - 100/120			
70 - 80									B2a
80 - 90							B2a	B2a	
90 - 100									
100 - 110		B2a	50	0.111	100 - 150				
110 - 120						B2b 100/120 - 150/160		B2b	
120 - 130							B2b		
130 - 140									B2b
140 - 150								C1a (B2/C1)	
150 - 160	C1	B2b	10	0.022	150 - 200				
160 - 170		B2/C1	30	0.067		B2/C1 150/160 - 180/200	B2/C1		
170 - 180									
180 - 190							C1		C1
190 - 200									
200 - 210	C2	C1a	40	0.089	200 - 250	C1 180/200 - 250/260		C1b	
210 - 220									
220 - 230									
230 - 240		C1b	30	0.067			C2		C2
240 - 250									
250 - 260					250 - 300				
260 - 270		C2	60	0.133		C2 250/260 - 300/320		C2	
270 - 280									
280 - 290									
290 - 300									
300 - 310	C3				300 - 350		C3	C3	
310 - 320									
320 - 330		C3	60	0.133		C3 300/320 - 380/400			C3
330 - 340									
340 - 350									
350 - 360					350 - 400				
360 - 370								D	
370 - 380									
380 - 390		C3/D1	40	0.089					
390 - 400						D1 380/400 - 410/420			
400 - 410					400 - 420				
410 - 420									
420 - 430									

Figure 2. Outline of the relative chronological systems used and their absolute chronology synchronization. The geographically relevant system (by J. Tejral) is complemented by temporal distributions of arbitrary 50-year time blocks (with shorter blocks at the beginning and the end), the actual duration of the relative chronology stage and its proportional temporal probability distribution (aoristic weight).

Dataset MARCOMANNIA and sources of information

There has been recently a focus on the search for tools to utilize quantitatively and spatially representative data, which might allow to question this idea of a homogeneous society more strongly. Therefore, two years ago, a research project has been launched within the framework of the project 'Protohistoric Communities of the 'Marcomannic' Settlement Zone in the Middle Danube Region – Structure and Dynamics on the Basis of Digital Modelling' (Czech Science Foundation grant project, no. 20-11070S). The project is oriented, amongst others, on the derivation of the quantitatively representative proxies of various aspects of the Germanic populations within the study area (Vlach *et al.* in press). The primary prerequisite for such

an approach is the emergence of a comprehensive dataset containing all relevant formal (attribute) and spatial information from archaeological and other sources. The first stage of this process, covering primarily published information and the metal detector finds presented and recorded by the authors' institute, has already been concluded. The resulting dataset, named MARCOMANNIA, currently contains more than 50,000 attribute data records and almost 40,000 features of spatial data. In this paper we present and discuss data resulting from various datasets, including our institute's internal database of metal detector finds, some other published inventories, and of course, the dataset created based on all known published archaeological data from the Marcomannic settlement zone.

Inevitably, all spatiotemporal analyses throughout larger datasets have to deal with chronological uncertainties resulting from dating possibilities or their compatibility with the respective relative chronological system (fig. 2). The method of aoristic sum and weighting (Ratcliffe 2000; Verhagen *et al.* 2016) was applied to various types of data within the MARCOMANNIA dataset to assess the probability of occurrence of particular phenomena based on their dating. Currently, in the studied region, the generally accepted relative-chronological systems are constructed foremost on grave assemblages and break down the duration of the Roman period into almost a dozen stages or substages with varying duration. The mean value of their absolute-chronological representation is 38 years with a standard deviation of 16 years. Therefore, the preset arbitrary 50-year time slots were used to quantify the temporal probability of occurrence through the mutually comparable temporal entities (Vlach *et al.* in press). The weighting was conducted on various scales: the whole components, the excavated features, and the individual artefacts. Consequently, the resulting values can be used as proxies of the development trajectories of various phenomena throughout time. Specifically, the differences between consecutive time slots and the resulting rate of change, independently of the overall quantitative representativeness, allow the temporal scale to provide meaningful proxies.

Brooches

The brooches of local and Roman origin represent one of the dominant find categories obtained by detectorists. The last systematic inventory from Moravia by Peškař (1972) recorded 371 brooches, of which only 18 % were Roman products. There are currently 546 records within the authors' institutional database of detector finds, of which 34 % are Roman imports. The quantitative parameters of this collection can be put into context with other available inventories from this territory. So far, the only published detector inventory is Zeman (2017) covering the extent of the middle reaches of the river Morava. Within the region, he maintains contact with detectorists who operate on the general behavioural principles described above. So far, his inventory includes the most significant number of brooches, a total of 1,020 items, of which 40 % are of Roman provenance.

Clearly, metal detection significantly changes the quantitative parameters of archaeological data. In recent professional archaeological publications focusing on Moravia, only 169 brooch finds have been reported that can be added to the above-mentioned inventories. Of course, many recent excavations remain unpublished, but the record of 169 brooches stands in contrast to what have been reported and recorded by metal detectorists. The reason for such a divide can be sought in two aspects. First this gap can be related to depositional and post-depositional practices on the Germanic settlements prevailingly situated on arable flatland, which are the primary source of brooches. Second is the predominant fieldwork practice, which focuses on excavating features, often without any form of exploration of the topsoil layers. The MARCOMANNIA dataset presently contains a total of 3,853 records of brooches. Unfortunately, of this number, 954 mentions do not contain any information of typological or chronological nature, so they cannot be included in the overall assessment. From the territory of the Moravia 2,367 brooches are recorded in the dataset, a little more than the number of brooches from *Dacia* in the inventory by Cociş (2004).

Changes in qualitative and quantitative parameters of our data can be demonstrated in one specific example, which also indicates the additional informative potential of finds from detectorists for better knowledge. Amongst the most intensively surveyed sites by detectorists in South Moravia is the extensive polyculture site southeast of the town of Mikulov on the border with Austria (Komoróczy *et al.* 2021). Detector finds are distributed with varying intensity over an exceptional area of 125 ha. So far, 1,776 datable metal objects have been handed over to the authors, of which 562 are dated to the Roman period. So far, geophysical prospection of 24 ha has been conducted, and our more profound interest also led to the systemic application of multispectral imagery. Using these methods, we managed to reconstruct a distribution of the Germanic sunken-floor dwellings. However, without field research, the dating of the recorded features remained unclear. In part of the area, in Mikulov, another institution carried out rescue excavation preceding building activities (Čižmář *et al.* 2015). After the mechanized removal of topsoil, they examined several Germanic settlements, including sunken floor dwellings. Their work yielded representative collection of Germanic and Roman-provincial pottery, including fragments of *terra sigillata* from Rheinzabern. However, no metal artefacts in the infill of these features were detected.

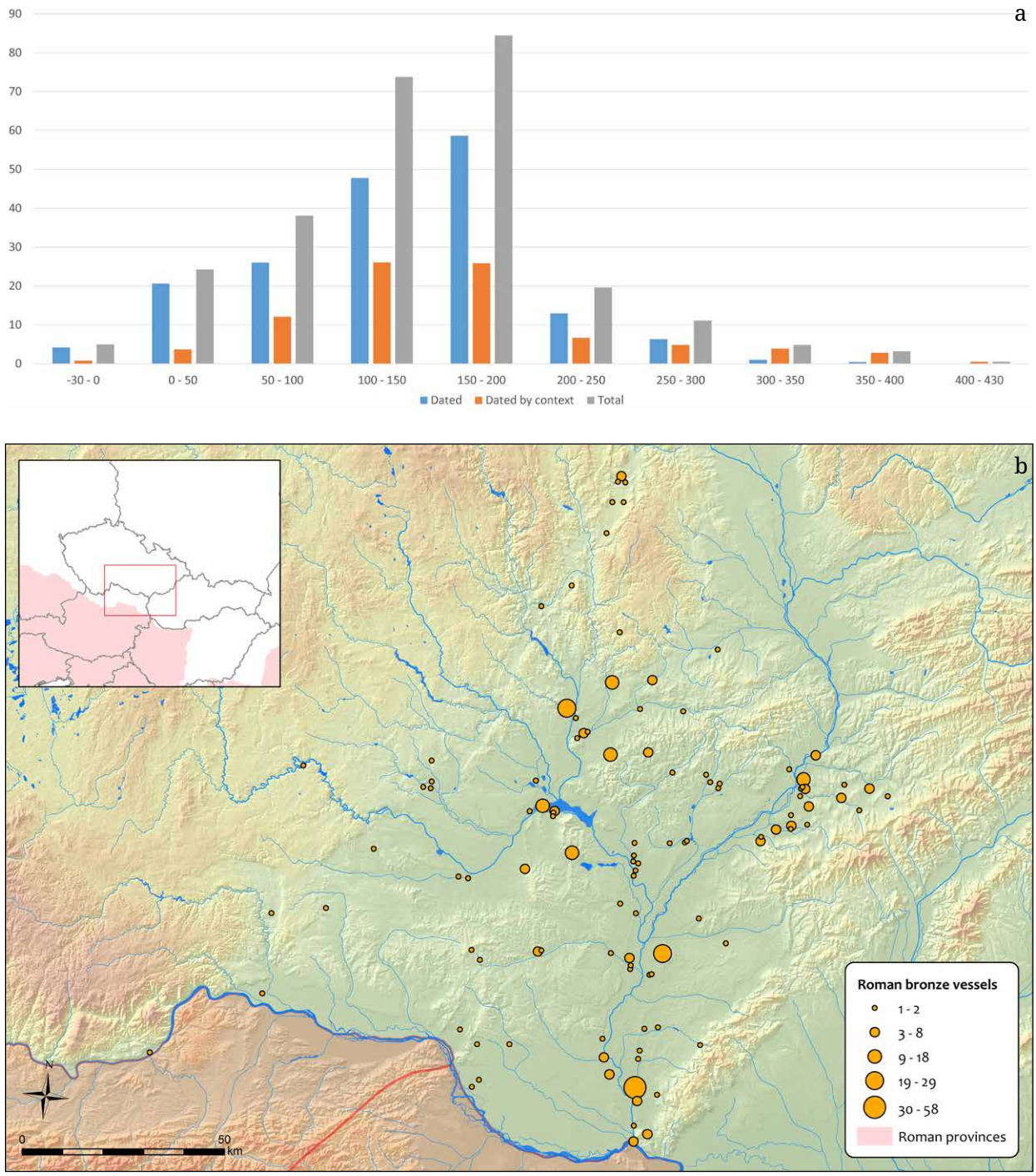

Figure 3. Bronze vessels (based on the MARCOMANNIA dataset). a. Aggregated probability distribution of the bronze vessels with differentiation of typology-based dating and dating based on context; b. Spatial distribution of evidenced quantities of bronze vessels.

The absence of metal finds in Germanic settlements is not surprising, and in general, the Germanic settlements are poor in metals. On extensive Quadian settlements with dozens of sunken floor dwellings in existance from the end of the 1st until the turn of the 4th and 5th centuries in Branč (Kolník *et al.* 2007) and Velký Meder (Varsik 2011), only, respectively, 12 and 11 brooches were recorded. In Moravia, only two brooches are known from dozens of excavated Marcomannic settlement features from the 2nd and 3rd centuries (Droberjar 1997). It can be assumed that in pursuit of the maximum recycling of metal items in settlements if their immediate catastrophic termination

did not occur, only those that were accidentally lost remained. Subsiquently, they became part of the context, which could be called a 'residential layer'. Since these settlements are almost exclusively located where some form of agricultural activity never ceased to exist in subsequent centuries, this layer gradually dissolved into the surface. Threfore, if archaeology focuses exclusively on the features below, as the rescue excavation in Mikulov did (Čižmář *et al.* 2015), it will lose the only representative metal assemblages from these sites. In this sense, a detector survey of Germanic settlements in agriculturally cultivated areas is indispensable.

The gradual decrease in Roman imported brooches is a general tendency observed on the scale of the whole Marcomannic settlement zone (fig. 5). In Moravia, a much larger number of graves have been excavated dated to the late than the early Roman period, which explains why the inventory by Peškař (1972) provides a significantly smaller proportion of Roman brooches. This pattern can also be observed in the MARCOMANNIA dataset. The very distinct presence of Roman, especially Norico-Pannonian profiled brooches, throughout the early Roman period is quite clear. In the 1st century, their number almost equals to that of Germanic brooches. From the beginning of stage B2, this ratio gradually decreases. From the end of the 2nd century, they already represent a noticeable minority (Tejral 1998). It is reasonable to assume that the Marcomannic wars and their aftermath played a significant role in this trend (*e.g.* Tejral 1983).

Bronze vessels

Bronze vessels represent a traditional category of Roman imports. There are currently 90 individual records of identified bronze vessels from 11 sites in our detector dataset. It is not a very high number compared to other categories and some factors relating to the nature of discovery might account for this trend. On one hand, the primary context of imported bronze vessels in the region is predominantely cremation burials with inhumantion in minority. Indeed, among the detector finds identified as bronze vessels and found on a relatively limited number of sites, large number of objects show signs of heat exposure. These objects may thus have originated from ploughed-up cremation graves, not necessarily destroyed by detectorists. On the other hand, there are indications that larger number of bronze vessels have been in circulation in the settlement context, but due to their natural degradation into small, often unidentifiable fragments, has resulted in the low number of recorded finds. Nevertheless, their absence is significant in the case of published finds from other sites.

Currently, the MARCOMANNIA dataset contains 380 records representing individual fragments of bronze vessels or their uncountable aggregation based on insufficient information. Even this number is not too high and is distorted by how they are registered and published. The exact number of vessels from the closed contexts of burials is known. In other cases, where surface finds predominate, an unspecified number of undifferentiated bronze vessels is mentioned. The quantification of imported bronze vessels is therefore highly challenging and burdened by several factors: the multiple occurrences in rich graves, the intentional fragmentation in cremation graves, susceptibility to unintentional fragmentation and resulting issues in identification amongst finds from topsoil in settlements. Despite these issues, some trends can be observed from the temporal evaluation of the bronze vessels from the MARCOMANNIA dataset (fig. 3).

Bronze vessels started to arrived to Moravia since the beginning of the Germanic presence. Although in limited numbers, they have been recorded from many known sites. Their number increases in B2/C1 period but then slightly decreases in proportion to the known sites. Bronze vessels gradually disappeared after the year AD 200, which can be connected with the observed trend of the impoverishment of grave goods in the late Roman period (Jílek 2012).

Coins

Roman coins within the Germanic environment are one of the most important category in several aspects of the Germanic society (economic or political, Bursche *et al.* 2008). Unsurprisingly, they are the most numerous finds of metal detecting. They consist of individual finds of coins, whereas hoards are practically missing from the Roman period in Moravia. Again, this category is subject to specific issues. Diverse circumstances influenced the final deposition of coins within the Germanic context, and the deposition happened in diverse periods, often remarkably distant from the date of coinage. Naturally, the situation in chronological determination of coin finds differs from the aoristic approach towards the find categories with standard means of dating possibilities. To quantify such data representatively on a temporal scale, one should either use frequency of mean value of identified intervals or summarization in individual years of the minting interval (fig. 4).

Also, from the viewpoint of archaeology, coins represent a category with a specific informative potential different from the environment of origin. Within the MARCOMANNIA dataset, the total number of 2,597 coins, which contain chronological information, consists mainly of detector finds reported to the authors' institution. This is despite the fact that in the study region detectorists are less willing to report coins to professional institutions, due to popularity of coin collecting amongst public. The second pool of dated coins in the dataset comes from the inventory by Pochitonov (1955), and the third – from Zeman's (2017)

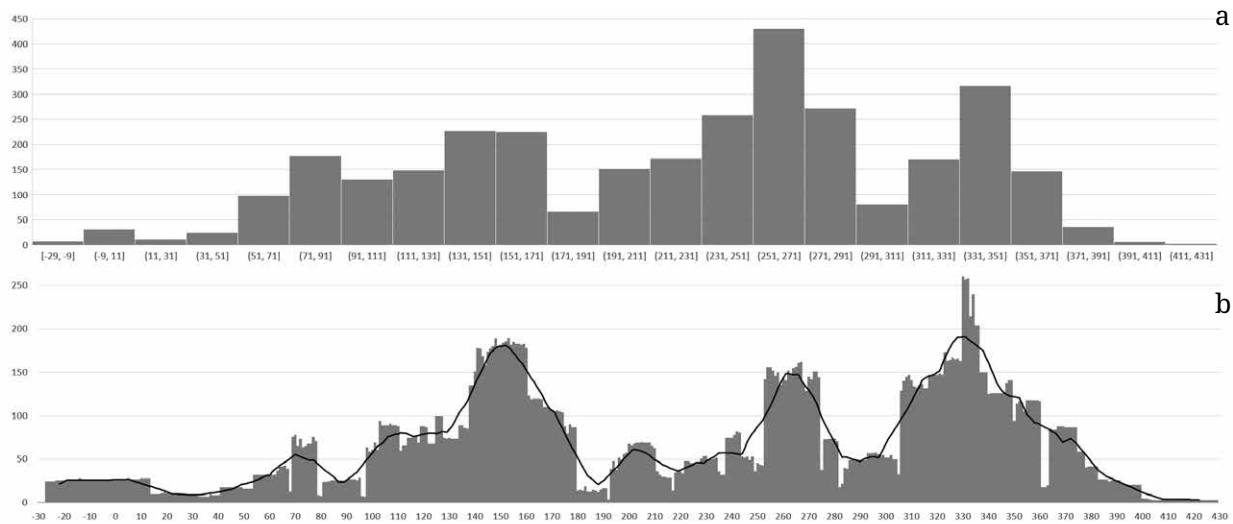

Figure 4. Chronological distributions of the datable Roman coins from the MARCOMANNIA dataset (based on 2,597 finds). a. Histogram of the distribution (20-year time steps) of the mean minting period; b. Aggregated yearly distribution of evidenced minting period.

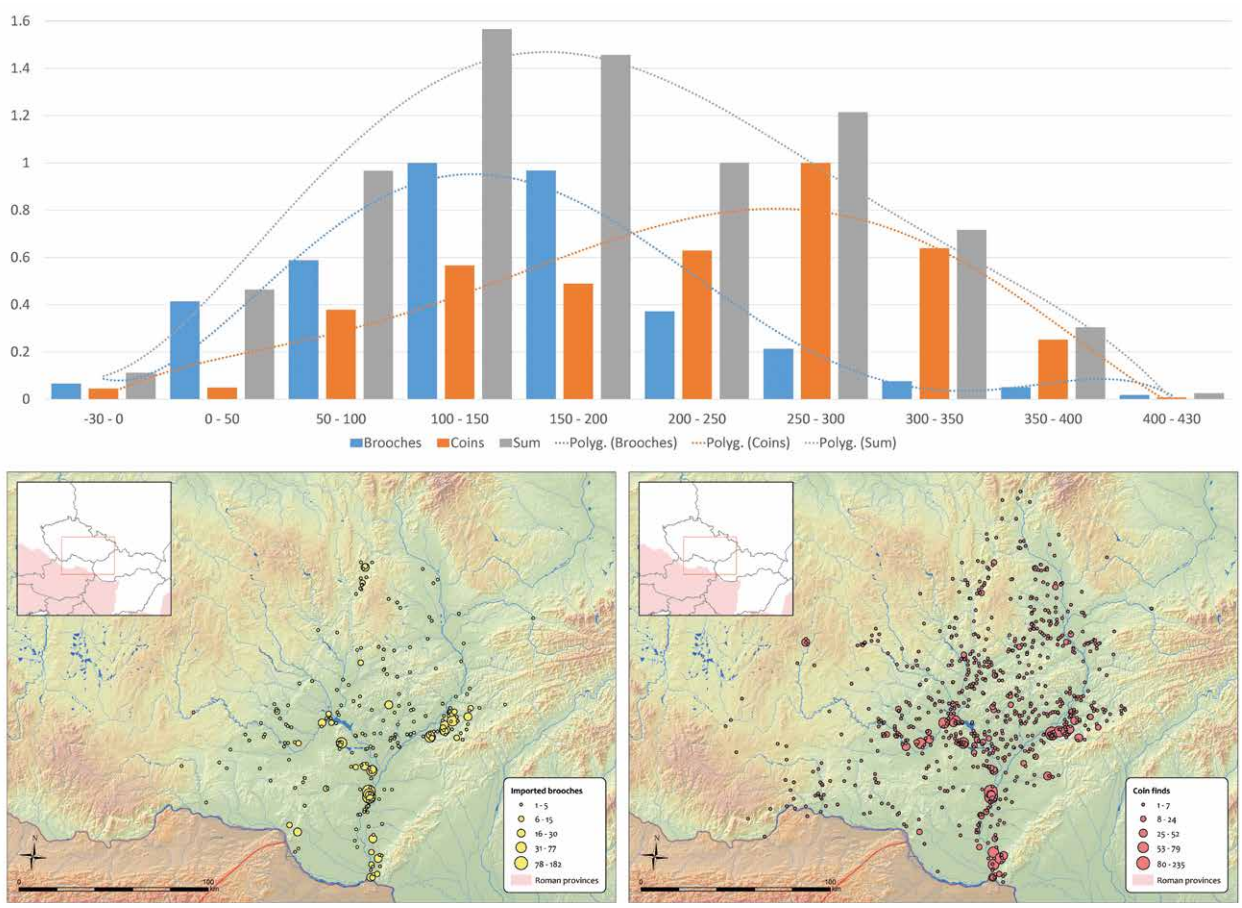

Figure 5. Comparison of the temporal development of the imported brooches and coins from the dataset MARCOMANNIA and their spatial distributions.

inventory of detector finds. This is in contrast to the professional literature, where only 175 dated coins are known. Therefore, the detector finds of the last 20 years constitute 60 % of all coins. Due to the quantitatively significant proportion of coins from the last decades, the resulting histogram can be considered a reasonably tight curve, which reflects a significant increase in the relatively low-value coins in the decades around the mid-3rd and the 4th centuries (fig. 4).

The two most prominent sites in the south Moravia, Mikulov (Komoróczy *et al.* 2021) and Drnholec (Komoróczy *et al.* 2019), account for a relatively high number of 62 and respectively 65 dateable and localized coins. From the Middle Moravian basin, Zeman (2017) reports 397 coins from 54 sites found by detectorists, which means an average of seven coins per site. At the same time, almost half of them come from only three sites. From the Slovak territory, the most significant number of 795 coins is reported from the extensive settlement agglomeration in Chotín (Rajtár *et al.* 2017, 182); 118 coins are recorded from Hurbanovo (Kolníková 2002, 299-301) and 121 coins from Zohor (Elslchek & Kolníková 2016, 177).

Conclusions

It has transpired most significantly in the presented cases that new means for overall archaeological interpretation could only be based on detailed and foremost qualitatively comprehensive and representative datasets. By doing so not only the general trends within the single type of archaeological data could be analysed, but with the application of means for their chronological probability evaluation, they could also be synchronized with other find categories. This provides a comprehensive basis for the analysis of patterns within archaeological data and allows for the development of more substantiated interpretations and theoretical models of the past processes.

When comparing the trends in the two quantitatively most significant import categories – brooches and coins – we observe two different developments in terms of increase and decrease (fig. 5). While brooches and the less numerous category of finds, bronze vessels, peaked during the 2nd century, coins are most represented from the late Roman period onwards. When combined, these imports partially balance this trend to reveal the most significant concentration of these objects in the 2nd and 3rd centuries. Despite many distortions resulting from the different conditions of acquisition and publication of finds, the spatial distribution of individual finds reveals significant structures throughout the entire Marcomannic settlement zone. It thus contributes to gradually overcoming of the original idea of a homogeneous, socially and economically undifferentiated Germanic society of the Roman period that was developed based on settlement finds.

Acknowledgements

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Investigating Roman strata to the core

The use of well core data in the interpolation of Vindobona's archaeological layers

Kira Lappé

Although we are in constant contact with it through underground railways, tunnels, underpasses and cellars, the underground of a city remains something abstract and difficult to grasp. While we are constantly aware of the human influence through the constructions and buildings erected on the earth's surface, the human interventions in the ground remain hidden from our eyes. To throw a light on this impact is the aim of this study.

Human interaction with the ground leads to the creation of 'archaeological or anthropogenic sediments' or 'artificially modified ground' (AMG), *i.e.* sediments that have been transformed, removed or deposited by human activity. The boundary between the AMG and the 'natural' geological ground is called 'Boundary A', a term coined by M. Edgeworth (Edgeworth 2014; Edgeworth *et al.* 2015). Aim of the interdisciplinary research project 'The Anthropocene Surge', based at the University of Vienna and the University of Applied Arts Vienna, is to estimate the human impact on the underground of the city of Vienna. One of the key objectives is to create an interpolation of Boundary A, which will then be used to calculate the thickness as well as the volume of the archaeological sediments. By this, the human impact on the underground of a modern, but long-lived city can be visualised and quantified. Further aim of the project is to trace the human impact not only in space but also over time, comparing different historical epochs of the study area. As practical output, the final 3D model of the interpolation shall be a reference map for the Department of Urban Archaeology Vienna to estimate the expected thickness of archaeological strata prior to excavation (and by this calculate the supposed duration of the excavation).

Interpolating ancient surfaces

First attempts to quantify the human impact on the underground have been done, *e.g.* in London (Ford *et al.* 2014; Terrington *et al.* 2018) and Rome (Luberti 2018). These studies were based on geological maps (Ford *et al.* 2014; Luberti 2018), digital terrain models (DTM) (Luberti 2018; Terrington *et al.* 2018) and well cores (Terrington *et al.* 2018). In the present study, I will include another data category, which are archaeological data. In archaeological research, reconstructing the ancient surface is often hindered by the lack of extensive data needed for the interpolation process. For investigating and interpolating the extent of archaeological layers, points are needed at regular intervals and in large numbers. This is provided by geological well cores, which often offer information on

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DOI: 10.59641/3d278gp

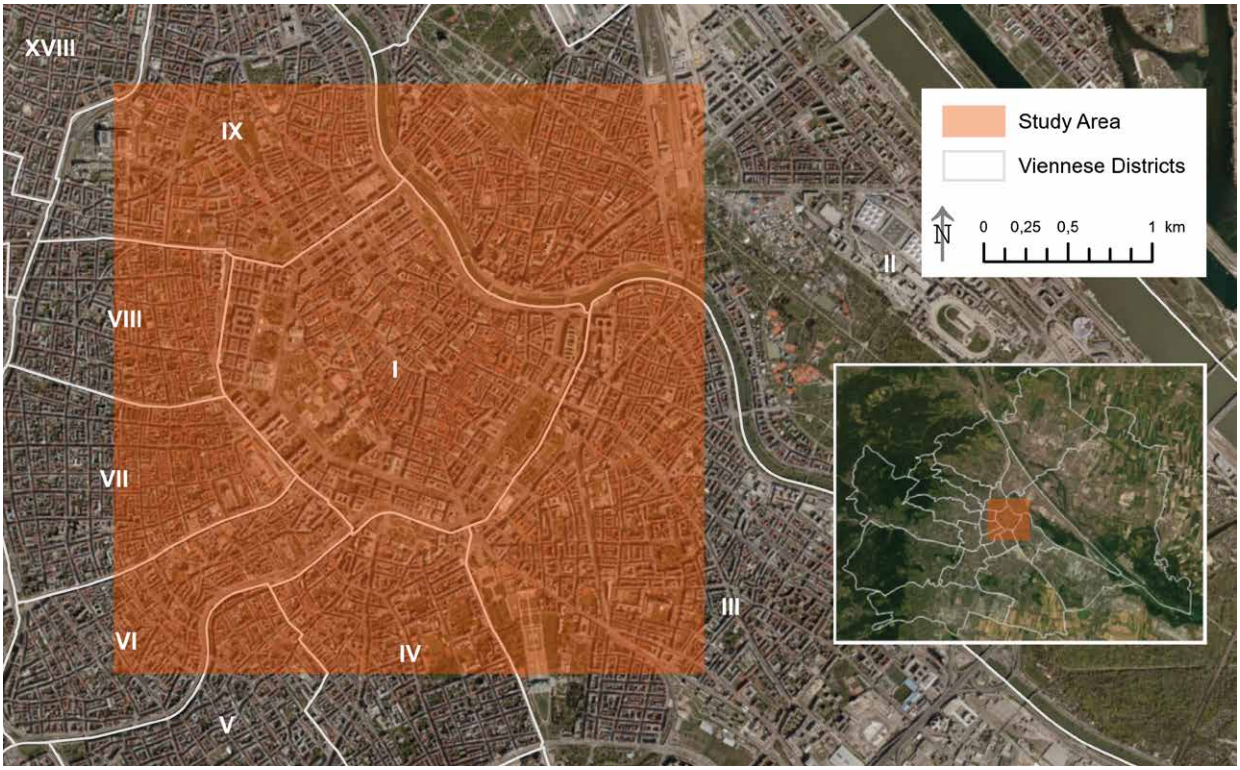

Figure 1. Map of the study area.

the archaeological layers above the geological layers. By adding archaeological data, *e.g.* digitised excavation plans, a more detailed and secure result can be achieved and the interpolation can be corrected.

Study area

The study area is located in the centre of the city of Vienna, covering an area of 12.25 km² (3.5 × 3.5 km) and enclosing the first district of Vienna and parts of its surrounding districts (fig. 1). This area was chosen because of the data availability – as the historic city centre it is covering more than 2,000 years of history and therefore providing the highest density of excavation and well core data of the whole city area.

Data

Well core data The Municipal Department for Bridge Construction and Foundation Engineering (MA 29 Brückenbau und Grundbau, Stadt Wien) is providing the well core data, which are stemming from the well core database of the City of Vienna, the so-called 'Wiener Baugrundkataster'. The information in the well logs includes the ID of each well core, the coordinates, the elevation, and the date of the drilling. Those well logs covering the layers of archaeological-anthropogenic sediments or structures give additional information. Each layer fills a row in the CSV-table, giving information on the well core it stems from and adding the height of the upper as well as the lower boundary of the layer. For each layer, a detailed description of its texture, colour, material, or artefacts found within, *etc.* is included. In the study area, 9,878 well cores have been drilled, of which 9,015 have AMG described.[1] 19,984 layers of AMG are documented in the well logs, classified as 'A' (anthropogenic sediments), 'A?' (probable anthropogenic sediments),[2] and 'Bw' (building structures).[3]

Archaeological data In Vienna, archaeological layers are digitally surveyed at excavations since 2005. 70 archaeological sites have been investigated in the study area since then. The archaeological data were directly received from the Department of Urban Archaeology (Stadtarchäologie Wien, Wien Museum) in DWG (CAD files) and SHP format. The archaeological sites are

1 The well cores included in this study cover a time span from the year of 1844 to the 15th of May 2019 (data were provided in August 2019).

2 'Probable anthropogenic sediments' mean that no artefacts or materials (as tiles, charcoal *etc.*) gave a clear indication to the drillmaster that this layer does not stem from natural processes. However, by their experience, these sediments seem to differ from natural sediments (by visual differences, differences during the drilling process (*e.g.* harder to drill), hints by the terrain or the building history *etc.*), and therefore they were classified as 'A?'.

3 This label is used for (intact) structures hit by the drilling, which are cellars, wells or masonry in general.

concentrated in the first district, in the centre of the study area, which represents the historical city centre. For every archaeological measure, an individual DWG file was delivered, including a map of the surroundings and of the archaeological layers and findings. The archaeological measures range from excavations (from short-term to several months) to construction monitoring, as trenches for infrastructure measures as sewage, electricity, or gas. Depending on the construction work, the depth of construction and archaeological excavation was sometimes constrained, and the Boundary A was not reached in all cases.

Digital terrain models (DTM) The Municipal Department for Surveying and Mapping (MA 41 Stadtvermessung Wien, Stadt Wien) provided digital terrain models (DTM) of the city area of Vienna as raster data in TIFF format with a spatial resolution of 1 m.

Methods

Software The whole data preparation processing was carried out in Python 3. For visualisation purposes and mapping the data, I have used the proprietary GIS software ArcGIS Pro by ESRI. The descriptive statistics and the ESDA were done with ArcGIS Pro and R. The geostatistical tasks were performed in the proprietary software Surfer v. 17.1.288, a surface and contour mapping program by Golden Software LLC.

Data preparation The well core data have been pre-processed via Python, extracting only those well cores with certain archaeological layers for the interpolation (*i.e.* none of the category 'A?'). By comparing the lower boundary of AMG in each well core with its total depth, well core drillings that have not reached the lower boundary of the anthropogenic sediments were detected. If no other layers underneath an AMG layer are documented, it cannot be guaranteed that 'Boundary A' at this position equals the lower boundary of the lowest anthropogenic layer of this well core. Thus, it can only be stated with certainty that at this position the anthropogenic sediments are reaching **at least** to this depth, yet anthropogenic layers underneath cannot be excluded. For these well cores, a new category was introduced, called 'A_min' (*i.e.* minimum depth of AMG at this location). These well cores have been excluded in the first interpolation step and later included in a second step of the interpolation, to enhance the result.

Regarding archaeological data, only those layers representing the 'natural' geological ground and layers that are reaching below that were considered. Of the 70 excavation sites in the study area, only those were used, where the excavation has reached the upper boundary of the natural ground. Following this criterion, 31 excavation sites could be included in this study. Depending on the type of archaeological measure, the site maps show between only 25 and more than 4,000 layers. As only points can be included in the interpolation, the 3D-polylines in AutoCAD had to be converted to point data. Therefore, the 3D-polylines of these layers were discretised in points at a distance of 1 m, by which 2,259 archaeological data points were extracted.

Interpolation After analysing the obtained data points by an Explorative Spatial Data Analysis (ESDA), the interpolation was conducted to receive a map of Boundary A of the study area. To obtain a reliable result, different variograms were produced, considering the anisotropy of the data set, and the gridded outcomes using kriging were compared. The outcome was validated by cross validation.

The well cores classified as 'A_min' only show the minimum extent of the anthropogenic sediments at this location and therefore should only be implemented if the interpolation of Boundary A at this location is too high. Thus, the following workflow has been developed: From the grids, obtained by interpolating the data sets without 'A_min' well cores, the elevation value is extracted at the locations of the drillings classified as 'A_min'. In Python, a new field was calculated by subtracting the extracted elevation grid values from the lower boundary elevation of the A_min well cores. If the

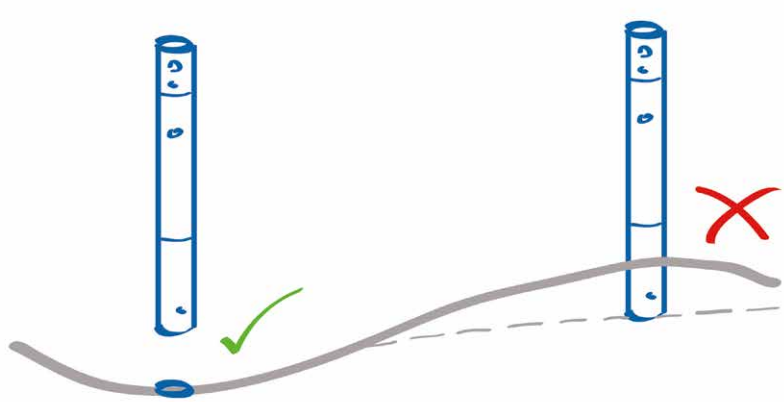

Figure 2. Visualisation of the workflow regarding the well cores 'A_min'. On the left, the interpolation fits the data whereas on the right, Boundary A is interpolated too high. The well core on the right must be included into the data set.

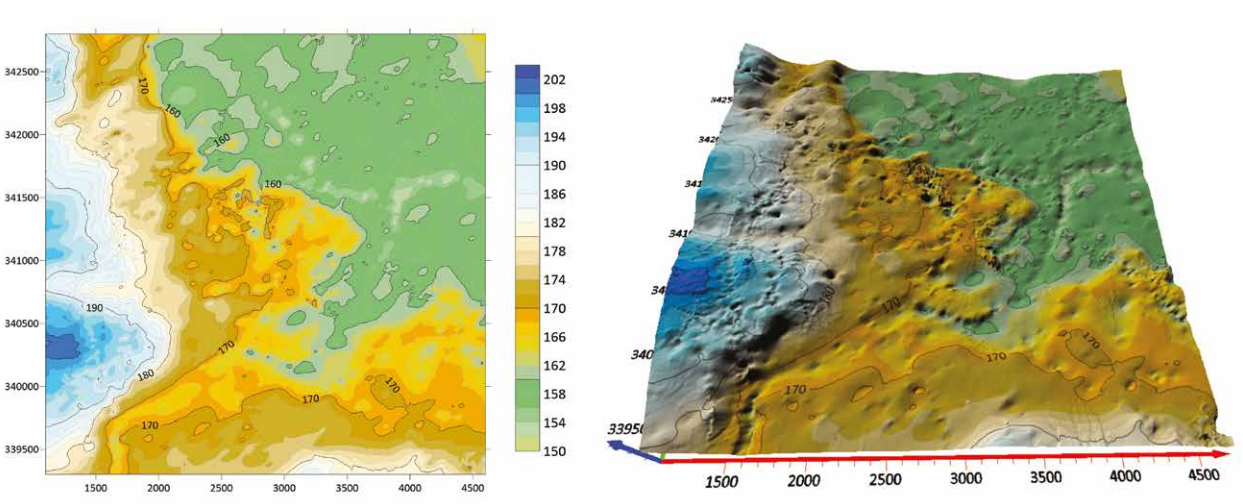

Figure 3. Interpolation of Boundary A, using well core and archaeological data. Contours (on the left) and 3D surface (on the right).

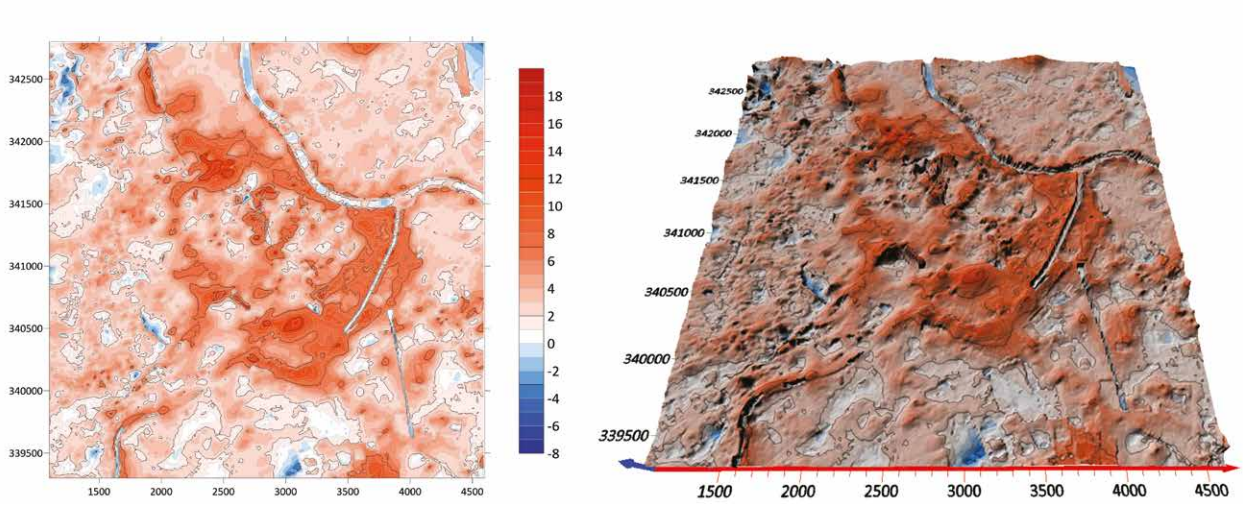

Figure 4. Thickness of AMG, using well core and archaeological data. Contours (on the left) and 3D surface (on the right).

result is < 0, the interpolation of Boundary A is too high at this location and the well core is extracted (fig. 2). The extracted well cores of A_min are then added to the data set used for gridding and the interpolation is redone.

The resulting map displaying Boundary A is used to calculate the negative and positive volume of the anthropogenic sediments underneath the study area. By subtracting the interpolated map of Boundary A from the modern DTM, a map of the thickness of AMG is received, which is analysed against the background of the historical development of the city.

Results

Interpolation of Boundary A For the study area, a global trend was detected, caused by the topography of the study area. The terrain is sloping towards the Danube Canal in the north-east, which is also reflected in the data sets. Therefore, linear detrending was applied to the data set during the variogram modelling. Besides autocorrelation, strong geometric anisotropy has been detected in the data set (anisotropy ratio of 3). Testing of different variogram models via cross validation resulted in creating a nested model as best fit (combined Gaussian and spherical model with nugget effect).

As interpolation method, Universal Kriging was used due to the global trend. Figure 3 shows the outcome as contours grid and as 3D surface. Gridding outcomes of using only the well core data or including the archaeological data points were compared, showing a clearly more differentiated interpolation result by including the excavation data. However, due to the spatial concentration of archaeological data on the centre of the study area, this enhancing effect is limited to the relatively small areas with archaeological sites.

Table 1. Calculated grid volumes and surface areas by using the modern DTM and the interpolated grid of Boundary A.

	using well core and archaeological data (excl. A?)
cut & fill volumes	
positive volume [cut]	46,515,407.26 m³
negative volume [fill]	330,034.82 m³
surface areas	
positive surface area [cut]	11,933,877.22 m²
negative surface area [fill]	310,624.54 m²

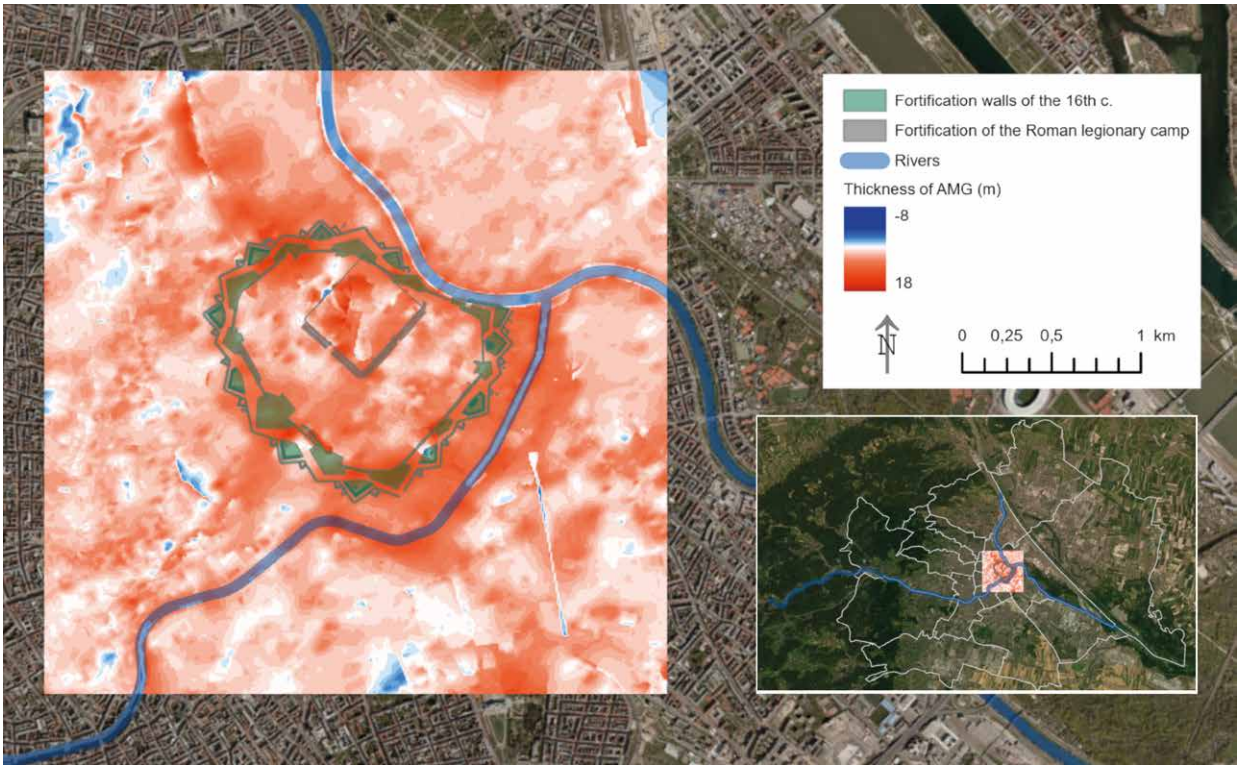

Figure 5. Historical and natural analysis of AMG.

Thickness of AMG In the study area, the thickness of anthropogenic sediments in the well logs reach from 0.02 to 19 m; when considering the modern DTM, *i.e.* including the AMG deposited during site redevelopment, the thickness of AMG has even a larger range from -5.56 to 19.85 m. The archaeological data points show a similar result with -0.22 to 16.69 m of AMG thickness. Maps of AMG thickness were produced by subtracting the interpolated Boundary A surface from the modern DTM (fig. 4). The result is a map representing the thickness of archaeological-anthropogenic sediments in red, darker red areas showing more massive archaeological sediments. Areas of 'negative AMG', *i.e.* areas that have been lowered since the time of drilling or excavation, are depicted in blue.

Volume calculations The volume of the thickness of anthropogenic sediments is calculated by using the modern DTM as upper surface and the interpolated Boundary A grids as lower surface (Table 1). The positive volume or 'cut' represents those parts, where the upper surface is higher than the elevation of the Boundary A documented in the data points, the negative volume or 'fill' stands for areas where the upper surface, *i.e.* today's ground level, is lower than Boundary A at this location at the time of drilling. At these locations, ground has been removed since the well core was drilled. The total positive volume of anthropogenic sediments in the study area amounts to 46,515,407.26 m³. Regarding the surface areas, 11,933,877.22 m² belong to the positive surface area, while 310,624.54 m² of Boundary A were higher than the present ground level. This area accounts to approximately 2.5 % of the study area that is currently lower than in the time the well cores were drilled.

Interpretation The distribution and extent of anthropogenic sediments in the study area are closely

intertwined with the history of the city. The most massive anthropogenic sediments are situated in the centre of the study area, following the course of the '*Ringstraße*', the boulevard enclosing the historic city centre. This boulevard has been erected in the 1860's on the site of the former city walls. This fortification, stemming from the 16th century, was demolished by imperial edict at the end of the 1850's (Sakl-Oberthaler *et al.* 2016). The walls' deep foundations are visible in more than 12 m of anthropogenic sediments in the well cores. Superimposing the SHP-file of the fortification shows a close match with the areas of thickest AMG (fig. 5).

Within the city walls, one area stands out with more accumulated sediments of anthropogenic origin than the remaining area inside the fortification. This area outlines the location of the Roman fortress, which is the first place of Roman settlement in Vienna. Other aggregations of AMG belong to natural phenomena. Along the banks of the Danube Canal and the river Wien, higher anthropogenic sediments can be observed, stemming from the river training and the reinforcement of the water bodies in the late 19th century. Within the framework of the river training, more than 2 km of the river Wien were vaulted and this part is also visible in the interpolation. The SHP-file of water network of the city fits perfectly with the interpolation. The straight structure of thicker anthropogenic deposits in the north-western part of the study area is caused by a terrace in the topography of the city that was formed by one branch of the Danube. The terrain level slopes down to the east, and to overcome the difference in terrain several staircases were built in this region of Vienna, which can be seen in this accumulation of anthropogenic sediments.

Areas where the terrain is today lower than at the time of drilling relate to large construction projects of the city. The straight linear feature in the south-eastern part of the study area represents the tracks of the rapid transit railway erected in the beginning of the 1960's, whereas the region in the north-western part of the study area belongs to the largest hospital complex in Austria, the Allgemeine Krankenhaus der Stadt Wien (AKH). The construction of the building complex took from 1964 to 1994 and led to levelling measures of the terrain.

Discussion

Comparison of AMG of various historic epochs One objective of this study was to distinguish the thickness of archaeological layers belonging to different historic epochs. For this, the materials documented in the well core logs have been extracted via Python. The more than 80000 entries have then been classified into 18 different groups of materials. The well cores are described by drillmasters without expertise in dating of archaeological material, which leads to very rough and undifferentiated descriptions of the artefacts included in the layers. Bricks, which are the material most documented in the well logs, can belong to Roman, Medieval or Modern times. Because of this, only materials that had appeared for the first time, can be assigned to a specific epoch, marking a *terminus post quem*. For the Viennese well logs, only materials belonging to the past 200 years fulfil these constraints (*e.g.* plastics) and could be used for an individual interpolation, yet this would not add any information to the thickness and volume of the Roman strata of *Vindobona*.

Constraints of this study Well cores are usually drilled before construction measures, aiming at examining the ground concerning civil engineering reasons. Therefore, more has changed, and probably more anthropogenic soils have been accumulated by the building activities following the drilling. Considering this, a scientifically exact interpolation of the current state of AMG is neither possible nor was it in the scope of this study. More, the focus was on getting an approximation of the human imprint on the ground in a modern, but long-lived city. And to get, by this, a glimpse at a reality that is usually hidden from our eyes, under the subsurface of Vienna.

Conclusions

Due to frequency and distribution, well cores allow the application of geostatistical modelling for the interpolation of the archaeological subsurface. Including well cores in this kind of study brings two advantages: at least in urban contexts, well cores are available in way larger number than excavation sites, and they can display anthropogenic sediments of a thickness that is rarely excavated, as is shown by deposits of up to 19 m in the study area. In Vienna, the interpolated thickness of archaeological layers shows a clear connection to the historical development of the city. The interpolation result gives an indication of the expected thickness of archaeological strata and might support the Department of Urban Archaeology in future plannings of their excavations.

To differentiate between time epochs based on the materials in the well cores was not possible in Vienna. It may be a promising approach in future reconstructions of former landscapes if archaeologists date the anthropogenic drill core layers. By this study, definite numbers have been calculated to estimate the human imprint on the underground of Vienna for the first time. The workflow developed in this study might be a template for other studies on archaeological-anthropogenic sediments, making comparisons to other cities, even on other continents, possible.

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Following Baradez's tracks

The GIS approach integrating photographic and satellite sources near Biskra (Algeria)

Andrea Meleri and Paola Zanovello

The Numidian limes and the *Fossatum Africae*

Although the limes segments in the Rhine-Danube region and the north of Britain are more researched and bibliographically familiar, the African limes was probably the first to be traced on the ground, already in the aftermath of the fall of Carthage in 146 BC. Since its genesis in the African landscape, the Roman limes was certainly not intended as a defense line drawn on the ground, but rather as a large border area, with an infrastructure of military works (ditches, observation towers, *castra*) and also civil works (roads, water pipes, agricultural divisions and the related production centres, *villae*): not so much, or in any case not only, a border line to be defended but rather a wide swath of territory, peripheral but actively productive and osmotically open to controlled commercial and socio-cultural exchanges with the external areas (Birebent 1964; Forni 1987; Ferchiou 1998; Zanovello 2017; 2019; 2020).

At the beginning of the 20th century, a significant stretch of the African limes was identified by the French historian and cartographer Gsell with a ditch called by the locals *seguia*, that they had always believed to be the remains of an ancient irrigation canal (Basset 1905). The area is located south of *Ad Piscinam* (Biskra), nearby the already known remains of the Roman fort of *Gemellae*: this was the first discovered segment of what is now commonly known as the Numidian Roman limes of Africa (Gsell 1911; 1929; Baradez 1949b; Trousset 1998). *Gemellae* and *Ad Piscinam* are also present in the *Tabula Peutingeriana* (Talbert 2010, 3C2).

The investigation continued in the aftermath of the Second World War, owing to the pioneering work conducted remotely and on the ground by Jean Baradez. A French army aviator with an interest in antiquities, he was already familiar with Gsell's work in Algeria because of his friendship with the archaeologist and epigraphist Louis Leschi. Stationed in the colonial department of Algeria during and after the war as a reviewer of infrastructure projects, Baradez examined hundreds of aerial photos taken for prospecting purposes and in this process he could also identify many new stretches of the Roman limes, complementing the ones already found by Gsell. These traces were located in a wider area that, consistent with the toponyms and itineraries present in the ancient sources, outlined the southern perimeter of the Roman territorialisation in this area (Leschi 1937; Euzennat 1971).

Thanks to new and specific aerial photography campaigns promoted by Baradez himself, the length of known segments of the Roman limes was thus extended from

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DOI: 10.59641/3d278gp

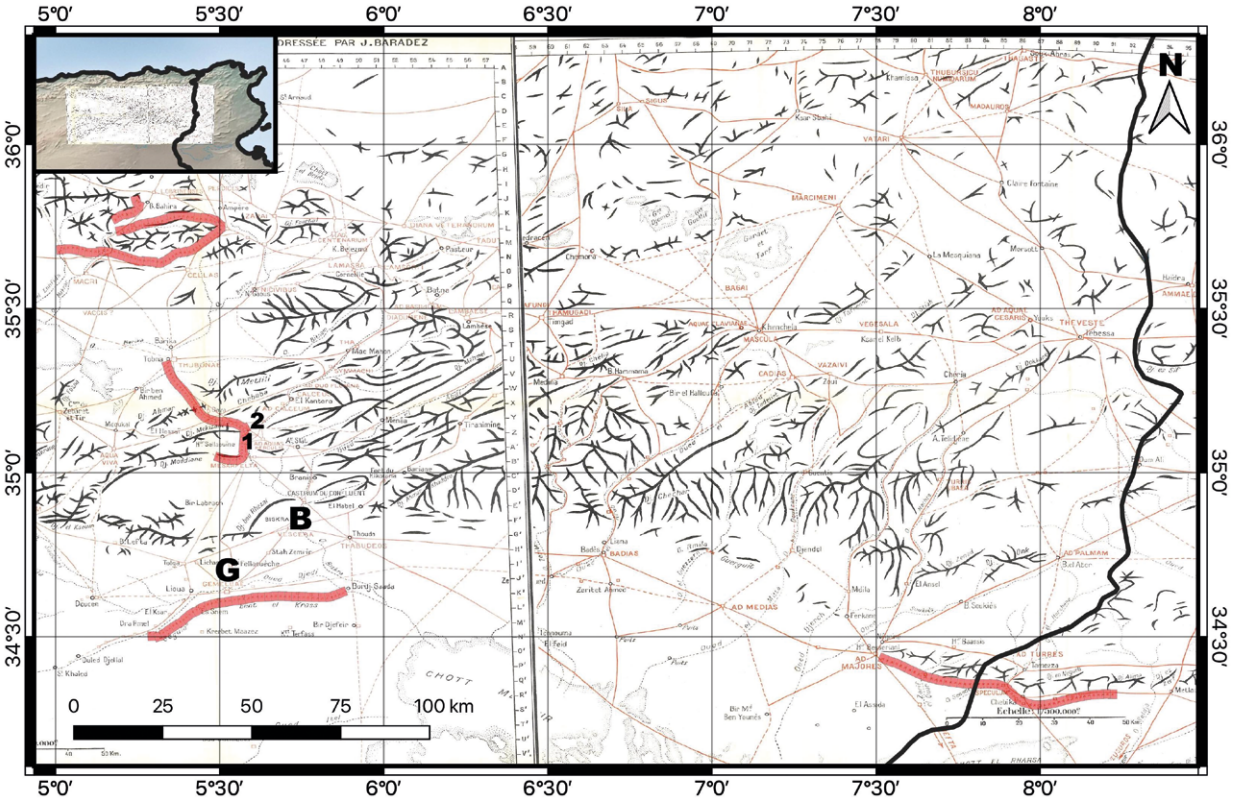

Figure 1. The large reference maps attached to Baradez 1949a are shown in a georeferenced format. Segments of the Numidian limes are shown as thick red lines, B. Biskra; G. Fort Gemellae; 1-2 mark the position of the archaeological sites surveyed around the area of *Fontaine des Gazelles* artificial water basin.

the 60 km discovered by Gsell to a new total length of 240 km (fig. 1). Furthermore, the complexity of the network of military, civil and production sites and infrastructure that populated these border areas clearly emerged from the aerial photos, augmented by Baradez interpretation and survey campaigns conducted on the ground (*e.g.* fig. 2). All the findings were collected and published in his seminal work *Fossatum Africae* in which the author implements the textual description of the findings with the use of interpretative transparencies that can be superimposed on the printed aerial photos (Baradez 1949a).

The use of aerial and zenithal photos in archaeology was innovative at a time when lateral pictures shot at lower altitudes were preferred, and this new approach was particularly effective in the landscapes of southern Algeria (Deuel 1969; Gester 2005). In *Fossatum Africae* the author recounts how often traces of structures that were evident in the photos became quite faint when seen from the ground, particularly if the survey was uninformed and not expecting to find anything. The morphology of the places, mainly peri-desert areas that had experienced moderate erosion due to atmospheric agents,[1] helped to disguise on the ground the same traces that were so evident in the aerial photos. Furthermore, these regions had generally seen only sporadic activity since Roman times, and thus the remains that had been naturally hidden had also remained largely undisturbed, but ready to be found during an informed and guided ground survey.

Georeferencing Baradez

The collection of archaeological sites identified and the volume of information published by Baradez in 1949 is considerable, but after the 1950's very little has been investigated regarding the new sites recorded in *Fossatum Africae*. The Algerian independence in the early 1960's, the construction of an autonomous nation in the following decades and a civil war in the 1990's imposed other priorities on the country. The generation of archaeologists that was formed at the turn of the new century is the one that in the last two decades has begun to take up again

1 Laureano 2005: wind erosion is the most constantly active agent, but the areas are also affected by water erosion events that can be occasional but of considerable magnitude.

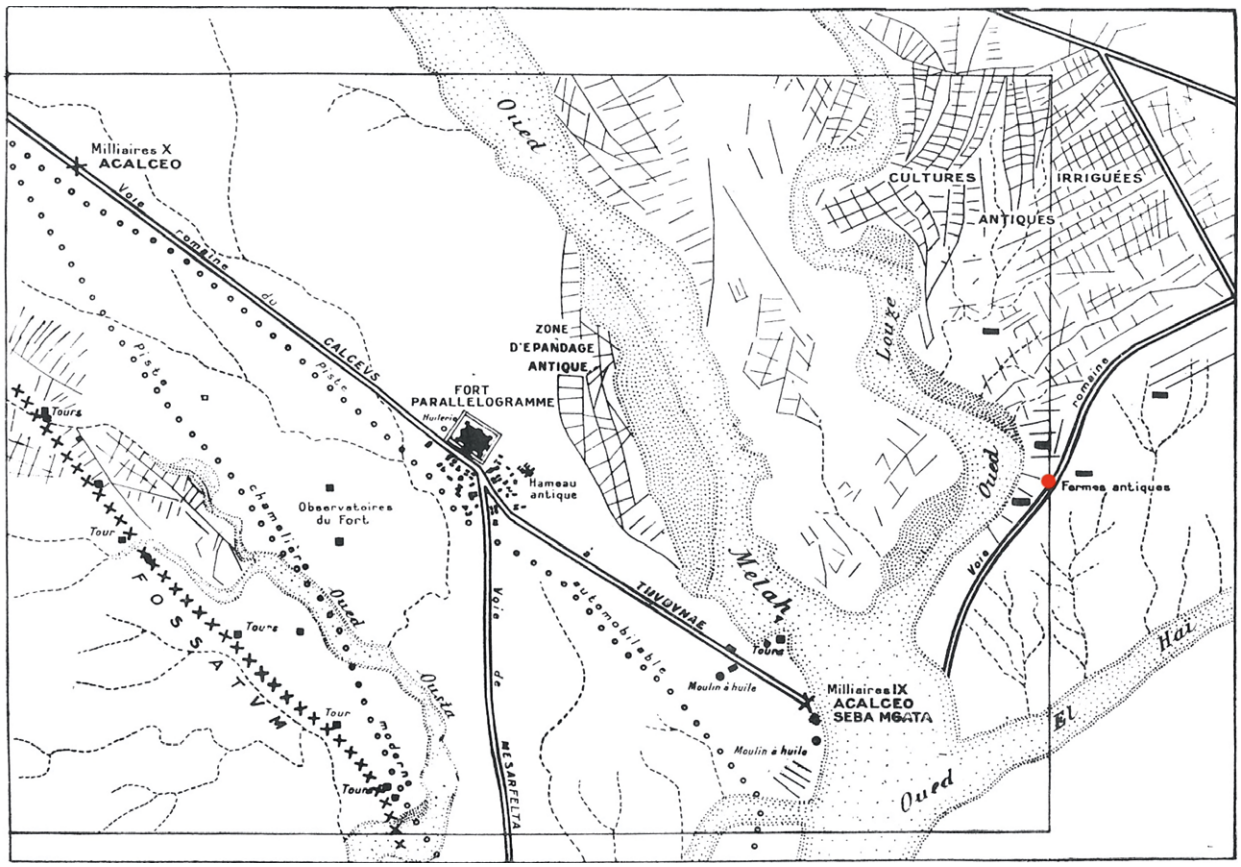

Figure 2. Baradez 1949a, 12: example of a Baradez annotated archaeological map derived from aerial photo imagery and analysis on the ground detailing the area surveyed around *Fort Parallelogramme* (2 in fig. 1) The limes passage is visible on the lower left (*fossatum*). Note the ancient cultivation area on the top right, the red dot marks the GPS destination set for the ground survey conducted in the *farmes antiques* area.

the investigations that were somehow put on hold with the end of the French colonial phase.

In this context of renewed interest in the archaeological past of Algeria, a rich and recent source of information as *Fossatum Africae* should play a pivotal role, but its use to guide new ground-based exploration is far from straightforward. The aerial photos are printed at different and sometimes unknown scales, the geographic north is not always indicated and the reference of a geographic grid is missing. The geographical location of a given photo present in the book is still possible but approximate, being frequently based on toponyms no longer in use and/or covering a wide area. In its pristine published form, Baradez's work is not always useful to guide an archaeological survey aimed at (re)discovering the sites described by the author, especially for the vast majority of lesser known sites that, for the above reasons, were left untouched and unexplored since the 1950's.

The most natural arrangement of all the archaeological and geographical information present in *Fossatum Africae* in a modern medium seems to be a geographic information systems (GIS) project. This approach seems also consequential to Baradez's choice to insert in his book several interpretative transparencies that could be superimposed on the printed aerial photos, a *modus operandi* that to an extent foreshadows the common GIS method of drawing informative vector layers over georeferenced photo grids.

To this purpose the majority of the photographic and cartographic contents present in Baradez's work were digitised, georeferenced and collected inside a GIS project, purposely using the open-source platform QGIS.[2] Thus, referencing against satellite sources (map data Google, Maxtar Technologies), almost all Baradez aerial photos within a radius of 50 km from Biskra have been georeferenced (fig. 3). The process mostly employed geomorphological or anthropic control points that could be safely assumed to have remained unchanged in the intervening years. Common examples are mountain or hill

2 See https://www.qgis.org – the use of free and open-source software seems preferable in an international collaborative context.

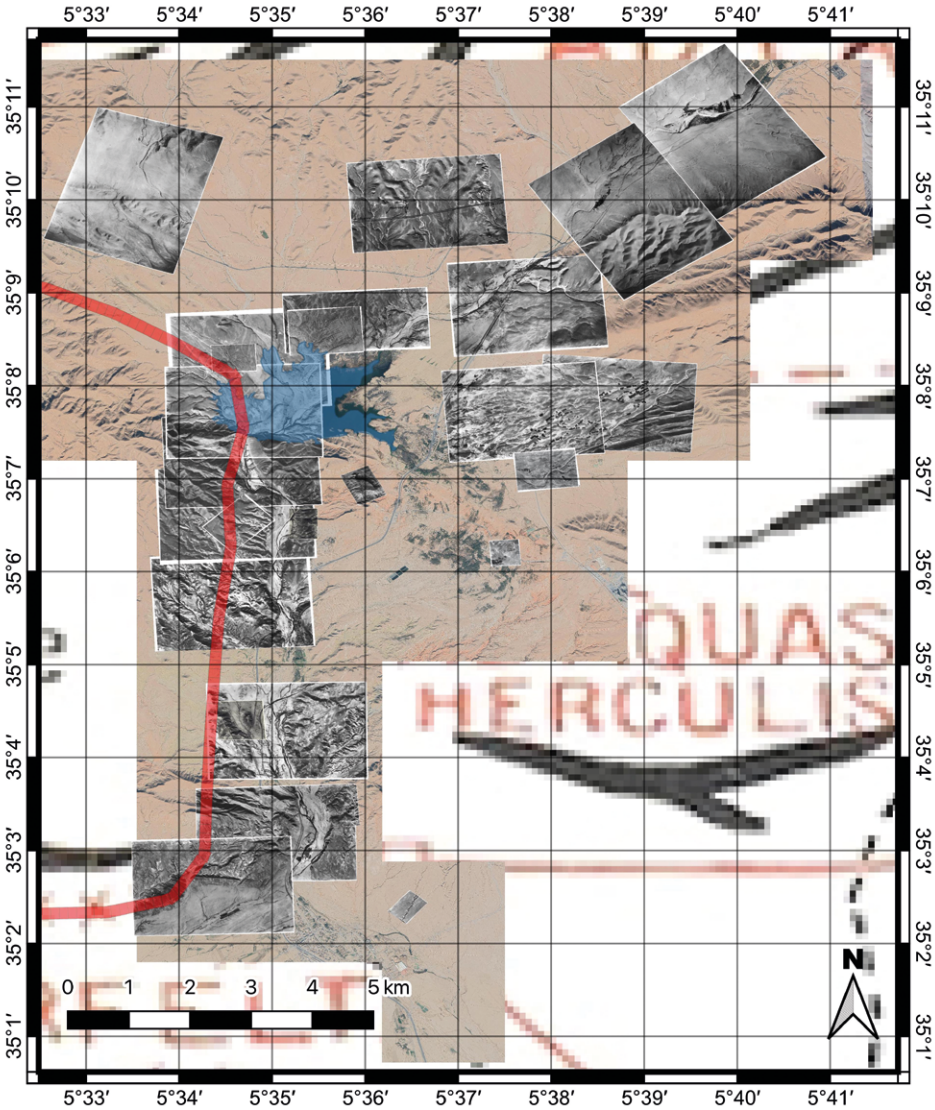

Figure 3. A set of Baradez 1949a aerial photos taken around the area of *Fontaine des Gazelle* (1 and 2 in fig. 1) are shown in a georeferenced format over a background of satellite imagery and the same reference maps used in fig. 1; the *limes* passage is enhanced as a thick red line, and the current extent of the artificial water basin is shown in blue (map data Google, Maxtar Technologies).

ridges and other similar geo-morphological features, but also ancient anthropic features present in Baradez's photos and still visible on modern satellite pictures (*e.g.* grids of ancient cultivated areas as in Baradez 1949a, 15 and 175). Baradez's interpretative transparencies were subsequently georeferenced over the photos: these transparent layouts do contain the most relevant information since they had already been controlled on the ground by the author. At the end of the process, all the features and structures discovered and outlined by Baradez eventually acquired precise geographical coordinates. Already in the first phase of the analysis, which was conducted only remotely, the consistency of this operation emerged: even in areas distant from the imposed control points the visible features were matching traces still identifiable in recent satellite photos, with an estimated error of about 10-20 m (fig. 4B), a precision sufficient to effectively guide a survey on the ground during the following phase.

Following Baradez's tracks

The second phase of the analysis was conducted on the ground during two short archaeological survey campaigns (7-10 days in March of 2018 and 2019), using the cartographic information reconstructed in the first phase and with the indispensable support of colleagues from the University of Biskra.[3] Two specific cases will be presented, both related to the same segments of the limes that run northwest of Biskra, nearby and around the perimeter of the artificial water basin of *Fontaine des Gazelles*.[4] This is also the general location of the *Herculis* station

3 A collaboration started in 2017 in the frame of Erasmus+ exchange programs.

4 The basin was made in the 1990's, but similar projects involving this same area are dating back to Baradez's time, and this may also explain why this is one of the most covered areas in Baradez's published materials (photo and ground survey data).

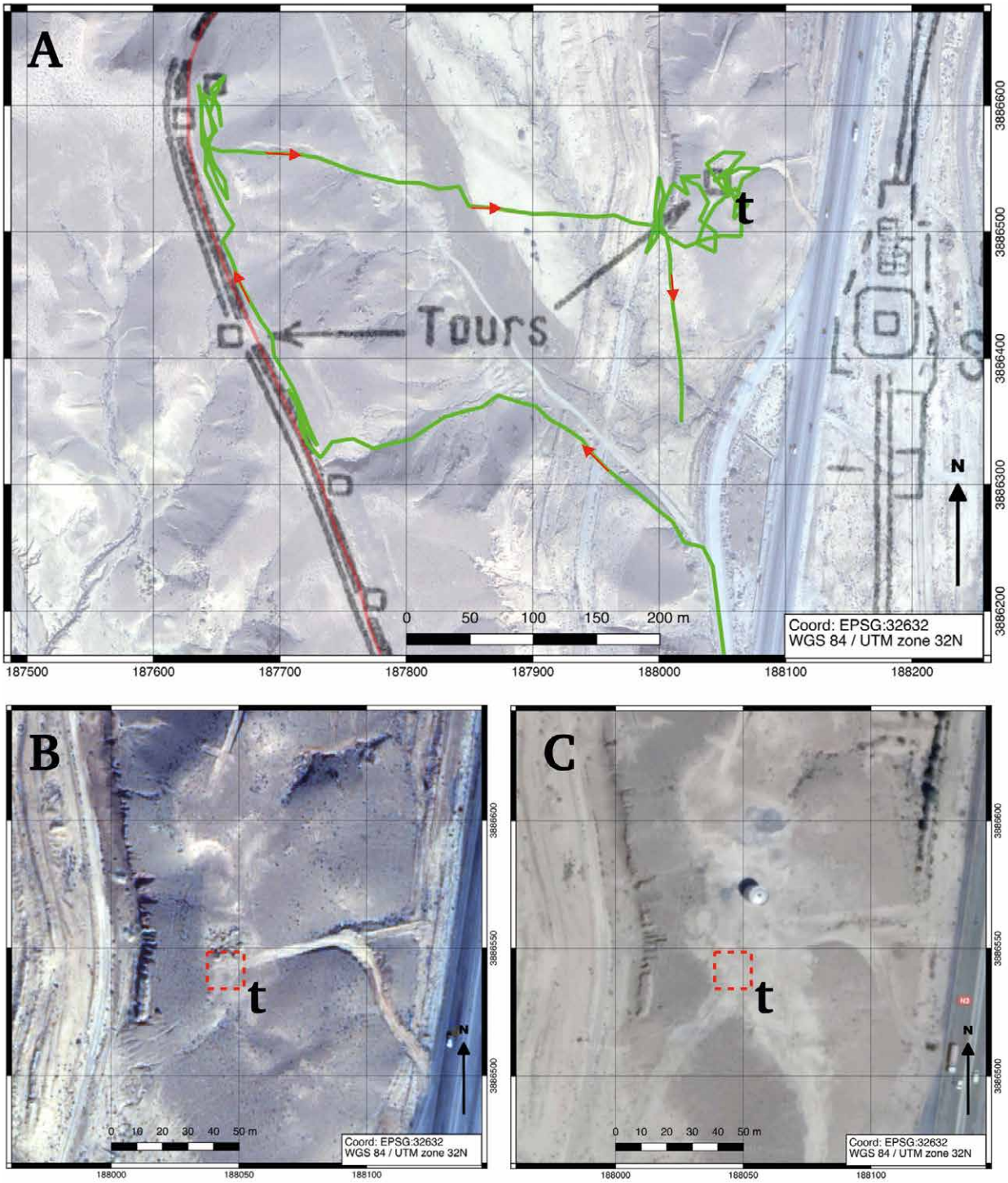

Figure 4. A. The first surveyed area (1 in fig. 1) is shown using Baradez (1949a, 47) georeferenced and overlaid on modern satellite imagery, the green line follows the recorded GPS track during the survey, stopping near the expected position of the observation towers; around t this track wanders, searching for a missing tower; B. Detail of the position t using 2015 satellite imagery, the red square marks the expected position of the tower, 15 m south of visible ruins; C. Same as B but using 2018 satellite imagery. The ruins have disappeared (map data Google, Maxtar Technologies).

(with *vignette*) in *Tabula Peutingeriana*, an indication that this area was already quite significant in terms of water presence (Talbert 2010, 3C5).

The first case regards a specific segment of the limes: the remote analysis had precisely georeferenced a 13 km north-south stretch of limes discovered by Baradez about 30 km north-west of Biskra, in a barren and peri-desert area, located at a certain distance from a regional road (1 in fig. 1). This was one of the most investigated limes segments by Baradez in terms of photo coverage and annotations detailing the *fossatum* shape and the position of its many observation towers.

Using a GPS device set on the coordinates derived from the remote analysis it was possible to find and identify the remains of the passage of the limes on the ground: a wide and levelled-down *fossatum* with a corollary of rectangular foundation ruins, the latter found in the same points where Baradez had marked the presence of observation towers (fig. 4A). Seen from the ground, the *fossatum* has indeed an evanescent and mimetic appearance (as in Baradez 1949a, 17), at least when traversing the area uninformed of its presence. Without the aid of the GPS coordinates derived from the GIS project, its identification would have been much more difficult and time-consuming.

Ceramic materials (*terra sigillata*) and Roman coins can still be found superficially near the position of the towers. A first visual inspection of the general timeframe of these surface materials seems to correspond to the later part of the Roman (and Vandal) presence in these areas (4th-6th century AD), compatibly with what was already reported in Baradez 1949a.

The most prominent of the observation towers was found by Baradez in an elevated ground (t in fig. 4A) and its square footprint is still remotely identifiable in satellite pictures dated until 2015 (fig. 4B). During the ground survey this tower was actively searched on the coordinates derived from the remote analysis, but the terrain appeared quite plain and devoid of archaeologic materials. It was later found out that this specific area had been completely erased by the recent construction of a tower silo, clearly visible in more recent satellite pictures (fig. 4C). The building operation had probably levelled out the Roman remains, emptying the area of all the archaeological materials, an occurrence that raises the issue of the protection and conservation of cultural heritage in a country that is experiencing a significant demographic growth.

The second case presented here relates to an investigated area located north of the previous one, beyond the artificial water basin of Fontaine-des-Gazelles (position 2 in fig. 1). The GPS coordinates derived from the remote analysis directed the survey to a precise position on the northern shores of this lake, where it was possible to (re)discover one of the sites best described in Baradez's work, a fort called by the author *Fort Parallelogramme*. This 65 × 65 m parallelogram-shaped Roman fort guarded a critical point where the *limes* changed direction, from east-west to north-south, nearby a relevant water source (as it is still today) that probably fed a grid of cultivated fields to the east (fig. 2),[5] whose traces are still visible both in Baradez's aerial photos and in recent satellite images. The nearby water source and cultivated fields are probably the reason for the presence of the fort in this location.

On the ground, this site appears as a slightly raised (0,5 m) quadrangular *tell*, dotted with numerous clandestine excavation trenches that reveal the presence of archaeological remains and a footfall level probably located about 1 m below the current one. A first visual inspection of the abundant surface materials, mainly *terra sigillata* and at least one coin, leads to the same broad Roman timeframe of the previous site (4th-6th century AD), confirming the reports present in Baradez 1949a.

The presence of clandestine excavation trenches in this site and the extent of the looting raises again the issue of conservation of cultural heritage sites and materials in this rapidly developing country. Looking at the time series of the satellite images, the number and size of the depressions seem to have significantly increased from Baradez' time to the present day (fig. 5A-B), especially in the last years when no further survey missions have been possible due to the COVID-19 travel restrictions. The resumed interest of the scientific community toward this site has probably encouraged further clandestine excavation activities. Any future interventions on this or other archaeological sites should be evaluated accordingly and should in any case start from involving the local communities, stressing the importance of preservation of the historical cultural heritage, a heritage that should be primarily felt as their own.

This area is also threatened by the variable water level of the reservoir, which in specific periods of the year can come very close to the archaeological site. This risk is even more evident in an adjacent area to the east, near the traces of ancient cultivation, a sector with evidence of productive structures that Baradez outlines in detail and refers to as *farmes antiques* (fig. 2): this area was also selected to be surveyed on the ground.

This nearby 'ancient farms' site is currently dominated by widespread shrub vegetation, with areas periodically flooded by the variable geometry of the lake shore (fig. 5C-D): particularly in this environment, the discovery of archaeological remains was possible thanks to the precise coordinates derived from the remote analysis. In addition to a fair abundant presence of *terra sigillata* on

5 The dating of these supposedly cultivated areas has not been determined yet, the traces visible today could be more recent and/or reiterating traces already existing in Roman times.

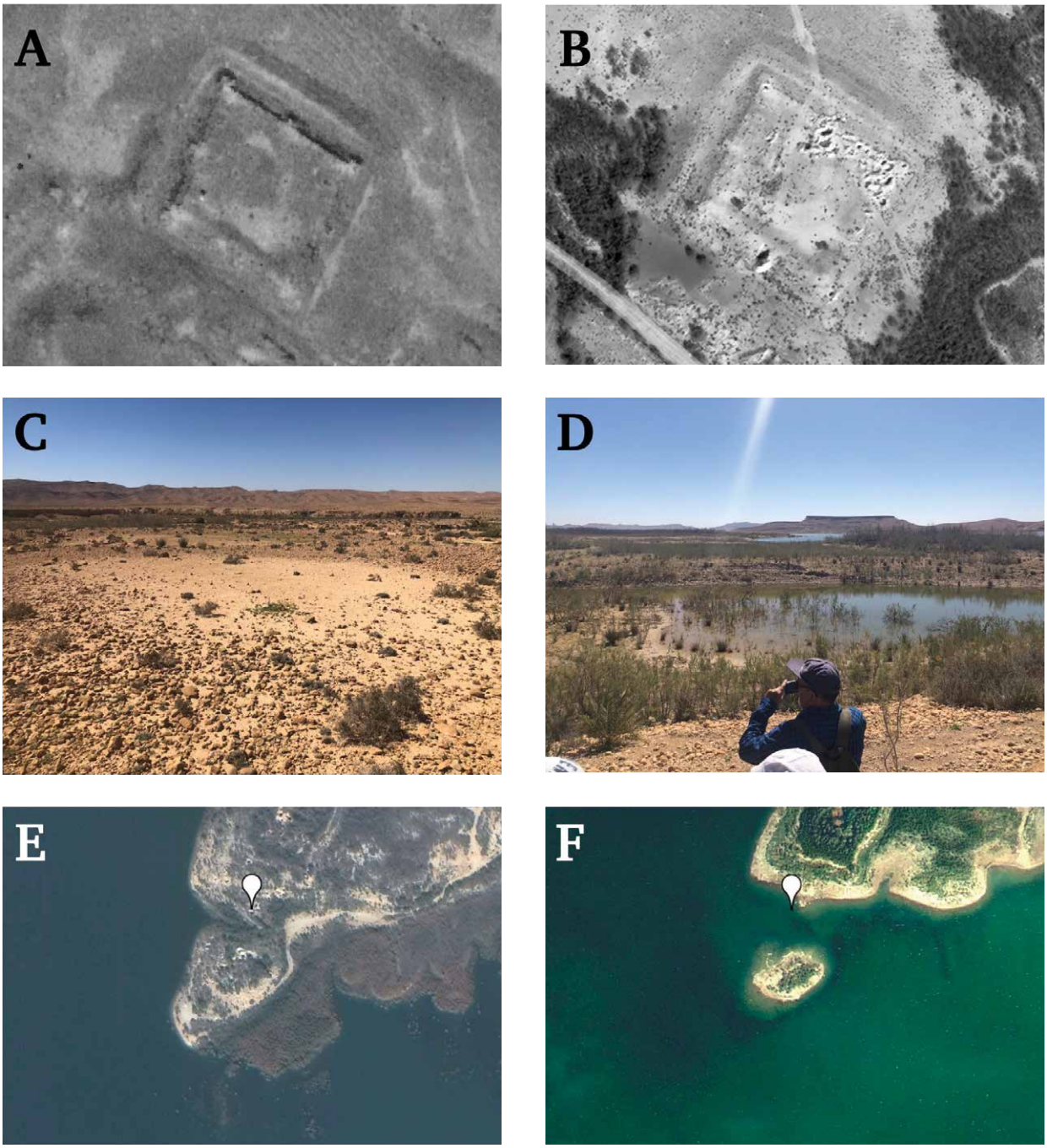

Figure 5. A. Detail of Baradez (1949a, 10) showing *Fort Parallelogramme* (2 in fig.1); B. The same area in modern satellite imagery (B&W for comparison), showing the extent of the looting; C. A square of the 'ancient cultivation' grid shown from the ground, where areas of finer sediment are framed in geometric shapes by linear creases of boulders and pebbles; D. The 'ancient farms' area surrounded and infiltrated by water coming from the nearby artificial basin; E-F. Location of the stone inscription shown over modern satellite imagery during periods of low and high water levels (map data Google, Maxtar Technologies).

the surface (compatible with what was found in the fort site), a millstone and other stone blocks are still present, probable remains of one or more oil press buildings.

A notable find was an exposed Roman inscription laying in (secondary) horizontal position, a rectangular stone slab measuring about 2,5 × 0,5 m that clandestine operators probably could not remove because of its weight. The inscription still lies in place and its dedicatory inscription is readable and seemingly datable to the reign of emperor Caracalla,[6] so this would be the earliest dating artifact found during this brief survey. Baradez accounted for many similar inscriptions in this area,[7] but this one seems not listed among them. A subsequent analysis of satellite images has revealed that this inscription was surely periodically submerged during periods of high water levels (fig. 5E-F), adding more concerns regarding the conservation of cultural heritage in these areas.

As a final note, the inscription and all the other finds cited above were found within a radius of 50 m from the GPS position set by the remote analysis, a destination target for the survey which was purposely placed along a trace that Baradez identified as a Roman road (the inscription would then be a milestone) in a position that was also the barycentre of the infrastructure of the area (red dot in fig. 2).

Conclusions

The aero-photographic and ground surveys conducted by Jean Baradez in the 1940's, later published in his *Fossatum Africae*, are often overlooked sources of information about the rich and complex network of archaeological sites around the Roman limes area of *Vescera* (Biskra) in Algeria. An effort was made to georeference in GIS most of the published Baradez aerial photos against modern satellite imagery and other sources, leading to the potential (re) discovery of many archaeological sites. Some of these sites were found and surveyed during two short archaeological campaigns conducted on the ground in 2018 and 2019. This contribution presents some preliminary findings, along with specific examples highlighting both the quality and the conservation risks of these sites, often located in the vicinity of recently developing peri-Saharan areas.

A subset of Baradez' 1949a aerial photos and interpretative layouts, when georeferenced in a modern GIS project, have shown the true potential of all the data collected and analysis performed by this author in the 1940's. In this digital format, such a treasure trove of information is more readily accessible for remote analysis and has proven to be able to guide targeted survey campaigns in specific areas, with an empirical precision of a few tens of metres.

Applying the same method to the whole material, and integrating it with different sources (*e.g. Tabula Peutingeriana*; Gsell 1911) could lead to the creation of a new and updated digital atlas for the Numidian Limes archaeological sites, a reference for future investigations and studies. In this context, some selected control sites around the area of *Fontaine des Gazelles* could be (re) discovered during GPS-guided surveys, revealing the presence of archaeologic materials datable to the Roman (and Vandal) phases in these areas. The crucial theme of the conservation and protection of cultural heritage has emerged several times during the operations conducted on the ground (looting, dismantling and flooding of archaeological materials): all future projects should take into serious consideration this issue, both at the state and local community levels.

6 The readable dedication refers to the reign title of Caracalla, seemingly in the year of his third *imperium* and fourth consulate which should correspond to 213 AD (Mastino 1982).

7 For example see Baradez (1949a, 17 and 62-63) 'milliairies'.

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Roman connectivity, networking and mobility along the Lower Danube frontier. A GIS approach

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The Lower Danube Roman limes represents a complex archaeological landscape, with numerous military sites constructed along the border of the Empire within a distinct ecological and cultural setting. Over 50 fortified sites were listed by Lemke (2015, with bibliography) as part of Lower Moesia's limes. He locates as many as 20 on the last stretch of the great river downstream from *Durostorum* (Silistra) scattered along the western edge of Dobrogea in Romania. That figure seldomly includes smaller fortifications however, which increase their number by as much as 50 % (Oltean & Hanson 2015; Ţentea *et al.* 2019). While not all of them may have been occupied at the same time, without exceptions, these sites are believed to be permanent bases. With the exception of *Troesmis* (Turcoaia) as base of *Legio V Macedonica* until the Marcommanic Wars, the forts are thought to be occupied by *auxilia*, even though as many as eight of them signal the possible presence of vexillations of *Legiones XI Claudia* or *I Italica* from *Durostorum* at least through tegular material. Among the auxilia, the most notable presence is that of *Classis Flavia Moesica* which had its permanent base at *Noviodunum ad Istrum* (Isaccea), and further presence in five other forts. A strong naval presence is not unexpected along a major Roman river frontier. However, it is notable the presence of cavalry units at five sites and probably increased to seven in the later Roman period (Aricescu 1980; Zahariade 1988; Gudea 2005). Distributed evenly along the limes, their presence indicates that horse-mounted terrestrial movement was just as important.

The landscape they tried to control presented considerable challenges. Rivers are generally thought to provide clear distinctions between the territories under the Roman imperial rule and those outside it, with added strategic benefits coming from the naturally-limited possibilities in cross-river movement that were more easily controlled (*e.g*. Breeze 2011, 92; Lemke 2015, 847). However, these advantages disappeared wherever the river line itself became blurred, prompting attacks from beyond the river to increase their frequency, and the frontier area to become a zone of connection rather than of separation (Ţentea 2016, 86). The Lower Danube presented these conditions. The Roman army had to control the Danube floodplain – a flat corridor of swamps, marshes, rushes, and lagoons interspersed with fluctuating, winding river channels, which in places reached 30 km in width (fig. 1). This was a world of wider, navigable, channels with tricky water currents, and with ever-changing ponds and rivulets, floating reed islands and tall

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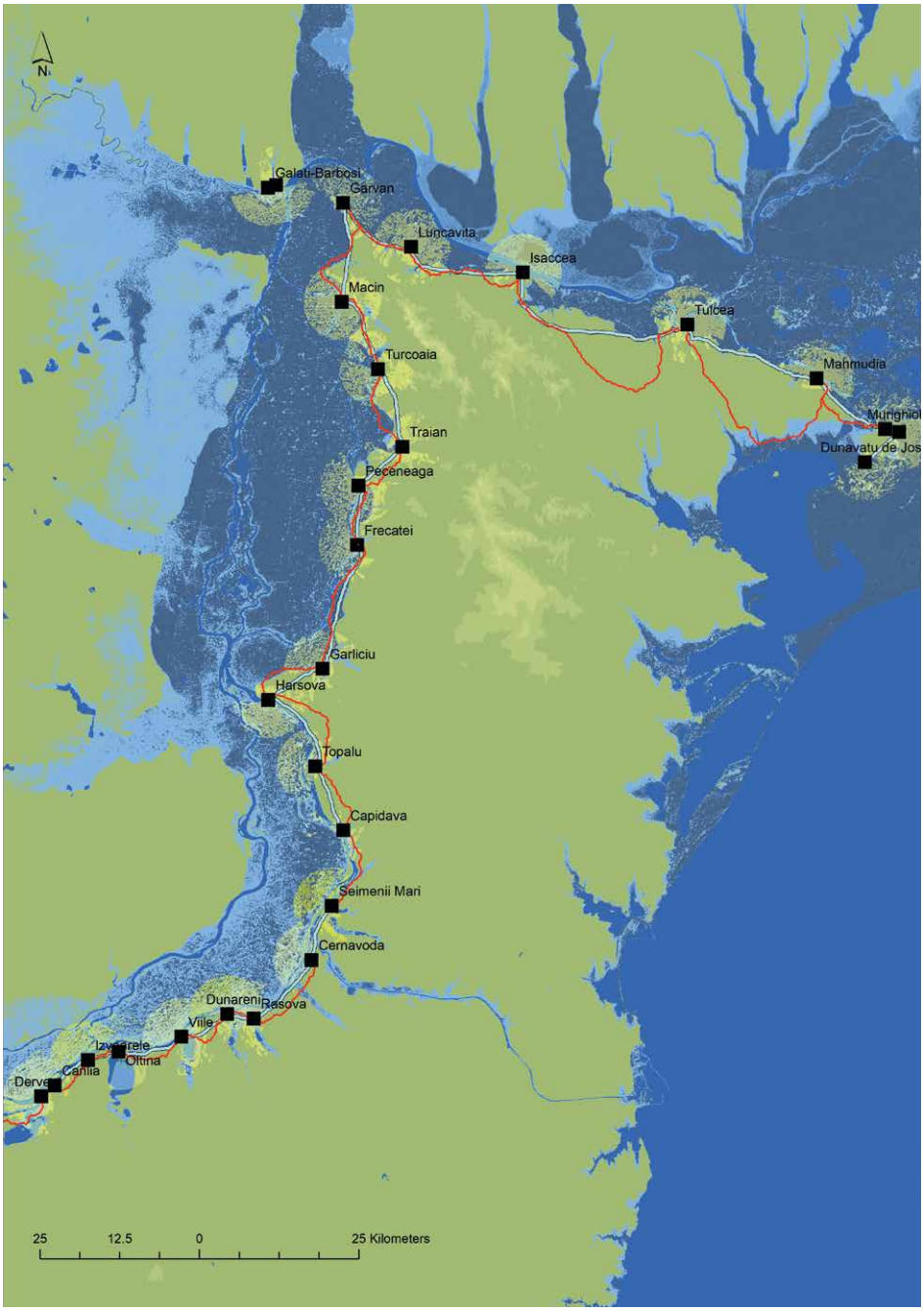


Figure 1. Distribution of LCP analyses (neutral: red; Llobera & Sluckin: blue) and Higuchi viewsheds (yellow) for Danube limes Roman bases in Dobrogea.

grasses interspersed with wood copses and solitary trees. While river water levels maintained, challenges to travel, icy, wintry conditions in particular, transformed it into a wide plain easy to negotiate across. These lands became drier only later in the 20th century after the construction of a series of dams further upstream and extensive interventions aimed at converting it to arable land as far as and including the Danube Delta. Nevertheless, its original extent may be grasped from aerial photographic or satellite surveys and from early modern maps such as Captain T. Spratt's 1:500,000 1856-1857 survey of the Danube Delta revised in 1865 and published in the Journal of the Society for Geography in Berlin (Koner 1869, plate I), which includes the entire Danube floodplain as far upstream as Hârşova. The region is now subject to EU-funded floodplain restoration plans as a green corridor for flood protection (https://climate-adapt.eea.europa.eu/metadata/case-studies/lower-danube-green-corridor-floodplain-restoration-for-flood-protection, 3-3-2023).

A key feature for the Roman limes defence system needed to be the ability of its bases to build a collective response to emergency situations and communicate with

each other, either through visual signals, or physically, by movement across land or water. Waterways played an important role in connecting river Roman limes forts and, even though several forts no longer enjoy immediate proximity to a major, active river channel of the Danube, Isaccea, *Aegyssus* (Tulcea), *Salsovia* (Mahmudia) alongside *Arrubium* (Măcin), Turcoaia, Peceneaga, *Beroe* (Frecăţei), *Carsium* (Hârşova), *Capidava*, *Sacidava* (Dunăreni), *Altinum* (Oltina), *Sucidava* (Izvoarele) and *Cimbriane* (Dervent) still retain immediate access to navigation channels. This would have been particularly relevant for the main base of the *Classis Flavia Moesica* in Isaccea and its possible secondary hubs such as *Dinogetia* (Garvăn), Măcin, Galaţi, Turcoaia, Hârşova and Cernavodă.

Most forts were located on promontories immediately downstream, and overlooking estuarine lagoons at the contact point of smaller streams with the Danube (*e.g.* Dervent, Canlia, Rasova, Seimeni, *Capidava*, Hârşova, Gârliciu, Frecăţei, Peceneaga, Traian, Turcoaia, Măcin, Luncaviţa, Isaccea, Tulcea, Mahmudia and Dunavăţ). These positions may have offered slower water currents and shallower waters to help boats coming ashore, thus highlighting their relevance in relation to navigation. However, in doing so, they raise at the same time potential (or seasonal) inconvenience, as fluctuations in water level and freezing conditions would have limited access from the river by boat. This required alternative ways of travel across dry land. Roads through the region are documented traditionally by evidence of milestones, confirming military involvement in their building and maintenance. However, their evidence alone allows only a schematic reconstruction of the Roman road network (Aricescu 1980; Panaite 2015). Prior to the extensive mapping of road stretches across southern Dobrogea by the first-named author since 2004 (Oltean 2013, 209 and fig 4; Oltean & Hanson 2015), shorter stretches of road had been identified on the ground or from the air within immediate vicinity of sites (Dunăreni: Ştefan 1987, 73-88; Turcoaia and Isaccea: Ştefan 1974, 98-104) and elsewhere, such as cutting across Danube's estuarine lagoon lakes at Bugeac, *Altinum* (Oltina) and Dunăreni (Galiţa: Romanian Archaeological Gazetteer/Repertoriul Arheologic al României no. 3, http://old.cimec.ro/scripts/ARH/RAR-Index/sel.asp?sir=62583&nrSel=1&lang=RO, 11-3-2023); Oltina and Dunăreni: Aricescu 1980, 114). However, some of these roads were in use a century ago which makes it more difficult to establish their Roman credentials exclusively on the basis of their current fossilized status. Moreover, any presumed bridge structures to allow the access of boats inside gulfs used as harbours (Aricescu 1980, 114) remains hypothetical and leaves open the question of the layout of terrestrial communication routes in use by the Roman army along the limes.

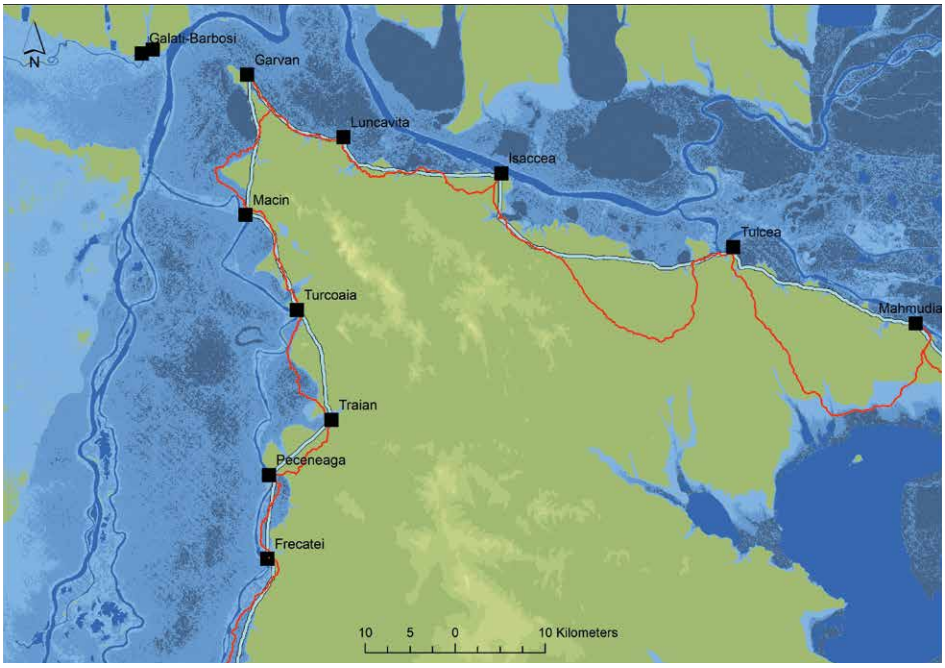
The present study aims to better understand how strategic connectivity functioned for the Roman troops within the specific ecology present along the last stretch of the Lower Danube Limes downstream from Silistra by using GIS spatial analysis to highlight the advantages offered by the local terrain and identify potential challenges they needed to overcome, by addressing the following questions:

1. To what extent strategic priorities beyond water navigation, like travel across land, visual command of the surrounding landscape and communication with other bases influenced site location?
2. Was the limes system, as we know it, able to cover appropriately the entire stretch of Roman frontier?
3. Was the pattern in troop distribution adapted to respond to local environmental challenges?

Methodology

This study uses Geographic Information Systems (GIS) spatial analysis to better understand the positioning, connectivity potential and ability to function as a coherent system of Roman military bases on the Dobrogea Limes. GIS has already been applied in archaeology to understand visibility and mobility between sites, with Viewshed and Least-Cost Path (LCP) analyses being by far the most popular (Verhagen *et al.* 2019), used either separately (Friedman 2009; Herzog 2014; Dyčka 2018), or in combination (Oltean & Fonte 2021). We employed a customized approach, combining topography-defined LCP and viewshed analyses in ArcGIS (10.6.1) to better understand connectivity patterns and contextualize existing archaeological information ensuing from the first-named author's high-resolution remote sensing mass-mapping programme, alongside archaeological gazetteer and historical map data freely accessible via Romania's online 'Cartographic Server for the Cultural National Heritage' (https://map.cimec.ro/Mapserver/). The integration of modern topographic data with historical mapping and archaeological record has been particularly useful to compensate for the complex hydrology of the Danube and for the significant landscape changes occurred in the last century.

LCP was tested against a change in parameters to construct alternative routes for a Neutral LCP (standard tool in ArcGIS) and a separate set using the Llobera and Sluckin (2007) algorithm. While the former (red lines on maps) is seeking the shortest routes from a place of origin to a specified destination by avoiding unnecessary negotiation of slope variation, the latter (blue lines on maps) has seen more application in archaeology given its modelling of the more traditional, archaeologically documented, human movement, by avoiding watercourses as natural obstacles. Reverse analyses were created for



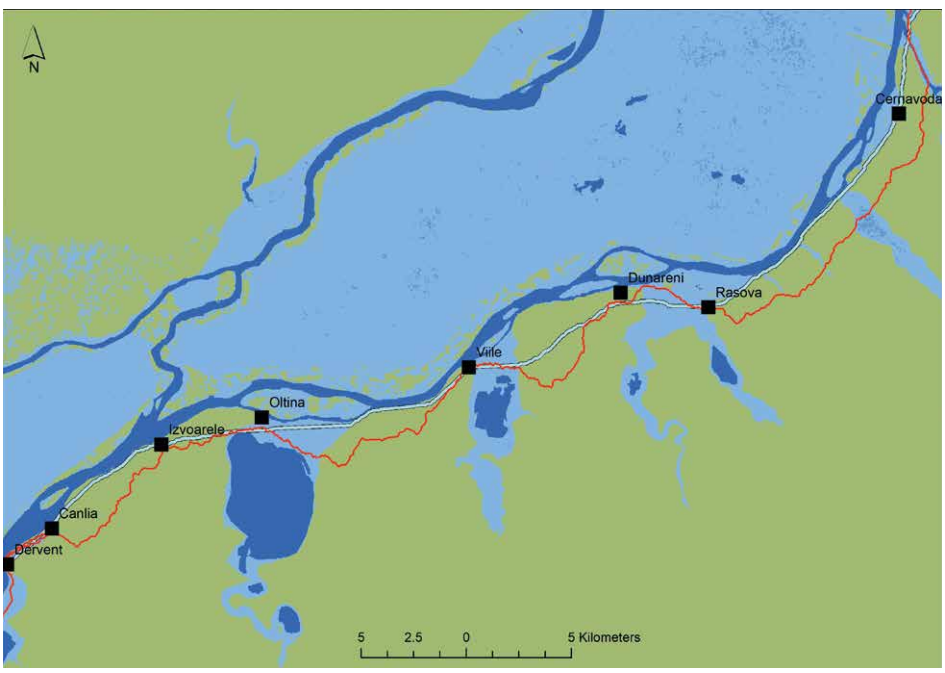


Figure 2. LCP analyses (Neutral: red; Llobera/Sluckin: blue) between every site in the sector Frecăţei-Mahmudia (above) and between every other site Dervent-Cernavodă (below).

each set, to assess the extent of the difference in output and theorize how this may have been negotiated in practice. LCPs were also generated between every other site, to better assess to what extent the positioning of sites has been influenced by the potential for terrestrial mobility. As part of LCP analysis, hydrology analysis was generated using ArcGIS hydrology tools and was tested against the modern river system using satellite imagery. In addition, DEM colouring and contours generated helped highlight areas which may have been more exposed to wetness, currently up to 15 and 20 m above sea level. These were validated against recent flood maps and historical maps in an attempt to diminish the effect of ecological change over the past 50 years on our understanding of the historical landscape (fig. 1).

Viewshed analyses using ArcGIS' tool generated visible and non-visible areas from each known site location. These were calculated from a ground height of 10 m as a maximum, by combining local estimates for fortification initial height available within the study area

(*i.e*. approximately 8 m at *Capidava*, see http://ran.cimec.ro/?codran=63063.01, 22-02-2023) with the height of a human viewer. However, visual range is normally limited by environmental factors and human eye abilities to see meaningful details. Higuchi limits have been created to highlight areas of immediate visibility within 6 km from origin, which in the local environmental conditions would constitute a distance where relevant detail might become identifiable on a visual target (Ruestes Bitrià 2008; Friedman 2009).

The results of our spatial analysis were compared in the southern part with information generated by the remote sensing-based detailed landscape mapping exercise undertaken by Oltean since 2004 (see above) and with published evidence coming from gazetteers and historical maps. Cultural background information on military units stationed along this stretch of the Roman and Late Roman limes and on their tactical capacities have also been taken into consideration to better assess the tactical potential offered by their landscape position.

Results and discussion

GIS mobility and visibility analyses performed provide a plausible representation of visibility and mobility for much of the archaeological landscape under study. A lesser degree of confidence is recorded in the area between Silistra and Dervent, where the DTM used lacks the level of ground resolution of the rest of the area studied and the area between Cernavodă and Seimenii Mari, due to modern extensive landscape development which produced major alteration to the natural topography (*e.g*. the construction of the railway, Danube-Black Sea Canal and A2 motorway, the development of the city of Cernavodă and the construction of the river harbour, *etc*.). Nevertheless, the insights gained highlight ways in which the Lower Danube Roman limes could have successfully fulfilled its main strategic objectives, by controlling the access into the Roman province, overseeing the terrestrial and river traffic. In addition, it allowed us to estimate the extent to which communication was possible between Roman army positions to allow them to engage in concerted action as a system whenever needed.

Site setting and potential for movement

That the Roman military bases were located in positions with easy access to the river navigation (see above) is unsurprising in the context of a river frontier. But, to what extent were these sites located in positions naturally favourable to movement across land? LCPs between every other site were calculated according to the two travel strategies considered throughout this study in order to establish whether the site in between was located along the natural accessibility routes or, whether the proximity of each site to the river constituted an overriding priority. According to these, with the exception of Oltina and Dunăreni, which both prioritise their proximity to the river which sets them some 400-500 m away from the LCPs, forts in southern Dobrogea are located along the most efficient routes for terrestrial movement (fig. 2). This is most consistently apparent for LCPs following the Llobera and Sluckin (2007) model rather than the Neutral, indicating a higher priority given to shorter distances than accommodating slope, more akin to a military mindset rather than a commercial one.

Moving across land

LCP analyses illustrate that on land, the most efficient communication routes between sites would have taken a more sinuous approach than the straight one traditionally expected of Roman roads. This is further supported by the evidence of fossilized ancient road lines visible from above-ground photographic and satellite imagery, where only shorter stretches retain a straight layout and with evidence of junctions at an angle other than 90 degrees (fig. 3).

Mobility on the ground is a key part of maintaining control over the limes. Generally, at least one version of the mobility paths calculated keeps to the edge of Dobrogea's Danube higher shore. Given their difference in principles, LCP analyses propose different routes when calculated using the Neutral, and the Llobera and Sluckin (2007) algorithms. The latter is generally shorter and more direct than the former. While it must negotiate a more challenging terrain, it nevertheless remains consistently above floodable levels, and maximizes the use of topographical dominance of the Roman army across the entire right bank of the Danube. By contrast, the Neutral LCP takes a longer and more winding approach as, in an attempt to avoid unnecessary slope challenge, it often diverted either into the floodplain itself, or further inland, away from the Danube shore cliffs.

This is particularly evident in the northern part of Dobrogea where our Llobera and Sluckin (2007) LCP calculations are more consistently following dryland offering efficient routes between the Roman army bases along the Danube, unlike the Neutral LCP which either crosses land potentially wet at least from time to time during the year (*e.g*. the sector between Traian and Turcoaia) or diverges considerably from the Danube shore (*e.g*. Isaccea-Tulcea and Tulcea-Mahmudia (fig. 2). However, even though the advantages of the Llobera and Sluckin (2007) path do present strategic benefits in the shorter travel distance and dryland consistency, the comparison with mapped remote sensing data indicates that, both strategies may have been in place. Indeed, in south Dobrogea, generally there seems to be a higher correlation between the Neutral LCP and remote sensing evidence as seen in the sector Dervent-Viile (fig. 3). In this area, the correlation between the two different LCPs on

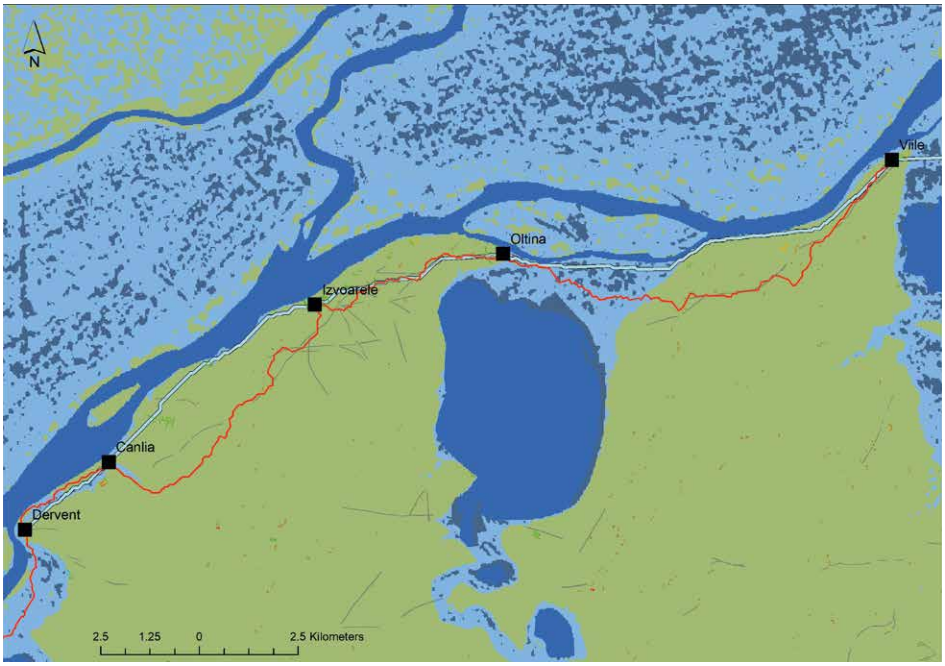


Figure 3. LCP analyses (red; blue) and road stretches (grey) mapped from aerial and satellite imagery between Dervent and Viile.

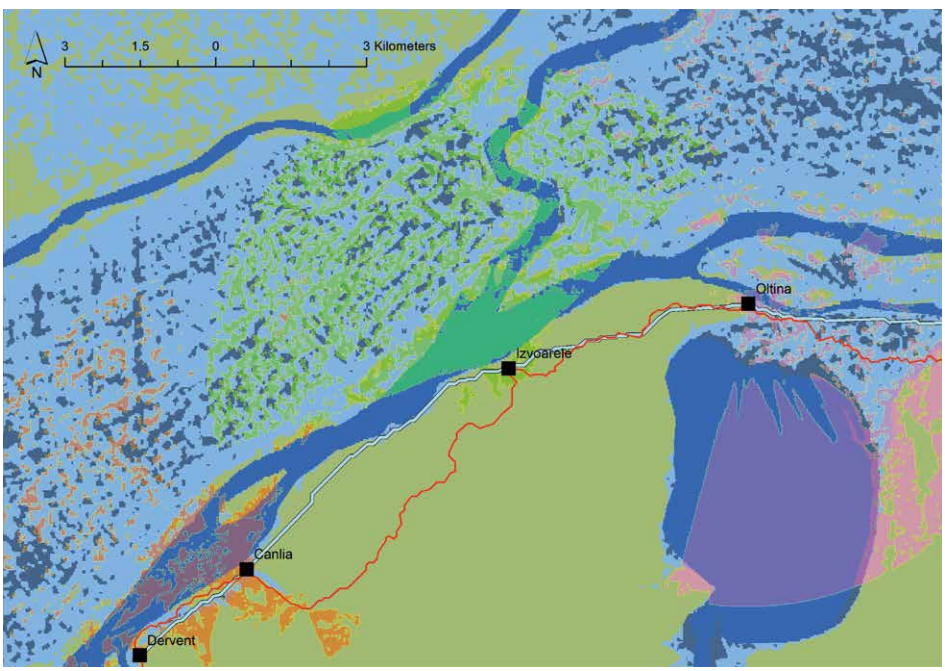


Figure 4. Higuchi viewsheds at Canlia (orange), Izvoarele (green) and Oltina (pink).

the one hand and the remote sensing data on the other is fairly close between Izvoarele and Oltina; however, the Neutral LCP shows a higher degree of overlap with road stretches identified from the air in several places between Canlia and Izvoarele, and between Oltina and Viile.

Locally-negotiated solutions as a combined approach between the two strategies could also have been the case in certain sectors, helping travellers to negotiate either slope or muddy terrain between Luncaviţa- Isaccea), Turcoaia-Măcin, and Măcin-Garvăn. Between Viile and Dunăreni and indeed, between Rasova and Cernavodă stretches of road can be found aligned to both LCPs. In other areas, such as at Bugeac, Oltina and Viile, or between Dunăreni and Rasova, Peceneaga and Gârliciu or Mahmudia and *Halmyris*, both calculated paths would have needed to cross areas of increased wetness. However, though excess water can temporarily discourage movement across the floodplain in wet seasons, freezing conditions or excessively dry periods may have allowed for seasonal unrestricted movement.

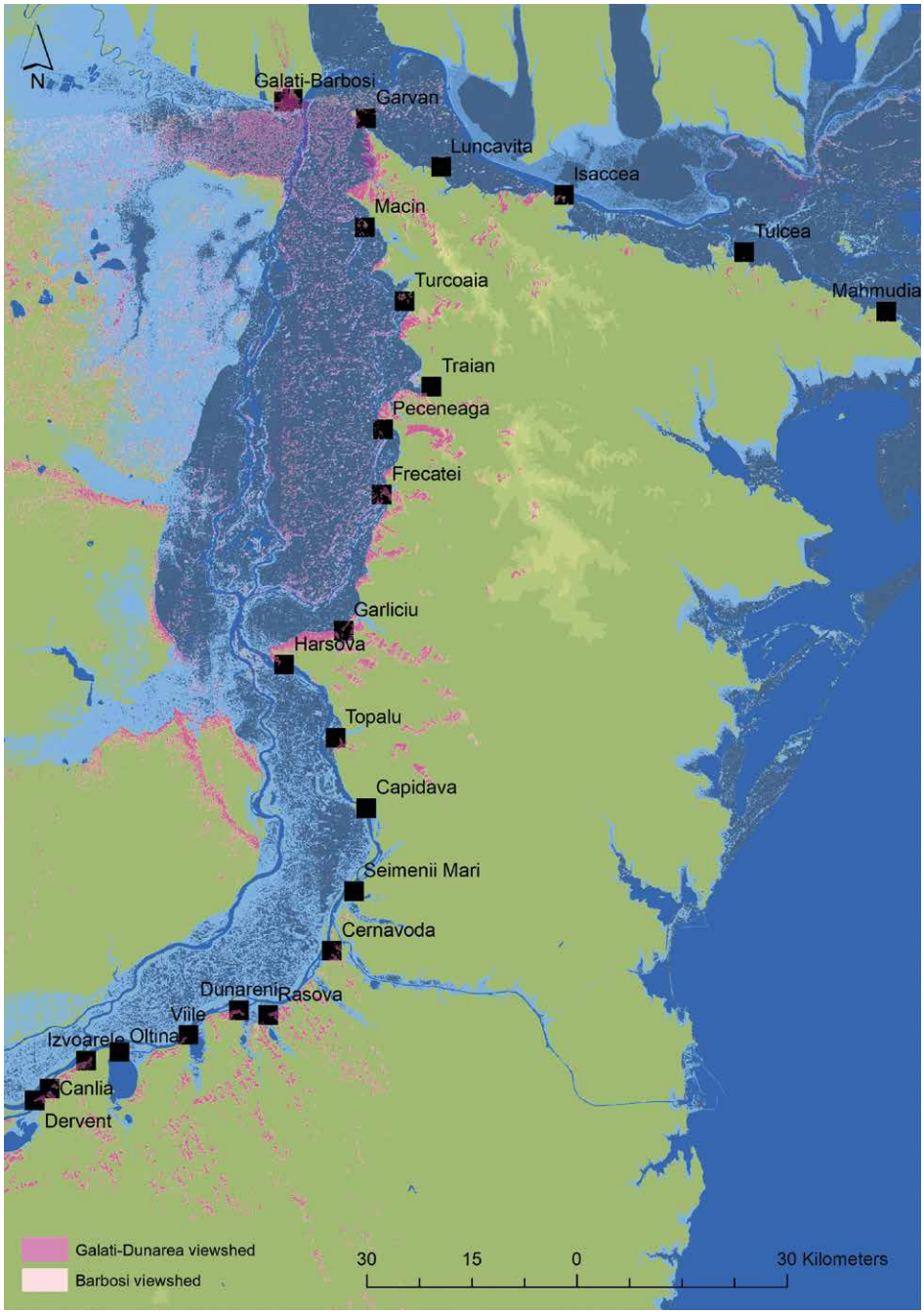


Figure 5. Viewsheds from Galaţi along the limes in Dobrogea.

Visual connections

Viewshed analyses allowed us to estimate the extent of visual coverage that could have been achieved from each individual base, with the Higuchi viewsheds extracted from these highlighting the extent to which visual coverage from each site was able to provide the observer with a broader range of meaningful details (fig. 1). These resulted in a range of observations of relevance from a strategic point of view. With very few exceptions, between Silistra and Dervent, Rasova and Cernavodă, or *Capidava* and Topalu, the Higuchi viewshed of sites south of Hârşova overlaps or extends to those immediately adjacent in a way which maximises their surveillance capabilities over the landscape, not dissimilar to that reported on the Antonine Wall (Dyčka 2018). To the north, overlap is rarer, with gaps more severe and frequent. This is notable between Gârliciu and Frecăţei, between Măcin and Garvăn or Galaţi, and in the whole sector between Luncaviţa and Murighiol (fig. 1). This interpretation however may be challenged in the future by the discovery of new sites to fill these gaps.

An important insight is that the coverage of the Higuchi viewsheds highlights just how limited surveillance was possible over the entire width of the Danube floodplain stretched in front of them. Very few and far apart sites were able to have the other side of the floodplain within their closer visual range. This seems to have been the case at Isaccea and Izvoarele, and possibly at Hârşova, but not elsewhere (fig. 1).

Calculated viewsheds indicate that Roman military bases often appear to be positioned along the limes alternatively in and out of sight, a distribution pattern also noted in the case of the Antonine Wall (Dyčka 2018). This seems to support the view of the sites working together as a system. Indeed, in some cases clusters of neighbouring sites complement each other to offer a comprehensive combined coverage (*e.g.* Canlia, Izvoarele and Oltina) (fig. 4). While the possibility is there, that not all of them may have been in use at the same time, it nevertheless highlights the possibilities for sites to work as a system rather than in isolation.

Visibility beyond the close-range may have been possible, however, depending on the strength of the visual signal itself and on the environmental conditions at the time (day/night, weather, *etc.*). The results of viewshed analysis shows that many of the sites benefited from possible intervisibility to allow for long-distance signalling. A particular significance with regards to the latter holds the bases at Galaţi (Barboşi and Dunărea: Ţentea & Oltean 2009) on the left side of the Danube, near its confluence with Siret river. The viewsheds extend at significant distance away, with a distinct south-facing character (fig. 5). While their viewsheds cover well the broad floodplain at the confluence of Siret with the Danube, it may also allow for distant visual communication to key strategic facilities on the right side of the Danube such as fleet bases and cavalry troops potentially (in the right conditions) far upstream towards Silistra. Their visual command over the limes bases further downstream is, however, less impressive; with the notable (but strategically important) exception of Isaccea, all other bases remain invisible. By the same token, neither are able to control visually the territory behind or in front of the linear rampart to the north and west from them, indicating that the strategic role of Galaţi had more to do with supporting inter-communication of military installations from the right side of the Danube, than with the control of population and trade influx from the Barbaricum.

Conclusions

Connectivity potential seems to have been an important factor in the positioning of sites. In terms of site locations, LCP analyses have highlighted that, with a few exceptions, where river access has been prioritised, sites were located along the most efficient routes of travel along the Danube as dictated by local topography. Roman forts could have been accessed on land in multiple ways to better respond to alternative priorities (*e.g.* route length versus favourable slope gradient). However, while at least one of the alternative routes explored would have secured connections between neighbouring forts on land naturally protected from flooding, in various sectors efficient travel might have meant necessarily crossing seasonally floodable areas. This could have raised problems that needed to be negotiated separately.

In terms of visibility patterns, based on the known distribution of sites a consistent coverage of the entire shore of Dobrogea along the Danube was possible only in the southern sector, where the relatively well-balanced coverage in between sites may indicate an intentional connection between visual surveillance and the distribution of sites. In many places the Least Cost Paths were found to be within the visibility range as well, suggesting this was an important consideration for road construction, alongside route length or steepness and nature of terrain. Elsewhere, gaps in visual coverage may give potential indication to the presence of military sites yet to be discovered. Nevertheless, the possibility for a most effective visual command from Roman bases across the Danube floodplain and over its left bank was limited. This could have created strategic problems in case of incursions from beyond the Danube particularly if they were conducted at a fast-enough pace, even more so under environmental conditions that facilitated river crossing (*e.g.* winter freeze). The in-and-out of sight arrangements shows that it was possible for sites to work in tandem, which was also a possibility in terms of long-distance signalling, a possibility that would have given Galaţi a particular relevance to secure coherence in communication between the sites upstream and downstream from its location.

All these observations indicate that the location of Roman bases on this limes sector had indeed been dictated by strategic priorities well beyond river navigation. The limes installations were systemic in their functioning, but there were also challenges. Indeed, while visual coverage gaps along the right bank of the Danube may still hide forts, fortlets or towers, this will not compensate for the fact that much of the Danube floodplain was too wide to control comfortably. The complexity of subsequent environmental changes limits our assessment of its original extent, but the presence of naval forces on sites currently removed from immediate access to active river channels (*e.g.* Garvăn, Galaţi, Traian) are a statement to water access there in the Roman period. However, the need for rapid reaction across the floodplain by means other than the fleet is signalled also by the distribution trends of cavalry troops along the limes which evolve from their positioning at a few key points within shorter distance from the left bank across the floodplain (*e.g.* Hârşova-Gârliciu, Măcin-

Turcoaia, Izvoarele, Dunăreni, *etc.*) to a more widespread and even distribution in the later Roman period.

Spatial analysis employed in this study has successfully drawn some of the baselines of army connectivity, networking and strategy on the Roman limes of Dobrogea with respect to the local topography based on. While far from being an unbiased methodology, in doing so, it highlighted potential gaps in our knowledge of sites distribution which will require further investigation to identify eventual new sites. It helps us also to appreciate better some of the complex practicalities involved in controlling this sector of the limes leading to tactical decisions.

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Part 5

‘MANAGING THE ROMANS?’

PRESERVATION, PROTECTION AND COMMUNITY MANAGEMENT OF FRONTIERS. OPPORTUNITIES, CHALLENGES, AND USE OF ‘CITIZEN SCIENCE’

Imagining Hadrian's Wall

Developing and assessing explanations behind its construction

Paul J. Kitching

"*Without the ability to imagine alternative explanations, archaeology languishes. On the other hand, without the opportunity and determination to test ideas, imagination is of little value*" (Trigger 2007, 183).

Hadrian's Wall is an enigma. Indeed, this accounts for a good deal of its continuing appeal to archaeologist and layperson alike. Each generation selects the questions deemed most worthy of investigation and, upon their apparent resolution, declares the matter closed (*e.g*. Wheeler 1961, 159). However, as the questions we pose about the Wall change over time, so too do our understandings. Nowhere is this clearer than in the ultimate question of **why** the Wall was constructed in the first place and what purpose(s) it was intended to serve. This topic, and the function of Roman frontiers more generally, remains controversial and has, with few exceptions, fallen out of favour in recent research (Breeze 2018).

Why might this be so? An optimistic reply would be that the question has been satisfactorily answered already, although a different response again would be that the question is fundamentally uncertain (Mattern 2002, 112-114). The latter point has some merit, as **all** questions posed of the past can only ever be answered provisionally, though it does not adequately account for the downward trend in research addressing the question of function. It is suggested here that an epistemological tension is at play: a growing quantity of increasingly niche research, often demanding very specific expertise, is shedding new light on detailed aspects of the Wall's structure and occupants but this, in turn, can pose challenges to their integration into broader research questions (Hingley 2008, 26).

It is argued that, notwithstanding the trends in recent research and occasional epistemological pessimism, the broader question of function remains worth asking and new methodologies are called for to progress the debate. Contrary to severer forms of relativism, it is stressed that not all hypotheses are created equal and that, in assessing the relative plausibility of each, we must examine its relationship with the evidence, itself constructed and theory-laden, in a transparent, auditable and reproducible way. What might help is to develop a methodology to bridge the gap between the detailed evidence and the broader questions and, whilst acknowledging the limits of what it is possible to know, to develop a deeper understanding of this enigmatic structure. This paper outlines how such an approach might work in practice and illustrates its potential benefits.

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Theories of function and archaeological tacking

Numerous theories have been advanced for the function of Hadrian's Wall, but none have received universal and enduring acceptance. Perhaps the earliest interpretation is one of defence. Early antiquarians, notably Horsley in his posthumously published *Britannia Romana*, drawing on the work of Gildas and the Venerable Bede, interpreted the Wall as a primarily defensive barrier. Though substantially undermined following Collingwood's influential work in the 1920's, a defensive reading continues to feature in debate on the Wall's function, particularly in light of the discovery of obstacles on the line of the berm in the early 2000's (Frain *et al.* 2005, 49).

Nonetheless, in the 20th century, a control-of-movement interpretation came to dominate the discussion and stressed the importance of security, including economic regulation, rather than defence. This was first posited by Collingwood (1921, 65) and developed considerably by Eric Birley who, inspired by the work of the French aviator Colonel Jean Baradez in *Numidia*, proposed that the Wall was built to support controlled economic development to the south (1956, 33; 1961, 273).

It is also possible to view the Wall in more abstractly symbolic terms, assigning its unique elements to the personality of the emperor rather than reflective of practical function (Stevens 1955, 385; Donaldson 1988, 126). The metaphorical and rhetorical aspects of the Wall, for instance, were highlighted by Janet DeLaine (2002, 221), whereby the symbolic restructuring of the landscape through the construction of Roman infrastructure is a display of a conqueror's power characteristic of Roman imperialism (Purcell 1990, 23).

These theories have often been presented as dichotomies: defensive versus economic, for example, or practical versus symbolic. Indeed, the binary and unresolved nature of this debate has arguably contributed to the decreasing trend for asking **why**. However, the theories are not necessarily mutually exclusive and can have many areas of crossover. Similarly, explanations need not be monocausal and likely include locational and temporal variations. A pragmatic approach might assist in developing the debate. Navigating between these different interpretations and, in turn, between multiple ways of considering the archaeological evidence, in a process akin to what Alison Wylie (1993, 24-25) characterised as archaeological tacking, can help explore compatibilities, expose assumptions, and prompt new ways of looking at a problem.

Understanding the construction of the evidence

The relative abundance of data for Hadrian's Wall (Collins & Symonds 2013, 9) brings its own benefits and difficulties. There is today an array of archaeologies, not necessarily interchangeable or even similar; the typologies of the pottery expert may make little sense to the palynologist, and vice versa. Archaeology has always been collaborative, but the sheer quantity of data available to archaeologists comes with an increasingly specialist level of knowledge required to interpret it, further exacerbated by the proliferation of grey literature. This arguably contributes to the aforementioned tension between specific, niche research and broader research questions. Pursuing the latter relies on an understanding of the former, but a lack of time or detailed knowledge makes it difficult to fully exploit. Simply noting the current consensus of the relevant experts, where one exists, is insufficient as it does not allow for the easy integration of new information when that consensus is overthrown and provides no safeguard against authority bias. Indeed, in place of a consensus there is more often a rigorous and protracted debate, the implications of which remain relevant to broader research questions.

In the traditional form of archaeological dissemination, the ubiquitous monograph, hundreds of pages of specialised text are invariably followed by a summary chapter which, while making a valiant attempt at synthesis, does not have the space to relate each conclusion back to the extensive chain of evidence and assumptions that support it. Thus, when the data are updated, it is difficult to appraise how this affects the overall conclusions. It is argued here that only by capturing this information, including the differing interpretations, and the chains of reasoning by which they are arrived at, can the researcher asking a general question hope to understand the limits of the data they are working with and the implications of them changing. The methodology used to capture these chains of reasoning must be transparent, auditable and modifiable as research moves forward, and it must be detailed enough to be reproducible to another archaeologist working with the same data.

Assessing different ideas for the intended purpose of the Wall relies on both the evidence drawn from archaeology and on the link between form, visible in the material remains, and function, which is approximated in hypothetical models. The specific form and placement of human material culture is reflective of their intended function (Dardel 1952, 40; Hölscher 2018, 323), a link evidently clear to the Romans themselves, with Vitruvius (*De Architecura* 6.5.2) emphasising the close relationship between a building's function on the one hand, and architectural design, scale and location on the other. This emphasis on the Wall's form is deliberate; although there is often overlap between the processes of discovery and justification in archaeological reasoning, with analogy playing a role in both (Kelley & Hanen 1988, 260-262), an assessment of the relative plausibility of different

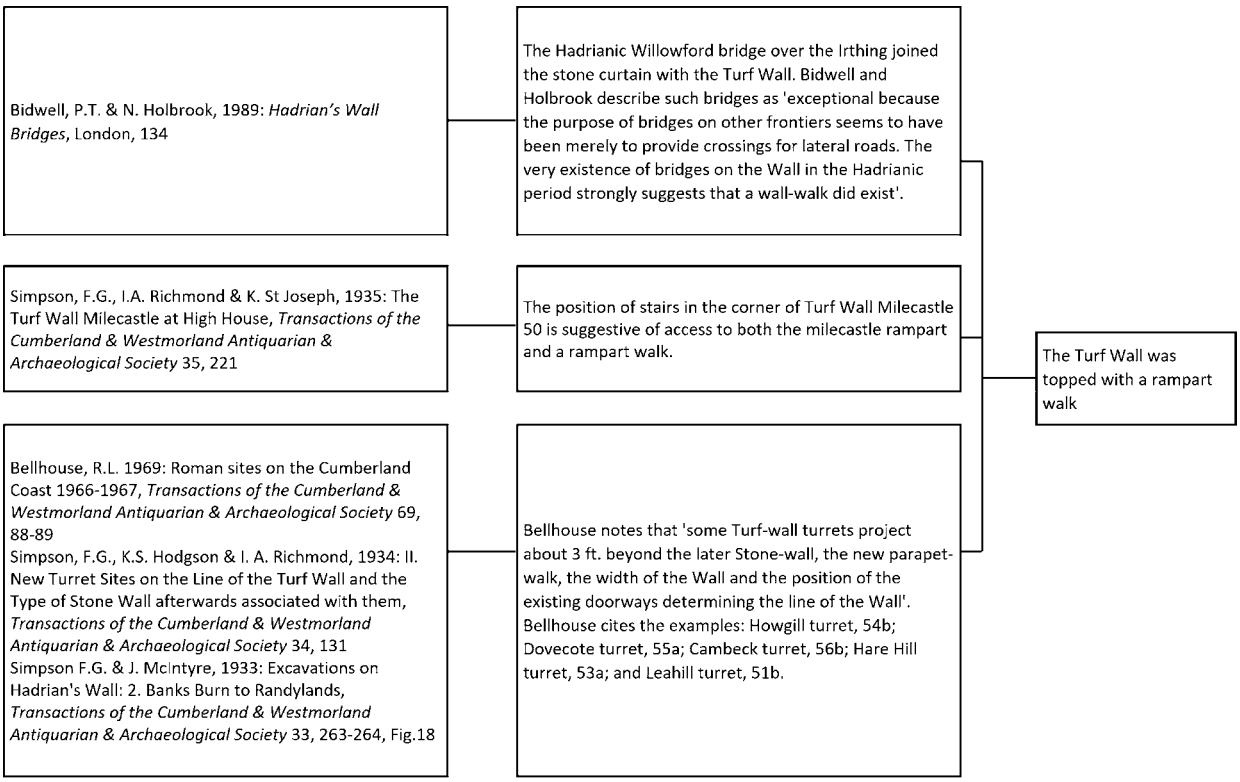

Figure 1. Simplified example of how evidence for the Wall is constructed.

interpretations must focus on a detailed understanding of the archaeology of the Wall itself.

With this in mind, we must be able to justify every knowledge-claim about the form of the Wall and its place in the landscape, referred to here as evidential statements, and the chains of reasoning that support them. It is possible to create a list of these evidential statements about the Wall, both as it was initially envisaged and as it was envisaged at the end of Hadrian's reign. It must be stressed that both these models are an approximation of an intent that was never realised; the initial plan was never completed, being altered by the fort decision and the addition of the Vallum, and the later plan was probably unfinished at the time of Hadrian's death. It is also a simplification into two clear stages of a process that could have consisted of a series of incremental modifications. Nonetheless, this is a useful thing to do because deliberate changes speak to either increased optimisation for an intended function or deliberate compromise. Identifying those differences and how they relate to different ways of conceptualising the Wall's function is key to the analysis.

The data for generating these evidential statements are drawn from a wide array of archaeological sources including excavation reports, ground and aerial survey, epigraphy, numismatics, and small finds studies. These data can be used to support an aforementioned statement, either through strong corroboration or, if corroboration isn't possible but where multiple strands of data independently support the statement, convergence (Cohen 1977, 94). A transparent understanding of this 'scaffolding' (Wylie 2016, 205) used to support an evidential statement is essential.

For instance, the existence or otherwise of a rampart walk is often cited in the debate between different ways of interpreting function, so understanding the origins and strength of these respective claims is paramount. Thus, in a very simplified and abridged example (fig. 1), source data, in this case from excavation reports, provides evidence for: the existence of a Hadrianic bridge over the Irthing at Willowford; the position of stairs in Turf Wall Milecastle 50; and the projection of several Turf Wall turrets beyond the later stone curtain. This evidence converges to support the statement that the Turf Wall was topped with a rampart walk. This is not proof of the existence of a rampart walk along the Turf Wall, but a representation of the scaffolding used when justifying making such a claim. Although greatly simplified, this example illustrates the general idea of tracing every knowledge claim about the Wall back to the archaeological evidence/observations. In practice, thousands of items of source data can be used to support hundreds of statements about the Wall as we understand it, both pre- and post-fort decision.

reliability and relevance					
Can the report conclusions be verified? Does the report explicitly support the statement?	no	probably not	undetermined / even chance	probably	yes
authenticity and accuracy					
Impact of reconstruction or alteration? Impact of limitations in recording?	severely affected	probably affected	undetermined / even chance	probably not affected	negligible affect

Table 1. Example of potential grading criteria.

The useful thing about laying everything out so explicitly is that it allows a more critical analysis. The process of archaeological recording is, in essence, converting the material remains into a new medium, with the risk that nuance and subtle meaning can be lost in the translation (Moser 2012, 317). When the scaffolding supporting a statement is laid out in a systematic, granular fashion, it can be graded according to reliability, relevance, accuracy and authenticity (Table 1). Reliability in this case refers to the opportunities to verify the written archaeological record which, given the often destructive nature of archaeological investigation, is not always possible. For instance, it may be possible to re-examine an inscription, re-calculate the dimensions of a feature or measure new variables in an artefactual assemblage. However, evidence based on the interpretation of excavated-away contexts, destroyed sites or on now-missing artefacts cannot be subjected to such verification.

Relevance, in this context, is an assessment of the extent to which the report explicitly supports the statement in question. Authenticity, an admittedly loaded term around which there is significant debate in conservation and heritage practice (Jones 2010; Jones & Yarrow 2013), is used more narrowly here to describe the extent of post-Hadrianic physical manipulation of the material remains in question. Thus, authenticity would be degraded by the reconstruction of the Wall in places (Hingley 2012; Breeze 2019, 19), even if such reconstructions are argued to physically resemble their Hadrianic form. Finally, accuracy is used to describe the extent to which a subsequent record reflects the material remains and includes a consideration of the methodology, resources and motivations of those doing the original recording. The requirement for an assessment of accuracy is a reflection that the attitudes and techniques of excavators since excavation first occurred on the Wall have not been consistent (Symonds *et al.* 2009, 9).

This illustrative example of a potential grading process is subjective but, crucially, makes the conceptualisation of the data explicit. We are mapping out the robustness of what Chapman and Wylie (2016, 211) describe as the tangled strands of evidence brought to bear in making knowledge claims. Importantly, this grading is specific to the evidential statement; so, it is not the case that antiquarian notes are always graded poorly and modern surveys always graded well, and the same evidence can be graded differently when used to support different statements. Neither is the grading used static or determinative. Indeed, considering multiple ways of conceptualising the evidence, and how this then strengthens or weakens broader interpretations, can highlight focussed areas for future research.

Assessing multiple hypotheses

Once the construction of the evidence has been explored, it must be considered in its totality against multiple possible interpretations, thus avoiding the selective support for a favoured hypothesis (Chamberlin 1965). The need to consider multiple hypotheses is driven by the assumption that none will be entirely correct and by the underlying scientific principle of uncertainty (Feynman 2000, 248); all of the explanations we can come up with remain approximations only (Elliott & Brook 2007). The aim must be to see which of these approximations most closely corresponds with the evidence as we understand it and, in doing so, to refine our understanding. This is especially important in long-standing problem-sets, like the study of Roman frontiers, where the integration of new information can be more challenging (Hodgson 2009, 4; Hingley 2012, 336). The use of multiple-hypothesis testing is not new in Roman frontier studies; Collingwood advocated the testing of multiple tentative theories about the form of the Wall through selective excavation (1931, 37-38), but the approach remains neglected when it comes to broader research questions. In actuality, archaeologists routinely weigh evidence and alternative explanations as a matter of course – the benefit of the approach advocated here is to be found in recognising this explicitly and ensuring both their systematic, detailed recording and availability to other researchers.

When examining multiple hypotheses against the various ways of constructing the evidence, it is not a binary process, offering neither the Hempelian nor Popperian absolutes of confirmation or falsification (Hempel 1965; Popper 2002). Likewise, the conclusions reached are not

If this hypothesis is true, how likely are we to see this evidence?	evidence-hypothesis correspondence summary	testing result
highly unlikely	evidence contradicts hypothesis	incompatible
unlikely	evidence does not support hypothesis	less compatible
not applicable (N/A) or even chance	N/A or even chance	N/A or even
likely	evidence supports hypothesis	more compatible
highly likely	evidence is essential to hypothesis	compatible

Table 2. Example definitions of testing criteria.

nomothetic explanations. Instead, the hypotheses are being examined for how well they *correspond* with the evidential statements. Correspondence is a question of how well the evidence provisionally fits the broader theory and, rather than claiming complete objectivity or independence, allows the evidence to challenge, as Hodder (1999, 61) put it, hypotheses which require excessive special pleading. In each case, we are asking what observations would be expected if the hypothesis were correct and, more crucially still, what observations should not be expected (Hanen & Kelley 1989, 16). Table 2 summarises an example of the definitions that can be used in carrying out the testing, essentially a sliding scale ranging from essential to contradictory.

Again, this is a subjective process but one that, in the format recommended here, is transparent, modifiable and reproducible in light of future work. Systematically questioning the correspondence between the evidence and a hypothesis helps expose assumptions, mitigate bias, and, because it uses multiple hypotheses and multiple ways of constructing the evidence, ensures multivocality. Indeed, multiple hypothesis testing combines many of the advantages of both deductive and inductive approaches (Trigger 2006, 514), allowing the input of a mixed range of evidence so that it is not restricted to the quantitative analysis of structural statistics but can capture broader qualitative judgements on materiality.

Such an approach does not, and cannot, seek to **prove** a particular hypothesis nor to have the final say in questions about the Wall's function – the relationship between data and explanation can only ever be provisionally determined (Hodder 1999, 64). This is what Collingwood (1946, 255) understood when he referred to being able to justify a conclusion as opposed to claiming it to be logically obligatory. By examining the relationship between several theories and the available evidence, the analysis can explore compatibilities, expose assumptions, and prompt new avenues of research. It must be emphasised that neither the evidence nor the hypotheses put forward in any analysis can be viewed as exhaustive or complete. Here, unlike in Hodder's definition (1999, 59), the idea of a working hypothesis emphasises it as provisional and relational rather than implying that, through testing, it will ultimately be proven. As Petrie (1904, 141) recognised of archaeological reasoning over a century ago, "questions can be left pending, and it is not peremptorily needful to act one way or another. An open mind can be kept (…) and a matter can be discussed in fresh lights".

These fresh lights include not only synthesising new information, but also capturing the implications of continuing, but unresolved, debates. For example, if one hypothesis rests on the statement that the curtain was continuous from coast to coast, then this could prompt focussed research on the Burgh Marsh, where the curtain might well have been absent (Welfare 2019). It may also be the case that long-accepted statements are revealed to rest on analogies with other sites, the understanding of which has since been refreshed. Similarly, it may be that key evidence in support of a hypothesis rests on scaffolding which is particularly weak, perhaps revealing circular reasoning or empty citations (Harzing 2002), and thus prompts additional work. In short, the proposed approach aims to capture the unresolved debates on the nature of the evidence and use this as a catalyst, rather than an obstacle, to further research.

Conclusions

Tacking between multiple interpretations and multiple ways of constructing the evidence, making inferences and subjective choices explicit, allows archaeologists to make best use of legacy data, to integrate new information as it develops, and for subsequent researchers to build on the reasoning carried out even when the conclusions become obsolete. The results of this sort of analysis are always relational and open to challenge and re-interpretation; the benefit is in the rigour it brings by laying out the chains of reasoning clearly, allowing for a critical analysis, and thereby identifying areas where new information could have a dramatic effect on interpretation. This, the development of new research questions and lines of investigation, directly supports the vision for research laid out in the Wall's research framework (Symonds *et al.* 2009, 42). Acknowledgement of the limits of what it is possible to know is no cause for pessimism or lack of scholarly interest, and systematic methodologies may offer a way forward. Despite recent research trends, the question of

function remains worth asking and the approach outlined in this paper forms the basis of a current doctoral research project at Durham University. The enigmatic nature of the Wall is something to be embraced as the spur for further research, balancing the possibilities of the imagination with a transparent and systematic assessment of what the archaeology can reasonably support.

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Engaging disadvantaged communities in heritage-led regeneration

Rediscovering the Antonine Wall Project

Ríona McMorrow

Since 2008, the Antonine Wall has formed part of the Frontiers of the Roman Empire World Heritage Site. It runs through a diverse landscape of urban, post-industrial, semi-rural and rural settlements in central Scotland. Many of the areas experience very high levels of deprivation due to the collapse of heavy industry and mining which had been a source of employment for many of the communities. This 38-mile turf monument is a challenge to interpret, especially as sites are only visible in a few limited locations. Since its inscription, a concerted effort had been put in place by partners to improve the interpretation on the Wall and increase its visibility (Weeks 2020). In 2018, the partners decided to take this further and embark on the delivery of an ambitious project called 'Rediscovering the Antonine Wall' with the aim of raising awareness of the Wall with wider audiences and increasing the relevance of the monument to the local communities living along its length. The project has seen the installation of iconic sculptures, colourful Roman themed murals and over 30 community led initiatives. After four years in delivery, the project now nears completion and it has become evident that through allowing a wider range of narratives and engaging more diverse communities, this once divisive structure has now become a focus for collaboration and bringing communities together.

Development of rediscovering the Antonine Wall

In 2017, work commenced on scoping out a project that would bring together many of the communities along the Wall, particularly those in some of the most deprived areas, as recognised by the Scottish Index of Multiple Deprivation (https://simd.scot, 28-11-2022). A comprehensive consultation process took place over two years which actively engaged communities in identifying proposals. This process formed the foundation of the project which seeks to deliver social and economic benefits for the communities who live along it. The project aligned with national strategies by improving people's lives through regenerating areas. This appealed to funders, in particular the National Lottery Heritage Fund and by 2018, £2.1m in funding had been secured from the lottery, partners, and a range of other funders. What was proposed was a co-development and co-curation model; communities being supported to develop and deliver their own projects, with support from the project team.

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Figure 1. Modern interpretation of a Roman distance stone in Falkirk (Crown copyright © Historic Environment Scotland).

Figure 2. Roman head sculpture at Lambhill Stables near Glasgow (Crown copyright © Historic Environment Scotland).

Project proposals

The project has several strands which include capital projects that aim to enhance areas and celebrate the Antonine Wall. These include sculptures of Roman heads and murals depicting life on the Wall, as well as Roman themed playparks and replica Roman distance stones. A community programme consisting of 30 proposals from Roman themed comic books to graffiti projects with young people have now been delivered, alongside a specific strand of work engaging groups who encounter barriers to engaging with heritage. This project specifically concentrated on working with refugees and asylum seekers, many of whom have travelled from potentially the same areas as those soldiers from the Roman Empire nearly two millennia before: from Syria, North Africa, and the wider reaches of Europe.

Place-making along the Antonine Wall

Public art is recognised as an excellent tool for placemaking and renewal of public spaces. It can not only enhance the local area and increase footfall but can act as an expression of local identity. The community consultation had indicated a need for creating landmarks in lesser-known areas where the physical remains of the Antonine

Figure 3. Silvanus Roman head sculpture near Croy Hill (Crown copyright © Historic Environment Scotland).

Wall was not as visible. Five replica distances stones (fig. 1) were installed in each of the local municipal areas and two sculptures were commissioned. The sites chosen formed part of regeneration initiatives already taking place within that community rather than having standalone proposals. An excellent example of this is Aurelius; an impressive Roman head sculpture. It has been placed in the middle of a community led regeneration project called Lambhill Stables near Glasgow, alongside one of the replica distance stones (fig. 2). This area experiences high levels of deprivation and the community has worked hard to tackle these inequalities and improve the area by converting old stables into a community space, a café and a community garden. Working in collaboration with the group has created a sense of ownership and responsibility for the sculpture in an area. The installation in turn has enhanced the space and encouraged visitors from outside the area to the community centre.

A second sculpture Silvanus and a replica distance stone have been installed near Croy Hill, a Roman Fort on the Antonine Wall (fig. 3). This location is close to the John Muir Way and the Forth and Clyde Canal, two popular long distance walking routes. The award-winning Silvanus has become a visitor destination and a gathering place for walkers and cyclists, encouraging visitors to explore further up onto Croy Hill. Silvanus was installed during one of the pandemic lockdowns and from afar the team could clearly see the glowing reviews on social media coming in from those who lived within the 5 mile limit. Poignantly, it was also a reminder that the designation of the Antonine Wall as a World Heritage Site has also protected much green space for communities near the Wall. Though further evaluation is required, these heritage themed art installations have potentially boosted for many visitors a connection with this Roman landscape, encouraged a more diverse range of visitors to the site and in turn provided a better understanding for why it should be valued. Silvanus' appeal has also meant it has become a focus for tourism initiatives in the region aimed at walkers, cyclists, and younger demographics. The tourism potential and economic benefits of these installations have yet to be fully quantified but initial figures from visitor counters suggest a noteworthy increase in footfall to the sites, highlighting the potential economic value of the project to the surrounding area.

Roman playparks

Playparks are a versatile way of delivering both social and economic benefits in an area. Consultation had highlighted a lack of amenities for young people and that interpretation on the Antonine Wall was targeted more at adults. It was proposed that five playparks would be installed providing a visual marker in the landscape of this Roman heritage through Roman themed play equipment. Providing high quality facilities for families on days out to the Antonine Wall increases dwell time in the area, an economic argument that appealed to funders and the partners (fig. 4).

All five play parks are now installed, each individually designed to tell a local Roman narrative. Their locations were identified based on a review of local amenities and levels of deprivation to support the communities most in need. Playparks were designed by local school pupils and adapted by professionals ensuring a strong sense of ownership. Constructive and active play is encouraged throughout with interpretation integrated into the

Figure 4. Roman themed playpark at Peel Park, Kirkintilloch (Crown copyright © Historic Environment Scotland).

playparks such as child-friendly interpretation boards, digital stories of Roman children and a firm favourite, Roman defensive pits, *lilia* in the form of trampolines. The playparks have proven incredibly successful, and reports indicated they are mobbed especially after lockdown, highlighting the importance of providing safe outdoor spaces for young people in areas of multiple deprivation.

Community led projects

For the partners, encouraging greater community participation and active engagement with the Antonine Wall was a priority of the project. Through the co-design consultation process, over 30 interpretative projects were identified along the length of the Wall with a wealth of imagination demonstrated; from graffiti projects to trishaws allowing elderly people and those with mobility issues access to the Wall. Being open to different approaches and allowing a wide range of narratives to come through permitted greater creatively and ownership of the projects. This can be seen at Bonnybridge near Rough Castle Roman Fort, where the community wanted a visual representation of the link between their Roman and Industrial heritage. Working closely with an artist they co-designed a sculpture incorporating the connection between Roman metal working and the Iron Foundry at Bonnybridge. Through close collaboration, a rich narrative around the diverse heritage of this area was explored, resulting in a piece of work that the local community have a distinct sense of pride over (fig. 5). Another strong example of collaborative working with the community was near Bearsden Roman Bath House. The community group here had a clear vision for their project which concentrated on an outdoor sensory experience. An unused corner of a community garden has been overhauled into a Roman-themed granary garden that includes a soundscape of what the granary would have sounded like in Roman times. The group fully embraced delivering the project, conducting research into the types of plants grown by the Romans in Scotland, and solving potential obstructions to the project themselves including calling in the local Men's Shed to help with the clearing of the garden. Though this paper only shares a few of the community led projects, it is evident that taking a co-design approach with communities created a stronger sense of ownership of the projects. It also increased the capacity and the confidence of the groups to take a more active role in raising awareness of the Antonine Wall.

New Scots Project

A clear priority of the project was working with groups who are underrepresented and underserved by the heritage sector. The Antonine Wall was originally set up as frontier and a barrier dividing communities. It was also home to many cultures during Roman times with soldiers coming from across the Roman Empire to Scotland. It had been identified through consultation that several towns along the Wall were and continue to host people who are navigating the UK immigration system, many of whom have come from places like Syria and North Africa. Archaeological evidence has also suggested that Roman soldiers from similar places like modern day Syria may have been posted in Scotland (Jones 2018). Part of the project looked to highlight the broad range of people who may have lived along

Figure 5. Co-designed sculpture with the Bonnybridge community (Crown copyright © Historic Environment Scotland).

the Wall by including them in narratives, murals and through characterisation *e.g.* the Syrian archers, women like Vibia Pacata.

In developing the project, working with experts within partner organisations as well as collaborating with organisations such as the Scottish Refugee Council was essential. In all, five partnerships across the Wall were established with involvement from groups like the Global Language Café which has been set up for refugees and asylum seekers that have been placed in temporary accommodation in Falkirk. A team with expertise in community co-curation and supporting diverse communities led the project, which consisted of art-based sessions exploring heritage, visits to the Antonine Wall as well as events in the Scottish Refugee Festival where the work of the participants was celebrated with the wider community. These included family days out as well as participants providing tours of the Wall; intertwining stories of Roman histories and personal experiences. Reflections by all echoed the original intention that collaborative projects like this allow the transformation of the Antonine Wall once a barrier which separated communities into a space for people to come together as a place of shared belonging (https://rediscoveringtheantoninewall.org/tilal/, 28-11-2022).

Lessons learnt and recommendations

The Rediscovering Project set out to be ambitious, having now delivered over 30 different projects for the communities along the Wall, despite unprecedented challenges such as COVID, lockdown and soaring costs increases. Here are a few lessons learnt from delivering the project:

1. Partnership working has been a success of this project, a clear understanding of stakeholders in the area is important for working with disadvantaged communities.
2. Providing a wider range of narratives has proven crucial for accessibility, feedback indicated that people want to have interpretation and narratives that are more relevant to them. The team looked at diversifying the narrative through characterisation and highlighting hidden histories.
3. Developing participant led projects and using place-based approaches with the communities created a sense of ownership and responsibility over the assets, this is crucial for long-term sustainability especially in areas of deprivation where vandalism is often a reality.
4. Being able to adapt quickly is essential; the volunteer programme launched just before the national lockdown and the team had to quickly adapt by developing online sessions and building up different partnership type projects to engage with volunteers.
5. Keeping in touch with funders and be honest about how the project needs to adapt and change according to the challenges and opportunities.

The long-term ambition for the Antonine Wall is to be a well-managed and sustainable World Heritage Site as well as a world class visitor experience. Though the Antonine Wall is admittedly still early on this journey, the Rediscovering the Antonine Wall project has demonstrated by making it more accessible through allowing different narratives and a variety of innovative and creative interpretative approaches, it is possible to engage and instil

enthusiasm in a wide range of people even for a perceived challenging monument like the Antonine Wall. The project has increased the number of visitors to the Wall, and it has also been demonstrated to the local community that it can be used as a catalyst for regeneration and better community cohesion. Increasing this sense of pride, value and ownership over the Wall will not only be integral to the long-term management and sustainability of the World Heritage Site but can also support the future resilience, vibrancy and inclusivity of the places and the communities of the Antonine Wall.

Acknowledgements

I have the privilege of writing up this paper but the Rediscovering the Antonine Wall project could not have been delivered without the commitment of the Antonine Wall World Heritage Site Steering Group, the enthusiasm and perseverance of the Rediscovering Team, The World Heritage Team at HES and my predecessor Trisha Weeks. More information and download links are available at www.antoninewall.org, and https://rediscoveringtheantoninewall.org.

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Frontier Voices. A creative exploration

Nigel Mills and Karen MacDougall

Frontier Voices is an arts-based creative exploration of perceptions of Hadrian's Wall World Heritage Site and its landscape amongst local communities – a learning and engagement project creating high quality artistic outcomes and sharing experiences. The project took place from May to November 2022, with a final celebratory exhibition in December 2022/January 2023. Participants comprised diverse groups and communities all along the Wall and from some of Europe's other Roman Frontiers, in the Netherlands and Germany (table 1). Venues included all the main Roman sites and museums across Hadrian's Wall, two Roman fort sites in the Netherlands and two parts of the Roman land frontier in Germany, in Bavaria and in Baden Württemberg. The project was funded by Arts Council England, with in-kind and cash support from partners including English Heritage, Vindolanda Trust, Tullie House Museum and Art Gallery Trust, Senhouse Roman Museum and Tyne and Wear Archives and Museums. The timescale for the project was very tight, largely as a result of Covid impacts, which led to the project only being approved at the beginning of May, leaving little time for detailed delivery planning for such a complex project involving so many different groups and locations.

The project has built on the experience of previous arts and interpretation projects along Hadrian's Wall, including Hadrian's Cavalry in 2017 (Booth & Nixon 2021; Griffiths 2021) and the Living Wall exhibit in the Roman Frontier Gallery at Tullie House Museum and Art Gallery in Carlisle (Mills 2021). Particular features of Frontier Voices are:

1. that it has been Wall-wide, involving groups and communities all along the Wall and all the main sites and museums.
2. that it has included communities from two other parts of the World Heritage of the Roman frontiers, from the Rhine frontier in the Netherlands and the German land frontier in Bavaria and Baden Württemberg.

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The project was led by artist Karen MacDougall. Karen is an artist, designer and creative producer based in Cumbria. She is passionate about art's ability to bring people together, so also works with museums, communities and other groups to create exciting art that combines heritage with a contemporary twist and forward-facing vision. She previously worked along Hadrian's Wall through a participatory arts project, part of the Hadrian's Cavalry dispersed exhibition in 2017.

The original idea for the project came from Nigel Mills, who approached Karen who developed the delivery model and individual projects with the different partners. Nigel also helped her navigate an application for funding to Arts Council England and assisted

in: H. van Enckevort, M. Driessen, E. Graafstal, T. Hazenberg, T. Ivleva & C. van Driel-Murray (eds) 2024, *Current Approaches to Roman Frontiers. Proceedings of the 25th International Congress of Roman Frontier Studies 1*, Leiden, Sidestone Press (= Archeologische Berichten Nijmegen 9), pp. 201-210.
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group/s	location	manager/owner	facilitators
Dearham Rainbows and Maryport Rainbows, Brownies and Guides	Senhouse Roman Museum	Senhouse Trust	Jane Laskey (Manager)
Members of inclusive Friday art group	Tullie House Museum and Art Gallery	Tullie House Museum and Art Gallery Trust	Catherine Moss-Luffrum
Hadrian's Wall volunteers	Birdoswald Roman Fort	English Heritage	Frances McIntosh (Hadrian's Wall, Curator) and Helen Klemm (Education Officer, North of England)
Haltwhistle Youth Club 'Young and Sweet'	Roman Army Museum	Vindolanda Trust	Anneke Hackenbroich and Barbara Birley (Curator)
(Final exhibition)	The Sill, Landscape Discovery Centre	Northumberland National Park	Sarah Burn (Head of Engagement)
Beavers, Cubs and Scouts, Allen Valley Scouts, Hadrian's Wall District	Vindolanda Roman fort	Vindolanda Trust	Barbara Birley (Curator)
Northumberland County Scouts and Explorer Scouts visiting Iceland summer 2023	Corbridge Roman Town	English Heritage/the National Trust	Frances McIntosh (Hadrian's Wall Curator)
Hadrian's Wall volunteers	Carrawburgh Roman fort, Mithratic temple and Coventina's Well	English Heritage	Frances McIntosh (Hadrian's Wall Curator)
Museum visitors	Great North Museum	Tyne and Wear Archives and Museums	Adam Goldwater (Manager) and Andrew Parkin (Curator)
Denbigh Primary School, Wallsend (Year 4)	*Segedunum* Roman fort	Tyne and Wear Archives and Museums	Beth O'Connell (Education Officer)
Hadrian's Primary School, South Shields (Year 5)	*Arbeia* Roman fort	Tyne and Wear Archives and Museums	Alex Croom (Curator) and Beth O'Connell (Education Officer)
Local people from Altmannstein: Elisabeth Riegler, Frank Waltinger, Claudia Schiereis, Bernhard Arbesmeier, Jürgen Hufsky, Peter Angerer	Upper German Raetian limes, Altmannstein	Altmannstein	Sabine Lund (LimesGemeinden coordinator, Kinding) and Markus Gschwind (Limes coordinator, Bayerischen Landesamt für Denkmalpflege)
Peutinger Gymnasium, Ellwangen (Year 9)	Upper German Raetian limes, Limestor		Silke Schwab-Krüger (Teacher), Andreas Schaaf (Teacher) and Andreas Schaflitzl (Limes coordinator, Landesamt für Denkmalpflege Baden-Württemberg)
Local people from Meerburg, Park Matilo	Park Matilo Roman fort	Project Grensland	Dorothee Olthof (artist and archaeologist), Ludy Feyen (artist) and Tom Hazenberg (Hazenberg Archeologie)
Arie Kort	Zwammerdam Roman fort	Ipse de Bruggen	Leen van Zwieten (Ipse de Bruggen, Staff from De Houtisten), Dick van Vuuren (Ipse de Bruggen) and Tom Hazenberg, Hazenberg Archeologie

Table 1. Participants of the project.

her, especially facilitating the wider connections across the Roman frontiers. The core idea for the project was to use creative art as a vehicle through which people could express their connections with the World Heritage of the Roman Frontiers – what this means to them, how and whether it inspires them. Engagement of local communities with World Heritage is one of the five strategic objectives of the World Heritage Convention (https://whc.unesco.org/en/convention/), so with Frontier Voices we wanted to explore local connections not only Wall-wide, but across the wider Frontiers of the Roman Empire World Heritage Cluster. The project also provided an opportunity for Karen to provide mentoring for a young creative, Clare Forsythe. Clare worked as Creative Assistant on several of the installations.

Following research at each of the locations along Hadrian's Wall, Karen devised initial design concepts for artworks that would capture the spirit of a place and its Roman 'Voices' and provide a vehicle through which participants could express their own 'Voices' – thoughts, ideas, identities. Over the timescale of the project, participants were able to share the experiences and the creative outputs of other groups and venues, facilitating cross-fertilisation of ideas. Participants included schools, outside-school-groups, an all-inclusive (special needs) group, older adults, adult volunteers from along the Wall and visitors to the Roman attractions (table 1). Participants visited Roman sites and learned about them through facilitated visits, inspiring ideas, feelings and conversations that were then expressed creatively to produce the artworks.

The approach taken with the groups from the Netherlands and Germany was necessarily more individual, with each group coming up with their own way of responding to the idea of expressing their connection with **their** Roman

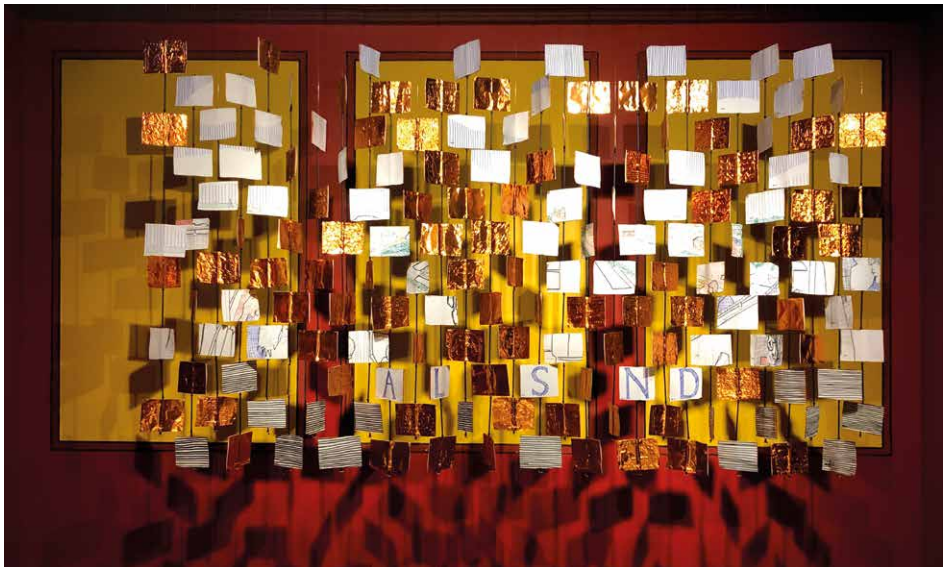

Figure 1. *Segedunum*, Wallsend (© Karen MacDougall Art).

Figure 2. *Arbeia*, South Shields (© Karen MacDougall Art).

frontier. Meetings and workshops took place largely online although representatives of the two Dutch groups were able to visit Hadrian's Wall towards the end of the project.

Creative outputs were displayed at the respective venues, then brought together for a final celebratory exhibition showcasing the project at The Sill, the Northumberland National Park Landscape Discovery Centre on Hadrian's Wall. A selection of examples from the project is provided below.

Segedunum, Wallsend

At *Segedunum*, Karen explored the museum and the fort with two year four classes from Denbigh Primary School, Wallsend. Particular highlights were the reconstructed section of Hadrian's Wall and the Wall of Names, a stone monolith inscribed with the names of Roman soldiers collected from the *centurio* stones along the Wall, marking sections of the Wall constructed by different military units. These were real voices who gave blood, sweat and tears to the Wall.

Inspired by Roman decorative patterns and inscriptions with the names of real people, the children created embossed marks on metal foil. These formed one side of a card. For the flip side of the cards, the children created a large drawing 3.0 m long and 1.8 m high depicting the area around *Segedunum* and the end of the Wall as it is now. This was then cut up and stuck to the back of the foil to create double faced 'stones'.

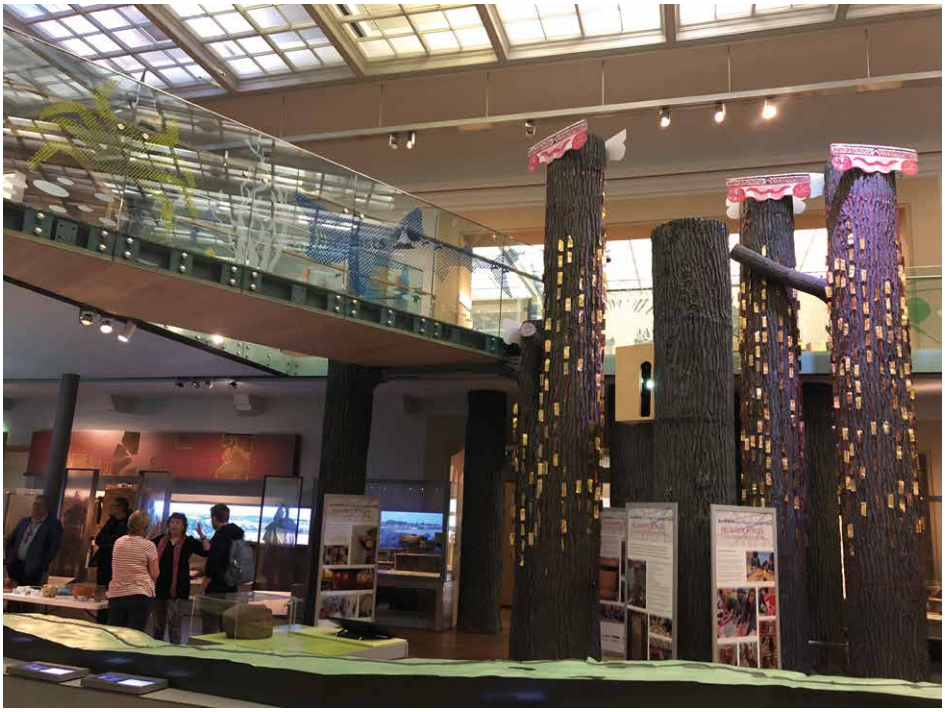

Figure 3. Great North Museum, Hancock, Newcastle-upon-Tyne (© Karen MacDougall Art).

These 'stones' were then assembled to create a giant mobile which moves in the air currents in the gallery (fig. 1), in the form of a wall, one side of each stone formed by a section of the drawing and the other by the embossed names and marks representing the Roman soldiers who built the wall. The mobile was hung in the shrine of the reconstructed headquarters building that lies at the heart of the Segedunum Museum.

Arbeia, South Shields

The inspiration here was the evidence of headpots made by African soldier potters in York that showed real faces; for example the face of Emperor Severus' wife Julie Domna from Syria. Year 5 children from Hadrian's Primary School South Shields had a sensory tour of the fort followed by artefact handling with curator Alex Croom, who identified objects that were named and so belonged to actual people living at *Arbeia* in Roman times. Examples included bowls with personalised marks and initials as well as evidence of dogs who left footprints in wet tiles before they were fired.

These ideas inspired the children and artist to look at our own identities – how we see ourselves and what we feel is important to us, and then to create their own headpots made of felted wool instead of clay, representing different characters or 'Voices'. These were then displayed in the Museum at *Arbeia* (fig. 2). Children from the school were participating in a performance of 'Much Ado About Nothing' by Royal Shakespeare Company Associates at the Northern Stage theatre in Newcastle. The headpots were carried by the children in the wedding scene, a real thrill for the children and evidence of the quality of the art they had produced!

Great North Museum, Hancock, Newcastle-upon-Tyne

The Hadrian's Wall Gallery contains many tombstones and other monuments and objects commemorating individual Roman people who populated this frontier 1900 years ago. Visitors arrive in the gallery through a forest of artificial trees, creating the impression of discovering the Roman past through an ancient landscape. Karen's idea here was to turn the trees into temple columns, inspired by the phrase *'Et in Arcadia Ego'*, a reference to a work by the Roman poet Virgil that death is always present. Through the artwork, these Roman 'Voices' would be juxtaposed with the 'Voices' of modern people.

Karen and Clare together with volunteers and staff from the Museum worked with hundreds of members of the public of all ages who 'dropped-in' to participate in the project. Visitors queued to join from the moment the project started and many stayed until the end of each workshop day. Working with the project team and inspired by 'Voices' from the Roman world of Hadrian's Wall showcased in the Hadrian's Wall gallery, participants explored their own identities and expressed them by embossing names and designs onto metal foil identity tags.

The metal was embossed using a wooden stylus such as the Romans would have used on waxed writing tablets (the iPad of Roman times!). Participants came from all over the world, reminiscent of the cosmopolitan society Hadrian's Wall in Roman times! Some visitors could not speak English,

but sign language and Alex, one of the volunteers, worked wonders here as a talented linguist. Iran, Spain, India, China, Scotland, Japan and many other countries were represented. Over 3000 people of all ages engaged in the workshops, creating 1290 identity tags.

Feedback from participants was enthusiastic, highlighting the inspirational, thought-provoking, therapeutic, calming – and coolness! – of the activity and its purpose, appealing to everyone from the very young to elderly visitors. The tags were then hung onto long red lines, which in turn became the lines on columns created from the artificial forest of trees (fig. 3).

Birdoswald, Brampton

Workshops at Birdoswald were for adult volunteers who worked on the Wall in some capacity, including people involved in social engagement, guided walks leaders and young people working with other young people. Frances McIntosh, Hadrian's Wall curator for English Heritage and Helen Klemm, Education Officer for Northern England at English Heritage helped provide background information and a handling collection of objects while volunteers shared their passion for and interest in the Wall. David Young of the Northumberland National Park shared his passion for geology and the landscape here.

Conversations flowed around the idea of walls past and present – barriers and connectors, impacts on native people, controlling movement and collecting taxes, implications for modern farmers and land managers. Opportunities were taken to share ideas with visitors to Birdoswald and to explore how they felt about the Wall and the landscape around Birdoswald.

These gave ideas for creative writing to be published as an anthology and for word art, patterns and drawings that could be displayed as banners. Examples of the creative writing include:

World leading
Ancient monument
Limes limestone
Leaving a mark.

Edge of Empire
Artefacts
Graffiti
Links to our past
English Heritage.
(Acrostic poem by Jackie McMullan)

Rain
cOld
Mist
hArd
StoNe.
(Mesostic poem by Joanne Dancer)

I've looked at **The**
Wall and the fort in the **rain**
From the gloom **comes**
a couple, dogs **pattering**
Beside. They want **out**
Of the weather, heedless **of**
History, Roman or not **the**
Cafes the target away from the **sky.**
('Golden shovel' poem, after W.H. Auden by David Young)

Senhouse Roman Museum, Maryport

One of the most important collections of Roman altars from anywhere in the Roman world is on display at Senhouse Roman Museum, so using a Roman altar design as the focus for an artwork was a fairly obvious choice. Girls and leaders from Dearham Rainbows and from Maryport Rainbows, Brownies and Guides participated in the workshops and decided what they wished to include in their altar.

Four groups each designed a side each. The front and back have elements of Roman altar design and throughout the patterns were chosen by the girls from museum exhibits. Everyone wrote their names on one side (signing the work) and as Girl Guiding is important to them, a number of badges were chosen, along with vintage buttons and other decorative items to create the side panels. The Guides designed the top of the altar with some really interesting pattern work.

The first line of the Guiding Promise was included on the altar as this is used by all Guiding groups young and old. Inspired by UNESCO values, these modern Frontier Voices are trying to live by their promise and make the world a better place!

Roman Army Museum, Greenhead

Here Karen and Clare worked with 'Young and Sweet', the Haltwhistle Youth Club, supported by Anneke Hackenbroich from the Vindolanda Trust. The group's thinking was inspired by visits to the Roman Army Museum and to Magna Fort where they were introduced to the serious effects of climate change. At Magna, the ground is drying out, resulting in a measurable loss of local heritage as it continues. In ten or twenty years all the organic matter that tells of the lives of people living at the fort will have dried out and fallen apart, as though it had never existed.

In discussion with the group, Cocceius Regulus, a centurion named on one of the *centurio* stones and responsible for overseeing construction of this part of the Wall, was identified, along with interpretations of the standard for *Legio IX*. Both feature in the Roman Army Museum exhibition, providing local Roman voices

Figure 4. Peutinger Gymnasium, Ellwangen, Baden-Württemberg (© Silke Schwaab-Kruge).

to work with. A recent geophysical survey of Carvoran provided a different kind of Frontier Voice, revealing what is hidden under the ground beside the Museum.

The group decided to create a large artwork created using recycled materials (plastics, fabric, offcuts from other Frontier Voices projects, *etc*.) cut into mosaics interlaced with embossed metal shapes. Recycled materials were used to symbolise the importance of looking after the planet to reduce climate change – important not only for today's young people but also to prevent the loss of their heritage.

A printed version of the banner will go on the gate beside Magna fort so walkers can see the site and appreciate the artwork and its messages in situ. This version will have micro-holes in the fabric to let the wind through! The youth club are going to put the original artwork up at their base, proud of their project! Many of the young people asked about the proposed dig next year, evidence of how the project has engaged the youngsters and stimulated their interest in being involved in future work.

Peutinger Gymnasium, Ellwangen, Baden-Württember

This project was facilitated by Silke Schwab-Krüger, a teacher of art and English at the Peutinger Gymnasium (secondary school) in Ellwangen. The link was made through Andreas Schaflitzl, Limes coordinator in Baden-Württemberg and Andreas Schaaf, a history teacher at the Peutinger Gymnasium and a volunteer archaeologist. Silke worked with her class of twenty five Year 9,s. The key Roman site for the project was the Limestor at Dalkingen, an impressive memorial to Emperor Caracalla and his wars against the Teutons in the form of a 12 m high monumental gateway modelled on other Roman triumphal arches. Karen MacDougall came up with the idea of projecting moving shadows of Frontier Voices, sharing ideas with the Segedunum Project, onto the triumphal arch and this concept was then realised by Andreas and Silke.

Through several online workshops with Karen and Silke, the children explored ideas about frontiers and borders and applied their thoughts to specific political figures, generic people and their own experiences of being well or poorly treated by frontiers when they have been travelling. Hadrian's Wall and the World Heritage of the Roman frontiers contributed to their thinking. The

Figure 5. Altmannstein, Bavaria (© Frank Waltinger).

children created thought bubbles expressing their ideas in words, which were then translated into cut-out portraits representing real and imaginary people and ideas. These were displayed in the Limestor Museum (fig. 4). Examples also went on display in the Frontier Voices exhibition at The Sill. Examples of the thought bubbles:

1. "I am a woman who is separated from her family by a border. One pupil of mine is shaped like a heart. That represents the love I feel for my family. The tear, my other pupil, represents my sadness, because I am not allowed to see them. The hand on my neck is strangling me, and stopping me from crossing the border. That's why I am DEVASTATED!!!" (Fiona age 14).
2. "I am Lukashenko, President and Dictator of Belarus" (Alexander, age 14 an ironic reference to the Emperor Caracalla who built the Triumphal arch).
3. "In an around my face is barbed wire that stands for breaking out and locking in. The barbed wire is around my head because I wanted to be free and to break out" (Emely age 14).
4. "I've been through a lot, but it was worth it. As a reminder I got a sea in my eye. In my other eye you can see different flowers, which I got because I crossed a flower meadow. The mushrooms on my throat I have from the woods and the dripping through the rain. The flowers on my head are supposed to represent a crown. It has cost me 4 years of my life to collect these experiences" (Maxi age 14).
5. "I am a person who had traumatic experiences during the fall of the Berlin Wall. That made me this mentally ill person I am today" (Elisa age 14).
6. "I am a famous singer who has traveled a lot. My song 'Wind of Change' was used as a hymn for the peaceful Revolution in Europe and the fall of the Berlin Wall" (Sofia age 14).
7. "Around my face there are a lot of butterflies. They surround the human face because there should be no border between humans and animals because we are both part of nature" (Mia age 15).
8. "I'm a young woman fleeing her country and fighting her cancer, but after all I still believe in peace" (Dhana (Abu Saleh) 14).

Altmannstein, Bavaria

The community of Altmannstein is one of six small, rural municipalities that cooperate as the 'LimesGemeinden' (Roman Frontier Communities) in the County of Eichstätt in Bavaria. Their aim is to preserve the heritage of the Upper German-Raetian limes and to make the Roman remains more visible and tangible for local people and visitors. The remains of the Raetian limes are difficult to see and understand for the untrained eye, usually comprising moss covered stones and an earthen bank in woodland or along field boundaries.

Facilitated by Markus Gschwind, Coordinator of the Raetian Limes in Bavaria and Sabine Lund, Coordinator for the LimesGemeinden, a group of local people came together and over several meetings explored their fascination for the limes in their area, their particular interests and how these might be expressed. Nigel and Karen worked with these Frontier Voices to help them shape their thinking and realise their artwork – a long banner – where they wished to express the linearity of the ancient frontier and a bend in the limes line that is a particular feature of the limes in the Altmannstein area. The individuals involved feature as photographs on the banner, associated with photographs of particular features that fascinate them together with an explanation of their interest (fig. 5). The project feeds in to a wider local project involving development of a walking trail along the limes in Altmannstein. This will include creation of a community recreation and interpretive space at Hagenhill, a residential area within the Altmannstein municipality.

Park Matilo, Leiden, Zuid-Holland, the Netherlands

Matilo or *Matilone* was a Roman limes fort located in what is now the municipality of Leiden in the Province of Zuid-Holland. An archaeological park has been created on the site of the fort, located between the modern communities of Roomburg and Meerburg. The reconstruction comprises the outline of the fort as an earthen bank with interpretive reconstructions in corten steel of the main fort gates. The archaeological park provides a popular and much used recreational space for the two communities.

Meerburg lies on the site of the vicus of the Roman fort. The flats in the area have been there since the 1950's-1960's and residents complain of moisture, drafts and mould. Consequently, the housing associations wanted to replace the flats with new ones, built to modern standards. This was in accord also with the housing policies of the city of Leiden for more housing, greater sustainability and freedom from natural gas usage.

Project Grensland (Borderland) was set up by artist Ludy Feyen and archaeologists Tom Hazenberg and Dorothee Olthof. The project aim was for residents of Meerburg to play an active role in the redevelopment of their neighbourhood. Through lectures and workshops on, among other things, the Roman history and crafts of this part of the limes, the Project Grensland team inspired residents to use their imagination during a design competition for the new neighbourhood. Residents were asked how they would like to see their neighbourhood changed and what role the Roman past could play in it.

More than fifty entries from children and adults showed the municipality, other residents and the managers of the housing corporations the wishes of the Meerburg residents. An expert jury judged all the artworks, and residents were able to cast their votes for the public prize. These results, together with the results of a large-scale neighbourhood survey, were incorporated into the strategic plan of the municipality of Leiden for the redevelopment programme. The Frontier Voices project offered further opportunities for the project:

1. To share the experience of Project Grensland with other contributors to Frontier Voices by creating a short video for display in the exhibition at The Sill.
2. To seek further inspiration for the project by visiting Hadrian's Wall, including some of the places involved in Frontier Voices, seeing some of the artworks and producing some artworks as a contribution to the final exhibition.
3. Offering a cultural exchange of community engagement practice at heritage sites between Karen and the Gresland delegation.

Some of the team were able to visit Hadrian's Wall in October 2022. On return to the Netherlands, the next step is for a series of workshops with residents and stakeholders to explore further the ideas arising from the design competition and from the visit to Hadrian's Wall and the Frontier Voices project.

Nigrum Pullum, Zwammerdam, Zuid-Holland, the Netherlands

Nigrum Pullum was a Roman limes fort located by the confluence of the river Meije and the former course of the Rhine. It is located in the modern village of Zwammerdam in the municipality of Alphen aan den Rijn, in the Dutch province of Zuid-Holland. Nowadays the area is the home of the health care institute Ipse de Bruggen and includes the Limes Visitor Centre NIGRVM PVLLVM. The outlines of the southern and eastern walls of the Roman fort are marked by coloured banners, sewn by the clients of the institute, while the outline of the headquarters building has been marked out in wood.

In the 1970's, at the Roman quayside located near the fort, archaeologists discovered six ships including three large barges 20-34 m long. Together with finds of boats in other locations in the Netherlands, these boats have helped transform our understanding of transport and trade in the Roman world.

Ipse de Bruggen is an organisation with more than 100 years of experience in the care of children, young people and adults with a physical and mental disability and with learning difficulties. The organisation is based near the fort site and runs a café, the Grand Café de Haven, staffed by clients of Ipse de Bruggen. The interior décor of the Café includes an exhibition about the Roman fort and the Zwammerdam ships.

A client of the carpentry group of Ipse de Bruggen, Arie Kort, wanted to contribute to Frontier Voices. Through their woodworking the carpentry group contributes to society and to their living environment. Arie decided to create a realistic wooden model of one of the barges, Zwammerdan 6, using the model to communicate the story of the Dutch limes to other communities across the Roman frontiers and to showcase his craft skills. Staff from the day care organisation De Houtisten, part of the Ipse de Bruggen institute, helped Arie make the case for the model. After display in the final exhibition at The Sill, the model is likely to be adopted by Tyne and Wear Archives and Museums for exhibition at either the Great North Museum, Hancock, or at *Arbeia*. Everyone at Ipse de Bruggen is proud that their work is part of the Frontier Voices project, showcasing their work, communicating across boundaries and showing that the Frontier Voices and the World Heritage of the Roman frontiers is for everyone.

Conclusions

As indicated in the introduction, the core aims for the Frontier Voices project were:

1. To use creative art as a vehicle through which people could express their connections with the World Heritage of Hadrian's Wall – what this means to them, how and whether it inspires them?
2. To provide opportunities to share these experiences and gain inspiration from the experiences of others.
3. To extend participation and sharing of experiences across communities of the wider Frontiers of the Roman Empire World Heritage Cluster.

The examples above show that overall the project achieved its aims at the same time as delivering high quality examples of participatory art. Restrictions on funding, Covid and the tight timescale led to their being less opportunity for sharing and cross-fertilisation of experiences than hoped. Despite this, Frontier Voices has been an effective illustration of how participatory art can engage modern communities and audiences with the past and promote thought and interest. An additional benefit of the project has been the opportunities it has created for people of many different ages and backgrounds to learn new creative skills, an important and especially enjoyable part of the process.

A particular achievement of Frontier Voices has been to take a first step in grasping the opportunity that the World Heritage of the Roman Frontiers offers to engage communities across this transnational World Heritage Cluster, delivering on UNESCO's aims of promoting understanding and cooperation amongst diverse peoples and engaging local people with World Heritage.

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Hadrian's Wall

Managing 1900 years of a cultural resource for future generations

Katie Mountain and Marta Alberti

Hadrian's Wall is one of the most extensively investigated archaeological resources in Britain, if not in the world, with 130 years of continuous excavations. Inscribed in the UNESCO World Heritage Site list in 1987, it is a complex monument with many facets of interest. 1900 years after Hadrian's visit, Hadrian's Wall scholarship spans across several branches. Antiquarian works, including John Collingwood Bruce's *The Roman Wall* (1851), provide information on the state of the remains of the Roman Empire's north-western frontier before, the advent of modern archaeological excavation and surveying techniques. Early 20th-century excavation reports, including those by Haverfield and Simpson, offered insights into the work of the first professional archaeologists in Britain. Comprehensive reviews of research and archaeological thought on the Wall have been penned by Collingwood (1921), Birley (1961) and Breeze (2014). 'Grey literature' reporting from developer-funded excavations (*e.g.* Pre-Construct Archaeology 2022), has proliferated in recent decades. Studies of material culture, from pottery (*e.g.* Bidwell & Croom 2010) to small finds (*e.g.*, Collins & McIntosh 2014) have examined amongst other subjects the *chaine operatoire* of artefact production, the objects' journeys to Hadrian's Wall, their spatial distribution and significance on the frontier. Guidebooks, such as Hodgson (2015) and Richards (2021) have been written for the benefit of the learned traveller and outdoor enthusiast. The work of Symonds and Mason (2009) has contextualised the research agenda of Hadrian's Wall within the framework of the Frontiers of the Roman Empire World Heritage property. Unsurprisingly, all this knowledge and the tangible remains from which it stems need to be carefully managed: works such as Stone and Brough (2014) and Mills (2013; 2021) address Hadrian's Wall as a cultural resource, and offer guidance on its management, interpretation, and protection for future generations.

Within such a vast scholarship, it might seem that the Wall today is well understood, well managed and well protected for the future. However, new challenges are constantly emerging and it is not always clear who will take responsibility for the monument's future, and who will be most affected by new developments. The aim of this paper is to share some learning points on the challenges the Wall faces today and in its immediate future. These concerns, although not completely new or unexpected, have come to light through the process of editing a volume on the Cultural Resource Management (CRM) of the Wall in its 1900th year (Alberti & Mountain 2022). This paper briefly explores the interlinking challenges of managing Hadrian's Wall which emerged from this volume and identifies the key stakeholders, including voices that have been previously under-represented, or missed altogether. This paper, just like the volume from which it originates, does not aim

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to comprehensively address and resolve all the challenges encountered by the monument in the 21st century. Rather it aims to spark meaningful conversations in the academic discourse that will result in a more realistic assessment of such challenges, and in collaborative solutions offered in consultation with the many stakeholders who work and live along the Wall.

Recognising the challenges of the Wall today

Previous approaches to Hadrian's Wall Cultural Resource Management (CRM) can be broadly grouped under two categories:

1. Responsive action: reacting to an immediate threat or weakness by profiling it and seeking funding to address the problem.
2. Retrospective analysis: charting the course for the future on the basis of past successes and failures.

Despite much being learned by a retrospective 'post-mortem' analysis of past initiatives, this approach is surprisingly rarely taken by those in managing positions on the Wall. The approaches to its management also still seem to lack a culture of prevention and future-oriented impactful action. What's more, 1900 years after its construction, some unresolved questions remain regarding who is allowed to take action to protect, research, promote, and interpret the Wall, and how can such 'authorised' stakeholders recognise the problems that may lie ahead, and put systems in place to address them.

From the start of the editorial project, we knew we wanted to create a space in Hadrian's Wall publications that would widen access to Wall knowledge beyond the academic and heritage management fora and involve a more diverse range of stakeholders than ever before in looking at the monument's future. Our aims were to not shy away from past failures, and to look at the ways the Wall's living and evolving landscapes interact with theoretical frameworks, rather than trying to impose those frameworks onto the landscape.

We approached a range of authors, from established frontier scholars and excavators to walkers and local business owners, with both personal and professional connections to the Wall and its surrounding frontier zone. We asked them to discuss the issues they predicted would affect the Wall in the future and asked them for their views on how to manage it and protect it for future generations. For some stakeholders, such as re-enactors and living-history business owners, this volume was perceived as the first time a 'seat at the table' had been made available for them in the management agendas of the Wall. For the large institutions, such as Historic England and the National Trust, this volume represented a chance to showcase their future-oriented initiatives, and to show their willingness to welcome new perspectives. Through the conversations that led to the volume being published, we realised the importance of connecting global issues and local concerns, and of building bridges between local stakeholders and bigger institutions.

Global issues. From the world to the Wall: climate change, evolving technologies and new audiences

The current and future impact of climate change on archaeology is a concerning challenge, both on a global scale and for Hadrian's Wall. The responsibility – both to initiate steps to prevent further climatic damage to the sensitive exposed archaeology and to protect subsurface remains – lies with the archaeologists and site managers, who should be working with policy makers to drive systemic change. In some cases, protecting buried remains can be done by leaving them underground. However, increasing sudden shifts in ground-water levels as well as riverine and coastal erosion are creating new threats and challenges to some areas of Hadrian's Wall archaeology.

New non-destructive geoarchaeological monitoring equipment can help to assess these environmental changes and plan for the future. At the Roman fort of *Magna* (Carvoran), data from the monitoring systems has shown that sudden fluctuations in the water-table levels and prolonged periods of drought are affecting the layers of peat which have been long preserving the archaeology of the site (Birley & O'Meara 2022). Thanks in part to the invaluable information that geoarchaeology has provided, the Vindolanda Charitable Trust obtained National Lottery Heritage Funding for a five-year programme of excavation and research of the threatened remains. Nonetheless, much remains to be done to understand and combat the effects of climate change on the buried archaeology of Hadrian's Wall. The network of sensors pioneered at Magna has already been expanded to Roman *Vindolanda*, and partners on the Wall are increasingly seeking to gather information on the ways in which climate change is putting our heritage at risk.

Non-invasive, low-carbon output exploration and data-presentation methods, such as remote sensing, aerial photography and LiDAR are constantly being improved, both from a technical and theoretical standpoint. The effective practice of confirming survey results with targeted excavations has become commonplace in investigations at sites along the Wall (Wilmott 2022). New and innovative ways of presenting archaeological sites can also be categorised under the umbrella of non-invasive, targeted archaeology. A great example is offered by the environmentally conscious display of the limes fort and site of Ruffenhofen, Bavaria: here landscape management is used as an alternative way of interpreting and presenting a World Heritage Site as a successful visitor attraction, whilst avoiding a costly excavation (Pausch 2022).

New technologies can be applied not only to excavation and survey of standing remains, but also to collections and their interpretations. Advances in digital imaging technology and ease of access to information are opening Hadrian's Wall on a global scale. Online gaming and educational courses give people around the world the opportunity to learn about and interact with the archaeology of the Wall, introducing the Roman Britain Northern Frontier to wider audiences than ever before, including younger people and non-academic enthusiasts. 3D-scanning of objects and digital access to collections allow remote academic research, but also raise ethical concerns over the ownership of digital information and how to protect it from misuse or misinterpretation (Hackenbroich & Williams 2022). As Hadrian's Wall collections are not protected by the World Heritage status, responsibility for their physical and virtual care, as well as interpretation and misinterpretation, rests on the shoulders of already overstretched curators. In this case, the advent of new technology has created a clash in curators' priorities: they are tasked both with protecting, preserving, and interpreting the Wall's collections, and at the same time with utilising technological advances to make them accessible and understandable worldwide (McIntosh & Price 2022).

Finally, current affairs have entered the world of archaeology through interpretation, as our relationship with the past is increasingly understood as a dialogue with the evidence, rather than one-way statements stemming from it. The museums and sites along the Wall are updating their collection policies and displays to better reflect new and enhanced views and technologies. Institutions are looking at ways of promoting the rich and diverse histories of the Wall and its populations, to both existing and new audiences on local as well as national and international levels (Woodward *et al.* 2022). For example, The National Trust has implemented a programme of art projects working with local artists, refugee and migrant communities concentrating on global issues of migration and colonialism. Local communities are also central in the interpretation strategies of sites such as the Senhouse Museum at Maryport. Here the curatorial team encourages and maintains a 'local pride' in their part of the frontier mainly through an active volunteering programme.

Local' challenges. From the Wall to the world: sustainability, accessibility and recognition of knowledge

Not all challenges that Hadrian's Wall faces stem from global phenomena: some equally complex concerns stem from the monument's local context. Key examples are the issue of sustainable management for the Hadrian's Wall Path National Trail, and that of interoperability between small local businesses and mass-tourism, between environmental consciousness and economic development, and between academic rigour and engagement with non-academic local communities.

The Hadrian's Wall Path, created in 2003 and running along the length of the Wall, is characterised by a myriad of different ecosystems. A balanced and considered approach to archaeological and landscape management, both urban, coastal and countryside, must be struck when maintaining the Path. Yet gradual loss of essential funding, which began unfortunately right from the Trail's creation, has meant that the expertise required has been diluted (McGlade *et al.* 2022), with only one ranger currently operating over the 73 miles and countless environs of the Wall. At the time it was opened, the Trail set new standards in heritage access management, playing a part in enfranchising the visitors in the maintenance and care of the World Heritage Site. As it enters its second decade, it faces the challenge not only of sustainability, but of accessibility and inclusivity. How can the Path become more accessible, not only as a walking challenge but as a thread between places? How can the need to create a space that is truly 'for all' be reconciled with the issue of preserving archaeology and protecting the natural environment?

The future of the National Trail, however, does not solely depend on rangers and policy makers. Walkers and tourists have an important role to play. It is the responsibility of the Trail managers to ensure that the message of shared civic responsibility is passed on and understood, and individuals should willingly follow the Countryside Code (fig. 1). For walkers, runners and tourists to play an active part in the protection of the Wall, they need to know that they hold a stake, and that they are authorised to engage with the issues concerning it. Only when the walkers, runners and tourists understand their own key role in landscape preservation, the Trail and its archaeological landscape can be enjoyed, both mentally and physically. A more conscious and green approach to tourism is already under way: walkers along the Wall overall show care about the environment, and often share their favourite walking spots, encourage others to visit the sites and, when locally based, even volunteer to monitor the conditions of the monument. There is also an increased public movement towards more environmentally conscious transport links along the Wall, with more accessible sites and connections to nearby and often overlooked areas. This is both in the interest of allowing more people to experience the Wall fully and safely, and to economically sustain less visited sites (McGlade *et al.* 2022).

Increased visitors' numbers are saluted as a lifeline by the people who live and work along the Wall. Among those who dedicate their lives and businesses to promoting the Wall, and yet often go unheard, are living history practitioners. Commonly known as re-enactors, they often put a vast amount of research into their work to provide tourists with a meaningful experience

Figure 1. Walkers on the Hadrian's Wall National Trail with sufficient width to walk side-by-side (© Northumberland National Park).

and deep understanding of life on the Wall (fig. 2). Their productions attract visitors to the region for big budget events, such as Hadrian's Wall Cavalry Turma (Griffiths 2021). Re-enactment events are a popular way to generate revenue which might go back into maintaining the archaeology and sites, research and development, and other events and exhibitions. Unfortunately, despite the popularity of their productions, re-enactors are often viewed by heritage professionals as volunteer entertainers with no academic interest, who can be 'wheeled out' without communication, relationship building or a management strategy. However, when consulted directly on the subject, re-enactors express themselves clearly: their relationship with heritage institutions could be greatly improved if standards of accuracy and service were recognised and upheld by site managers (Brown & Robson 2022). Re-enacting can be an extremely worthwhile opportunity to accurately portray the historic diversity on the frontier, and responsible practitioners are aware of the challenge and are eager to face it.

Overall, local concerns have been woven into wider efforts to 'unify' the Wall, such as Hadrian's Wall Management Plans and Hadrian's Wall Partnership Board (Henderson 2022). However, it is important that 'smaller' stakeholders such as walkers, guides and local businesses continue to be encouraged, supported, and integrated with the current and future management plans and research agendas. They are not simply a local reality but play an integral role in protecting and promoting the human history and natural landscapes of the Wall, often to new audiences outside the usual scope of academic archaeological scholarship.

Who is responsible for what on the Wall?

During the editing process of 'Hadrian's Wall. Exploring its past to protect its future' (Alberti & Mountain 2022), we have come to recognise that the stakeholders in the protection, management and interpretation of the Wall go beyond those identified by authorised heritage discourse. The latter was theorised by Smith (2006) as multi-faceted modality of interaction between humans and heritage, which sets clear limits regarding what heritage is, the ways it should be interacted with and who should be entrusted with the task of its safeguarding for future generations. On the contrary, when Hadrian's Wall is concerned, several stakeholders share a responsibility to interact with it, interpret it and protect it. Such stakeholders range from the traditionally accepted heritage professional to the often under- or mis-represented volunteers, public(s), and tourists.

For example, museum curators and site investigators are responsible for the theoretically informed use of digital technologies to assess and research archaeological remains. They are also responsible for timely dissemination of their work to wider audiences. However, where does curators' responsibility end? Are curators responsible for digital interpretations and reworkings of artefacts in their care? One of the steps suggested to assist in protecting Hadrian's Wall material culture is its formal recognition as an integral part of the World Heritage property, with this important initiative also being discussed in the wider limes on how to raise awareness of the essential role museums play in the protecting and promoting the cultural landscapes (De Bruin *et al.* 2018).

Policy makers and funders are responsible for recognising that interpretations of the Wall are changing:

Figure 2. Kevin Robson, living history practitioner and business owner of 'Ancient Britain', in Romano-British dress.

the monument's future features increased emphasis on accessibility, attention to ethics and the 'wiggle room' needed to absorb new approaches. Site managers are responsible for ensuring that the many different museums and archaeological remains on display offer a range of environments and learning points which complement rather than combat each other, working together to give visitors a full and impactful experience. With the number of institutions and stakeholders we have outlined in this paper, cooperation is easier said than done, and must be fostered by all parties involved in equal measure. In the field of interpretation, the public(s) also have a role to play, holding institutions accountable to embrace the key global issues of today, to be welcoming to previously neglected audiences and to sustain interest for the future.

Finally, the voices of the people who live and work along the Wall, experiencing its impact in their daily lives, are as important as those in academic and heritage institutions. Heritage site owners and managers, and archaeologists may well possess the toolkit necessary to effectively oversee an expansive World Heritage Site using established frameworks and agendas, often restricted by higher funding or governance. Nonetheless, recognition of, and mutual support from the wider community is needed to keep Hadrian's Wall archaeological and cultural resources relevant, inclusive, and sustainable. In other words, it is the responsibility of all heritage professionals to ensure that voices on-the-ground such as those of living history practitioners, volunteers, business owners and walkers, should be heard, be engaged with, and be recognised as stakeholders in their own local World Heritage Site, one connected to the wider Frontiers of the Roman Empire World Heritage Property.

Conclusion. What does the future hold for the Wall?

Hadrian's Wall is a complex cultural resource which still holds many unanswered questions (Breeze 2022). In this paper, we have attempted to summarise the different challenges that Hadrian's Wall faces in its immediate future, as well as all the many stakeholders that may be affected by such issues. It would, unfortunately, be impossible to resolve all issues, but there are steps that can be taken today to reflect the complexities and diversities of the Wall's past, present and future and to make it more inclusive, accessible, and sustainable both locally and worldwide.

Challenges are constantly evolving and often interconnected: for continuing and future successes of the Wall, the 'big' global issues must be seen in conjunction with local concerns. Management frameworks and guidelines are useful but are often implemented with a 'top-down' approach. There needs to be a 'ground-up' approach to managing Hadrian's Wall's cultural resources. Although this type of approach and its methods, may be more time-consuming in the long-run, one of the first steps is to help people feel included in the world of Hadrian's Wall, and entitled to form an opinion on the way it is cared for, interpreted, displayed and experienced. With the volume of papers, published as part of the commemorations of the 1900th anniversary of Hadrian's visit to the Wall, we intended to provide a place for those often forgotten in management discourse, and this paper aims to further share the results and stimulate wider conversations for steps forward in the protection and management of Hadrian's Wall World Heritage Site for its next 1900 years.

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Community involvement in the World Heritage Sites of Pécs (*Sopianae*)

Dániel Poulet

The Romans conquered the territories of Transdanubia in the first half of the 1st century AD, and it subsequently became the frontier province of the Roman Empire, as *Pannonia*. *Sopianae*, identified as Pécs, was one of the most significant Roman settlements in *Pannonia*. The Itinerarium Antonini, a late 3rd-century map, demonstrates the economic and strategic importance of the town, which was located at the intersection of the Roman Empire's main roads. *Sopianae* thrived during the 4th century AD. The change was brought about by the fact that, as a result of the reforms by Diocletian, *Sopianae* became the centre of the civil administration of the province of *Valeria*. Due to this significant promotion, the city had its golden ages in the 4th century. The earlier urban settlement became a real city, an administrative, religious, economic and cultural centre. Starting from the late Roman period, three different cemeteries are known to have lain around the city. The most extensive early Christian cemetery complex of Hungary is located in Pécs. The more than a thousand known graves, several burial chambers, the variety of other cemetery buildings and the mausoleum, all indicate the presence of a flourishing Christian community. The early Christian sepulchres of Pécs are regarded as the largest single Christian cemetery complex outside Italy.

Part of the late Roman, early Christian northern cemetery of *Sopianae* was inscribed on the UNESCO World Heritage List in 2000. The heritage site earned the title of cultural-historical treasure by that it is extremely versatile and complexly illustrated in the architecture and murals of the excavated group of finds, the early Christian funerary architecture and art of the northern and western provinces of the Roman Empire. Pécs northern cemetery complex 240 years ago – the so-called Peter and Paul burial chamber since its discovery in 1782 (fig. 1) – known by the resarchers and for science. Following the award of the World Heritage title, during years of archaeological research, the already known tombs were also excavated, and many unknown burial chambers came to light. Some of the sepulchral buildings have painted walls decorated with biblical scenes and symbols (Poulet 2022, 139). The murals are early Christian art works, modelled on Italian and Balkan patterns. The monogram of Christ, the most widely used symbol of early Christians, was a favourite element of decoration. The murals illustrate biblical scenes. A rich variety of plant and animal ornaments, doves, peacocks, a wine pitcher and glass, as well as geometrical patterns symbolising the Garden of Paradise are also frequently used motifs.

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Figure 1. Painted walls of burial edifice No. I (Peter-Paul burial chamber) (© Zsolnay Heritage Management Non-profit Ltd).

Figure 2. The 'Improvokál' youth theater group on the day of the live historical adventure game, in the interior of *cella septichora* (© Zsolnay Heritage Management Non-profit Ltd).

Since the year 2007, a significant portion of the excavated findings have been concentrated within a single complex at the Cella Septichora Visitor Centre. The Early Christian Mausoleum and the monuments of Apáca Street can be seen separately as small islands at several points of the World Heritage Site (Tóth & Poulet 2022, 16).

A noteworthy example of an experience-oriented and at the same time entertaining presentation of World Heritage Sites is living history or live interpretation, which can be considered a popular and successful method these days. In the 'Our heritage in the past adventure game' Project, the values of our heritage were presented by a company from Pécs, using the improvisational theater genre. The live-action scenes dealing with the themes of architecture and wall painting, also included an interactive presentation of religion, Roman gastronomy and clothing, as well as late Roman burial forms. Great emphasis was placed on the active involvement of visitors and the experience of joint creation, so that the audience can experience the ancient history of the city of Pécs by taking part of the roles that shape the story and the action. The participants were welcomed by a scientist, who happened to be an expert on time travel and explained the situation: four Roman artefacts were missing from the exhibition. The mission

Figure 3. Presentation of ancient ghost stories, Diogenes and Antisthenes at the gate of the underworld (© Zsolnay Heritage Management Non-profit Ltd).

was to travel back to Roman time, find the artefacts and bring them back to the present time. Everyone got dressed in Roman clothes and walked through the time gate. During their mission, they met Roman characters (performed by a theatrical company) such as an architect who explained the unique architectural details of the *cella septichora*, the workers who were actually constructing this early Christian building, the wealthy nobleman from Rome and his wife from *Sopianae* who ordered to erect the cemetery building, the domestic workers and servants of the noble family, a soldier and a wall painter from Italy who guided the participants through the *necropolis* presenting the murals, the Christian symbols and the biblical scenes on the walls of the burial chambers. The participants were asked to create their own murals. The main goal of the live historical performance planned for the Cella Septichora Visitor Center is the creation of a sustainable, art-based program, as well as the rediscovery and promotion of the UNESCO World Heritage Site in Pécs with the inclusion of contemporary art. We first tested the program on the European Cultural Heritage Days with interested people from the local community. Since it was very popular and the announced dates were full, we announced more events, which also ended as a 'sold out' event. In the spring of 2022, we repeated the program during an exchange program of an international project (TRAME), this time in English. The participants were students (between the age of 14-19), teachers, heritage experts and heritage managers from five countries.

The World Heritage Sites in Pécs are part of the late Roman early Christian Necropolis of *Sopianae*. Cemeteries are a reflections of the society of the archaeological eras, so they prove to be an excellent location for the presentation and interpretation of everyday life. The question of death and the cult of the dead always comes up as an interesting topic during the organization of various programs that take place on site. One such event related to the cult of the dead was the ancient *Lemuralia*. *Lemuralia* was the most typical festival of the pagan Romans in May, which meant the days of atonement for the spirits of the dead. Later, this tradition continued in the period of early Christianity. We collected ghost stories from Antiquity and planned to present them to the audience in an interactive way. With the collected stories, we contacted an excellent director and dramaturg, and together we went through the underground Cella Septichora Visitor Center, which covers an area of about 2000 m^2. I told her the history of the Roman city and the cemetery buildings, where she gathered a lot of inspiration. Finally, the exciting stories prepared by the dramaturg were presented by actors from Pécs among the burial chambers of the World Heritage Site, accompanied by shadow play, light and sound effects (fig. 3). The audience was able to participate in the public rehearsal held three times this spring, and at the presentation of the theater performance in the end of May (which, by the way, was the period of the Lemural Festival in Antiquity). The special feature of the evening performance was that it did not take place on one stage, but took place at ten different points of the underground cemetery buildings, where the audience accompanied the actors from scene to scene in the underground labyrinth, illuminated by shadow play (fig. 3). Another aim of the project was to create a production that can be organized continuously in the following years as a program linked to special events.

The heritage pedagogical workshops of the World Heritage Sites are irregular not only because of the real historical places, but also because we evoke the given historical age both in terms of clothing and activities, and with this 'time travel' we make history lessons truly experiential. One of the great advantages of heritage education over school education lies in the historical space itself, in the possibility of creating a more relaxed atmosphere. The various heritage pedagogical methods offer a variety of ways and means to create activity and experiential knowledge transfer. We also use a mix of traditional and innovative techniques and methods when designing sessions. The traditional methods include, for example, guided tours with worksheets and drama based pedagogical methods, in which we process the memories of an exhibition and the history of the venues in role play. In the 21st century, mobile communication tools and multimedia applications cannot be left out of the toolbox of heritage cultural transmission (Hermann 2022, 52). A board game can be a good way to present and learn about heritage. As a development of the innovative method, our local history board game, 'Every Age of Pécs', was completed. The game is designed for World Heritage Sites, where students can relive the different historical periods of Pécs by playing during the game (Poulet 2022, 142-143). Basically it is a historical activity game. The students, working in small teams, have to pick cards with contents connected to the history of *Sopianae* and Pécs and present them to each other by drawing, imitating or periphrasis. One player draw one card from the deck and has to present the term written on the card. The form of presenting is drawn by a dice. On the board three historical periods are represented with the 3D recontructions made of different buildings representing each period. The cards are also seprated by the three different periods. Before printing out the final board game we were playing this game using paper, pen and a clipboard. After a site visit or a Roman city historical walk, we asked every student to write two or three words on the papers that come to their mind related to the history of the City and the World Heritage Sites. We collected these words from different schools and students from all over the country and also from foreign schools. The target group of the students were between the age of 14 and 19. Today, the territory of the Late Roman, Early Christian cemetery from Antiquity is already part of the UNESCO World Heritage list. The contemporary city walls, the Episcopal Palace with the Cathedral, and the first University of Hungary represent monuments of the Middle Ages. In the Middle Ages, the Bishopric of Pécs was established above the Late Roman Cemetery of Sopianae and they later used some of the cemetery buildings as chapels and churches. The following period was the Turkish Age, succeeded by the Ottoman occupation, which, as well as destruction, brought the erection of many magnificent buildings, including numerous mosques and baths that further diversified the cityscape. Through the architecture, history and cultural layers of Pécs we can interpret multiculturalism in the past and the present as well. The game shows and summarizes the history of Pécs.

With a group of heritage experts we took part in an international project in a cooperation with five partner countries (Italy, Hungary, Poland, Serbia and Turkey). The main aim of the project was to show what cultural heritage sites can add to education. It also encouraged educators to develop collaborations with heritage experts, enabling secondary school students to discover and understand the value of cultural diversity through Roman heritage. The main theme of the programme was for the secondary school students to learn about the phenomenon of migration and multiculturalism through the heritage of the Roman era. The TRAcce di MEmoria – TRAME in Italian means Traces of Memory. TRAME was a two-year project, co-funded by the Erasmus + Programme of the European Union (Hermann 2022, 7). The curricula and the topics studied by the students in schools were, on the contrary, taken into account while developing the TRAME national piloting activities. We created a project 'task force' composed of school teachers and heritage managers from partner organisations, who are involved in the piloting phase and cooperate on the development of the intellectual output of the students. It was necessary to set up common bases for the implementation of the piloting phase. National piloting activities were used to test and validate the educational methodology created by the partner organisations in Italy, Hungary, Serbia and Turkey. The activities and the learning experience at local level were later transposed to the European dimension with the TRAME transnational training activities organised in Serbia (Viminacium), Hungary (Pécs), and Italy (Rome): through this enriching experience students were able to compare elements collected in the different archaeological sites and seek common elements to connect them, following the thread of migratory flows (Hermann 2022, 9-10). After the pilot project students decided to make a new board game during the exchange programs. They started to develop the game in *Viminacium* (Serbia) and finished the game in Pécs (Hungary). The students were divided into small groups. The divisions were done by the teachers according to the students' skills, strengths, talent and educational background. The pupils continued working on various components of the game such as: design of the board with the map of the Roman Empire (fields representing the main migratory roads, crossroads, mountains, rivers, volcanoes, cities); 16 Roman characters, each character has a card with an illustration of the character, a personal story on the reason why they are migrating and their abilities and skills; clay figures representing the 16 Roman characters; two types of cards; and rules of the Neverending Journey (goal of the game, characters, special cards, and fields). In general, there were two main groups. The Hungarian students were working on the texts, rules and the stories

Figure 4. The first players of the 'Neverending Journey' board game at the final event of the Hungarian exchange program in Pécs (© Zsolnay Heritage Management Non-profit Ltd).

Figure 5. The participants formed the logo of the UNESCO World Heritage Site during the light flashmob in Pécs (© Zsolnay Heritage Management Non-profit Ltd).

of characters. The Serbian students were working on the design and visual content and also on the digitalisation for the print version of the board game. Two students, one Serbian and one Hungarian were the captains of these two groups. They had meetings every day and they were supervising and coordinating the work of each group. Hungarian teachers guided the Hungarian students in text writing. Some students wrote the stories of the characters in Hungarian and took care of the translation. The texts were passed to the Serbian team who took care of the digital design of the character cards. The Serbian teachers supervised and guided the Serbian teams. The heritage experts provided relevant historical facts making sure of the authenticity and helped finding relevant Roman representations of each character in form of sculptures or painting and give support to study and interpret them.

The output of the exchange programme in Pécs was the 'Neverending Journey' board game (fig. 4). The game was inspired by the visits to the heritage sites and the knowledge the students gained in the workshops during the TRAME project. The students jointly created a board game combining different areas of the Roman Empire; the colourful Roman characters appearing in the game, the manual of the game, the graphic design and the creation

of figures were also part of their work. The game captures the knowledge they acquired about antiquity, migration and diversity, which they incorporated into the game's theme and visual world.

Each year the Cella Septichora Visitor Center is a special site of the Zsolnay Light Festival, where different light installations are presented in the interior of the *cella septichora* building. It is a different branch of heritage interpretation when an ancient cemetery building becomes part of a special light installation designed by light artists and heritage professionals. On the International Day of Light highlighted by UNESCO, we drew attention to our Roman heritage sites, their signs and symbols with light flashmobs (fig. 5). The event is also an important part of community involvement and the strengthening of local identity (Poulet 2022, 146). It was a surprising experience that, in addition to local high school students, adults, families and elder people also participated in the program, as well as foreign university students. The participants sent together the symbols of the Christogram and the UNESCO world heritage sites with the help of lighted lamps, which we recorded with the help of a drone and shared in the form of a video. It was a good experience for us and for the participants, because everyone felt that they were literally part of the heritage and the symbols of which we built together by standing together, in the form of special shapes.

World Heritage sites have significant social advantages, as they strengthen the sense of belonging and local identity of communities. Therefore their utilisation should focus on keeping the heritage alive and accessible, as a heritage can only meaningfully exist in the present, where historical value can be matched with new functions. The biggest advantage of our cultural heritage is not about what we possess, but how it helps to identify who we are.

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Limes in the forest. Threats and chances

Andreas A. Schaflitzl

When thinking about how and where cultural monuments are best preserved, forests and woodland come to mind. Compared to agrarian landscapes, monuments in woodland areas are protected from repeated ploughing, which otherwise digs deep into the soil and thus can damage structures. Frost, wind and rain cause obvious destruction in the field, but do not have the same effect in a forest. But is the romantic image true that trees grow between the ruins and protect them under a canopy of leaves so that no damage can be done to the cultural heritage? Unfortunately, there are many risks, which are increasing and are also intensified by the effects of climate change.

One such threat is posed by tree roots. Not only do they grow into the monuments and absorb minerals by dissolving the features, but they also lift the soil and destroy walls. Furthermore, when a storm brings down trees, the roots or the root plates cause large holes from which they tear out great amounts of soil. The older a tree is, the greater the damage, since older trees have a large root network and also tend to be knocked down more easily by the wind (Becker & Obmann 2013).

Another danger is human-induced logging. Falling trunks, especially old and heavy trees, can cause a lot of damage to the above-ground remains. When the trunk is pulled out, it drags across the ground and cuts deep furrows. Today, felling and pulling out trees is done with very heavy machinery whose wheels sink deep into the soft forest soil. This is exacerbated in wet and rainy weather, when the ground is slippery and the wheels of the aforementioned machinery can dig in 50 cm or more. Due to administrative change in the structure of forest districts, most of them no longer have assigned and dedicated loggers who can extract and fell timber in dry weather. Today, independent logging companies are hired and given a specified window of time to complete any work. They work according to the principle of profitability, and there is hardly any time to worry about suitable weather. These companies often also work all over Europe, so that the employees do not have sufficient knowledge of the specifics and needs of a microregion and are thus not sensitised to, for example, monuments and other remains.

The hot and very dry weather of recent years has also had an impact on the forests. The trees are more susceptible to diseases and the bark beetle infests large regions. Often extensive areas have to be cleared, leaving the soil exposed to the weather and causing erosion to set in. But large treeless areas should not only be seen as dangerous, as they can also represent an opportunity for a monument: First of all, a treeless area offers the opportunity to conduct geophysical measurements that are not feasible in a dense forest. Another opportunity is the possibility of visualising the heritage. Several different routes have been taken in the past to accomplish this.

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Figure 1.
Watchtower 9/53 at Großerlach-Grab with cleared track (A. Schaflitzl).

Figure 2.
Watchtower 9/53 at Großerlach-Grab overgrown by bushes and ferns (A. Schaflitzl).

Visualisation 1. The open space

The first and most obvious way to visualise the limes is to cut or maintain a track in the forest. On the one hand, this kind of re-creation makes it possible to experience the long linear structures as the Romans did. On the other hand, there are also disadvantages, as clearings in the forest always provide a channel for the wind to attack and knock down trees. Such open spaces also need to be regularly cut free and maintained, as the incidence of light causes scrub and brush overgrowth in a short time. Regular mulching in turn requires increased personnel and financial expenditure. To facilitate and speed up the work, large machines are used, which in turn pose a risk to the structural integrity of the monument.

A practical example from Baden-Württemberg is the well-known watchtower 9/53 near Großerlach-Grab (fig.1). Here, a 30 m wide and 500 m long aisle was created in which the watchtower and the course of the limes can be seen very well in the extension of the road. For reasons of cost, the mound is only mown and mulched every two years. In the meantime, brambles and ferns grow, sometimes as tall as a person, and block the view of the ditch system (fig. 2). The large machines cannot work in the deeper ditch, so that it is now overgrown with bushes and small trees (fig. 1).

Figure 3. The limes at Welscher Buckel with the rampart. Arrows indicate the direction for cutting and pulling trees; yellow are the skid trails parallel to the limes (© LiDAR Scan @Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart, © map @ OpenStreetMap; Compilation @ A. Schaflitzl).

To the north of Osterburken in the woods of the 'Hintere Kalbe' area, another 180 m-long cutting was made. However, since it is only about 10 m wide, the treetops form a denser canopy that shades the ground. Here, the undergrowth cannot grow as high, and blackberries are kept out by mulching twice a year. But here, too, maintaining visibility means constant maintenance. These measures interfere with the economic sector and the profitability of the forest and mean that forest owners always have to cede and clear land.

Visualisation 2. Visibility by natural shadow

In order to combine forestry use with the protection of the monument substance and a meaningful visualisation, the former head of the forestry office Martin Hochstein has developed a concept that he has been implementing since 2011 south of Osterburken on the 'Welscher Buckel' area (the following are shortened and translated quotes taken from the unpublished concept paper written by Martin Hochstein):

> *The goal is for forest management along the Limes to maintain the positive effects of the forest (protection from erosion, shading, i.e. retention of low growth and thus better visibility), but to minimise the negative ones (driving over the monument with machinery, destruction by tree throws and roots). Therefore, the continuous canopy over and shading of the Limes must be ensured, but if possible, no older trees should grow on the actual rampart.*
>
> *In addition, the forest should be treated like a permanent forest; stable-rooted shade tree species are to be preferred. However, this type of management results in a conflict of objectives with an economically optimised forestry treatment. Accordingly, the forest owner must give his consent. Therefore the area in question should be designated as small as possible in order to minimise economic disadvantages for the forest owner.*
>
> *An adapted system of skid trails as well as a corresponding cutting order exclude management damage* (fig.3). *Insofar as the skid trails do not meet the requirements, they should be completely redesigned.*

The concrete measures Martin Hochstein implemented, starting in 2011, were:

> *Adaptation of the forestry development network to the course of the Limes. No skid trails are created within the protection zone, existing skid trails are abandoned. Trees to be harvested in the protection zone will be felled away from the limes and roped to the alley outside the protection zone.*
>
> *Re-routing of hiking trails along the Limes. To protect the limes, hiking trails must not be routed along the limes crest. A distance of approx. 5 m from the base of the limes parallel to the course of the limes is optimal* [fig. 5]. *This also increases the visibility of the monument, but the greater the distance between the limes and the hiking trail, the larger the area of the forestry 'special treatment zone' – with corresponding*

Figure 4. Welscher Buckel with newly grown vegetation, about 2 years old (J. Scheuerbrandt).

management restrictions for the forest owner and, in the long term, higher maintenance and care costs. In addition, the greater the distance from the limes, the more timber harvesting activities affect the hiking trail, because all the timber between the trail and the limes has to be pulled across the trail towards the skid trails. Also, at greater distances from the footpath, the view of the limes cannot be ensured with acceptable effort.

Removal of the trees standing on the limes rampart. The trees standing on the rampart are gradually pulled out. The following applies: thick trees before thin trees, less stable rooted tree species before stable rooted tree species, trees on the crest of the rampart before trees on the flank. Removal must be gradual in order not to reduce the shading of the limes too much and thus prevent extensive overgrowth. These measures require 20 to 30 years.

Establishment of shady tree vegetation on both sides of the limes wall. The protective and shading function of the limes is taken over by trees outside the rampart area. For this purpose, it should be possible for trees to grow in a strip of approx. 5 m width from the base of the limes. If there are already trees here, they will be kept in place, otherwise a new suitable stock must be established. Stability and well-developed crowns (shading) are the most important goals here. This is best achieved by raising the tree individuals in a solitary manner. The natural branching process that results can be supported by pruning measures. Shade and semi-shade tree species are to be preferred. These measures require 20 to 30 years.

When applying this method, parts of the ramparts will remain invisible or overgrown for a certain period of time (fig. 4, fig 5A). However, after only about 5 years, the contours of the monument become visible again through targeted stubbing (fig. 5B). It is important that the young trees are not damaged at the top, branches and shoots in the lower regions of the tree however must be removed so that the tree can grow taller quickly and form a broad crown. As these measures are designed to be sustainable in the long term, there is always some loss of visibility in the short term. In order not to let the entire monument 'disappear' over the years, it is advisable to carry out these measures in sections, step by step (fig 5A). In order to accelerate the regrowth of shady trees after the felling of a large old tree, young shoots can be grown in the years before the felling. Deciduous tree species that can grow in the shade are best suited for this, in the case of the ORL (Obergermanisch-Raetischen Limes) beech trees. This tree species is particularly suitable because it forms large shade-providing crowns, is stable and can withstand dry periods well. Beech also grows faster than other eligible species like oak. When choosing a tree species however, native or autochthonous species should be selected over foreign ones, as these are best able to cope with the local soil and climate conditions. The factor of climate change with its extremely dry summers, which in the last three years have caused problems even for

Figure 5. 180°-panoramas at Welscher Buckel. A. Left is the dense new growth and in the centre rejuvenated older vegetation. B. The limes is shaded by 5-8 year old vegetation and already clearly visible (A. Schaflitzl).

supposedly well-adapted tree species, should also be taken into account. Every felling measure necessitated by dead or diseased trees poses a risk to the monument.

Visualisation 3. Several different tree species to illustrate the monument

Another method of ensuring the visibility of the limes is the targeted planting of different tree species on or around the limes. In the Bendorfer Wald (Rhineland-Palatinate), a large area had to be cleared due to beetle infestation and diseased trees. The limes runs through this clear-cut area. Here, the opportunity arose to implement a concept for reforestation that on the one hand cuts through the limes and on the other hand visually highlights it. In the so-called Bürgerwald, it was decided to plant the limes with sweet chestnut, a tree species that the Romans brought to the region, and with yew, to aid with visualisation. Although not all laypeople can immediately recognise the difference in mature trees, these other tree species then allow for a clear distinction from the air due to their appearance in the crown. Also a different behaviour in autumn, whether it is different coloured foliage, higher growth, *etc.* can often be clearly seen from a distance. Furthermore, on satellite images, which can be explored via relevant platforms online, the line can be seen clearly.

During meetings of the AG-Wald (*Arbeitsgruppe i.e.* working group) by the Limes coordinators for the ORL, other possibilities were also discussed. For example, the yew tree lends itself to visualisation in an already existing forest. This tree species thrives very well in the shade and can also be planted subsequently. Because these trees can be kept down as a bush and also grow into a tree, they can be used while only slightly or not at all disturbing the forest. It was considered whether the yew could then be used to visualise the palisade, which is no longer visible today. As the AG met for the first time in September 2021 there are no further concepts and field reports yet.

Visualisation 4. Colouring the logs

Another way of visualisation in the already existing stock forest is to paint tree trunks that are standing on the limes. These are marked up to a height that corresponds to the original height of the limes or palisade, by using a special paint for trees that has no negative impact on the trees themselves and the environment. To ensure the durability of the paint, the surface is first prepared by brushing it off. Depending on the weather, the paint will last an average of 3-5 years. This type of visualisation is particularly suitable for closely spaced tree cultures and in areas where nothing is visible above ground. This colouring is not only applicable in the forest, but is also used for trees standing in field margins on the limes. Consistent implementation thus reinforces the visual impression and the recognition effect for visitors.

Conclusion

In summary, all the aforementioned visualisation methods have their merits in different fields. Methods 1 and 4 yield results quickly but, depending on the maintenance, the results only last for a short time or require constant maintenance. Method 1 often requires additional areas to be bought up and taken out of use. Methods 2 and 3 are visualisations that have to be developed in close consultation with the owners and the responsible foresters. They require a balancing act between visualisation and economic use in order to protect the monument. This necessitates the will and willingness to compromise on the part of all those involved, but it helps to protect and preserve the monument in the long term. The results are usually not immediately visible, but the method is designed for sustainability. Close consultation with the foresters during planning is also essential, as they know the soil and climatic conditions best. In the course of climate change, autochthonous tree species are to be preferred, as they are usually best adapted. After an initial period of intensive care, the amount of care required then decreases steadily.

Depending on how information about the monument is conveyed to the public and the will and desire of the participants, it can also make sense to combine the different visualisation methods. The goal is always the sustainable protection of the monument and the best possible communication of information to the visitors and the population. It is the visibility and recognition of the monument which results in its acceptance and understanding, which then ultimately leads to its protection.

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Citizen science on Hadrian's Wall

A case study of the WallCAP Project

Kerry Shaw

Commanding a corridor across the north of England, Hadrian's Wall, part of the transnational Frontiers of the Roman Empire World Heritage Site (WHS), was inscribed for its monumental scale as a military frontier of the Roman Empire in the 2nd century. Regardless of its military and engineering fame, the Wall is more than simply a stone-built feature for the present day communities who live and work along its length. Described as a complex heritage ecosystem (Stone & Brough 2014), its character and relevance is constantly evolving, providing contemporary resonance and benefit to the local host population.

Community archaeology and engagement in heritage has consistently grown over the past 20 years in the UK, but Hadrian's Wall has historically always benefited from a broader public interest and engagement, both with local and long-distance audiences (Collins & Shaw 2021, 82). If a factor of successful heritage management lies in consultation and participation (Norman 2007), then Hadrian's Wall has seen significant growth in this area in recent decades, with a greater diversity and more transparent practices of management, interpretation, and presentation. This has run concurrent with the increasingly participatory role of its communities and reflected in the way in which they value the Wall, which has evolved over the past two decades. For this reason, Hingley (2011; 2012) effectively describes the Wall as having a 'composite character' encapsulated of its archaeology, its landscape, and its socio-cultural value.

In the Hadrian's Wall WHS, expanded and enhanced public engagement has been progressively supported and encouraged. This is also in parallel to shifts in heritage management objectives toward being more inclusive, alongside structural changes to the funding and staffing of heritage management organisations of the WHS. Wall-wide volunteering initiatives, over the last decade have been an excellent vehicle for facilitating this active participation.

Citizen science is the co-production of scientific knowledge through public participation for the purpose of mass data collection and social benefit. This is done through adhering to a number of key principles; anyone can participate, everyone utilises the same methodology to produce high quality data, such data can then be combined to offer meaningful conclusions to real life issues whilst being robust enough to be shared across broad audiences and disciplines.

With citizen science becoming increasingly popular as a methodology in archaeology, here we will appraise how a participative, collaborative and co-curated research approach

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Figure 1. Volunteer excavating at Cambeck river crossing, Cumbria.

has blended the needs of the local host populations, heritage managers and the archaeology through the Hadrian's Wall Community Archaeology Project (WallCAP), funded by the National Lottery Heritage Fund and hosted by Newcastle University between 2018-2022.

A nine-month Development Phase across 2017/2018 allowed WallCAP to consult with local communities, professional and governmental bodies and researchers to identify overlapping priorities and concerns of these different constituencies. Motivated individuals and community groups desired opportunities to make a meaningful contribution to the WHS whilst heritage managers were concerned about deterioration and threats to the monument that were not adequately understood. The results of the nine-month Development Phase resulted in a 45-month Delivery Phase.

WallCAP case study

WallCAP aimed at engaging local communities in the vital task of preserving the heritage of the Hadrian's Wall WHS for future generations. The project was structured on the premise of community archaeology (citizen science) to address a series of heritage management concerns and research questions (Collins 2022). It would be achieved through scientific enquiry, archaeological research and meaningful participation by the local communities of the Wall.

Following consultation in the Development Phase, the project identified three key audiences for consideration during the delivery of the project:

1. Heritage management audiences, concerned with both the degrading physical condition of the upstanding masonry at certain locations along the Wall (Symonds & Mason 2009) and the need for understanding the current and potential threats to the monument.
2. Academic and research audiences, wanting to better understand the setting and features of the Wall and its environs.
3. Local communities and volunteers, keen to take a more active participatory role in the understanding and management of the Wall (Norman & May 2014).

Two distinct yet complimentary strands of work were explored through WallCAP:

1. Addressing the threats facing the Wall and key **Heritage at Risk** (HAR) sites such as damage caused by severe weather, invasive plant species and grazing animals, and wear and tear from tourism.
2. Identifying Wall stone origins and re-use along its length, **Stone Sourcing and Dispersal** (SSD).

Heritage at Risk (HAR)

Research-led interventions at Wall sites on Historic England's Heritage at Risk (HAR) register saw volunteers excavating, surveying, mapping and monitoring the condition of the monument at key locations. To do this, volunteers were involved in onsite recording, analysing and interpreting archaeological remains, finds washing and processing (fig. 1). Volunteer were trained on site and in some cases, prior to fieldwork (online), in a variety of subjects including; how to undertake archival research, visual identification of archaeological features in the landscape, survey techniques, (including traditional and digital methods for topography, ground-penetrating radar, and geophysical survey) and archaeological excavation and recording. This work resulted in greater understanding of the Wall at discrete sites, and also to a deeper understanding of the threats to these sites. At some locations, conservation work saw repairs to the monument.

Stone Sourcing and Dispersal (SSD)

The other key strand of activity in WallCAP was Stone Sourcing and Dispersal (SSD), which sought to understand the long-term life-cycle of the Wall, by focusing on the stone that was used to build it. This meant that volunteers were guided in learning the basics of geology, including rock identification and environmental geology to understand how the landscape was formed over millions of years, influencing the stones available for

Figure 2. WallCAP Volunteers measuring Wall stone at Wallsend.

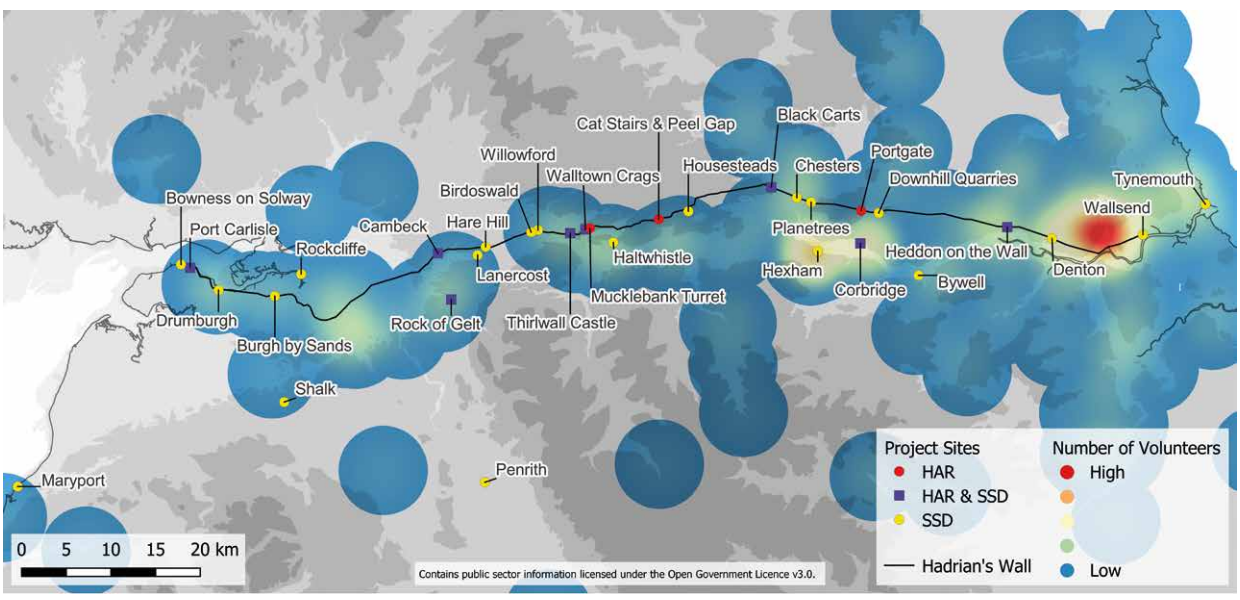

Figure 3. Distribution of intervention sites (HAR and SSD) and location of project volunteers (map has been made by Kathryn Murphy, containing public sector information licensed under the Open Government Licence v3.0, available at https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/).

building. This geological knowledge was then connected to detailed examination of the Wall at specific sites (fig. 2), and further survey and examination of post-Roman sites with suspected or confirmed reuse of Wall-stone. Events and training were organised under the following four topics: Understanding the Geology, Inspecting the Wall, Unearthing the Wall's Rock, and Investigating Re-purposed Wall Stone. The work resulted in detailed data pertaining to local geology along the length of the Wall, investigation of quarry sites for the Wall, and identifying links and sources of stone for the Wall, and buildings that made use of the Wall in the centuries following the end of Roman Britain.

In pursuing these two strands (HAR and SSD), volunteers and local communities shared and learned new

skills through various fieldwork and research activities, as well as exercising their role as active stakeholders in the Wall's management.

Participation

Volunteers drew from a truly global audience (particularly for the digital elements of the project), but 98 % of the 407 registered volunteers were resident in the UK (Collins *et al.* 2023). The remaining 2 % of international volunteers represented eight individuals, who were resident in (USA, France, Germany). Figure 3 below shows the distribution of the project volunteers relative to the intervention sites.

Geographical Information System (GIS) Research Project

A key aim and output of WallCAP was the construction of a bespoke GIS for Hadrian's Wall, that captured the myriad of archaeological detail of the monument to support management and research. The WallGIS also provided opportunities for volunteers, particularly during the Covid-19 pandemic. Volunteers were invited to digitally research sites along the Wall (the curtain and vallum, milecastles and turrets) using a methodology designed initially by the project's academic staff, but ultimately, co-curated by the volunteer team. All data was then moderated and validated before being uploaded onto the central database underlying the GIS. With over 150 features requiring research, over 50 volunteers enthusiastically hunted through archives, excavation reports, Historic England records, published research and book chapters, to fuel their interest and contribute to the new online resource. Each individual structure and linear mile of Wall feature was to become a separate record in the database, therefore the data was collected using identical methodologies. There were two phases to the volunteer data collection, Phase 1 focused on turrets and milecastles and Phase 2 focused on the Wall curtain, ditch and vallum. Phase 1 took place during the first Covid lockdown in Spring 2020 and Phase 2 took place during the third lockdown in December 2020 – January 2021. Based on the results of the first phase of volunteer research and in collaboration with the volunteers, adjustments were made to the data collection forms to make them clearer, and more detailed guidance and worked examples were given. Several drop-in help sessions for volunteers were arranged to ask WallCAP staff any questions and to discuss their research.

Evaluation of the GIS project demonstrated that the volunteers enjoyed participating in the creation of a resource which would not only help educate and inspire others but would become a key management tool for multiple users. Of the volunteers involved, 42 % were newly active to the project, having registered but sitting 'dormant' in the Volunteer Portal until invited to participate in a way which was more suited to their engagement preference. Remote involvement lead to increased involvement, particularly for new audiences as the home-based working and furlough conditions of the Covid lockdown provided engagement opportunities for volunteers who were normally unavailable to anticipate due to work-commitments. This exercise also provided flexibility in terms of time commitment over an extended period, rather than a more 'normal' scheduled activity that would be in-person and event-based.

The value of this piece of crowd-sourced research has been acknowledged by many Wall stakeholders but also by the UK Commission for UNESCO, who saw a value in sharing the good practise and lessons learned through involving local people in becoming a local solution to a global problem. A case study was also written and shared with other World Heritage Sites (UNESCO 2021). The WallCAP GIS project offered an engaging and practical methodology to address a long-term aspiration amongst a number of practitioners involved in the Wall's management and research. Time, capacity and scale of the research were seen as limiting factors that previously hindered the construction of a GIS for the Wall, but a citizen-science model was able to overcome these obstacles.

Benefits of a citizen science approach for WallCAP

The benefits to participants and the heritage asset of Hadrian's Wall were widespread. The benefits of a citizen science approach for the World Heritage Site and the WallCAP project can be measured in a number of ways:

1. Eleven Heritage at Risk sites were investigated and are now better understood to inform management.
2. *C.* 660 m^2 of degrading or collapsed Wall fabric have been repaired.
3. Four sites have been removed/are in the process of being removed, from the Heritage at Risk register.
4. Better understanding of the geology, stone sources and use of repurposed stone has inspired new research on the biography of the stones.
5. Construction of a useful and accurate Hadrian's Wall GIS, freely available through the Archaeological Data Service (ADS).

Benefits to people

The Heritage at Risk research offered practical excavation and technical skills while the Stone Sourcing and Dispersal strand delivered activities (table 1) that allowed volunteers to understand their local landscapes, exploring the pathways in which stone was quarried from the ground and used to build the Wall and subsequently reused to build the castles, churches, farms and villages at the heart of communities in the WHS today.

theme	skills and learning points	testimonial (volunteer quotes)
archaeological fieldwork and training: 1,095 **v**olunteers and 6,015 attendees	geophysical survey, topographic survey, archaeological excavation, historic buildings survey, archaeological recording and illustration, historical information/knowledge, IT skills and photography	"I enjoyed finding out about LiDAR. I learned how to excavate a site methodically and appreciate how much work goes into organising such an event." – "[I learned] how to decide whether a particular site should be investigated and how to determine exactly where to focus and the best method to carry out further work – even knowing that nothing is there is useful!" – "Discovery of local previously unknown (by me) interesting sites to visit and share with family... who are all of course as interested as I am."
geological fieldwork & training: 619 **v**olunteers: 619 and 5,163 attendees: 5,163	rock identification, geological formation, quarrying techniques and masonry techniques	"Signed up to a geology training course that I wouldn't have known about if it wasn't for WallCAP." – "Learning about the different types of stone, how quarried, *etc*. Adding to my overall picture of Roman and other life on the Wall."
interpretation and management: 167 volunteers: and 1,816 attendees	source assessment, critical reasoning, outcome-based communication, audience interests and bias and professional practice	"I was surprised to learn all the different processes involved in planned a new gallery at the Roman Carlisle event. We analysed the current gallery, discussed at length what we liked and also what we thought didn't work. Naturally none of us agreed, so a fascinating discussion followed. It was quite an insight to hear other people's views on the gallery."
well-being and inclusion: 547 **v**olunteers and 2 attendees	appreciation of place, position and value of heritage in communities, pride & identity, celebration of role within the WHS, career development and added capacity (individual/local group)	"It's had a massive impact, I would have gone into real deep depression without it." – "I work full time so struggle to get along to digs and other archaeological events and activities. As such the GIS project offered flexibility, in particular given home working due to Covid19, to undertake elements of research for the project." – "I appreciated the opportunity to take part in an indoor activity as I sometimes worry my fitness may let me down during outdoor sessions."

Table 1. Thematic activity of WallCAP, associated skills and benefits. Volunteers and attendee numbers are counted as individual attendances.

benefits of a citizen science approach for WallCAP	benefits of a citizen science approach for Hadrian's Wall
volume of research achieved	brings extra human resources and different perspectives
share staff expertise on Hadrian's Wall, archaeological concepts, techniques and geology	ensures monument is monitored & conserved properly
share staff expertise; knowledge and in use of specialist professional grade equipment	enhances our collective understanding of the monument
staff gained experience in working with local communities	monument is respected, appreciated and valued
high volunteer retention rate alongside constant growth of volunteer numbers due to high levels of dedicated resourcing (including staffing)	enhanced transparency amongst all stakeholders
	community members as ambassadors and key stakeholders in Wall management

Table 2. The benefits of a citizen science approach for WallCAP and Hadrian's Wall.

WallCAP encouraged high levels of community involvement, both to meet funder requirements whilst also undertaking structured and professional archaeological investigation and intervention. WallCAP was also able to enhance public understanding of the Hadrian's Wall World Heritage Site through taking a citizen science approach. A range of benefits for both the project and Hadrian's Wall are illustrated in table 2 below.

Volunteer Investment and Value Audit (VIVA)

A method called the Volunteer Investment and Value Audit (VIVA) was employed in the evaluation of WallCAP to identify the **value** of volunteering. Introduced in 1996 and used in the public, private and voluntary sectors, the tool aims to assess the efficiency and benefits of volunteering projects (Gaskin 2011). Expressed in financial terms, the tool attributes a wage to volunteer time and calculates a return on investment ratio based on the financial inputs involved in managing the volunteering programme (staff coordination time, training costs, volunteer expenses). The VIVA audit for WallCAP identified that it was only after a period of 2-3 years that the project started to see a return on this investment. This highlights the need for patience when developing citizen science projects in archaeology but also critically, that volunteering is cost effective and not free. So, given genuine time and financial investment, the returns can outweigh the costs in a high quality and high value way. The VIVA audit also highlights, however, one of the dangers of a project cycle. Given the time required for the value of volunteer contributions to be achieved relative to the investment, there is significant potential for a very low cost-benefit analysis or sustained volunteer interest over the course of a series of discontinuous, discrete projects. A

sustainable and good VIVA audit requires a medium-to long-term project, and planned legacy or sustainability frameworks for periods after formal project ending.

Wellbeing

A means of judging the success of community involvement with any heritage project is when it contributes to the health and wellbeing of both the individual and the heritage asset (Shaw forthcoming). At the individual and personal level, feelings of connection, meaningful participation and valued contribution are all essential tenets for promoting well-being with the intrinsic motivating factors attributed to a number of criteria; resonance with daily life, sense of 'agency' over contributions and meaningful participation in worthwhile causes. Evaluation of WallCAP strongly reflected this, particularly over the Covid pandemic:

> "It is really wonderful, especially during these challenging times, to be able to feel that in a small way an individual can contribute to the better understanding of an historic site which is of worldwide interest" (WallCAP Volunteer quoted over the Covid pandemic).

Wellbeing can be difficult to articulate and define, and can also take many forms however, 95 % of WallCAP volunteer respondents reported that the project had a positive impact on their wellbeing to some or a greater extent (46 % and 49 % respectively). The largest proportion of volunteers (75 %) noted that it had impacted their mental stimulation and a similar proportion (67 %) felt an increased sense of place within their local area. 22 % of respondents also reported a positive impact on their physical health.

Conclusions and learning

As evidenced through this case study, there is much to learn from the WallCAP project and the adoption of a citizen science approach. A participatory approach to community engagement should be embedded at a project's inception. There is then a subsequent need and benefit to managing and respecting expectations across varied project disciplines. For this reason, a multi-disciplinary Project Manager and/or a dedicated Engagement Officer role are essential to navigate and bridge the gap between the specialist disciplines and the needs, skills and motivations of the community 'scientists'. By being proactive in addressing barriers (perceived and real), projects can broadened the audience to science and empower people to take action in a meaningful, supported and worthwhile ways whilst helping to address personal constraints such as social exclusion (geography, disability).

The transnational nature of the Frontiers of the Roman Empire World Heritage Site means that there are geopolitical differences in levels of support for and delivery of such community archaeology initiatives. The UK has a long standing culture of volunteering initiatives and a community archaeology approach. The success of a citizen science approach is therefore hugely dependant on the geopolitical setting of the programme.

Appropriate resourcing is essential, in terms of both financial and human resourcing. This championing may be observed through using tools such as VIVA to lobby interested stakeholders and funders to maintain or increase support. Volunteering and community engagement within a citizen science approach is cost effective, but not free, so proper resourcing, training and support for participants must be provided.

Where communities are involved in citizen science approaches, not only are they involved as part of the solution but they are also valuable ambassadors for the cause and an effective conduit for dissemination of the results. WallCAP showcased and indulged in the notion that engagement is essential to achieving successful management of a heritage resource. The enthusiastic engagement by the communities of Hadrian's Wall must therefore be supported as a legacy to WallCAP in order to sustain their role as genuine key stakeholders. The consultation for the HW Management Plan 2021-2025 reflects this with a significant percentage of consultees requesting richer and continuous interaction with the Wall, this is alongside the recognition that there is potential for an even greater offering for participation (Lekakis & Dragouni 2021).

The success of the WallCAP project and the citizen science approach was down to the quality of the research programme, the enthusiasm of the staff team and the commitment and passion of the WallCAP volunteers. As a result, the project successfully generated reliable and reputable archaeological data, tackled heritage conservation concerns, and enhanced public engagement and enjoyment with the World Heritage Site.

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Identity though art

How Weißenburg is strengthening its role as a Roman city in modern Bavaria

Simon Sulk

Roman Weißenburg, referred to as *Biriciana* on the *Tabula Peutingeriana*, was located in the province of *Raetia*, which today lies in the territory of parts of Baden-Württemberg and of Bavaria. In around AD 100 AD *Ala I Hispanorum auriana*, a mounted auxiliary unit of about 500 men, moved into a 3 ha fort located in the present-day town area of Weißenburg. Located some 5 km behind the limes line, through the long range patrolling capabilities of the mounted soldiers it served as a strategically important place for controlling the border, until the abandonment of the limes in AD 253/254.

The remains of Roman *Biriciana* are located in the west of the town (Sulk 2020), separated from the medieval and modern town by a railway line (fig. 1). With the Roman fort, the associated *vicus*, the Great Baths discovered in 1977, and the Roman Museum in the old town, Weißenburg has a rich Roman heritage that regularly attracts day-trippers to Middle Franconia. The fort area was designed as an archaeological park after the archaeological investigations at the beginning of the 20th century. For many decades, the original Roman walls stood unprotected against the weather. In the 1960's, the site was filled in and the plans of the interior buildings were visualised with stone slabs. In 1990, a reconstruction of the north gate followed, and in the 2000's, a partial reconstruction of the fort's enclosure wall. The fort site with its large open space attracts, in equal measure, visitors interested in history and city dwellers looking for recreational space. The Biriciana Roman Festival with its living history programme takes place here biannually. About 200 m from the fort area lie the Great Baths, which were conserved after excavation and provided with a protective structure. The area of the *vicus* has been made visible in one location through ground plans of strip houses, with reconstructed wells and a stone cellar. The finds from the excavations in Weißenburg and from many other forts of the Raetian Limes are exhibited in the RömerMuseum in the old town.

The RömerMuseum is a branch of the Bavarian State Archaeological Collection and was thoroughly renovated between 2014 and 2017 and reopened with a newly designed exhibition in March 2017 (Steidl 2019). Due to its location and its collection comprising the most important finds from the Bavarian section of the limes, it is the main museum for the limes in Bavaria. The highlight of the collection is the 114-piece Weißenburg Roman treasure, discovered in 1979 during garden landscaping not far from the baths (Kellner & Zahlhaas 1992). The treasure comprises objects of everyday use, scrap metal, tools, 15 high-quality statuettes of gods and other objects from religious contexts, and three cavalry masks from a military context. It is one of the

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Figure 1. Aerial view of the fort site *Biriciana* with the Roman bath in the lower right corner, the railway track and the medieval city wall (Museen Weißenburg/Simon Sulk).

most important hoard finds in Germany from the Roman period, presumably hidden by a tenant in the turmoil of the mid-3rd century (Steidl 2021).

Despite the omnipresent references to the Roman period, awareness amongst the people of Weißenburg of their Roman heritage is very limited. On the one hand, the Roman past is overshadowed by the town's eventful history in the Middle Ages, when Weißenburg had the status of a *Freie Reichsstadt* (free imperial town) for more than 500 years. With this special status, the town was subject only to the emperor and a self-image developed that is manifest today, kept alive through the large number of architectural monuments from the Middle Ages and early modern times. On the other hand, the location of the Roman sites beyond the railway line, in an urban area that was not built on until around 1900, seems also to have contributed to the lack of awareness of the Roman heritage. The Weißenburg Interpretation Framework (Mills 2015, 944-946), commissioned in 2011 by the city council and delivered by a team from the Hadrian's Wall Trust, sought to address this disconnection between the modern and medieval city and the museum on the one hand, and the Roman remains on the other. The framework provided a mechanism through which to link the disparate elements both physically and through storytelling. Some elements of the Interpretation Framework were delivered, including a waymarked route between the museum and the Roman sites, and an audio-visual installation in the baths that encapsulated the Roman story. Unfortunately, not all recommendations have been executed yet. However, archaeological excavations in the *vicus* area in 2021 (Arnolds & Hepa 2022) and 2022 as well as in the 2022 discovered cemetery, have recently drawn more attention to the town's Roman past.

In order to raise awareness of their important Roman past amongst the town's 18,500 inhabitants, the Stadtmarketing Weißenburg organisation, newly founded at the end of 2019, has carried out various projects in partnership with the City Council of Weißenburg. One of the most important elements of the Roman treasure are three face masks dating to the first half of the 3rd century AD. One of the masks corresponds to the rather feminine oriental type, the other two to the hellenistic type which is close to the iconography of Alexander the Great with its

Figure 2. The Roman face mask erected in 2015 (1) and the small version nearby the train station (2), both created by local artist Roland Ottinger (Simon Sulk).

typical raised curls above the forehead (*anastolé*). Possibly, perhaps supported by different colours and other symbols, these different types were used to represent different teams in the equestrian games called *hippika gymnasia*. Use of such helmets in battle has been the subject of much research and seems at least conceivable.

In 2015, the local artist Roland Ottinger took one of the masks as a model to create a new artistic interpretation. Commissioned by the city of Weißenburg, he created a 4 m high mask made of concrete, fixed on two silhouettes made of corten steel in the shape of a human head. The base is a 4.5 ton concrete cube that supports the artwork, erected on the B2 road towards Augsburg which, as *Augusta Vindelicum*/*Aelia Augusta*, was the capital of the Roman province of *Raetia* (fig. 2.1). Supported by many volunteers and by regional construction companies, a widely visible reference to Weißenburg's ancient past was created for the first time. However, due to its location on a bypass road, it is visible only for through road traffic and remained largely invisible to citizens of the town. For this reason, the positioning of the artwork was highly controversial within the town council. As is so often the case with art, the design was and still is the subject of controversy, the more so because the motif was taken up again in 2021. But more on this later.

A more fundamental element for positioning and promoting Weißenburg as a Roman town was the creation of a new city logo (fig. 3). The old word-picture logo was no longer up to date in terms of design, so a new logo was sought in a competition involving students of the Design Faculty of the Technical University of Nuremberg. The winning proposal by Christiane Krug took advantage of the fact that, since 2017, there has been an official version of the capitalised ß, the sz or sharp s, in the German alphabet. A discussion that has been going on since the end of the 19th century. This new, capitalised ß now appears, in the lettering WEIßENBURG in the new word-picture, as a stylised Roman helmet in grey with a red crest, the colours

WEIßENBURG
in Bayern

Figure 3. The new created city logo for the City of Weißenburg, containing the capitalized sharp s (Stadtmarketing Weißenburg).

of the new corporate design for the city. This capitalised ß in the style of a Roman helmet is also used as a stand-alone logo. Thus, a clear reference to the Roman era is now made, and the new corporate design appears on all new advertising materials and administrative documents.

This Roman stylised ß is also used in the logo of Stadtmarketing Weißenburg. This newly founded organisation includes 119 members from trade, gastronomy, industry and private individuals and will give the Weißenburg brand a new direction, making the city better known and positioning it nationally as a tourist destination and cultural location as well as a shopping city. When the association's first managing director was appointed, the author was deliberately chosen as a Roman expert and was in charge of the organisation in its early days, from January 2020 to June 2022. Tourism and culture were the main focus, made considerably more difficult by the pandemic from March 2020. In a period of increasing tourism within Germany, it was more urgent than ever to sharpen the profile of Weißenburg as a Roman town in order to be able to keep up with the emerging competition of national holiday destinations. In this regard, it should be noted that Weißenburg has a lot to offer not only culturally, but also scenically thanks to its location in the Naturpark Altmühltal (Nature Park Altmühl Valley) and the Franconian Lake District.

With a provincial Roman archaeologist as managing director, it was clear that the topic of the Romans would receive increased attention. Discussions took place with Roland Ottinger as to how the motif of the mask could be used further as a symbol for Roman Weißenburg. A second version was created on a smaller scale, placed opposite the railway station on the ring road around the old town to appeal to train passengers as well as car drivers. The unveiling of the 1.8 m high, 1.4 ton version took place in October 2021 (fig. 2.2). Once again, the design and placement were controversial – but the project was sure to attract attention. Through the support of local businesses, the mask was realised without costs for the city council. As controversial as the look of the mask is within the local population, it has high recognition value – amongst other applications, it is used as a logo for the local art days and in a scaled-down form as a high-quality present given by the mayor to people of merit.

Another opportunity to position the Romans more strongly in Weißenburg arose by chance. The walking route from the RömerMuseum to the archaeological sites leads through a not very inviting railway underpass, the four concrete surfaces of which were repainted in light grey in spring 2020. It was immediately clear that these surfaces would be excellent for interpreting Weißenburg's Roman past to motorists, cyclists and pedestrians – both visitors and local people. Initially, it was proposed to hold an art competition among private individuals, schools and similar institutions. However, it quickly became clear that only a professional design of the subway would realise the potential of the opportunity. Through personal contacts, the internationally known graphic artist Pablo Fontagnier (aka HOMBRE SUK), was engaged for the project. Fontagnier had already worked for several global brands and exhibited his works in various museums and festivals around the world. With his high profile as the executing artist, it was possible not only to obtain highly professional graffiti art, but also to draw attention to Weißenburg. Together with Oliver Kruspel (aka ELAN), HOMBRE presented the first drafts at the end of 2020. Responding to a brief written deliberately without too limited specifications, the first drawings were very promising and were accepted by the association's board with few requests for changes. Thanks to the prompt approval of Deutsche Bahn as owner and the generous support of local entrepreneurs, the project started in summer 2021 (fig. 4.1).

HOMBRE and ELAN worked on the design of the underpass for about ten days spread over several weeks. The design process was deliberately given time, so that the process of creation could be witnessed by as many people as possible. The work attracted a lot of interest. The police stopped by not only once to ask about the legality of the work and numerous interested passers-by stopped to ask questions of the artists. A specially advertised 'Meet the artists' day was scheduled shortly before completion. The local print media accompanied the creation of the graffiti with several articles, from the first presentation of the project in the town hall in June through to its completion in August 2021. Radio stations reported on the project several times and let the artists explain their work. Particularly gratifying was the coverage by BR Bavarian Radio, which broadcast a television report including interviews with the artists.

The underpass has two fields of plain concrete on each side, meassuring approximately 8 × 3.5 m. Both sides are dedicated to Roman Weißenburg themes. While the south side depicts the fort and the military in the primary colour red, the north side is blue and shows civilian life with reference to water/bathing. The motifs are intended to create a connection. On the one hand spatially, from the old town to Roman *Biriciana*, from the museum to

Figure 4. The railway underpass which connects the medieval town with the Museum and the Roman archaeological sites (1) and the finished graffiti in the underpass (2), dealing with the fort (*Kastell*) and the Roman bath (*Thermen*) (Simon Sulk).

the archaeological sites. On the other hand, a temporal connection realised through the spatial link from antiquity to modernity, but also by the motifs themselves. A military diploma from 30 June 107 AD found in Weißenburg records the soldier Mogetissa, his wife Verecunda and their daughter Matrulla. They are generally regarded as the 'first Weißenburg citizens'. Even without separate naming on the walls, they are an obvious device through which to depict the 'founding couple' of the town in Roman times (fig. 4.2).

Mogestissa stands for the military aspect of ancient *Biriciana*. Dressed in, admittedly historically extremely incorrect, soldier's gear, he is asked for a selfie by an elderly lady of today's era. The contrast is intensified by the fact that it is an older lady who wants to capture the encounter with the Roman soldier on a modern smartphone. The other, civilian, side works with similar contrasts. Here it is Verecunda who, as a Roman matron, looks confidently at the passers-by. At her side is a young man, clearly oriented towards hipster fashion. With gold glasses, beard, neck tattoo and striking ear jewellery, he stands for a young, modern generation. The analogue street map, which identifies him as a tourist, can be seen as an anachronism and in turn brings dynamism into the motif through contrast.

The second surface assigned in each case is provided with lettering. The soldier's side is filled with the word *Kastell* (fort). A schematic ground plan and a suggested wall structure reference directly the cavalry fort; the ß of the Weißenburg logo and the face mask pick up on already introduced figurative devices. The lettering *Thermen*

Figure 5. 1. 'Het Gezicht van Nijmegen'. Artist Andreas Hetfield´s version of the famous mask from the Waal; 2. Herrmann Hollweck´s Praetorian Head in the area of LIMESEUM Ruffenhofen; 3. The corten steel sculpture of Silvanus near Nethercroy on Antonine Wall, created 2020 by Svetlana Kondakova; 4. The concrete sculpture of Aurelius near Lambhill Stables on Antonine Wall, made in 2021 by Malcolm Robertson (1-2 Simon Sulk; 3-4 Rediscovering the Antonine Wall Project).

on the civilian side is designed with agitated, splashing water motifs while the *caldarium* of the bath building is indicated as a ground plan. A fountain mask of the sea god Okeanos is depicted as a counterpart to the cavalry mask on the opposite side; it comes from a *villa rustica* in nearby Treuchtlingen. The original can be seen in the Roman Museum, and a copy is located in an apse in the partially reconstructed bath house, thereby linking both Roman locations within the city. The capitalised ß motif can also be found here and is a reference to Weißenburg's self-portrayal.

The artists deliberately wanted to create contrasts and connections. They have succeeded brilliantly, as the consistently positive reactions to the graffiti so far show. The beautification of the connecting path from the museum to the Roman sites can therefore be seen as an absolute success. According to Pablo Fontagnier, vandalism damage by other graffiti sprayers is not to be expected; he is too well-known a name in the scene for that and is usually treated with respect. However, wanton destruction cannot be ruled out. A layer of protective varnish has been applied to prevent the worst damage. So far, however, there has been no damage to the work of art. As described above, the project for the design of the underpass, which was initially planned as a competition with community involvement, was awarded to professional artists. The result shows that

this was the right decision in terms both of the quality of the product and of the high profile of its creators who have attracted both interest and respect. Community engagement was nonetheless an important part of the project, realised through facilitating public interest in the process of creation and, subsequently, running a graffiti workshop for children and young people under the guidance of the artists. Over two days, the 14 participants learned the basics of spray painting and were enabled to immortalise themselves with a large-scale picture on a wall specially provided for this purpose. Here, too, media attention was generated.

It was important to the client, Stadtmarketing Weißenburg, as well as for the sponsors – all of whom were members of the association – to create another key point of reference to Roman Weißenburg, in this case possessing a certain 'instagramability' triggered by the motifs and the executing artist. In the design, emphasis was placed on repeating the already familiar motifs of the ß motif and the cavalry mask, further anchoring them in the consciousness of the public.

Face masks are striking and highly suitable as iconic motifs as illustrated by the well-known mask from the battlefield of the Varus Battle. Found during excavations in 1990, it still serves as an identifying symbol for the museum in Kalkriese. An art project with the mask transformed into a 'peace sign' even made it to the European Parliament in Strasbourg and the German Bundestag (Varusschlacht 2009). The cavalry mask from Nijmegen found in the river Waal in 1915 is similarly prominent. In a 4 m high version by the German artist Andreas Hetfield, since 2020 it is visible from far and wide as 'Het Gezicht van Nijmegen' (The face of Nijmegen), located on a bank of the Waal opposite Nijmegen (fig. 5.1). The original, from the second half of the 1st century AD, is on display at the Valkhof Museum, less than 1000 m away, and is one of the best-known face masks of the Roman period. The artwork was presented to David Breeze in a scaled-down version, in recognition of his services to the Limes Congress. While the Weißenburg mask by Roland Ottinger has been reproduced in miniature as gifts from the mayor, the Nijmegen copy is likely to remain unique. Elsewhere, a miniature version of a face mask with a preserved occipital helmet from *Durostorum* (Silistra, Bulgaria), is offered as a souvenir in the local museum shop. Many participants of the Limes Congress 2012 did not miss the opportunity to purchase this iconic symbol! A replica of a Roman cavalryman's mask is also available at the RömerMuseum Weißenburg – surprisingly, however, not based on the finds from Weißenburg, but on a mask from the treasure find at Straubing.

Other Roman sites and museums open to the public have also recognised the beneficial impact of large-scale artworks with Roman references. In Ruffenhofen on the Raetian Limes, a 4 m high artistic representation of a Roman head was displayed from August 2018 to September 2020. The 'Praetorian head' by Hermann Hollweck is made of corten steel and is supposed to represent a fallen soldier of the imperial guard (fig. 5.2). It was later placed in Seebruck on Lake Chiemsee, the Roman *Bedaium*. The two most recent interpretations of larger-than-life Roman head and helmet combinations are located on the Antonine Wall. They are part of the 'Rediscovering the Antonine Wall' project, supported by local communities and Historic Environment Scotland. The first head, made in 2020 by Russian-British artist Svetlana Kondakova, was named Silvanus and is located at Nethercroy, on a cycling and walking route (fig. 5.3). Silvanus, god of the woods, is attested on several altars along the Antonine Wall. The name was chosen in a public vote and even if the name seems inappropriate for a soldier, at least its dimensions are godlike: the steel sculpture is 6 m tall in total. The second Roman head is located at Lambhill Stables and is another representation of a helmeted soldier's head. Cast in concrete, the head created by Malcolm Robertson in 2021 was given the name Aurelius, again through a public vote (fig. 5.4). Both figures have already established themselves as a frequently used photo motif on social media, fulfilling the desired purpose of drawing attention to the Roman past.

However, compromises do have to be made in this kind of approach to interpreting the Roman past for modern audiences. With the exception of the true to the original reproduction of the Nijmegen mask, none of the works of art shown is historically accurate. They are always artistic interpretations of military protective weapons, which can lead to damaging false perceptions. A further problem with the use of symbolised representations of Roman soldiers for such marketing campaigns is that they are limited to using males as ambassadors of for the Roman past and of time more generally. This completely disregards the diversity of Roman society. The use of such motifs from a military context takes interpretation of the Roman past back a few decades, when 'Roman' equalled 'military'. As useful and functional as the face masks, helmets and Roman heads are in generating an awareness of Roman history, the choice of imagery must be judged objectively. It must be possible to draw on other population groups and potential symbols of the Roman period to represent the historical heritage in the future. Otherwise, it will be difficult to communicate why history is relevant to everyone, not just to those interested in power, the military and war.

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Part 6

RECONSTRUCTING THE LIMES

ROMAN ARCHAEOLOGY AS NATIONAL AND TRANSNATIONAL HERITAGE

Reception of the limes in cities along the Rhine and the Danube (16th and 17th centuries)

Konrad A. Ottenheym

From the second half of the 15th century, growing interest in Roman antiquity in general also stimulated scholarly debate on local legacies of classical antiquity north of the Alps. Humanists and antiquarians studied ancient texts for clues about the events of their own region in Roman times (Helmrath *et al.* 2002). From historical writings, such as those of Caesar and Tacitus, it was clear that the Rhine and Danube had been the northern border of the Roman Empire and that this frontier was guarded by larger and smaller military fortifications. In both the Low Countries and Germany, scholars tried to connect these ancient histories and places with contemporary geography, using ancient geographical descriptions such as those by Strabo, Ptolemaeus, and the so-called Peutinger Map (Boschung & Schäfer 2019). In the 16th century also material remains and soil finds began to be used as sources for this kind of research. Visible remnants, from small objects to (ruins of) buildings, were used as proofs of the supposed continuity from the glorious Roman past to their own time, as testimony of old age and standing of certain privileges or power structures (Enenkel & Ottenheym 2019). This paper will focus on the various ways this knowledge about the Roman limes was subsequently deployed by urban authorities in the late 16th and 17th centuries, comparing the free imperial cities in the German lands with the almost autonomous cities of the Dutch Republic.

The rediscovery of the limes along Rhine and Danube

In 1508 Desiderius Erasmus (*c.* 1469-1536) was the first humanist in Holland who posit the brave but civilised Batavians as ancestors of the Dutch (Wesseling 1993). In the following decades Erasmus' contemporaries Gerard Geldenhouwer (1482-1542) and Cornelius Aurelius (1460-1531) began the actual research on local Roman and Batavian antiquities in the Northern Low Countries (Enenkel & Ottenheym 2019, 151-183). The Batavians were regarded as a civilised community living in proper cities, and as 'friends and brothers of the Roman Empire' (Aurelius 1611, 99). Accordingly, the Romans protected the country against 'barbarians' and 'pirates' with strong castles along the river Rhine (Aurelius 1517, fol. 91v). Aurelius mentions for instance the *Arx Brittanica* / *Brittenburg* at Katwijk, the castle hill in Leiden and the ruins of castle *Roomburg* (Aurelius 1611, 106). In fact, these were the remains of a 13th-century seat of the van Rodenburg family, but interpreted as *Roomse-burcht i.e.* 'Roman castle'. This misinterpretation can easily be explained since

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Roomburg was near the site of the ancient *castellum Matilo* and, indeed, several Roman stones and objects were found here (Brandenburgh & Hessing 2014).

Almost simultaneously with these first attempts by Aurelius and Geldenhouwer to identify Roman *castella* along the Rhine, the same happened in Bavaria along the Danube. A key figure here was Johannes Aventinus (1477-1534) (Schmid 2019). In 1517 he was commissioned by the Duke of Bavaria to write a complete chronicle of Bavaria, a job that would take him a total of eleven years. In preparation, he visited libraries and archives in monasteries, towns and castles. As one of the first in Southern Germany, Aventinus also actively searched for material evidence of Bavaria's ancient past, such as ancient coins, tokens, tombstones and old buildings. He considered the Danube as the northern border of the Roman Empire and many towns, ancient castles, or remnants thereof, along the river, he tried to identify as the remains of the various limes fortifications mentioned in ancient texts (Ottenheym 2022). As far as is known, he was also the first to identify this series of *castella* and *castra* as a coherent chain of fortifications along the border: "the Danube and the Rhine were the borders of the ancient, Italian Roman Empire and imperial power against Germany, equipped with all the required martial forces. (…) So there was one Roman force after another, as the ancient fortresses, with all the ancient stones and Roman inscriptions show" (Aventinus 1881, 260-261).

The German imperial cities and their ancient roots

Most German historians of the 16th century, including Aventinus, were strong supporters of the idea of the *translatio imperii*, the idea that the universal Empire was not lost with the downfall of the western emperor in Rome. According to them and their princely patrons, the country had been part of the Empire from Julius Caesar's times onwards. With the coronation of Charlemagne in the year 800, the Empire continued to exist. Since then the imperial dignity had been transferred to all his successors, without interruption, until Maximilian I and Charles V in the 16th century. These two emperors emphatically portrayed this idea in their public displays and other forms of representation (Checa Cremades 1987; Müller 1982; Wood 2005). For Charles V, the comparison with the Roman Empire was self-evident: as emperor of the Holy Roman Empire and as King of Spain (which also included Southern Italy and Sicily and the colonies in the Americas), his realm was indeed comparable to that of the ancient Roman emperors.

The Holy Roman Empire included many different kinds of territories, each with its own type of leader. At the top, right after the emperor, were the seven electors, followed by other prince-bishops and powerful abbots of the imperial abbeys and various kinds of lords, from princes and counts to petty barons and knights. At the bottom of the hierarchy of the Empire's political structure were the *c*. 50 free imperial cities. In this case 'free' means that these cities had no regional over-lord, such as a duke or a prince-bishop. Instead, they stood immediately under the supreme authority of the emperor (Moraw 1979). The emperor's actual influence in the day-to-day affairs of these cities was limited in practice; the bonus for the emperor lay in the tax revenues from these cities. Every few years, all rulers of the Empire, including the imperial cities, were convened by the emperor for joint deliberations, the so-called 'Reichstag'. Until the 1660's these meetings took place in one of the major free imperial cities (later the Reichstag remained permanently in Regensburg). Hosting the Reichstag was a great honour for the cities and sometimes they competed with each other for the role of host.

Not only the emperor and the high nobility used their (real or presumed) ancient roots in public display, also the imperial cities brought their Roman past to the fore in words and images, when defining their position within the Empire's political structures. Although the emperors had designated most of the 'free imperial cities' between the 13th and 15th century, many cities sought the origins of their special relationship with the emperor back in Roman times. Imperial cities that could demonstrate an ancient origin, as a Roman *colonia*, *municipium* or just a *castellum*, could boast continuous ties with the emperor for almost 1500 years. With such historical roots, they could make it plausible that their cities had been part of the political structure of the Empire from its early days onwards, and that they weren't a *Fremdkörper* from later times, as most noblemen wanted to believe.

The imperial past could serve as rhetorical ammunition against contemporary territorial claims of surrounding feudal lords. The freedom of smaller imperial cities was increasingly threatened by their intrusive princes. During the 15th century, for example, the Duke of Bavaria had annexed two such cities. By linking their status of an imperial city to the Roman past, other cities tried to avoid a similar fate. With a demonstrable continuity of privileged connection with the emperor, from Julius Caesar up to Charles V, cities could counterbalance potentially 'historical' claims of surrounding greedy princes. The most important place to publicise one's own Roman history was the town hall. To this end there were various possibilities varying in scale and financial costs, as some examples show.

A humble solution was applicated in the small town of Weissenburg, next to the site of the former *castellum Biriciania*. Here, in 1567, a tower was added to the gothic town hall to house the city archives, with a decorative stone sculptured in high relief, showing two Romans in full

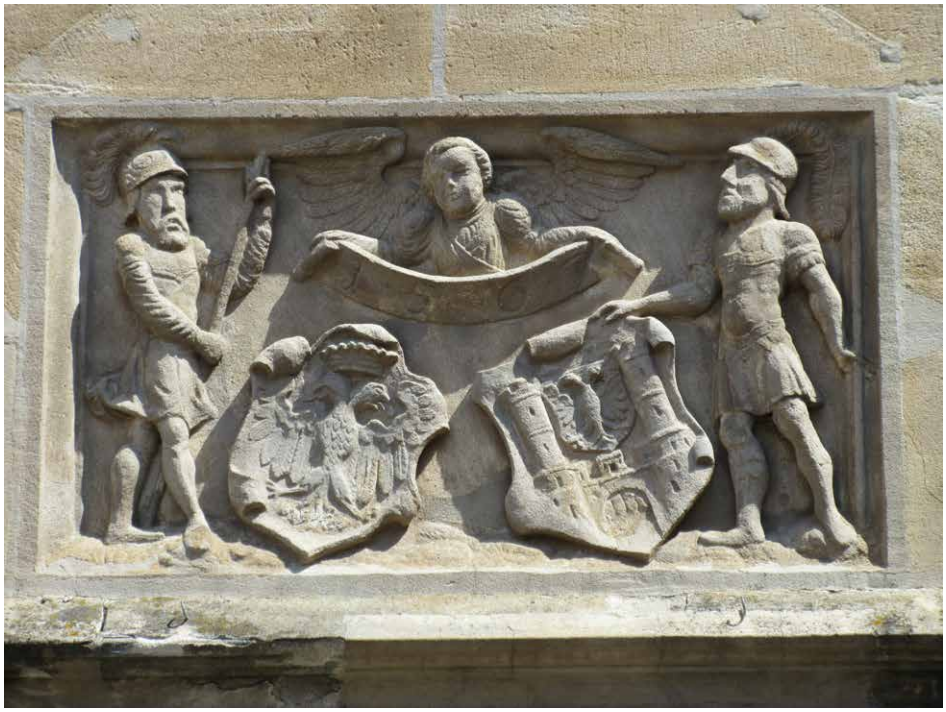

Figure 1. Weissenburg, townhall, memorial stone in the archive tower, 1567 (author).

armour presenting the city coat of arms and the imperial coat of arms with the double-headed eagle (fig. 1). The connection of city and emperor is thus literally supported by the Roman past.

A slightly more monumental elaboration of the same idea, can be found in Kempten. It was known in the 16th century that the Roman city of *Cambodunum* had been located here, but where exactly was not yet clear. In reality, it was on the other side of the river (where today is the archaeological park), but in early modern times it was believed that the castle hill next to the city centre had been the ancient *Cambodunum* (Ott 2002, 266-269). Kempten is also home to the important St. Lorenz Abbey, headed by an abbot who also held the title of imperial prince. The city had been engaged in a dispute with the abbot over its independence from the abbey since the 14th century. This conflict intensified when the city converted to Protestantism in 1525, while the abbey remained loyal to Catholicism. The abbot's contention was that the city had come into existence only after the abbey was founded in 773 AD. The city council believed it could refute this argument with the city's Roman origins: Kempten was said to be the direct continuation of Roman *Cambodunum*, and had always been directly under the emperor even long before the arrival of the first abbot. To underline the city's Roman origins, in 1601 a fountain (fig. 2) was built in front of the medieval town hall, with an almost life-size statue of a Roman officer, representing the founders of the city and holding the coats of arms of both the city and the Empire (Weiß & Böck 1993).

Figure 2. Kempten, fountain in front of the townhall, 1601 (author).

Something similar was at play in Cologne. The city, ancient *Colonia Claudia Ara Agrippinensium*, had been in conflict for several centuries with its own archbishop, who was also one of the electors of the realm. In 1268 the bishop was expelled from the city and since then he resided in nearby Bonn, but the bishop had never officially accepted the city's independence. In the 16th century, Cologne also had a great interest in its own Roman past. Especially among some traditional ruling families this was an important fact because in their circles lived the myth that their families descended from the Roman senators sent north by emperor Tiberius to rule the city. Members of these families were also the first collectors of Roman antiquities from Cologne. And in 1569-1573 they had a monumental *all'antica* loggia added to the Gothic town hall, with classical columns, antique-looking *tondi* with portraits of Roman emperors and with reliefs that referred to the city's medieval battle against the bishop (Kirgus 2003). Thus, local antiquity was used here to override the bishop's claims to power: Cologne traditionally belonged to the emperor, and its magistrates were loyal and accountable to the emperor only, that was the message expressed in this loggia.

The most monumental 'imperial' town hall was built in Augsburg in 1615, the ancient *Aelium Augustum* / *Augusta Vindelicorum*. Augsburg was a multi-denominational city where both Catholicism and Protestantism were allowed. The city's Roman origins had been undisputed since the early 16th century thanks to the work of humanists such as Conrad Celtis and Conrad Peutinger. By 1590-1594, a fountain with a bronze statue of emperor Augustus as the city's founder, by Munich sculptor Hubert Gerhard, had already appeared in front of the old city hall. Twenty years later, construction of the new city hall began. This seemed primarily intended to outdo the other major imperial cities and to provide Augsburg with a suitable home for the Reichstag, possibly in the hope that the emperor would therefore choose Augsburg as a meeting place more often. Both in scale and detail, the monumental building seems to emulate classical architecture (Baer *et al.* 1985). The rooms for the various magistrates and officials of the city administration were located on the ground floor and first floor. The grand second floor offered meeting facilities for the Reichstag, with the large central 'Golden Hall' and with rooms for the emperor and the electors. The murals of the great hall depicted a series of ancient, medieval and contemporary emperors, showing once again the continuity of the Roman and Holy Roman Empires and their strong connections with the city.

Even when a city had no ancient past al all, it could be considered important to simulate such lineage. This happened in Nuremberg, one of the major commercial and industrial cities of Central Europe and a free imperial city since 1254. At the highest point of the city stands the medieval imperial castle, where since 1424 the imperial regalia were kept. Nuremberg's prominent position within the imperial cities was evident, but an ancient origin could only be 'created' with some difficulty. After all, the city is situated some 100 km north of the Danube and this area never belonged to the Roman Empire. Nevertheless, already in the 15th century the legend had been developed that its history started with a military camp erected in 10 BC by Tiberius at the foot of the mountain and with a watchtower on top of it. After his full name, Tiberius Claudius Nero, the site was called '*Neronis-berg*', which subsequently became '*Nürnberg*' (Ott 2002, 263-266). Tangible evidence of its alleged Roman origin was identified in the oldest tower of the castle with the romanesque chapel (in fact a 12th-century construction), according to 15th-century chronicles said to be a former 'temple of Diana' (Ott 2010, 145).

The assumed ancient past of Holland's cities

In the Low Countries, the concept of free imperial city did not play a significant role in politics. Maximilian I had only raised a few cities to this status, in 1495, but Charles V put an end to their privileges shortly afterwards. By the time of the Dutch Republic (1585-1795), however, cities dominated provincial and national politics. In the government of the Province of Holland, 18 cities had one vote each, in addition to one vote for the nobility. The ranking of cities was determined by the year of their city rights: the oldest city in Holland was Dordrecht with charters from 1220, followed by Haarlem in 1245, Delft 1246, Leiden 1266, Amsterdam in 1306, *etc.* While the official hierarchy was defined, most cities tried to increase their age and their standing in relation to the other cities, by presenting a much older foundation date (Enenkel & Ottenheym 2019, 311-347). Occasionally they sought arguments for a Roman origin, as a former army camp along the limes. Such imagined histories were reported in city chronicles, which were usually written at the request of the relevant city administration. Sometimes these stories were also given a place in the decoration of public buildings, as the following examples illustrate.

In 1618, at the waterside of Dordrecht a new gate house was constructed called *Groothoofds Poort* (Great-Pier Gate). The decoration of this building refers to an obscure myth of the city's origin in Roman times. Above the gate, in blue stone, a two-storey building was erected in brick, with sculptured decorations in sandstone. The façade towards the city is articulated by a superposition of small pilasters, Ionic above Doric. The sculptured decorations accentuate the classical sprit of the design, with the heads of Hercules and Medusa above the windows in the upper zone and the bust of a Roman emperor directly above the gateway (fig. 3). On the façade overlooking the quay, there is a grand relief of the personification of the city, crowned

Figure 3. Dordrecht, Groothoofdspoort, 1618 (author).

by a bust of another Roman emperor. It is possible that the city authorities who commissioned the gate were inspired by a story told in 1577 by Dominicus Marius Niger in his description of the world. In his chapter on the Low Countries, Dominicus Marius mentions a city founded in 140 AD by emperor Antoninus Pius "at the northern tip of the island where the Meuse reaches the sea", first called *Benefacta* but later renamed as *Do*(r)*drana*, inhabited by 'Dordranesii' (Marius 1557, 57). The city was praised for its excellent people, strong walls, abundant riches and its favourable mercantile potential. One can well imagine that the 17th-century city authorities were pleased with such a story and were eager to use it as part of their unofficial claims to superior age (Van Beverwijck 1640, 75-82). However, apparently nobody in Dordrecht was interested in having a correct portrait of Antoninus Pius here, in the way that he was known from coins and print series, always with an elegant beard. The imperial heads presented on both façades of the gate do not resemble him in the least: the emperor figure above the gate seems to be inspired by Vespasian, while the other, overlooking the quayside, resembles Nero. For the purposes of illustrating the supposed Roman origin of the city, any emperor would do, apparently.

Also Delft had its own understanding of its 'true' age. The kernel of the settlement which later grew into Delft was said

Figure 4. Leiden, the castle hill, in early modern times regarded as *castellum Lugdunum* (public domain).

to have sprung up along the canal which the Roman general Corbulo had had dug in the 1st century AD. Thus the central canal of the city, called 'Oude Delft' was in fact regarded as part of the *fossa Corbulonis*. The 17th-century historian of Delft, Dirck van Bleysweijck, reported that the bottom sections of the tower of the Old Church (Oude Kerk), which stands practically on the quayside of Oude Delft, originated from a Roman watchtower which Corbulo had installed alongside his freshly-dug canal, as was customary along the military limes (Van Bleysweijck 1667, 45). He insisted that this tower was the oldest building in Delft and for many miles around, as was borne out by the tufa blocks used in its foundations. Later, as he had it, the first counts of Holland pronounced sentences at this tower, thereby gradually giving rise to the settlement from the 11th century onwards.

Obviously, also Leiden claimed to be much older than the date of 1266, the year of its city charter. Local historians had proclaimed the city's presumed ancient origin, identifying Leiden with the Roman fort of *Lugdunum* on the *Tabula Peutingeriana*: Jan Orlers (1614, 13-14) blithely wrote in his 1614 city history that Leiden, or *Lugdunum Batavorum*, was the centre of Holland and perhaps the province's oldest city, and older at any rate than Dordrecht or Haarlem, since they had no Roman history: "Leiden [is] not just old but the oldest and principal city of Holland, certainly older than Dordrecht and Haarlem". While those two cities assert their privileges, nobody, he dismissively adds, has ever seen the documents. The key proof of Leiden's great age was the round fort on the high motte at the confluence of two branches of the Rhine (fig. 4): "The fort, being an ornament to this city, is not only the first and oldest building which has stood in Leiden for several centuries but is even one of the very oldest establishments and fortresses of all Holland" (Orlers 1614, 59). It was generally believed that the city had come into being as a fishing village at the foot of that fortress, which was regarded as the best preserved Roman *castellum* along the limes. Opinions varied as to the exact date of construction. In the early 16th century, Aurelius proposed that Caesar had founded it. A century later somebody suggested it must have been Nero (Van Leeuwen 1672, 23 and 42). In the current state of historical knowledge, this dating would be almost a millennium too early: the first impulse to build a modest hill fort may have come around 1000 AD and it was raised in height around 1050, with the first ring-wall being raised around 1150 (subsequently repaired and fortified numerous times) (Van der Vlist 2001).

Elsewhere in the Republic there were a few cities of genuine Roman origins and the most important of these was Nijmegen. But here, too, several misunderstandings prevailed. Firstly, it was believed that the Julius Caesar himself had founded the fortress and the city during his campaign of 55 BC, whereas this would probably only happen half a century later in the time of Drusus and Tiberius. The designation of the location of the main settlement was also based on a misunderstanding. According to our current knowledge, there had been several Roman settlements around the later city of Nijmegen, first the *Oppidum Batavorum* in the centre of modern Nijmegen, more to the west the Roman town *Ulpia*

Figure 5. Nijmegen, Townhall (1555), entrance gate with Julius Caesar (right) and Charlemagne (left), post-1945 copies (P. van Galen, collection RCE).

Noviomagus, and the large military camp on the Hunerberg and the command post on the Kops Plateau (Willems & Van Enckevort 2009). From the late 15th century onwards, however, scholars in Nijmegen proposed that the Valkhof castle had been the centre of the Roman city, which in later centuries also Charlemagne had used as his palace. Indeed the Valkhof was located on the site of the last Roman defences from the late antiquity and indeed Charlemagne also had a residence here. But the ancient stronghold was subsequently destroyed and rebuilt by Emperor Barbarossa around 1155. The octagonal St. Nicholas Chapel on the castle grounds dated from the 11th century, with later repairs. Both because of its octagonal shape and because of the many ancient *spolia* used as building material in the walls, it was believed that this building must have been a former Roman temple. Moreover, a Roman tombstone of a certain Caius Julius Pudens and his son, reused at the entrance to the chapel, led some to believe it had been a temple in honour of the gods of the underworld, or otherwise the mausoleum of this Pudens (Ottenheym 2021, 372-378).

When in 1553-1554 a new entrance wing of town hall was built, sculptures on the facade clearly marked the Roman origins of the city (Schulte 1982). The upper windows were decorated with antique heads, while the front door was crowned by statues of Julius Caesar and Charlemagne, the presumed founders of the city (fig. 5). In the 1660's, in order to strengthen the connection with the Roman past, the interior of the town hall was enriched by paintings depicting the city's Roman past. In addition, in 1670 a dozen ancient tombstones were brought to the town hall, where they were displayed as gallery of honour of the city's (alleged) great ancestors (Smetius 1784, 204). As a matter of fact, the tombstone of Caius Julius Pudens from the St. Nicholas chapel on the Valkhof was among them. After all, the chapel was considered his mausoleum, and anyone given such a monumental tomb must have been a very distinguished and heroic person, the reasoning went.

To conclude

In the 16th and 17th centuries, occasionally cities along the former Roman border liked to make use of their (real or imagined) ancient origins as a limes *castellum*, as a legionary town or as a Roman city. This connection to the past could be expressed in the urban space in various ways: with a simple memorial stone, with statues and fountains, with the

decoration of public buildings or even with the construction of a new *all'antica* town hall. Historical and scholarly interest was only one of the motivations to explore that distant past. Local patriotism and attempts to increase the city's fame, were certainly important motives too. But for urban authorities, there was sometimes more than honour and prestige. In some German imperial cities, a provable historical alliance with the emperor could be an argument to parry territorial claims by intrusive neighbouring princes. In the Dutch Republic, by contrast, there was no such threat from outside. Here, the competition for city antiquity was linked to the mutual ranking in the Provincial States and thus directly to political influence in the national administration.

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Cologne *praetorium*, new findings

The bath of the governor and news about phases of the late antique and early medieval times

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Course of research

Since the 16th century, traces of the Cologne governor's palace have been found in the immediate city centre, right next to and under the Cologne town hall (for all sources Schäfer 2014). The main part of the *praetorium* was excavated in 1953 (Doppelfeld 1956; 1957; Precht 1973; Schäfer 2014) and its northeast section was immediately preserved under the current protective structure. There were follow-up archaeological examinations by the Römisch-Germanisches Museum in 1955/1956, 1964, 1967/1968, 1971 and 1998 (summarizing the campaigns and publications Ullmann 2003). The most extensive work about all the excavation campaigns is the dissertation by Felix Schäfer (2014) from the Cologne Institute for Classical Archaeology. Schäfer reorganized the features from periods I-III, *i.e.* 1st to 3rd century, according to the architect Gundolf Precht, who had interpreted the excavations of Otto Doppelfeld in the other important book about the praetorium (Precht 1973). Schäfer differentiated the sections of the architectural development purely in terms of architectural history into his periods A to H, which not only include the building phases but also the construction stages. Schäfer did not rework the late antique phase and the finds, but he wrote also about the building decoration. Ristow (2019) summarized all the information up to 2007 in a short overview. The first results of the new excavations since 2007 are actually being added by the excavators from the 'Archäologische Zone' of the City of Cologne. Hopefully in the course of time, there will be more information particularly about the late antique phase and possibly as well, about the early medieval times when the original Roman palace building was still in continuous use.

The governor's bath

The features of the thermal baths presented here have not yet been clearly identified as such in the older publications (fig. 1). They came to light towards the end of Doppelfeld's excavations in 1953 and were dug relatively quickly and not documented in detail (Doppelfeld 1956). The excavation had not been completed when it was required to come to a halt due to the urgently planned restoration on the buildings of the Cologne town hall in the 1950's, which had been destroyed during the Second World War (fig. 2).

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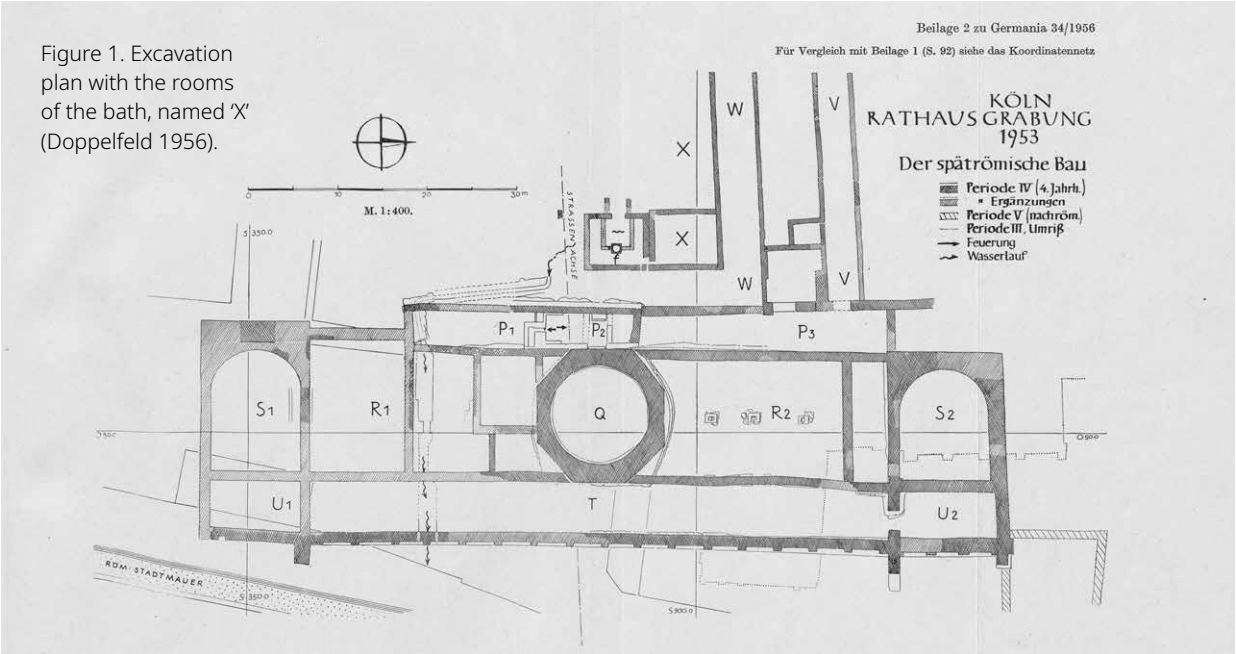

Figure 1. Excavation plan with the rooms of the bath, named 'X' (Doppelfeld 1956).

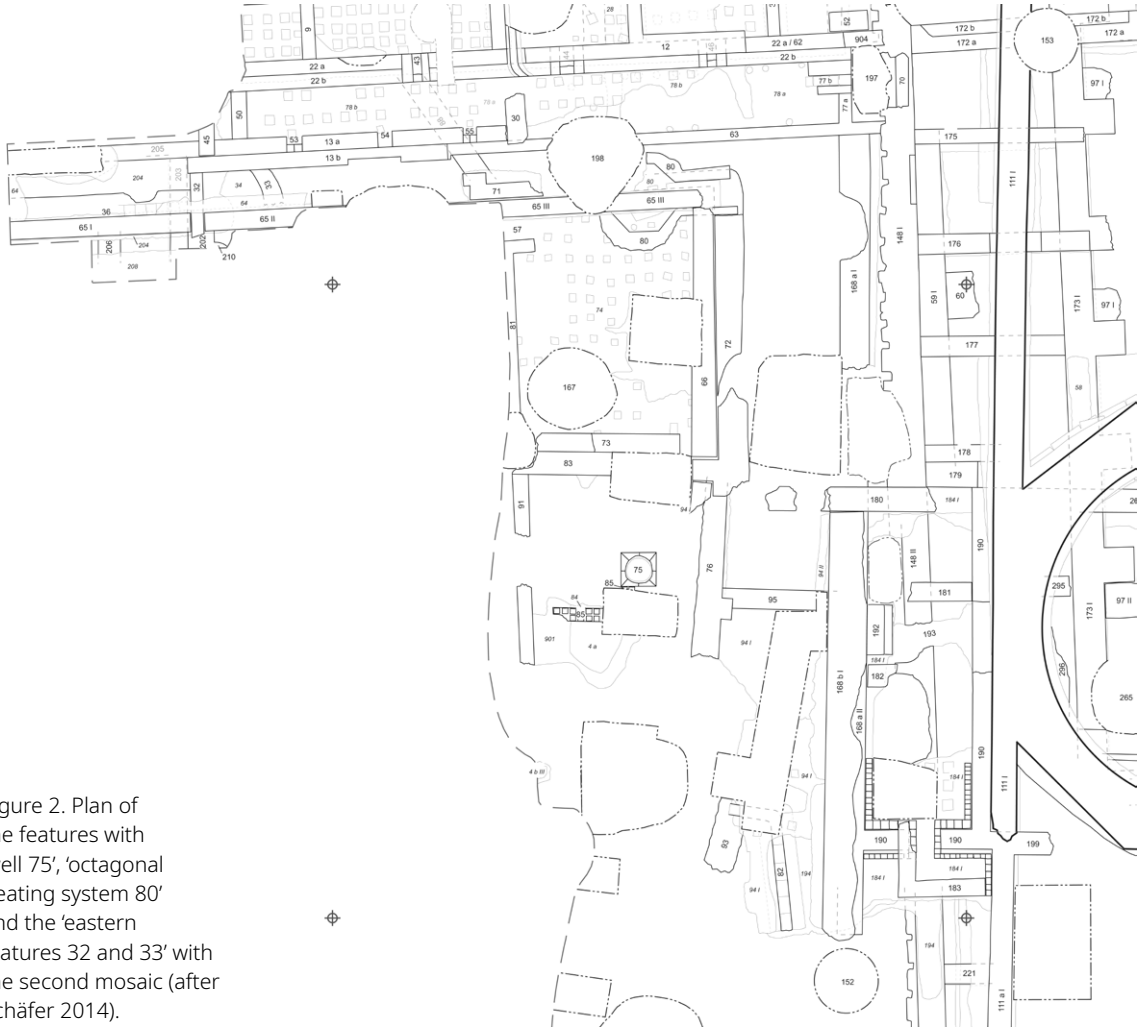

Figure 2. Plan of the features with 'well 75', 'octagonal heating system 80' and the 'eastern features 32 and 33' with the second mosaic (after Schäfer 2014).

Figure 3. Restored and partly reconstructed mosaic from the governor's bath of the Cologne *praetorium* in the exhibition 'Roms fließende Grenzen' from 2022 (S. Ristow).

When viewing the findings as part of their presentation in the new Museum MiQua – which is currently under construction and will be opened in a few years' time – some rooms in the north-west area of the known parts of the palace buildings, presumably assigned to the governor's private area, were reconstructed as remains of thermal baths. These 'governor's thermal baths' were well equipped, as evidenced by the remains of two mosaic floors, probably from the 3rd century. However only one mosaic (fig. 3) has been found in the depot of the Römisch-Germanisches Museum, and we can show, that the material from which it was constructed is rather simple: it includes fragments of limestone and marble as well as *terra sigillata*, also quartzite and brick (Ristow 2021a, excurse Merzenich).

The bath has all important functional rooms. You can enter the thermal complex from the north-west, where there is also space in the inner court of the praetorium for a *palaestra*. Then it was possible to use the *tepidarium*, the *frigidarium*, or the *caldarium*, and in the north was a *laconicum* or *sudatorium*. The features include a separately heated area in the northeast corner of the building with an octagonal-shaped floor plan, completed after the preserved part of the mosaic. Perhaps it could also be assumed that this place was also covered by an octagonal shape in the roof construction of the bath building, as reconstructed here in one of the possible varieties of the upper part of the walls in this area of the excavation (fig. 4a-b).

Thermal baths of the same period with central buildings in *praetoria* can also be found in *Aquincum* and *Alba Iulia*. In Budapest it is room 41 from the 2nd or early 3rd century (Havas 2019, táb. 14-18), but at *Apulum* there is no actual analysis for room 225 (Schäfer 2014, 285). The heating for the Cologne bath came from a *praefurnium* in the west and the separate octagonal hypocaust was heated as addition from the east. So, one can imagine something like the bathtub of the governor on the top of the mosaic floor, which can be heated extra hot!

We don't know exactly how the water supply and disposal in Cologne were arranged, but in the southeast of the excavated area there seemed to be the technical parts of the bath. Also features of a channel are preserved there and a well, which could perhaps be in use as an addition to the normal fresh water supply of Roman Cologne. The Roman well of the bath complex which should be the one the governors were using up to the early second half of 4th century (Binsfeld 1961), gives us also an idea about the possible destruction of the baths perhaps during the time of the Frankish conquering of Cologne in 355/356. By this time the use of the small but nice thermal bath complex definitely had come to an end. The latest period of constructions and of when the Cologne praetorium was still in use in early medieval times.

The last phase of the *praetorium*, *i.e.* Period IV,1 and 2 of Precht 1973, was built in the 4th century, but we don't know, if the first section of the construction works took place before or after the Frankish conquering in 355/356. We also don't know how much of the palace had been finished and if all the rooms and courts had been in use. Perhaps we have to think also about provisional states in

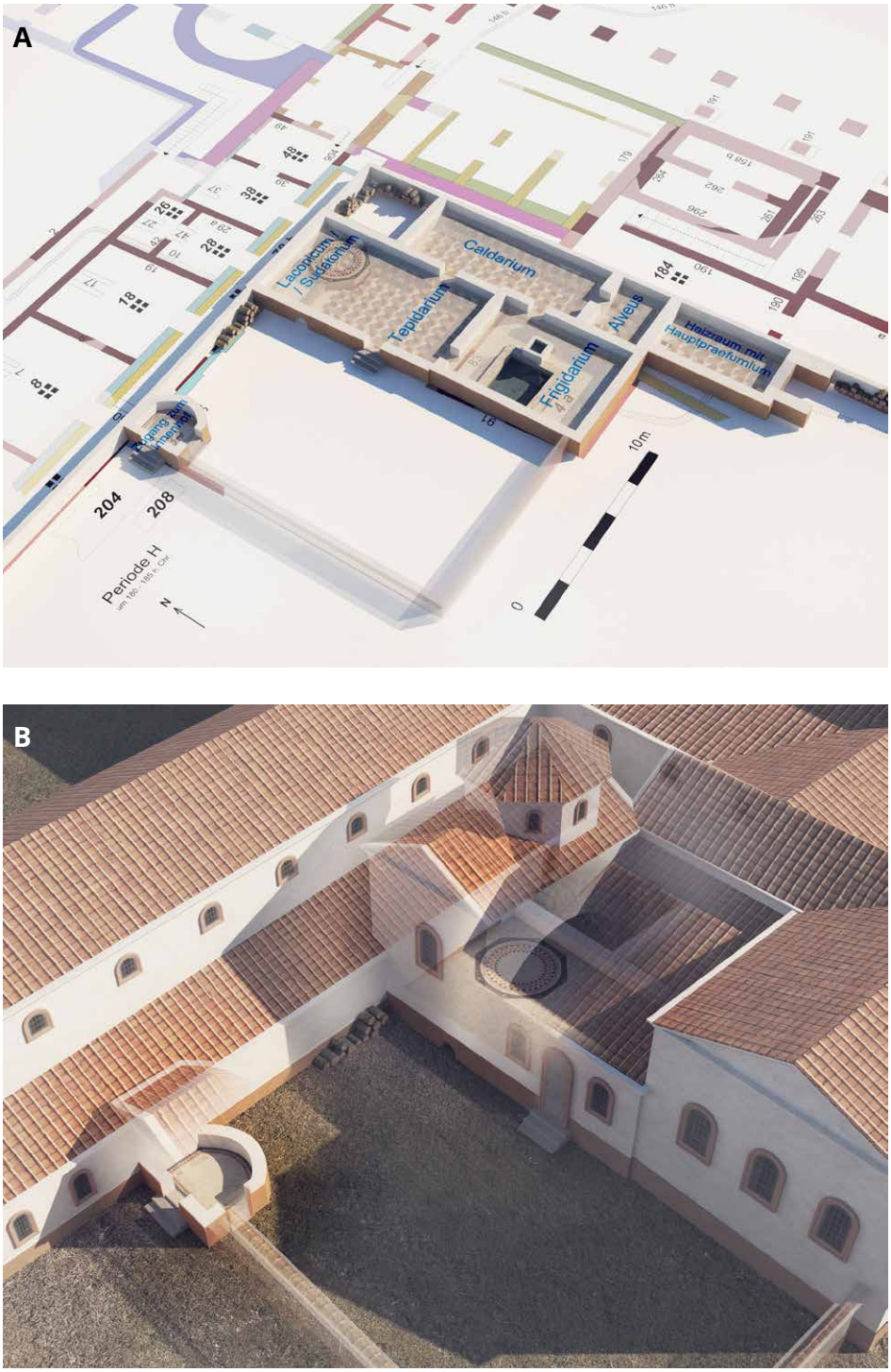

Figure 4. Plan of the features and room functions and reconstruction varieties for the bath with octagonal roof construction (Zs. Vasáros & G. Nagy, Narmer Architecture, Budapest / S. Ristow, LVR, MiQua, 2021).

different parts or rooms of the last Roman phase of the palace. Not too much is known about the use in early medieval times. The first examination of finds gave us – so far as we have uncovered yet – information about material from the 6th/7th century, *i.e.* ceramics, a brooch and a *solidus* (Ristow 2023). Also, written sources tell us about the use of the former praetorium in the Frankish period (Doppelfeld 1958). Perhaps in the later 8th or in the 9th century the building was destroyed by a subsidence of the subsoil (Precht 1973, 31-32). The functioning palace of the most important rulers of Cologne probably changed its location later to the south of the Carolingian cathedral (Dietmar & Trier 2011, 194-198). Doppelfeld (1957. 219) recognized that the people from Carolingian times must

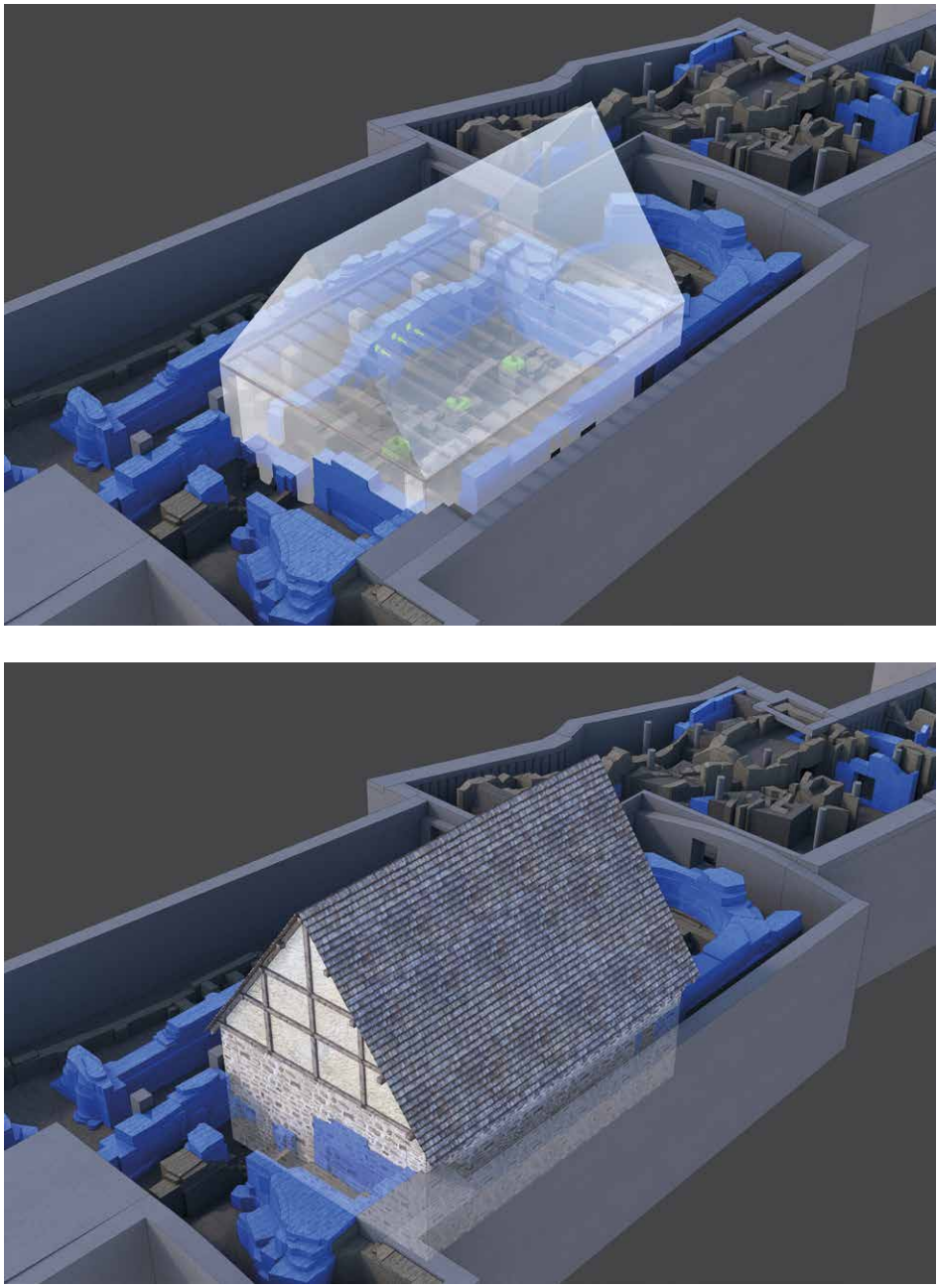

Figure 5. Reconstruction idea for the wooden construction features, fixed at holes in the walls and settings in the ground of the north hall of Cologne *praetorium* (Zs. Vasáros & G. Nagy, Narmer Architecture, Budapest / S. Ristow, LVR, MiQua, 2021).

have dug for building remains early on, because in several places, pits with sherds of Pingsdorf and Badorf type ceramics led deep down to the foundations. The building material seems to have been deliberately taken from the praetorium ruins. So, it is no wonder that the old cathedral, a building of the archbishop and of considerable importance, probably like that one of the former *praetorium*, contains massive, reused stone blocks from the Roman era (Back *et al*. 2012).

For the 4th-century phases of the *praetorium* we don't have any wall paintings to connect with, no capitals or columns and also no specific late antique incrustations, like *giallo antico*, which for Cologne is always a good indicator for a 4th-century date (Ristow 2021b; 2023). However, it could be possible that the Romans finished the architecture but never have had the possibility to decorate it. However, Doppelfeld wrote about the fact that the building had been plundered in the Carolingian period (Doppelfeld 1957, 219), which could explain the missing evidence. Also Charlemagne was taking building materials for his palace at Aachen, further depriving us of potential evidence.

A late inscription from Roman Cologne tells us about the construction of a building in the years between 392

and 394 by the *comes* Arbogast, the last official known by name under Roman law in Cologne (Ristow 2021b, 261, fig. 8). A round central hall with an external octagonal plan had been found but not fully documented featuring some big stone blocks in the centre, perhaps substructures for a provisional roof or whatever. In the northern hall there have been excavated square stone settings for a beam construction. Between these, loose stones were found (Doppelfeld 1957), perhaps remains from an internal subdivision. There are also beam holes at different levels in the side walls. Perhaps these settings and holes can be interpreted as the remains from the construction of a wooden floor and perhaps part of a half-timbered building on the top of the northern hall (fig. 5). These constructions can be dated as well from the late 4th century or from later times, as this was noted by the excavator. But he wrote explicitly that he believed these fixtures were added to the room in a later period – although perhaps Roman as Doppelfeld (1957) interpreted, or possibly in the early medieval period.

Summary

In summary, a compact bath of 250-300 m² with the main bath rooms of a ring type *thermae* can be reconstructed from the excavated features near to the – assumed – private rooms of the governor of Cologne's *praetorium*. For the octagonal separate heating feature, (feature no. 80), according to the results of Doppelfeld, the most probable likelihood was an area optically separated by the mosaic floor. The mosaics and the bath, which developed in several phases, are therefore likely to have been used between the late 2nd century and at latest the first half of the 4th century. The findings of the bath have been known for a long time, but have not yet been interpreted in detail. The same applies to the late antique and early medieval phases of building use. The remains of the thermal baths have now been destroyed or built over by an underground car park. In the area of the latest period of use, the currently ongoing excavations can still provide valuable results. This also applies to the still incomplete examination of the finds from the excavations of 1953.

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The Romantic Limes

Catherine Visser

Visualising Roman archaeology of *Forum Hadriani* in historical and cultural perspective

Forum Hadriani-Arentsburgh is a World Heritage Site in Voorburg, the Netherlands. Underneath a listed 17th- to 19th-century landscape park lie the remains of a Roman provincial town closely linked to the strategic naval infrastructure of the Corbulo Canal (Polak *et al*. 2020). It is a multi-layered site with a strong cultural-historic context. For the visualisation of the Roman archaeology the layered history and special quality of the site led to a design approach different from other visualisations in Dutch limes sites, where the military rigour and monumentality are represented in a *tabula rasa*. The design for the proposed visualisation has been attained through contextual and historical analysis, encompassing the afterlife of the Roman urban infrastructure and its cultural echo's. The design re-actualises 19th-century concepts of the picturesque and the sublime that influenced both the 19th-century vision of the Roman town as it was first excavated in 1827 and the romantic English park created after the excavation campaigns.

Discussion

In the whole of the Frontiers of the Roman Empire but especially in the Netherlands where archaeology is mostly hidden underground, we are confronted with a complex historical infrastructure represented by ephemeral and fragmentary finds. In visualisation projects on site, the Dutch planning tradition often responded through emblematic representations of fortress shapes or iconic imagery with a modern materiality (Leiden – Park *Matilo*, Vechten – *Fectio*, Alphen aan den Rijn – soldier, Byland – bathing nymph). This tendency of conceptual presentation is motivated by the wish to show the public unambiguous and recognisable proof of Roman military greatness (the first thing that comes to mind when one tries to imagine the frontier of the Roman Empire). Though these presentations function well as spectacular signs triggering the curiosity of the public, they fail to engage with the fascinating multi-layered narratives and material worlds that come out of archaeological and historical research. The result is not only a false pretence of certainty, but is also alienating from a contemporary public that wants to discover and question instead of being told. In this paper we propose a more diversified and hopefully engaging design approach based on the multi-layeredness of the historical site and interacting with the public. This way of designing is not separated from research but is the outcome of dialogue and interpretation. It interprets the Roman archaeology as part of a long transformation of the local landscape and considers the afterlife and cultural reverberations of Roman presence.

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Figure 1. Caspar Reuvens overlooking the excavation of the bathhouse of *Forum Hadriani* with in the background the kitchen garden wall and the house of Arentsburgh (lithographer Tiemen Hooiberg, collection Rijksmuseum van Oudheden, Leiden).

Interpretation of heritage on-site

Unlike scientific interpretation of archaeological facts, interpretation in the process of presentation and visualisation focuses on bringing to life (a selection) of historical facts in a way that is likely to engage the visitor. To do so it is necessary to connect to the audience (Mills 2015). But the audience of a museum is not that of an urban site that is the daily environment of a community and is frequently but not massively visited by heritage tourists. The narrative told cannot focus exclusively on the Roman heritage as stated in the Outstanding Universal Value (OUV) but should inscribe itself within the wider context of the site and its different stories past and present. The Roman heritage, substantialised by the archaeological remains, can enrich the sense of place, adding time depth to a familiar environment. Sence of place and connection to a shared history constitute one of the long-term objective of UNESCO World Heritage as stated in the management plan for the Lower German Limes (Leene *et al.* 2020). A multi-layered approach to interpretation including cultural themes and narratives beyond the OUV is also one of the main strategies promoted in the 'Interpretatiekader Romeinse Limes in Nederland', the interpretation framework that was made for the Dutch part of the Lower German Limes (Visser *et al.* 2016). As stated in the interpretation framework, there is a danger of redundancy when all sites tend to tell a broadly similar story and use the same visualisation tools. The finesse of archaeological knowledge is often not communicated to the visitor as it is considered too complex. Highlighting the multi-layered history and sense of place can strengthen the uniqueness of a site, making it complementary to other sites. Taking into consideration the reception history of the limes highlights the political and cultural resonances of the Frontier of the Roman Empire, both in the past and in the present (Hingley 2013).

Analysis. *Forum Hadriani*-Arentsburgh, a multi-layered case

How does the specific spatial and cultural context of the site *Forum Hadriani* – Arentsburgh make for its uniqueness within the Lower German Limes? A brief description of the main layers that constitute the site touches of the following thematic lines:

1. The development of consecutive historical physical structures.
2. Ideas on Roman heritage that materialised around the site.
3. The excavation history of the site.
4. The material culture of the different eras that came to us in fragments.
5. The local involvement and current use of the site.

Figure 2. Picture of the Arentsburgh estate around 1900. View from the (excavation) hill overlooking the pond, and in the background the picturesque gardeners house of Hoekenburg (collection Kees van Leer).

Physical structures

Forum Hadriani, the provincial town of the *Cananefates* and officially named as *Municipium Aelium Cananefatium* is thought to have been functioning as a Roman provincial town with strong military affiliation on the Corbulo Canal between AD 121 and AD 250. The town structure has been clearly demonstrated over different excavation campaigns although much of the excavations have not been properly published. It is believed a big part is still there. The town features an important harbour on the canal (excavated in 2007 and 2008) and many fine stone buildings fitting a provincial Roman town (Driessen & Besselsen 2014). The setting and harbour testify of the importance of market towns in the chain of food production and supply for the army (Buijtendorp 2010; Driessen & Besselsen 2014; Polak *et al.* 2020). Archaeological finds show that unlike the sturdy building types of the *castella* along the Rhine, the public architecture of *Forum Hadriani* attained a high level of luxury and refinement befitting a Roman civil centre. The town thus also frames the local elite, veterans and trades people as members of *romanitas* (Buijtendorp 2010). The main road, *decumanus*, of *Forum Hadriani* proved to be a persistent structure. On 17th-century maps the structure persists as the 'Burghpat' (English: castle path) and is still now recognisable in the lay-out of the adjacent hospital terrain.

On the famous map of Delfland from 1722 by Nicolaas Cruquius (Nic. en Jac. Cruquius, 't Hooge Heemraedschap van Delflant, 1712, collection Nationaal Archief), the site, now called Arentsburgh, is part of a long string of country estates along the Vliet, an important canal linking The Hague with Leiden and Delft. This water infrastructure is still there today and follows more or less the same course as the Roman Corbulo Canal. These country estates, Arentsburgh, Hoekenburg, Hofwijk, *etc.* were created in the 17th century by wealthy merchants and courtiers fleeing from the inconveniences of urban summers (Blok 2006). It is just far away to allow for lush gardens combining production and pleasure but within easy reach of the city by boat. The houses would be along the water while the gardens would stretch out at great length. The orthogonal classical lay-out of the 17th century Arentburgh evolves towards the 19th century. This transformation is triggered by the famous excavation campaign of Caspar Reuvens in 1837. His massive digging as seen on the print that was made of it (fig. 1) uprooted the whole site and leave behind a pile of dirt. The site is then transformed by the next owner in an English style landscape garden with serpentine paths, a hill, and a pond. Small decorative buildings like teahouses adorn this landscape. (fig. 2) In the 20th-century part of the Arentsburgh estate becomes a school institution (house and kitchen garden) and the

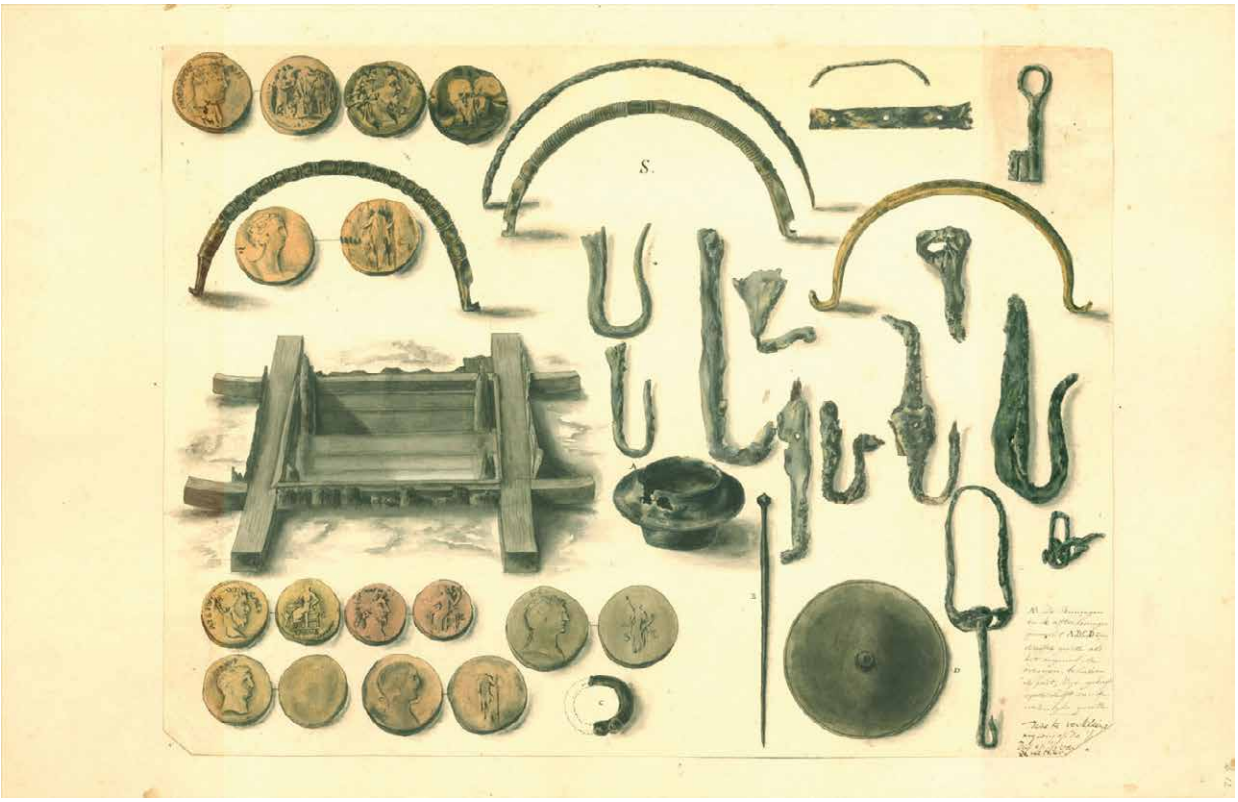

Figure 3. Drawing of the excavated great well with the treasures it contained commissioned by Caspar Reuvens (Lithographer Tiemen Hooiberg, collection Rijksmuseum van Oudheden, Leiden).

remaining part is turned into a public park jointly with the neighbouring estate Hoekenburg. The surroundings outside of the estates are built over with houses. The general structure and the orientation of the estate changes through this change of function. Remnants of the prior phases, like the kitchen garden wall the tree alley and the pond are still present in the park. In 2005, luxury apartment blocks are built on the site of the former school.

Ideas on Roman heritage

The 17th-century, political and financial elite of the Dutch republic adopted different attitudes towards the Roman past. In political propaganda as propagated by the same estate owners along the Vliet, Roman history provided a justification for the Dutch Republic: the Batavian Revolt AD 69/70 was seen as a predecessor of the Dutch revolt against Spanish rule. The *Batavi* as proto-calvinists, fighting for their freedom, is bringing history into the realm of mythology hence the name 'Batiavian Myth' (Van der Woud 1998). It is to be found in many paintings of Rembrandt, Potter and in literature of the time. On the other hand, Roman writing and architecture were being studied and emulated by the same elite in the classicistic revival of the 17th century. Among them Constantijn Huygens, an influential courtier and writer, who arranged his nearby garden of Hofwijck according to Vitruvius' principles and who collected Roman objects found in the area (Van Leer *et al.* 2016). In the 17th and 18th century, the Roman past was often presented as a historical episode associated with Dutch rivers. The message being: "The mighty Romans once overpowered the delta landscape, now nothing of that remains" (Vondel 1630; Smits 1750).

Excavation history

It is the figure of Caspar Reuvens, world's first professor of archaeology, who in *Forum Hadriani* marks the beginning of a new era in historiography and archaeology by conducting archaeological research in a scientific way. The team of Reuvens drew very precisely measured drawings of the finds charting the different materials and layers and detailing telling fragments (fig. 3). This approach marks a shift away from mythology: Reuvens argues that archaeology is there to correct historical assumptions derived from books (Van der Woud 1998). Although breaking with the tendency to idealise history, Reuvens can be considered as a bridge between the position of the old antiquarian and the modern archaeologist. Looking at the imagery he produced we see a picturesque staging of sublime ruins in a 19th-century landscape (fig. 1). It is a representation of the excavation site as a Pompeian

landscape in the style of the Piranesian ruin drawings. Tiemen Hooiberg, lithographer of Reuvens, clearly alludes to the Pompeian images that were very popular at the time. He uses the pinnacles on the gates of the 17th-century house to suggest a continuous colonnade running down the side of the bathhouse bridging between antiquity and the 19th-century context (fig. 1). After the famous Reuvens campaign between 1827 and 1835 other excavations followed, often triggered by building activities. The last excavation in 2007 and 2008 on the site of the former school has uncovered an extensive harbour complex within the city walls (Driessen & Besselsen 2014). Although much is documented, there are still many unanswered questions and a lot of results have not been worked out.

Material culture

The high level of leisure, luxury, and beauty both in Roman period and in the period of the country estates form a striking continuity. Throughout the history of the site inhabitants achieved a 'good life'. This is apparent in the material culture of the site. The bathhouse with its sandstone ornaments, the fragments of statues, household objects and wall decorations make this site stand out from other Dutch limes sites. They represent a material culture associated with Roman urban life and echo other cities in the Empire. The topiary variations, ornamental flowerbeds, statues and building ornaments of the estates, as can be seen in the historic photographs, and be recognised on site, materialise the leisurely luxury of the country estates. Even now, the large mansions from the 1930 and the more recent apartment blocks form a comfortable and luxurious living area within the The Hague metropolitan region.

Local involvement

As stated in the FARO treaty cultural heritage has a social and societal value. With the volunteers of the Archeologische Werkgroep Leidschendam-Voorburg (AWLV, Archaeological Working Group Leidschendam-Voorburg) and the Historische Vereniging Voorburg (Historical Society Voorburg), *Forum Hadriani* has known a long and lasting involvement of dedicated amateur archaeologist and historians. They are, together with the local museum Swaensteyn, the initiators of the current presentation project. In 2017 they asked for help to develop a presentation as their initial idea to uncover the famous cellar that Caspar Reuvens documented in 1827 proved to be technically impossible.

Besides this dedicated group many of the inhabitants feel ownership for the park even though the park is public and situated at an important crossing of bike roads and waterways. As it is, inhabitants feel their environment undergoes disruptive changes like the big scale transformation of the nearby hospital site and the creation of a fast lane for bicycles. Within this changing environment the listed monument of the park is valued for its existing green qualities and quietness. The addition of a Roman layer, as proposed in the 'Romantic Limes' project, is considered to be too disruptive by a large section of the inhabitants. They are fearful about the intervention being too big and the possible increase in visitor numbers.

In response to that the project is currently being reconsidered: In the upcoming project 'Forum Hadriani, Weaving Times / Caring Confrontations' students of the Design Academy Eindhoven will explore alternative narratives and imaginations with inhabitants: (due January 2024). This process will hopefully result in more dialogue and trust and provide the basis for a new start of the visualisation project.

Spatial interpretation. The historical sensation of the 'Romantic Limes'

As stated above, presenting a Roman heritage site and its afterlife in a public place is not like curating a museum exhibition or writing a book about the site's history. Although elaborate explanations are out of place a heritage site offers the possibility to experience the history of the place. This experience is a mental process, involving imagination and the physical experience. Being in it, touching the ground where history left its imprint, feeling the presence of the past. For such a transcendental 'historical sensation' (Huizinga 1905) to happen, something physical, tangible, and beautiful must be there. As argued by Ankersmit (2005), the experience of history is sublime, a sudden moment of awe and revelation when one realises the immensity of a past space and time through the confrontation with a suggestive fragment. This notion of the sublime was one of the key concepts of romanticism together with the picturesque. Through the *mise-en-scene* of fragments and ruins (follies) in a natural environment, landscape parks of the romantic period were making historical experiences either of imaginary classical arcadias, the odyssey, alpine landscapes, or real medieval remains.

In the case of the Park Arentsburgh the unravelling of this sense of place in the different layers explained above provides the framework for the presentation design. The design interpretation started by identifying on one hand the continuities of the space and on the other hand the exceptional features. The romantic lay-out of the park with its serpentine paths, the surprising vistas and the pond form the spatial continuity but also provide a conceptual frame. This is the romantic experiential approach as discussed above. In this context, the Roman limes heritage is staged in a fragmentary way enhancing a historical experience. Resonating with the leisurely way of life that formed the place, the interpretation is attempting to be light-hearted and pleasing, blending into the relaxed green context.

Figure 4. Impression of the water well folly, the bubble fountain and the fragment of the *decumanus* in the setting of Park Arentsburgh (DaF-architecten).

For the AWLV the visualisation of *Forum Hadriani* had to focus on either the 'kelder van Reuvens', a stone cellar, or the 'put van Reuvens', the central water well of the Roman town. Both were initially discovered by Reuvens and re-excavated with the help of members of the AWLV in the 1980's. We choose the water well for different reasons. The well is relatively small, 2,5 × 2,5 m, which makes it easier to accommodate in the park. On the other hand, the well is like the navel of the Roman town, it is situated om the crossing of *cardo* and *decumanus* and its public function demonstrates the level of public amenities in Roman towns. Furthermore, it yielded a great number of fascinating objects and coins and is represented in an exquisite drawing of Reuvens (fig. 3). The other represented feature is the curved wall of the bathhouse situated in the pond. Here, the continuity of the site can be stressed by representing the bathhouse wall by a bubble fountain in the pond. The sheer size of the bathhouse and its elaborate bath system represent the urban standards of Roman towns all over the Empire. The last represented Roman element is the *decumanus*. This straight infrastructure of 16 m wide (Buijtendorp, 2020) strongly contrasts with the narrow and winding park paths.

The water well is designed as a modern folly with a tiny exhibition viewable from the outside. The construction is undeniably modern but alludes to classical composition techniques as tripartition, symmetry and Roman materiality. Using wood, ceramic roof tiles and stone rubble permits us to represent the material culture of the Roman town that is, in reality, hidden deep down. Together with the members of the AWLV, we consider using some of the archaeological material to make the composite walls of the folly, thus making the building project into a joint effort. The design does not stop at these fragmentary visualisations but extends to a restauration of the 19th-century landscape with the now hidden wall of the kitchen garden. This will restore the sweeping vista from the hill, the pivotal Reuvens scene (fig. 1) that embraces both the Roman elements and the wall of kitchen garden. The winding diagonal paths of the park will tie all these different elements from different times together into one voyage, providing different experiences and storylines.

Figure 5. Plan of the proposed restauration and visualisation. The lay-out of the excavated stone and wood foundations of *Forum Hadriani* are drawn with lines (DaF-architecten with archaeological data (CAD) from RCE).

Conclusion

Presenting the world heritage of *Forum Hadriani* into 19th-century landscape of Arentsburgh requires a bigger culture-historical perspective than the OUV provide. Caspar Reuvens framed his excavation as a Pompeiian scene blending different historical periods in one romantic *vista*. This aesthetic and cultural framing lead the way to the current proposal for visualisation. The adaptive and eclectic use of cultural references embedded in the history of the site is informed by a cross over analysis of the cultural currents and spatial themes. This implies knowledge and methods from different fields, archaeologists, historians and landscape architects and the experience of locals. Mutual understanding (in the spirit of UNESCO) is the beginning of a fruitful collaboration. This can be achieved by understanding the methodology and underlying value systems of the different areas of expertise. This article attempts to showcase the designer's position and use of concepts like context, interpretation and layering for an audience consisting of mainly archaeologists. It goes without saying that interpretation in the design of archaeological visualisation cannot do without archaeological input. However, for an engaging archaeological presentation to be part of the sense of place, we cannot do without the spatial interpretation informed by a wider cross-disciplinary analysis.

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Part 7

FRONTIERS OF THE ROMAN EMPIRE

WORLD HERITAGE ACROSS THREE CONTINENTS

Frontiers of the Roman Empire. World Heritage across three continents

Marinus Polak, Stéphanie Guédon
and René Ployer

The session held under the title 'Frontiers of the Roman Empire: World Heritage across three continents' may be seen as a step in a process which started 35 years ago: the recognition of the immense cultural historical value of the frontiers of the Roman Empire through their inscription on the World Heritage List of UNESCO, the United Nations Educational Scientific and Cultural Organisation. In 1987, Hadrian's Wall was the first part of the Roman frontiers to be inscribed. Since the summer of 2021, all the frontier sections stretching from the United Kingdom to Slovakia are part of the World Heritage List. The remaining European sections up to the Black Sea are expected to follow soon. It is the ambition to expand the World Heritage status to the frontiers outside Europe, from Turkey to Morocco – similar and very different at the same time. The added value of the frontier sectors in the east and south is clear and has been outlined in a thematic study presented to UNESCO in 2017 (Ployer *et al*. 2019).[1] Since then, various initiatives have been taken to put words into action.

It was the purpose of the congress session to conduct a scholarly debate on the frontiers of the Roman Empire in general and those outside Europe in particular, in the context of World Heritage. What do the frontiers look like in those regions, what are their characteristics? Is the definition of the Roman frontiers that was used to nominate the European sections for the World Heritage List appropriate for those in North Africa and the Middle East? What is needed to be able to nominate the frontiers of the south and east? How can their values be explained to the wider audience, to society? And, now the number of frontier sections on the World Heritage List is substantially expanding, how can we harmonize their management and further their development?

Most of these aspects will be addressed in the papers following hereafter. In the present paper we will briefly recall the concept of World Heritage, the history of the Frontiers of the Roman Empire as World Heritage and the framework developed for recent and future World Heritage nominations. Finally, we will explore the road towards expansion of the Frontiers of the Roman Empire as World Heritage in North Africa and the Middle East.

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World Heritage

World Heritage, or more fully World Cultural and Natural Heritage, is defined in the 'Convention concerning the Protection of the World Cultural and Natural Heritage',[2] as "parts of the cultural and natural heritage that are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole."

This definition reveals four key aspects of World Heritage:

1. World Heritage may be cultural or natural (or a combination of the two).
2. Only heritage of outstanding interest qualifies for World Heritage.
3. World Heritage needs to be preserved.
4. World Heritage is heritage of all the peoples of the world.

Elsewhere in the Convention, cultural and natural heritage and the outstanding value defining them as World Heritage are defined in more detail. Cultural heritage is stated to include 'structures of an archaeological nature' and 'archaeological sites'.

The Convention was adopted at the General Conference of UNESCO in November 1972 and is currently adhered to by 194 State Parties.[3] By ratifying the Convention, a State Party takes on many commitments, first of all to identify and delineate cultural and natural properties of potential outstanding universal value in its territory, and to ensure the protection, conservation, presentation and transmission to future generations. It is important to note that the Convention is not only about protection and conservation, but also about presentation, which relates to the general aim of UNESCO to maintain, increase and diffuse knowledge and to the specific aim of giving the cultural and natural heritage a function in the life of the community.

Every State Party to the Convention is to submit an inventory of cultural and natural properties which it considers as having outstanding universal value (Tentative List). If a property is nominated for inscription on the World Heritage List it is up to the World Heritage Committee, composed of 21 States Parties to the Convention, to decide on the justification of the claimed value, by applying criteria established in the 'Operational Guidelines for the Implementation of the World Heritage Convention'.[4] The Committee is advised by the International Council on Monuments and Sites (ICOMOS) and the International Centre for the Study of Preservation and Restoration of Cultural Properties (ICCROM) for cultural properties and by the International Union for Conservation of Nature (IUCN) for natural properties. In case of a positive decision the nominated property is inscribed on the World Heritage List,[5] the record of World Cultural and Natural Heritage kept by the Committee.

The Committee has defined ten criteria for the assessment of outstanding universal value: six for cultural and four for natural properties. The sections of the Frontiers of the Roman Empire inscribed on the World Heritage List meet three of these criteria:

ii. (Exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design.
iii. Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.
iv. Be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

A nominated property must also meet specified conditions of integrity and authenticity, and have an adequate protection and management system. Integrity is about the completeness and intactness of the attributes conveying the outstanding value and requires control of deteriorating processes. Authenticity relates to the credibility and truthfulness of the representation of the values, avoiding misinterpretation; in case of archaeological remains, conjectural reconstructions are considered as compromising authenticity. Protection and management are aimed at maintaining, and where possible improving, the integrity and authenticity. Effective protection requires adequate legislative regulations and clear boundaries including all relevant areas and attributes. Management is not just about monitoring and maintaining the physical condition of a property, but also about presentation and community involvement.

World Heritage properties are usually single monuments located within the borders of a single country; if a property extends across the borders of two or more adjoining countries it is called a transboundary property. A property consisting of a series of discrete monuments is called a serial property; if its components are divided over more than one country it is called a serial transnational property. At present, the sections of the Roman frontiers inscribed on the World Heritage List are divided over three distinct properties:

2 https://whc.unesco.org/en/convention/, 3-11-2022.
3 https://whc.unesco.org/en/statesparties/, 1-4-2024.
4 https://whc.unesco.org/en/guidelines/, 3-11-2022), current version: 24 September 2023. The criteria for the assessment of Outstanding Universal Value are set out in section II.D, which also refers to sections II.E and II.F.
5 https://whc.unesco.org/en/list/, 3-11-2022).

1. 'Frontiers of the Roman Empire': Hadrian's Wall (England), inscribed under its own name in 1987,[6] extended with the Upper German-Raetian Limes (Germany) in 2005,[7] under the new joint name, and further extended with the Antonine Wall (Scotland) in 2008.[8]
2. 'Frontiers of the Roman Empire – The Lower German Limes' (Netherlands, Germany), inscribed in 2021.[9]
3. 'Frontiers of the Roman Empire – The Danube Limes (Western Segment)' (Austria, Germany, Slovakia), inscribed in 2021.[10]

All three are serial transnational properties, consisting of distinct monuments divided over two or three countries. At the time of writing, the World Heritage List comprised 1154 properties, including only 43 transboundary or serial transnational properties,[11] three of which are thus sections of the Roman frontiers. In view of UNESCO's conviction that transboundary and transnational properties encourage international and peaceful cooperation, the importance and impact of the ambition to expand the Frontiers of the Roman Empire as World Heritage to the remaining frontiers in Europe and to the continents of Africa and Asia are evident.

Origin and development of the Frontiers of the Roman Empire as World Heritage

When Hadrian's Wall, probably the most iconic section of the frontiers of the Roman Empire, was inscribed on the World Heritage List in 1987, it was not intended to be the first of a series (for this section Breeze & Jilek 2008; Sommer 2021). The idea of a multinational World Heritage property for the frontiers of the Roman Empire was first launched in the late 1990's, by Zsolt Visy, then professor of archaeology at the University of Pécs and as Secretary of State at the Ministry of National Heritage (1998-2000) delegate of Hungary when this State Party was member of the World Heritage Committee (1997-2003). His proposal was well received by other Committee members and by the World Heritage Centre, which is tasked with the day-to-day management of the Convention. Unconscious of Visy's initiative, the same ambition was voiced by a group of Roman archaeologists and cultural heritage managers attending the annual conference of the European Association of Archaeologists (EAA) in 2001; in following years it was developed further, particularly from a scientific point of view, in a 'Working Party on Roman Frontiers'.

Meanwhile, Germany had started preparing the nomination of the Upper German-Raetian Limes. First submitted on an individual basis, the nomination was deferred by the Committee with the request to negotiate with the United Kingdom to extend the property of Hadrian's Wall with the Upper German-Raetian Limes. The resulting bi-national nomination was accepted by the Committee in 2005, with the recommendation "that the nomination be seen as the second phase of a possible wider, phased, serial transboundary nomination to encompass remains of the Roman frontiers around the Mediterranean Region".

The combined property was inscribed under the new name of 'Frontiers of the Roman Empire'.[12] In 2008, the Antonine Wall was added as a further extension, resulting in a single World Heritage property with three components. By that time, Austria, Hungary, Slovakia and Croatia had stated their intention to nominate their sections of the Roman frontiers, while Germany had started preparations for the nomination of their part of the Lower German frontier. All these sections were expected to be nominated as further extensions of the existing property, in line with the 'phased' approach recommended by the Committee in 2005.

At the meeting where the Committee decided to add the Antonine Wall to the Frontiers of the Roman Empire property, growing concerns were voiced about serial nominations in general and large transboundary and transnational ones in particular. Issues mentioned included the definition of outstanding universal value, the selection of components, effective international collaboration and the complexities of management of large properties.

The subject was further discussed during expert meetings in 2008, 2009 and 2010. The latter meeting resulted in a long series of conclusions and recommendations, which were approved by the Committee at its 43rd session in 2010.[13] Two statements resulting from the expert meeting were particularly relevant to future nominations of sections of the Roman frontiers:

6 Decision 11 COM VII.A, http://whc.unesco.org/en/decisions/3749, 27-11-2022.

7 Decision 29 COM 8B.46, http://whc.unesco.org/en/decisions/511, 27-11-2022.

8 Decision 32 COM 8B.40, http://whc.unesco.org/en/decisions/1501, 27-11-2022.

9 Decision 44 COM 8B.40, https://whc.unesco.org/en/decisions/7959, 27-11-2022.

10 Decision 44 COM 8B.24, https://whc.unesco.org/en/decisions/7943, 27-11-2022.

11 https://whc.unesco.org/en/list/, 3-11-2022.

12 At the 29th session of the World Heritage Committee, Decision 29COM 8B.46 (https://whc.unesco.org/document/5941, 3-11-2022.

13 For the expert meeting and its outcomes Document WHC-10/34.com/9B (https://whc.unesco.org/en/events/1097/; https://whc.unesco.org/document/103442, 3-11-2022). See also Decision 34 COM 9B (https://whc.unesco.org/document/104960, 3-11-2022).

1. (The Meeting requested that) "the Advisory Bodies (…) provide guidance to States Parties on the preparation of Tentative Lists, including through (…) the preparation of thematic studies for regions or sub-regions where serial nominations are considered".
2. (The Meeting noted that) "when a series of sites is nominated, each State Party should be aware of the implications (…) in relation to the nomination strategy they choose to adopt. Examples of different nomination strategies include:

    a. nominating single properties, including series of national sites;
    b. extensions to existing World Heritage properties (both single or serial);
    c. nominating a series of single properties under a common framework (but not constituting a single property);
    d. nominating a single serial transnational property."

In line with the recommendations of the experts, ICOMOS advised the countries preparing new nominations of Roman frontier sections to compile a thematic study on the whole of the frontiers of the Roman Empire, across three continents, and to propose an agreed nomination strategy. It was clear that, because of the size and complexity of a single property extending over three continents and some twenty countries, further extension of the existing monument was no longer thought to result in a coherent and manageable World Heritage property. Instead of continuing along the lines of strategy b above, which had resulted in the creation of the serial Frontiers of the Roman Empire property with three components divided over three countries, it was suggested to consider strategy c: a series of distinct properties under a common framework.

Since several countries were already well underway with the preparation of national or bi-national nominations along the lines of the phased extension of the existing property recommended by the Committee only a few years previously, it took until 2016 before it was accepted that this path was no longer passable, and that the compilation of a thematic study was needed to move forward. The study was presented to the Committee in 2017 and accepted as a solution for a feasible nomination process, for single properties under a common framework.[14]

Compared to the phased approach suggested in 2005 – gradually extending a single property, country by country – the new strategy has two major implications. Firstly, the nomination of larger segments with a common and distinct outstanding universal value requires joint and synchronous preparations by several countries, which can be challenging. Secondly, a common framework providing a similar degree of coherence and collaboration as achieved by a single property requires an additional organisational level (Jones this volume).

The framework for recent and future nominations for the World Heritage List

The thematic study presented to UNESCO in 2017 owed much to the work of the already mentioned EAA Working Party on Roman Frontiers and to that of the Bratislava Group, a scientific committee created in 2003 to advise on the Roman frontiers in the context of World Heritage (Jilek 2008). The latter group, named after the city in which it first met, set out the contours of a World Heritage property for the Roman frontiers across three continents, in the run-up to the nomination of the Upper German-Raetian Limes as an extension of the World Heritage property of Hadrian's Wall. These contours were laid down in a Summary Nomination Statement inserted in the nomination file of the Upper German-Raetian Limes (Breeze & Young 2008).[15] This statement also specified the nature, purpose and membership of the Bratislava Group. Shortly after the submission of the nomination, the Bratislava Group was requested by the World Heritage Centre to provide a succinct definition of the Roman frontiers in the context of World Heritage. This resulted in the 'Koblenz Declaration', after the city where it was agreed upon: "The Frontiers of the Roman Empire World Heritage Site should consist of the line(s) of the frontier of the height of the Empire from Trajan to Septimius Severus (about 100-200 AD), and military installations of different periods which are on that line. The installations include fortresses, forts, towers, the limes road, artificial barriers and immediately associated civil structures. It is accepted that Roman frontiers are more complex, and that this might be recognized in a later amendment to the above definition, but this definition is recommended as the first step in the creation of this multi-national World Heritage Site." This definition of 2004 was an amended version of an earlier proposal developed at the EAA conference of 2001. The Koblenz declaration was adopted as a point of departure for the thematic study of 2017.

The thematic study presents the Roman frontiers from a chronological, geographical and typological perspective, gives an impression of their remains and summarizes and compares their main characteristics (Ployer *et al.* 2019). In line with the Koblenz declaration, the study focuses on the 2nd century AD. The frontiers in Europe are discussed in more detail than those in Africa and Asia, which are less well known so far. It is argued that five groups of frontiers can be distinguished:

14 Decision 41 COM 8B.50 (https://whc.unesco.org/document/159798, 3-11-2022); for a printed edition of the thematic study Ployer *et al.* 2019.

15 https://whc.unesco.org/uploads/nominations/430ter.pdf, 3-11-2022.

1. The desert frontiers of the Roman provinces of Africa, Egypt, *Arabia* and southern Syria.
2. The frontiers of northern Syria and Cappadocia (Turkey), constituting the frontier with the powerful Parthian Empire in the East.
3. The frontiers along the European rivers Rhine and Danube.
4. The artificial linear barriers of Hadrian's Wall, the Antonine Wall and the Upper German-Raetian Limes.
5. The mixed frontier of the Roman province of *Dacia* (Romania).

The study concludes with a proposed nomination strategy for the frontiers in Europe. Those in Africa and Asia need more study, and it is to the States Parties involved to agree on a nomination strategy for these areas. In Europe, the artificial barriers have already been inscribed, as parts of the combined World Heritage property 'Frontiers of the Roman Empire'. For the remaining European frontier section it is suggested to nominate these as three distinct properties:

1. The Lower German Limes.
2. The Danube Limes, to be nominated in two steps.
3. The Dacian Limes.

Together with the artificial barriers, these groups would constitute four distinct World Heritage properties, united under an overarching collaborative framework, the 'Frontiers of the Roman Empire World Heritage Cluster'. The implementation of the proposed nomination strategy is now halfway. The Western Segment of the Danube Limes and the Lower German Limes were nominated in 2018 and 2020, respectively, and were both inscribed on the World Heritage List in 2021.[16] The nomination of the Dacian Limes has been submitted in 2023 and that of the Eastern Segment of the Danube Limes will follow soon after.[17] The Frontiers of the Roman Empire World Heritage Cluster is gradually taking shape (Jones this volume).

Expanding the Frontiers of the Roman Empire as World Heritage outside Europe

The presentation of the thematic study to UNESCO in 2017 has led to various steps towards the expansion of the Roman frontiers as World Heritage to the continents of Africa and Asia. Delegates of all the involved States Parties, particularly those from the east and south, were invited for various discussions at UNESCO and ICOMOS meetings in 2017, 2018 and 2019, and for the presentation of the nomination file for the Lower German Limes to UNESCO in 2020. One of the delegates attending the latter event was Claudia Reinprecht, then Ambassador at the Permanent Delegation of Austria to UNESCO. She developed into an ardent advocate for the expansion of the Roman frontiers as World Heritage outside Europe. In this regard, she organized two online meetings in 2021 with her diplomatic colleagues, heritage managers and archaeological experts, and with advice from the World Heritage Centre and ICOMOS.[18]

During these online meetings it was clarified which steps need to be taken to arrive at nominations of Roman frontier sections in the east and south. First of all, the thematic study of the Roman frontiers needs to be expanded to give a better view and definition of the frontiers in the mentioned regions (Akerraz this volume; Guédon this volume; Toköz & Aktüre this volume), to outline their preservation and the opportunities for sustainable protection, and to add a detailed nomination strategy. Particularly in northern Africa there appears to be a shared interest to move forward.

In September 2022, Stéphanie Guédon, Marinus Polak and Anna Walas submitted a research proposal in respond to the Cultural Heritage, Society and Ethics call (CHSE) of the Joint Programming Initiative Cultural Heritage and Global Changes (JPI-CH), an instrument launched by the European Union. The proposal, with the title 'African Frontiers of the Roman Empire: Rethinking and protecting World Heritage (AFROME)' aimed at (1) redefining the Roman frontiers in the Maghreb (Morocco, Algeria, Tunisia, Libya), in dialogue with societal and political stakeholders in the region and breaking away from tainted colonial legacies, (2) mapping and assessing the remains of the Roman military installations and (3) supporting a sustainable and inclusive heritage process to enable future inscription of these frontier sections on the World Heritage List. To achieve these goals a consortium was established with partners from the four Maghreb countries, the Netherlands Institute in Morocco, the World Heritage Centre of UNESCO and several experts from Europe (including Rebecca Jones, David Mattingly and René Ployer). Although most elements of the proposal were highly commended, the application was unfortunately not funded. Since the main applicants and the consortium are convinced that the project would be a significant step forward to the expansion of the Roman frontiers as World Heritage outside Europe, they will search for new opportunities to realize its aims.

16 The nomination file for the western segment of the Danube Limes was submitted by Austria, Germany, Hungary and Slovakia, but the Hungarian part was withdrawn and is not part of the inscribed World Heritage property (Sommer 2021, 39-40).

17 The eastern segment of the Danube Limes will be nominated as an extension of the inscribed western segment, and may include a selection of sites in Hungary.

18 The first meeting was recorded and is available online: https://limes.univie.ac.at/files/film_unesco.mp4 (22-12-2022). The presentations of this meeting are also available online: https://limes.univie.ac.at/files/FRE-Merged_presentations.pdf, 22-12-2022.

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The authors would like to thank all colleagues who presented a paper in this congress session as well as those who attended it and participated in the discussions. We think the session very much reflected the spirit of the World Heritage Convention. We are well aware that in our efforts to bring the process of the Roman frontiers as World Heritage further we are standing on the shoulders of many, of which David Breeze, Zsolt Visy and the late Sebastian Sommer deserve particular mention. We are grateful to David and Zsolt for valuable comments on a draft of this paper.

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Le système de défense romain en Maurétanie tingitane

Aomar Akerraz

Traiter du système défensif romain impose nécessairement de prendre en considération plusieurs autres aspects qui lui sont étroitement liés: historiques, géographiques, politiques, économiques, rapports avec les tribus à l'intérieur ou voisines de la province. Toutefois, nous nous limiterons dans cette contribution à ne présenter ce système et ses éléments en Maurétanie tingitane durant les Haut et Bas Empires qu'à la lumière des recherches récentes sur la question et sur l'occupation du territoire. Les publications sur les ouvrages militaires et le système de contrôle du territoire de la province romaine de Tingitane qui se sont poursuivies depuis les travaux de Charles Tissot dans la seconde moitié du 19e siècle à ce jour sont abondantes et parfois confuses[1]. Cette note, a pour ambition de jeter un nouvel éclairage sur la question, fondé sur une revue de l'ancienne documentation et sur l'apport des nouvelles prospections qui ont favorisé une meilleure connaissance du territoire tingitan et son occupation dans l'Antiquité.

L'occupation du territoire tingitan

L'histoire de la Maurétanie occidentale romaine peut être subdivisée en deux principales phases durant lesquelles les frontières de la province ont varié de façon significative. Durant le Haut-Empire (42 ap J.-C – fin 3e siècle) la province était limitée, selon les sources littéraires, à l'est par le fleuve Malva (Moulouya), au nord et à l'ouest par la Méditerranée et l'Atlantique. Au sud, la frontière peut être *grosso modo*, la courbe matérialisée par la limite nord de la forêt de la Maâmoura qui relie *Sala* à *Volubilis*. Au Bas-Empire (fin 3e – 429 ap J.-C.) la frontière méridionale de la province est ramenée autour de la région du détroit de Gibraltar, au nord de l'oued Loukkos.

Le réseau urbain, composé de 5 colonies (*Tingi*, *Zilil*, *Lixus*, *Banasa* et *Babba*), d'au moins 4 municipes (*Septem*, *Thamusida*, *Volubilis* et *Sala*) et d'autres agglomérations dont nous ne connaissons pas le statut (*Tabernae*, *Ad Novas* (Souiyar), *Oppidum novum*, Souk el Arbaâ, Rhira, *Tocolosida*), est implanté dans et autour des plaines alluviales atlantiques (Tahaddart, Loukkos, Sebou, Bou Regreg) et méditerranéennes (oued Martil). La majorité des cités de la province se trouve le long des deux voies de direction nord-sud et autour de la rive sud du détroit de Gibraltar; et hormis quelques sites, dont le principal est

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1 Nous nous contenterons ici de ne citer que les dernières synthèses sur la question: Euzennat 1989; Rebuffat 2000; Akerraz 2010. Pour illustrer les différentes tergiversations, Rebuffat (1987, 33), donne une liste de 14 camps pour le Haut et le Bas-Empire et dans sa dernière synthèse (Rebuffat 2000, 267 et fig. 3) il parle de 17 camps.

in: H. van Enckevort, M. Driessen, E. Graafstal, T. Hazenberg, T. Ivleva & C. van Driel-Murray (eds) 2024, *Current Approaches to Roman Frontiers. Proceedings of the 25th International Congress of Roman Frontier Studies 1*, Leiden, Sidestone Press (= Archeologische Berichten Nijmegen 9), pp. 279-286.
DOI: 10.59641/3d278gp

Rusadir (Mellilia), sur la côte méditerranéenne, aucun établissement n'a pu être attesté entre la voie intérieure de l'*Itinerarium provinciarum Antonini Augusti* à l'ouest et l'oued Moulouya à l'est.

Des prospections archéologiques extensives menées depuis les années 1950 sur le littoral méditerranéen et dans les bassins des grands fleuves atlantiques qui abritent l'essentiel du réseau urbain de la Tingitane ont grandement contribué à la connaissance de l'occupation du territoire antique de la province (Luquet 1964;1966; Ponsich 1964;1966; Tarradell 1966; Euzennat 1989; Rebuffat & Limane 2011; 2012; Akerraz & El Khayari 2000; Raissouni *et al.* 2015; Akerraz & Palumbo 2020). On peut affirmer désormais, grâce à de récentes recherches maroco-italiennes dans le Rif oriental, que la côte méditerranéenne est peu occupée à l'époque romaine à l'est de la vallée de l'oued Martil (Akerraz *et al.* 2019). Dans la région du Détroit, et sur la façade atlantique, les prospections ont permis de dresser des cartes assez complètes qui autorisent à émettre plusieurs conclusions sur divers aspects de l'occupation du territoire. Pour ce qui nous intéresse ici, nous pouvons dire que les limites de cette occupation sont les mêmes aussi bien aux périodes maurétaniennes qu'au Haut-Empire romain et que celle-ci est concentrée autour du détroit de Gibraltar et au voisinage des plaines atlantiques.

Les éléments du système de défense en Tingitane

La recherche de l'implantation du système de contrôle et de défense romain a constitué l'une des principales préoccupations des différents programmes de prospections. Il en a résulté qu'en l'état actuel des explorations, notre connaissance de ce système est bien améliorée ce qui ne signifie pas qu'il est toujours susceptible d'être complété par de nouvelles prospections dans certaines zones. S'il est presque assuré que la liste des camps ne connaîtra pas de changements notables, celle des fortins et des tours de guet peut sensiblement évoluer, en particulier dans les régions de Tanger et de *Tamuda*, pour les tours. La découverte d'une tour de guet à Dar Chaoui (Akerraz & Palumbo 2020, 76-77 et 262, site n° MS04), incite désormais à rechercher le réseau de tours qui reliait la région de *Tamuda* à celle de *Zilil* et de Souiyar.

Les camps du Haut-Empire

16 camps dont les dimensions varient entre 2,56 et 0,64 h sont aujourd'hui attestés en Tingitane sous le Haut-Empire. Rebuffat (2000, 267) recense 17 camps mais prend en considération le site de Tanger-Gandori qui doit être retiré de la liste et un camp non attesté à *Oppidum novum* (el Qsar el Kébir). Il ne connaissait pas le camp d'el Mers, au nord d'el Qsar el Kébir, découvert en 1997 et publié en 2010 (Akerraz 2010). Dans Akerraz (2010, 561), je comptais 17 camps mais les prospections géophysiques menées sur le site d'el Knayez par F. Martorella à ma demande n'ont pas confirmé la vocation militaire du site. Par ailleurs. je pense qu'il faut soustraire de la liste des camps l'ouvrage de *Exploratio ad Mercurios* (Khedis) qui, de par ses dimensions réduites, prend sa place dans le type des fortins; cf. plus bas note 20. Nous ne reviendrons pas ici sur chacun des ouvrages mais 4 d'entre-eux, el Benian, Aïn Daliya, Souiyar et Fouarat, méritent d'être discutés.

El Benian Le camp d'el Benian est signalé par Ch. Tissot (1877, 171-172) comme un ouvrage qui formait avec *Tamuda* et Aïn Daliya une ligne de défense. M. Tarradell y a effectué quelques sondages en juillet 1953 qui lui ont permis de dater l'occupation du monument entre la fin du 3e siècle et la chute de l'Empire, et cette datation s'est maintenue à ce jour (Tarradell 1953, 302-309; Lenoir 2011, 258). Avec Rebuffat (1987) et Villaverde Vega (1993, 349-350), nous pensons que le camp d'el Benian est un élément du système défensif de la région de Tanger et de la province pendant le Haut-Empire. Ses dimensions qui en font le plus grand camp de la Tingitane, après *Thamusida*, et son plan initial aux tours arrondies, incitent à revoir la chronologie qui lui est attribuée depuis les rapides sondages que M. Tarradell y a implantés (Rebuffat 1987: "Ce qu'on connait du matériel archéologique, céramique et monnaies, daterait ce camp de la fin du III siècle, et son activité s'étendrait sur le IVe siècle. En revanche, le peu qu'on discerne de la typologie ferait penser à un camp du Haut-Empire. Mais un examen plus détaillé serait évidemment nécessaire". Voir aussi Martorella 2021).

Aïn Daliya Charles Tissot (1877, 268) identifiait les ruines qu'il avait visitées à Aïn Daliya comme "vraisemblablement celles d'un poste militaire destiné à défendre le défilé que traversait la voie antique entre cette pointe et le Mharhar" alors que M. Ponsich (1964, 278, nr. 82), presqu'un siècle plus tard, y voyait "l'adaptation postérieure d'une villa agricole en poste militaire garantissant la sécurité des colons de la plaine de Bougdour". Des travaux récents d'aménagement entrepris sur le site par l'Office national de l'eau potable (ONEP), ont révélé l'existence d'importants vestiges dont les traces d'un bâtiment thermal et d'un large mur le long du talus qui domine à l'est l'oued Mharhar. Les travaux qui ont détruit en partie ce mur ont permis d'extraire de nombreux blocs taillés et des moellons liés à la chaux. Les éléments d'architecture dont une base de colonne en grès et des blocs taillés retirés du site par la direction de la station de pompage sous laquelle se trouve le site, encore visibles dans les locaux de l'administration de la station, montrent qu'il s'agit d'un important établissement. L'implantation du site, au sud de la ville de Tanger, au débouché de l'oued el Kebir et de l'oued es-Sghir dans la lagune de Tahaddart, sur une plateforme qui domine la

Figure 1. Carte des camps du Haut-Empire (infographie: F. Benjaafar).

plaine inondable, et sa situation le long du tronçon de la voie de l'*Itinerarium provinciarum Antonini Augusti* qui reliait *Tingi* à *Ad Mercuri templum* incitent à identifier cet établissement à un camp militaire, comme l'avait soupçonné Ch. Tissot (1877).

***Ad Novas* (Souiyar)** Le camp de Souiyar a été identifié en 1954. Garcia Figueras (1954, 331-335) a signalé les ruines romaines et Tarradell (1954, 117, fig. 4) indique Souiyar comme: "castellum de nombre antiguo desconocido…". Dans une photographie aérienne du site publiée par M. Ponsich (1964, 275), R. Rebuffat (1973-1975, 370) a proposé de distinguer à titre d'hypothèse: "trois enceintes (…) une petite enceinte carrée à tours d'angle; une grande enceinte carrée dont la petite occupe le coin; et enfin l'enceinte polygonale d'une ville…". Aujourd'hui, l'hypothèse est devenue une certitude. L'appui de M. Lenoir (1981-1982, 217) à cette hypothèse suite à deux visites sur le site a permis à R. Rebuffat (1987, 35) de conclure qu': "Il y a bien deux camps" (voir également Villaverde Vega 1995, 347-348; 2001).

Or, le réexamen de la même photographie aérienne et l'observation des vues satellitaires de Google Earth (35° 25′ 35.48″ N. 5° 48′ 41.04″ W) permettent de douter sérieusement de l'existence de deux camps imbriqués. Le petit camp carré avec ses tours d'angle est parfaitement visible mais le grand camp rectangulaire ou carré ne l'est pas. Il est possible que ce soit la destruction des quatre courtines du camp carré qui ait fait croire à l'existence d'un bâtiment rectangulaire délimité par les palmiers nains sur les vues aériennes. En tout cas, il n'y a pas de doute sur l'existence d'un camp à Souiyar au Haut-Empire mais il faut sans doute en revoir les dimensions à la baisse.

camp	superficie (h)
Tabernae	0,67
Frigidae	0,71
Banasa	1,70 ?
Thamusida	2,30
Sala	1,97
Tamuda	0,91
Ad Novas (Souiyar)	0,50
El Mers	0,65
Fouarat	1,45 environ
Souk el-Arbaâ	1,09
Sidi Saïd	0,80
Aïn Schkor	0,77
Sidi Moussa bou Fri	0,88
Tocolosida	1,82

Tableau 1. Les camps de Maurétanie tingitane au Haut-Empire avec leurs dimensions.

Fouarat Le site de Fouarat, situé sur la voie de l' *Itinerarium provinciarum Antonini Augusti*, entre *Oppidum novum* et *Vopisciana* a été signalé pour la première fois par Paul Schmitt, puis visité lors des prospections de la mission du bassin du Sebou en 1989 (Schmitt 1973, 299-300). Dans la publication des résultats de cette dernière, l'existence d'un camp sur ce site, proposée par M. Euzennat, n'a pas été retenue, mais finalement acceptée avec réserve (Euzennat 1992, 211-212; Rebuffat & Limane 2011, 23 et 96.

unités	lieux de stationnement
Praefectus alae Herculeae	*Tamuco = Tamuda*
Tribunus cohortis secundae Hispanorum	*Duga = Ad Novas* (Souiyar)
Tribunus cohortis primae Herculeae	*Aulucos/Ad Lucos* (el Mers?)
Tribunus cohortis (et) *Ityraeorum*	*Castrabariensi* (Aïn Daliya ou Lamdanna ou el Benian)
Tribunus cohortis?	*Sala*
Tribunus cohortis Pacatianensis	*Pacatiana* (el Benian ou **Aïn Daliya** ou Lamdanna)
Tribunus cohortis tertiae Asturum	*Tabernas*
Tribunus cohortis Friglensis	*Friglas* (Lamdanna ou **Aïn Daliya** ou el Benian)

Tableau 2. Les unités militaires stationnées en Tingitane au Bas-Empire selon la *Notitia Dignitatum* et leur lieu supposé de stationnement.

camp	superficie (h)
Aïn Daliya	1.40 environ
El Benian	2.56
Tabernae	0.67
Sala	1.97
Tamuda	0.92
Souiyar	0.50
Lamdanna	0.84
El Mers	0.65

Tableau 3. Les camps de Maurétanie tingitane au Bas-Empire avec leurs dimensions.

fortin	superficie (h)
AM72	0.35
AM78/86	0.32
QC72	0.03
Khedis/*Exploratio ad Mercurios*	0.32

Tableau 4. Les fortins et leur superficie.

Dans sa dernière synthèse: Rebuffat 2000, fig. 3, indique Fouarat comme camp probable).

À la notice publiée par la mission de prospection du bassin du Sebou, il faut ajouter que l'image satellitaire de Google Earth (34° 50′ 02.65″ N, 5° 57′ 28.26″) laisse deviner un rectangle de direction nord-est-sud-ouest aux angles arrondis, de 134 m minimum de longueur nord-sud et de 108 m environ de largeur est-ouest, soit une superficie d'environ 1,44 h. Par ailleurs, plusieurs visites du site ont révélé l'existence de structures et de matériel céramique à l'ouest du camp jusque dans la forêt d'eucalyptus, au-delà de la voie ferrée qui longe le camp dans cette direction. C'est probablement à cet endroit qu'a été découvert le 'milliaire' dit d'Arbaoua (Euzennat 1992). Un tronçon de canalisation qui semble amener l'eau en direction du camp, ou peut-être de son *vic*us, a été également repéré au sud-ouest, près de l'oued Fouarat qui coule à l'ouest et au sud du site vers l'oued Mda, à environ 350 m. du centre du camp. L'identification de ce camp implique à notre avis de suivre M. Euzennat et de localiser la station *Tremuli* de l'*Itinerarium provinciarum Antonini Augusti* à Fouarat et non plus à Arbaoua.

Les camps du Bas-Empire

Pour le Bas-Empire, nous comptons désormais 8 camps dont 1 seul (Lamdanna) est construit après la fin du 3e siècle alors que les 5 autres existaient depuis la période précédente (El Benian, *Tamuda*, *Tabernae*, *Sala*, Souiyar et el Mers). À ces derniers, et si l'on suit M. Ponsich qui assure avoir découvert de la céramique sigillée claire D sur le site d'Aïn Daliya que nous identifions comme un camp, nous pouvons ajouter ce dernier à la liste des camps réutilisés au Bas-Empire (Ponsich 1970, 357). On ne comprendrait d'ailleurs pas pourquoi un camp aurait été abandonné dans une région dans laquelle s'est retirée l'armée sous la Tétrarchie et dans laquelle de nouveaux ouvrages ont été construits. Le nombre de camps du Bas-Empire ainsi établi correspondrait à celui assigné pour la même période par la *Notitia Dignitatum* au stationnement des 8 unités en Tingitane.

La *Notitia Dignitatum* qui nous renseigne sur les lieux de stationnement de 8 unités en Tingitane au 4e siècle place un *tribunus cohortis Friglensis* à *Friglas* que l'on a toujours identifié au camp du Haut-Empire de *Frigidae* à Azib el Harraq. Mais les prospections répétées sur ce site n'ont à ce jour pas démontré son occupation postérieurement au retrait romain des régions au sud de l'oued Loukkos à la fin du 3e siècle. Aussi, l'identification de *Friglas* à *Frigidae* est-elle abandonnée dans toutes les études récentes sans toutefois qu'aucune localisation ne soit proposée pour la cohorte des *Friglenses* (Lenoir 2011, 262 maintient cependant, mais sans la discuter, l'identification de *Friglas* à *Frigidae*, contre Rebuffat 1987, 36; Akerraz 2010, 561, note 6). Le camp le plus proche de l'oued Loukkos, occupé durant le 4e siècle, étant celui d'el Mers, il est permis, à titre de pure d'hypothèse, d'y voir *Aulucos* ou *Ad Lucos*, lieu de stationnement de la *Cohors Prima Herculea* de la *Notitia Dignitatum*. L'implantation militaire en Tingitane au Bas-

Figure 2. Carte des camps du Bas-Empire (Infographie:F. Benjaafar).

Figure 3. Situation des fortins (Infographie: F. Benjaafar).

Empire se présenterait ainsi si l'on accepte nos différentes hypothèses.

Les fortins

L'identification des fortins en prospection n'est pas aisée. Nous appellerons 'fortin' un site dont les dimensions sont importantes par rapport aux sites généralement identifiés par les prospections et qui présente des éléments d'architecture (blocs taillés, structures avec mortier de chaux) qui ne sont pas toujours présents sur les sites ruraux. Les 4 sites que nous pensons être des fortins ont été ainsi identifiés, l'un (AM76/86) par une prospection au sol couplée d'une image thermique prise par drone, le second (*Exploration ad Mercurios*) par des fouilles, et les deux autres par la prospection au sol. Trois des quatre ouvrages ont des dimensions proches (0.3 h) alors que la superficie du 4e leur est sensiblement inférieure (0.03 h).

La position des 4 fortins identifiés à ce jour donne à penser que ces ouvrages ont pour rôle de contrôler, pour deux d'entre eux (AM72 et AM78/86), l'entrée et la sortie

du réduit de Khandaq Zoubia (Lenoir 1993, 517 pour AM72; Akerraz *et al.* 2020, 419-423 pour AM78/86) qui relie la région de Tanger à celle de Zilil, pour le troisième (QC72), celui de Bab Tisra qui relie la plaine du Gharb au territoire de *Volubilis*, et pour le quatrième, le débouché de l'oued Bouregreg dans la plaine alluviale de l'Oulja de Rabat-Salé. Nous avions classé ce fortin parmi les camps de la Tingitane (Akerraz 2002; 2010) mais nous acceptons ici la réserve de Rebuffat (2000, 267 note 6) qui pense que: "Le petit camp de Khedis près de Sala peut être une simple dépendance du camp de Sala."

Les tours de guet

Les prospections ont permis d'identifier 80 tours de guet (sur l'identification des tours de guet, on se reportera à Akerraz *et al.* 1986; Limane & Rebuffat 1995, 321-336) dont 48 au sud de l'oued Loukkos (Limane & Rebuffat 1995, 321 recensent 43 tours de la région de Volubilis; et Akerraz 2002, 215, fig. 5 pour les 4 tours dans la région de Rabat) et 32 au nord de celui-ci,[2] sachant que les recherches autour de *Tamuda* n'en ont signalées qu'une seule.

Pour les zones où elles sont les mieux connues, nous pouvons affirmer qu'elles sont implantées le long des deux voies qui relient Tanger à *Sala* et *Volubilis*, et par conséquent le long de la ligne de défense orientale entre *Tamuda* et *Volubilis*, le long de la ligne de défense méridionale, entre *Volubilis* et *Sala*, et bien sûr autour des camps. Une cartographie précise de ces tours est en cours d'élaboration par Fadwa Benjaafar dans le cadre d'un Doctorat sur l'armée romaine de Tingitane.

Ouvrage linéaire au sud de *Sala* (Rabat)

Le seul ouvrage linéaire connu en Tingitane est un fossé, parfois doublé d'un talus et/ou d'un mur, situé à environ 6 km au sud de la ville antique de *Sala*. Cet élément, long de 10.25 km, protégeait le territoire de la ville romaine entre la côte atlantique au sud-ouest et le débouché de l'oued Bou Regreg dans la plaine alluviale au sud-est où il se termine par une tour de guet appelée '*dar Daqious*' (maison de Dèce) par les habitants de la région. La datation de l'ouvrage reste incertaine (Napoli 1997, 397-407).

2 Akerraz *et al.* (sous presse) qui prend en considération les résultats des prospections de l'équipe maroco-française de *Zilil* (Dchar, 13 tours) et de celles du programme Insap-UCL. Qatar (Akerraz & Palumbo 1920 (4 tours), soit au total 17 tours dans le triangle *Tabernae* (Aïn Dalya-Dar Chaoui). Les prospections en cours dans le bassin du Loukkos ont recensé 14 tours autour de la plaine alluviale de l'oued Loukkos, dans les environs des camps de *Tabernae* et Souiyar, et le long de la frontière orientale de la province, entre Souiyar au nord et *Oppidum novum* au sud. Les explorations menées dans la région de *Tamuda* ne signalent qu'une seule tour: Raissouni *et al.* 2015, 149, site n° Yac. 019. Nous ne tenons pas compte des tours recensées par Ponsich (1964, 253-290), qui n'ont pas été retrouvées ou qui n'ont pas été confirmées par les nouvelles prospections.

Remarques sur l'organisation du système militaire de la Maurétanie tingitane

Le dispositif de défense composé de camps, de tours de guet et de fortins, est complexe et très serré. Il n'est pas seulement linéaire, car en plus de former une frontière au sud et à l'est de la province, il couvre également l'ensemble du territoire puisqu'on trouve des camps et des tours à l'intérieur de la province le long de la voie littorale de l'*Itinerarium provinciarum Antonini Augusti*. Les distances entre les deux voies parallèles, nord-sud, qui sont jalonnées de camps et de tours, n'étant pas toujours importantes et les communications entre les différents éléments du dispositif assurées par un faisceau de tours de guet, il nous semble permis d'émettre l'hypothèse que le système défensif tel que nous l'avons proposé constitue un ensemble de sous-systèmes qui s'organisent autour des principales régions de la province. Ainsi, nous pouvons dessiner ces différents sous-systèmes comme suit:

1. Le long de la frontière orientale entre *Tamuda* et *Volubilis*.
2. Le long de la frontière méridionale entre *Sala*, *Thamusida*, Sidi Saïd et *Volubilis*.
3. Une défense de la région du détroit de Gibraltar comprenant les camps d'Aïn Daliya, el Benian et *Tamuda*.
4. Une défense du bassin du Loukkos avec les camps de Souiyar, *Tabernae*, el Mers, *Frigidae* et Fouarat.
5. Un sous-système protégeant le bassin de l'oued Sebou avec les camps de Souk el Arbaâ, *Banasa*, *Thamusida* et Sidi Saïd.
6. Et enfin, deux sous-systèmes autour des deux territoires frontaliers de Volubilis avec les camps d'Aïn Schkor, *Tocolosida*, Sidi Moussa Bou Fri et Sidi Saïd, et de *Sala* avec le camp de la ville et le fortin de l'*Exploratio ad Mercurios*.

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An Interpretation Framework methodology for the Roman frontier in Tunisia

Christof Flügel and Nigel T.W. Mills

Interpretation Framework – methodology

The Interpretation Framework approach to public presentation of the Roman Frontiers has been applied in several sectors of the Roman Frontiers World Heritage cluster in Northern Europe, namely the Antonine Wall in Scotland, Hadrian's Wall in England, the Lower German Limes in the Netherlands and the Upper Danube Limes in Bavaria and Austria. The question asked of the authors for this session was 'Can the Interpretation Framework approach be applied to public presentation of the North African Limes?' As we will go on to argue, the answer is unequivocally YES, on the basis that good interpretation, as understood by heritage interpreters, can be applied to any cultural or natural heritage assets, anywhere. The principles are the same, but the approach has to adapted to local circumstances.

For professional interpreters (Mills 2021 for a wider explanation of interpretation as understood by heritage interpreters) involved in the public presentation of archaeological sites and objects, interpretation can be seen as a process of mediation between academics and professionals on the one hand and the wider public on the other. Many languages use the word mediation and mediators or their equivalents to describe the work of interpretation as understood by professional interpreters. Interpretation in this sense is still anchored in the evidence itself and in scientific explanation – it simply goes further in focusing on presenting the information in ways that are most likely to engage and connect with visitors.

An Interpretation Framework is essentially a methodology for applying good interpretation practice to situations (such as the Roman frontiers) that involve multiple sites and museums located in close proximity that deal with similar subject matter. A key aspect of the Interpretation Framework approach is the recognition that Roman frontier archaeology tends to be repetitive and tends to be very much focused on the military. A major benefit of the approach is that it enables areas with multiple sites to offer different visitor experiences at each site/museum, collectively contributing to an overarching story about the Roman frontiers Through this approach, Roman sites along the frontiers are seen as objects that illustrate stories – they are not in themselves THE STORY (though they are obviously part of the story!).

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Key interpretive principles used in the Interpretation Framework approach are that:

1. Interpretation should be audience focused. Interpretation is not about giving scientific facts to visitors. It is about communicating scientific information to visitors in ways that they can connect with and understand. You need to understand your audience and what interests them before you can communicate with them.
2. Interpretation should be thematic and story led. Look for interesting stories that visitors can connect with. Don't just communicate information and scientific facts. But always ensure that the stories are founded in good science. People are interested in people, not lumps of rock in the desert or mouldy stones in a wood!
3. Media selection – deciding which methods to use to present the stories and the way the stories should be displayed and presented is always the last thing to consider! First understand your audience, then identify the stories. Only then start thinking about the media.

Experience shows people readily connect with stories about individuals or families, daily life, crafts and technical skills, fashion and food. Challenging people to think and to interact with the evidence and the stories can also be an effective means of engaging people with the past, making connections with issues facing the modern world for instance. As a family of interconnected World Heritage Sites that essentially represent conflict, division and the imposition of authoritarian rule, the Frontiers of the Roman Empire is especially suited to exploring UNESCO's core values of promoting peace through understanding, respect, toleration and collaboration – "Since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed".

Comments from visitors to the Living Wall exhibit in the Roman Frontier Gallery at Tullie House Museum and Art Gallery in Carlisle (Mills 2022) illustrate the potential of challenging visitors to think about the objects they are looking at: "I have visited Hadrian's Wall many times. This is the first time I have seriously considered the social and personal consequences of the Wall"; "The only museum I have been to that really links the past with the present. Amazing, moving and relevant."

A more recent temporary exhibition at Tullie House explored the scale and complexity of the Roman Empire through a small number of high quality objects. In addition to understanding the nature, purpose and context of each objects at face value, visitors were encouraged to 'dig deeper', exploring hidden and surprising meanings for the objects and making connections with the modern world. As with the Living Wall exhibit, these hidden meanings and contemporary connections triggered thought and engagement: "An excellent and fascinating exhibition. Particularly liked the connection made with modern society"; "Great exhibition. Liked the fact it was so thought provoking. Well done indeed."

The Interpretation Framework approach is helpful in dealing with archaeological and visitor landscapes – situations where the archaeology occurs in multiple locations across the landscape, and there are usually multiple locations, in the form of sites and museums open to the public, which act as focus points for presenting the frontier story. Another key aspect of the approach is that it widens the scope of interpretation from the purely military to understanding the purpose and significance of the frontiers in the context of the Roman Empire as a whole – we cannot understand any frontier without understanding the political, economic and social factors that lie behind it.

One of the authors (Mills 2015, 943; 2021, 18) has proposed a core narrative for the Frontiers of the Roman Empire that could be used as a basis for developing themes and storylines for different frontiers. This illustrates the potential scope of stories that can be told through the archaeology of the Roman frontiers: "The Roman Empire was one of the largest, most powerful and influential Empires the World has ever seen. Its impact and legacy continues to affect and shape our modern world although the high point of the Empire was over 2000 years ago. The frontiers ebbed and flowed in response to economic and political issues and decisions at the heart of the Empire and threats and pressures at its edges. Imperial ambition, Roman identity, external threats, trade, resources, communications and supply were important factors alongside geography influencing the location, extent and nature of the frontiers and how they changed and evolved over time."

"The frontiers of the Roman Empire defined the Roman world physically, symbolically and psychologically. The Emperors spent much of their time on the frontiers and depended on the army, based mainly on the frontiers, for support. Many Emperors came from the frontier areas, especially in the later Empire. The nature and physical structure of the frontiers and their military systems varied across the limits of the Empire, including stone walls and timber palisades, rivers, deserts and mountains. The purpose of the frontiers varies too, over space and time, and was often as much about controlling and managing communications, trade and movement of people as it was about defence, The frontiers were where the Roman world came face to face with others. As in the modern world, these frontier zones were marked by innovation, cultural exchange and ethnic mingling and diversity."

"Today the story of the Roman frontiers symbolises many issues confronted by people and nations in the

Figure 1. *Clausura* of Bir Oum Ali (Christof Flügel, Munich).

modern world, of conflict, security, mistrust, autocracy, economic prosperity and opportunity, religion, ethnicity and cultural exchange. They provide a window through which to look at the past, the present and the future. They provide a vehicle through which to explore and to promote UNESCO's core values in creating the concept of World Heritage – to promote understanding, toleration, co-operation and respect amongst the nations of the World."

A methodology for the Tunisian Frontier

It is not our intention in this article to try to propose an interpretation framework for the Roman frontiers of Tunisia! Self-evidently, that needs to be done by local specialists with relevant expertise from various disciplines. We can, however, use our experience and expertise to identify some key issues and suggest a methodology that could be applied.

The key steps in the methodology are:

1. Identify the archaeological assets and where they are located.
2. Understand the audiences – in particular, differentiate between local people and visitors, and identify their different characteristics, how they might experience the Roman frontiers and how the Roman frontiers might be relevant and interesting to them.
3. Identify the range of potential stories, thinking about this in the broad context illustrated above.
4. Identify the locations where the stories can be told to different audiences.
5. Identify the appropriate media through which to communicate the stories to the audiences in different locations.

Key points to bear in mind in using this methodology are: the process is iterative and needs to go through several cycles; the process also should **not** be left to academics or to tourism professionals! They should, however, be closely involved; the process should involve a wide range of stake-holders including local people, museum professionals and heritage attraction managers, academics, archaeologists and tourism professionals; selection of appropriate media

Figure 2. *Clausura* of Jebel Tebaga (David Mattingly, Leicester. Courtesy of Anna Adamcyz, Waszaw).

occurs at the last stage of the process – first the stories and audiences, only then consider which media might be most appropriate in which locations.

The archaeological assets and their locations

The archaeological assets currently proposed for inclusion in the World Heritage nomination for the Tunisian limes are:

1. Clausura of Bir Om Ali (fig. 1).
2. Clausura of Jebel Tebaga (fig. 2) and fortlet of Benia Guedah Ceder (fig. 3), protecting the *clausura* access.
3. Fortlet *Tisavar* (Ksar Ghilane) fig. 4).
4. Fortlet of *centenariumTibubuci* (Ksar Tarcine) (fig. 5).
5. Fortlet of Benia bel-Recheb.

The reasons for this selection are provided in the Southern Tunisian Limes (south of the Chott el Djerid) document submitted for the Tunisian World Heritage tentative list (Tentative List Limes Tunisia 2012): "*Le choix des* éléments (…) *a voulu exprimer la variété et la richesse typologique des ouvrages militaires qui ont composé le limes du sud tunisien et illustrer leur répartition géographique et leur* évolution *chronologique*."

1. *Critère* II: "*…un exemple remarquable de transposition dans un environnement à la lisière du Grand Sahara d'un système de défense de territoire et d'une architecture militaire caractéristique d'un pouvoir politique né dans le centre de la péninsule italienne…*".
2. *Critère* III: "*témoignage* éminent *de l'architecture militaire romaine et son* évolution *en fonction des changements des approches stratégiques*".
3. *Critère* IV: "*adaptation pragmatique aux conditions géographiques et à l'environnement humain* de la région" (authors' emphasis).

The carefully selected sites proposed for inclusion in the World Heritage nomination for the Southern Tunisian Limes section south of the Chott-el-Djerid comprise representative examples of typical military archi-

Figure 3. Fortlet of Benia Guedah Ceder (Michael Mackensen, Munich).

tecture of various periods (Mackensen 2021b): Early (late 2nd century. *e.g*. Tisavar) and late antique military installations (*e.g*. Benia Guedah Ceder; Benia bel-Recheb) with typical protruding square towers. The sites chosen belong to an archaeologically relatively well-studied section of the North African Frontier (Euzennat 1972; Mrabet *s.a*.; Mackensen 2021a-b; 2022), study of which has recently been resumed through the cooperation project between the Institut National du Patrimoine Tunis and Munich university, concentrating on the fort of *Bezereos*).

There will certainly be a challenge as to how the proposed Tunisian sites can be included in the framework of a wider transnational nomination approach, since the Frontiers of the Roman Empire nomination strategy proposes a common World Heritage cluster for North Africa, Egypt, Arabia and Southern Syria (Ployer *et al*. 2019, 150, fig. 8.2). If implemented, this approach to nomination will also have consequences for interpretation, as the sheer extent of the *Limes Tripolitanus* necessarily calls for various interpretation regions of which the Southern Tunisian Limes certainly is one part. However, the Southern Tunisian sites in this case can be considered to be a testbed, as they show the 'limes in a nutshell'.

Audiences

The two main audiences are likely to be local people and tourists. Full information about both these broad audience groups is needed, but some likely key characteristics can be suggested. Local people are perhaps unlikely to be interested in Roman history and archaeology as the Romans may be seen to represent an imposition of colonial rule similar to that of European powers in the 19th century, and to reflect the interests of former colonial powers (Roman history = 'Colonial Archaeology'). It might be expected that the interest of local people in history would start with Arab history, although simplistic assumptions should be avoided as local populations may have different cultural backgrounds.

Overall there is likely to be a challenge as to how to engage local people with the World Heritage of the Roman frontiers. The major challenge for tourists is that that the key sites being put forward for the World Heritage list are very remote, located in inaccessible desert locations with challenging climate and a generally hostile environment. A differentiation should also be made between cultural tourists visiting the major Roman sites (Carthage, *etc*.) on the coast and adventure tourists visiting remote locations in the desert.

Figure 4. Fortlet Ksar Ghilane / Tisavar erected 184-191 under Commodus (Christof Flügel, Munich).

Stories

The communication of Outstanding Universal Value is an important requirement for World Heritage Sites. However, Outstanding Universal Value (OUV) is necessarily an academic and technical construct, intended and written to meet UNESCO criteria for World Heritage nomination (Mills 2021, 8), while the selected sites are, again necessarily, military. Restricting the focus of public presentation to OUV and the military would have limited appeal to the identified audiences and fail to communicate understanding of the frontier system.

There is potential to explore a much wider range of stories that could engage audiences more effectively. A key principle to keep in mind is that the sites themselves are not the story – the sites can be used to illustrate many different stories. Some suggested stories concerning the core theme of the Roman frontiers are:

- Adapting the defence of the Empire to local climate and topography.
- Adopting a strategy for frontier surveillance in arid areas – no need for a continuous line. Controlling the movement of people with linear barriers through intelligent understanding of landscape.
- Managing access to and availability of water.
- Comparisons with other frontiers.

There is a range of wider stories that might appeal to local people and to tourists:

1. Perceptions and legacies of the Roman period in Arab history, science and culture.
2. The Roman frontiers as part of a wider desert history and the interplay between desert and coast over time (interactions between nomads and settled peoples).
3. Contrast the world of *ksours* and *ghorfas* of medieval & later periods (storage facilities for grain adapted to arid climatic conditions), to the world of the Romans who stuck to their customary construction schemes, not necessarily so well adapted to local conditions?

These wider stories might be especially suitable for local audiences, potentially more interested in ***their*** history than Roman history. The Interpretation Framework developed for the Dutch section of the Lower German limes takes this wider perspective approach, seeing the limes story as part of the wider story of Dutch history and culture and the particular importance that water management plays in this (Hazenberg & Visser 2021). The Dutch Interpretation Framework for the Roman frontiers therefore advocates

Figure 5. Fortlet of Ksar Tarcine / *centenariumTibubuci* (Michael Mackensen, Munich).

interpreting the Roman story as part of Dutch history and identity, not as a separate story. Re-use of Roman frontiers in the 2nd World War, for example at Ksar Ghilane, is potentially another wider story that might be of particular interest to foreign audiences.

Locations

The hostile environmental conditions severely restrict physical accessibility of several of the sites in the nomination list. There are, however, opportunities to include interpretation of World Heritage within the interpretive scope of other, more accessible locations suitable for less adventurous visitors:

1. Integrate World Heritage interpretation into interpretation at Carthage & other coastal / northern museums.
2. Include World Heritage Site interpretation at visitor nodes such as airports, bus stations and taxi hubs.
3. Include Douz as a centre for desert tourism with its already existing Sahara Museum, which could include the story of the Southern Tunisian Frontier.
4. Include Ksar Ghilane as an already existing starting point for desert adventure tours.
5. Connect limes interpretation with interpretation approaches in the Ksour-region west of Medenine / Tataouine, which itself has been included on the Tunisian tentative list as a proposed World Heritage Site as part of a transnational nomination of the Maghreb states.

More adventurous tourists could explore less accessible sites using mobile devices in offline-mode with GPS triggering. All sites have potential for engagement with local people, but the opportunities differ widely across the different sites and need to be considered on a site by site basis.

Media and Marketing

The App 'LIMES mobil' was created as a technical framework using a storytelling approach that follows the principle of 'one site – one object – one story'. This app framework is available for free on an open source-basis for all existing and future parts of the Frontiers of the Roman Empire World Heritage Site (Dobat 2020; Weeks & Dobat 2021). As the geolocated content can be downloaded before the actual visit to a site and therefore does not require internet access in the desert, this may be a solution for individual visitors in South Tunisia.

The archaeological Infopoint at London Heathrow terminal 5 provides a good example of how archaeological and historical information can reach an audience outside the usual information hubs of sites, museums and visitor centres. Especially for local people using the 'group taxis' which connect the major cities in Tunisia, the 'taxi louage-stations' may be good points to offer tailored information for local audience groups.

All interpretation (graphic design, interpretation panels, signage, *etc.*) of the Tunisian frontiers should have an overall corporate design approach, to enhance the

perception of the Tunisian sites as a coherent monument. This approach has been successfully implemented along the Upper German-Raetian Limes World Heritage Site with a common design along the 550 km of the German Limes. The Danube and Rhine river sections of the limes will adopt this corporate design approach.

Conclusion

The proposed Southern Tunisian Limes World Heritage Site is a perfect testbed to explore opportunities for applying interpretation approaches in a Roman context outside Europe. There is clearly enormous potential to develop an interpretation framework for the Tunisian Limes as a means of bringing the sites and stories of the limes to life for local people and tourists. The framework needs to be developed by local experts, tailoring the proposed content to the interests and needs of different audiences and with special regard to the local population.

The proposed sites provide a unique insight into the chronological, military and architectural development of the limes in an arid environment and offer a concentrated glimpse into life at the edge of the Roman Empire 2000 years ago. There are few regions in the Roman world that can offer the 'limes in a nutshell' in the way this can be done in Southern Tunisia, which is both a challenge and an opportunity.

Interpretation planning is an integral part of the World Heritage application process, as illustrated by recent successful applications including the Danube Limes (Western segment) and the Dutch section of the Lower German Limes (Flügel & Kuttner 2016; Hazenberg & Visser 2021). This reflects the inclusion of communication – increasing public awareness, involvement and support for World Heritage – as one of the five strategic objectives of the World Heritage Convention (https://whc.unesco.org/en/convention/). We therefore strongly encourage our Tunisian colleagues to develop their own interpretation strategy in parallel with the nomination process and not to consider interpretation as an additional 'nice-to-have', as was the case with the Upper German-Raetian Limes World Heritage application document back in 2005. However, interpretation since then has become an integral part of the management plan for the Upper German-Raetian Limes (for general parameters see Deutsche Limeskommission, 2019, Appendix C).

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Frontiers of the Roman Empire. UNESCO World Heritage and frontier perspectives

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Limes: the word is traditionally used to evoke the Roman frontier, the image we have of it today and the way we envisage the protection of its remains. Nevertheless, the interpretation of the word has been much debated and still raises important questions today (for a recent update on the ancient uses of the word limes and the discussions to which they gave raise (Guédon 2018, 8-9 and 99-133 focusing on the situation in ancient Africa). The word is Latin, but its definition has often reflected modern historians' own conceptions and the concerns of their time. As a result of which the general approach developed in a long historiography and retained for the nomination of the Frontiers of the Roman Empire World Heritage has been influenced by both a European and Romano-centric perspective. This focus had major consequences for the way of considering people living near Roman frontiers and their relationships with the Roman world.

The renewed discussion of the notion of Roman frontier, and the interest in Roman frontiers all around the Mediterranean and in particular in the MENAT area, that is to say the Middle East, North Africa and Turkey, invite us to revisit the approach of the so-called Roman frontiers and their implications in terms of human, and not only military, settlement. This is the objective of this paper which proposes, through a particular focus on the Maghreb, to question and enrich our representation of Roman frontiers and their perception as a World Heritage.

A history under influence

The opening words of the Koblenz Declaration (Polak *et al.* this volume) in 2004 define the World Heritage Site of the Frontiers of the Roman Empire as follows:

"The Frontiers of the Roman Empire World Heritage Site should consist of the line(s) of the frontier of the height of the Empire from Trajan to Septimius Severus (about 100-200 AD), and military installations of different periods which are on that line."

The focus is clearly on a linear definition of the Roman frontier, which corresponds more generally to the way in which the concept of the frontier has been conceived since the creation of modern states, particularly in Europe with the formation of Nation-States in the 19th century. The way of representing the frontier as a line is a classical use in modern cartography, but it is not neutral as it contributes to create an 'inside' and an 'outside', and then contributes in a more fundamental and subjective way to the production of territory

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and identity (Retaillé 2008; Reddé 2018). This 'obsession with the frontier', as some geographers have even called it, has had a lasting influence on thinking about the notion of frontier till today.

The use of the line as a symbol of the Roman frontier can be observed on the general maps published within the framework of the 'Frontiers of the Roman Empire' World Heritage property (Breeze & Jilek 2013), and it symbolises in particular the African Limes (for comments see Reddé 2018). But it should also be noted that the more detailed maps of Africa produced by David Mattingly and his collaborators in the same framework show a radically different approach: they show 'open' frontiers for Africa, with no clear boundaries. These different representations are not anecdotal: today Africa dramatically represents all the issues of Roman frontiers. Their interpretation was closely linked to a univocal conception of Roman frontiers, firmly based on the European model of 'barriers', whether linear or riverine. In the case of Africa, this conception was linked to the idea of a generalised threat coming from the Saharan world and against which the Roman Empire should have protected itself (on this traditional interpretation and its critique: Guédon 2018).

This idea was developed at the time of the French colonisation in the Maghreb, and was justified by the military function attributed to a large number of remains discovered in this period in Algeria and Tunisia (Benseddik 2000; Dondin-Payre 2000). The French colonisation has heavily and subjectively oriented the research on the ancient past of the Maghreb. Indeed, the Roman conquest of Africa was used to justify French colonisation and its ambitions in the Maghreb (Mattingly 1996; Dondin-Payre 2011). It was also at this time that the stereotype of the Roman frontier developed, regularly referred to by the Latin limes and traditionally regarded as the original model of the defensive frontier. Through this word, the European colonial empires wanted to see the Roman Empire as the first state to conceive of the frontier as a hermetic barrier to the limits of its territory, in the face of peoples considered 'barbarians'. The Roman frontier in Africa was thus perceived as a line of defence and protection against the presence of populations deemed hostile.

This view has had a major impact on both the interpretation of the ancient remains and the perception of the inhabitants of the Roman frontier area in Africa. This presumed threat led to a real strategic dimension being given to the Roman frontier in Africa, which was then interpreted in terms of 'defensive systems' (Le Bohec 1999, 113). The division of geographical space in colonial times was used to argue a relationship between the Roman frontier and a presumed 'climatic frontier', establishing a coincidence between the Roman frontier and the 'useful Maghreb' defined by the limits that the climate imposed on cereal growing (Despois 1942; Gautier 1952, 212-213). In fact, these limits are valid for a commercial agriculture, the one developed by French colonisation, but cannot be applied with the same rigour to traditional agricultures, especially in Antiquity (Leveau 2018).

But this interpretation of the Roman frontier as a defensive and climatic frontier had important repercussions in the way of perceiving the ancient populations established in its contact: they were supposed to live in desertic lands, and were then considered as nomads. The notion of Roman frontier is then closely linked to that of 'tribe' in Africa (Guédon 2022). A social organisation based on nomadism and a presumed hostility to official political powers are part of the traditional perception of tribes and the tribal phenomenon in North Africa. The notion of 'tribe' that emerges in the course of the 19th century reflects the cultural stereotypes of nomads in the Greco-Roman literature. This notion used in social and historical studies dealing with the Maghreb still suffers from depreciating discourses. In the European thought, the tribe is regularly opposed to the ancient political model of the Greek-Roman city. In fact, like the ancient Romans who were confronted with a social reality that was very different from their own, it is still difficult today to understand who these peoples were and how they lived, beyond prejudices.

The Roman frontiers beyond prejudices

The Roman frontiers in Africa remain among of the most discussed of the Roman Empire (Reddé 2014, 131-134), and they urgently need new studies. More than any other frontier in the Roman Empire, the Roman frontiers in Africa invite us to question the model of the linear and defensive territorial limit of Roman power. That the Romans conceived linear structures to materialise the external limits of their provinces is undeniable: the example of Hadrian's Wall bears witness to this. But each province has its own history in terms of relations between the local populations and Roman power. The model of the linear frontier cannot be generalized to all the Roman Empire, in particular when we consider the provinces whose frontiers touch the desert or pre-desert environment as in the east and the south of the Roman Empire.

In Africa, the hypothesis of a linear materialisation of the Roman frontier was based on aerial surveys carried out by Jean Baradez in the south of ancient *Numidia*, in present-day Algeria, in the 1940's. He identified linear works and made them known under the name of *Fossatum Africae* (Baradez 1949), by reference to the structure evoked by a constitution of Honorius and Theodosius II (*Codex Theodosianus* 7.15.1, 401 AD) at the edge of Roman Africa. Shorter linear works than those described by Jean

Baradez in southern Algeria have also been found in southern Tunisia and Libya (Guédon 2018, 123-133). For Jean Baradez, the linear works of Numidia combining in various ways ditches, earthen embankments and walls, were part of the limes and were intended to protect the Roman world from nomads living outside the Empire. He was greatly inspired by the work that had been carried out shortly before in Roman *Syria* by Antoine Poidebard (Poidebard 1934).

It is now generally accepted that the linear works from *Numidia* to *Tripolitania* were not a response to a potential danger that would have threatened the frontiers of Roman Africa. The hypothesis generally accepted today, diffused by Pol Trousset (in particular 1984), is to see in these linear works the means implemented by the Roman authority to control the movements linked to pastoralism. The problem is that we have no clear evidence of pastoral or nomadic movements in this period (Guédon 2018, 10-13). Furthermore, the dating of all the linear structures, and their function, remain highly debated. What we can see is that all these structures were not systematically on the frontier. They appear, in general, to have been easily circumvented and do not seem to have had the function of blocking and controlling openings provided by natural passages. In fact, only one structure, in *Numidia*, could be clearly linked with the context of the Roman frontier (Guédon 2018, 123-133).

The erroneous military character given to the remains found in the region of the Roman frontier in Africa has been denounced, in particular by the work carried out in Algeria by Nacéra Benseddik (1980; 1999) who has revised the identification of some sites: she has demonstrated that their occupation was civilian and not military, and that they were fortified farms. This has a major impact on the way of conceiving the Roman frontier. Indeed, some of the sites revised by Benseddik are linked to the road called '*noua praetentura*' south of the province of *Mauretania Caesariensis*, and traditionally interpreted as the military materialization of the Roman frontier. The name '*noua praentura*' is given by some milestones, with *a priori* a military character. While this route certainly facilitated movement between the garrisons established in the region, it is now accepted that it was first and foremost a communication route, which did not only link the sites of military occupation, and cannot in itself be considered as a frontier. It did not mark the limit of the province's extent and the local frontier of the Roman Empire, which is now recognised to be undefined (Hamdoune 2018, 59-60).

In the light of the latest research, it appears clearly that the Roman frontiers in Africa were porous and implemented with an economy of force. More generally, from Egypt to Morocco, the modalities of Roman military settlement linked to the frontier are local and appear discontinuous both in space and in time (Guédon 2018; Hamdoune 2018, 52; Reddé 2018). This is evidenced by the relatively small number of soldiers who, under the command of the legate of the Third Augustan Legion, were involved in garrisons on the African frontier compared to the size of the area it covered. It is estimated that between 10,000 and 12,000 men were garrisoned along the 1,200 km or so of the Proconsular African frontier: by comparison, the same number of troops seems to have been deployed along the 117 km or so of Hadrian's Wall (Guédon 2018, 133).

Therefore, what the African context teaches us is that the Roman frontier cannot be reduced, in particular for the period of the High Empire, to its military aspect alone, and only considered from the point of view of the military influence on the 'way of life' in the Roman frontier area. In other words, the challenge is to stop seeing the Roman frontier as a system in which only the Roman army was the main actor. It is no longer a question of considering the populations of northern Africa from an exclusively Roman point of view, but of better understanding the areas marked by the Roman civilisation and which also generated a specific culture and know-how. In a way, it is a question of 'decolonising' and 'deromanising' the history of ancient North Africa (Leveau 2016). It is clear that the frontier has left its mark on the societies established in its vicinity. Nevertheless, it was not the frontier as a territorial limit that structured these societies, but rather the specific relationship they had with the Roman authority in terms of competences, at the limits of the direct intervention of the Roman army (for an overview of the issue Guédon 2018, 247-274).

Conclusion. The contribution of the Roman frontiers of Africa as World Heritage

The international context shows how the notion of frontier has become a crucial issue today. The Roman legacy, both in the way we think about frontiers in contemporary times, and as a historical link between very different cultures all around the Mediterranean, is more than ever a World Heritage to be preserved. The Roman past in the Maghreb particularly invites us to renew the questioning about Roman frontiers, beyond prejudices and modern conceptions. The Roman frontiers of Africa do not only concern military evidence but also civil, rural and urban settlements. They show us how much the Roman frontiers were rich, complex and original spaces of life and cultural exchanges. It also means recognising to the ancient North African peoples their capacity as actors in the way these frontiers have been defined and experienced locally. That's the way for making the history and evidence of Roman frontiers in the Maghreb recognised and protected as World Heritage.

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Developing a management system for the Frontiers of the Roman Empire World Heritage

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The United Nations Educational Scientific and Cultural Organisation (UNESCO) was established in 1945 a short while after the foundation of the United Nations (UN), with its principal aim: the advancement of peace and security by promoting collaboration among nations through education, science and culture. As with the UN, its role and remit has developed over the past 75+ years, and in the year of the Nijmegen Limes Congress (2022), UNESCO celebrates the 50th anniversary of the World Heritage Convention (UNESCO 1972).

The success of the World Heritage (WH) convention probably goes far beyond what was envisioned in 1972. As of 2022, there are 1,154 properties inscribed on the list from 167 countries (states parties); 194 countries have ratified the convention; a huge number of further potential sites are listed on their national tentative lists (the process by which a country indicates properties it may bring forward for 'inscription', the formal process by which a site becomes a World Heritage property).

> "Transboundary projects truly enhance the founding principles of the World Heritage Convention, which was designed to build peace through cultural cooperation and foster collective responsibility over shared heritage" (Irina Bokova, former Director-General, UNESCO 2019).

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Yet, only 43 properties on the list are transnational; that is, they cross national borders and involve more than one state party. This is fewer than 4 % of the total number inscribed.

Outstanding Universal Value

In order to be inscribed, properties have to demonstrate their Outstanding Universal Value (OUV) to all humanity, regardless of current geopolitical borders (Polak *et al.* this volume). The Frontiers of the Roman Empire (FRE), in its entirety, represents the largest single monument of Roman civilisation with potentially over 7,500 km of frontier marking the Roman response to differing topographic, political, military and social circumstances (fig. 1). The remains have a high cultural value and significant impact on the development of the western world including the spread of cultures in remote regions (Ployer *et al.* 2017, 117-118). The overall ambition of the FRE WH is to:

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Figure 1. Map of the frontiers of the Roman Empire in the mid-2nd century AD (created as part of the EU Culture 2000-funded Frontiers of the Roman Empire project, 2008).

1. Make the Roman frontier again visible and understandable in its enormous vastness and complexity, forming the single largest monument to the Roman civilization and defining the maximum extent and nature of the Roman Empire, one of the greatest states the world has seen.
2. Show that the single monuments of the frontier belong closely together thus forming an organic entity.
3. To extend and deepen the existing relationships among archaeologists and cultural heritage experts involved in the daily protection and management of the Roman frontier (Breeze & Jilek 2008, 7).

The Management of the FRE

The origins of the FRE lie in the inscription of Hadrian's Wall in 1987 – only the second year that the UK nominated sites for the list. The history of the FRE is outlined elsewhere, with the addition of the Upper German-Raetian Limes in 2005 and the Antonine Wall three years later (Sommer 2021; Jones 2022; Polak *et al.* this volume). By 2010, the management of the FRE was through an Inter-Governmental Committee (IGC) comprising representatives from the state parties; the Bratislava (expert advisory) Group, providing scientific, technical and expert advice; and the Hexham Group, which is the vehicle for site managers to discuss management, best practice and collaboration opportunities. But a UNESCO report (2010) meant that a new approach needed to be adopted and the IGC and Bratislava Group, together with ICOMOS, commissioned a Thematic Study and proposed World Heritage Nomination Strategy (Ployer *et al.* 2017). Once approved by UNESCO (2017), the partners could progress with multiple World Heritage properties for inscription, working together, leading to the successful inscription of both the Lower German Limes and the Danube Limes (Western Segment) in 2021. A promise of the Nomination Strategy was the creation of a Frontiers of the Roman Empire World Heritage 'Cluster', but given various political and other delays (including Covid delaying the World Heritage Committee meeting), the principal focus of the partners was on getting the properties inscribed. Now that the first stage of this has happened, how do we go about taking the 'Cluster' concept from vision to reality, whilst our partners also work on the inscription of the other segments?

Transboundary management

If transboundary/transnational sites epitomise what UNESCO is trying to achieve with the World Heritage Convention, then the difficulties inherent in getting

inscribed to this elite club is one reason why fewer than 4 % of all World Heritage properties are transboundary. Of these transboundary properties, over 85 % lie across neighbouring countries and are either contiguous across modern geopolitical boundaries (*e.g*. Mosi-oa-Tunya in Zambia and Zimbabwe) or represent multiple locations across neighbouring countries (*e.g*. the Belfries of Belgium and France). There is no 'one size fits all' for transboundary properties or their management. Now that it has three Frontiers of the Roman Empire World Heritage properties, our partnership is currently unique (representing 7 % of transboundary inscriptions). But being in a unique position also means that we are breaking new ground – the FRE is the first World Heritage 'cluster' and how we manage this could have implications for any future clusters in the future. One future cluster could centre round the Silk Roads with one inscribed so far (the Routes Network of Chang'an-Tianshan Corridor between China, Kazakhstan and Kyrgyzstan) but many more on national tentative lists. When we consider the cultural context – a frontier monument encircling an Empire – the closest parallel to the FRE is probably the Great Wall of China (inscribed at the same time as Hadrian's Wall). This is reflected in a current transnational Wall to Wall project between the UK and China (Bing & Brough 2019; Brough & Bing 2021). Yet despite its vast length, the Great Wall is only located within one state party and therefore does not have the management complexities of a transboundary property.

So what lessons can be learnt from the management of other complex transboundary properties, occupying more than two neighbouring countries? One European example is the Ancient Primeval Beech Forests, a natural World Heritage property across the Carpathians and other regions of Europe, with 94 component parts in 18 countries, making it the largest globally. Whilst the conservation challenges for a natural property are very different, particularly with the ongoing expansion of beech, several State of Conservation reports have been delivered to UNESCO, dealing with multiple factors ranging from hunting and forestry production to management systems. Nevertheless, each state party commits funding and they share a Joint Management Committee which meets once a year. The secretariat for the group rotates through their transnational coordinators and is currently based in Belgium (on a four year period since 2020). The Struve Geodetic Arc, representing points of a survey which represented the first accurate measuring of a long segment of a meridian with 34 component parts in 10 countries from Norway to the Black Sea has a coordinating committee which meets biennially.

The recently inscribed (2021) Great Spa Towns of Europe has a Management Board comprising the 11 mayors from the towns, who are responsible for the operational coordination of the property together with an Inter-Governmental Committee (seven countries). This involvement of mayors echoes other initiatives such as the grouping of the 15 Spanish World Heritage Cities together for collaboration and tourism promotion; and the Organisation of World Heritage Cities (OWHC) which connected over 300 cities around the world, represented in the organisation by their Mayor, supported by elected officials and heritage managers (

https://www.ovpm.org/all-about-owhc/). A similar linear World Heritage property to the FRE, encompassing multiple countries, is the Qhapaq Ñan Andean Road System running for some 6,000 km through six countries in South America. This has a participatory management structure involving local communities in its management which surely epitomises the ethos of World Heritage, even though it no doubt poses management challenges. Regular State of Conservation reports have been provided by the partners to UNESCO which relate to their management planning, but the property now has a secretariat in Bolivia (which was previously in Argentina) demonstrating the importance of coordinating technical and transnational work.

Another interesting transnational parallel is the Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement, inscribed in 2016 (fig. 2). Whilst this comprises 17 individual buildings

Figure 2. The Maisons La Roche et Jeanneret in Paris, part of the Le Corbusier World Heritage property.

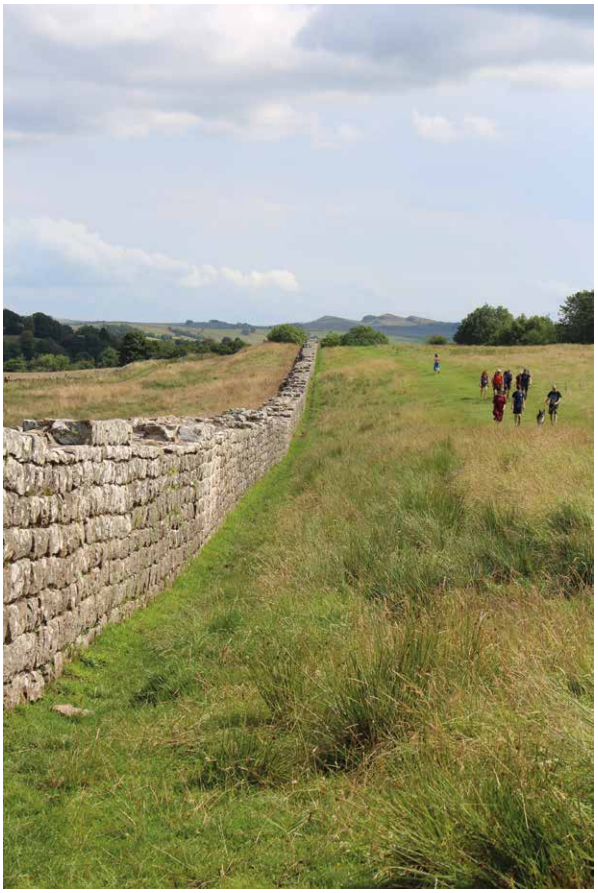

Figure 3. Hadrian's Wall near Birdoswald Roman Fort.

spread across seven countries on three continents, it is another property like the FRE that clearly epitomises how the series adds up to more than the sum of its component parts. Whilst its management systems have been the focus for two State of Conservation reports, the partners have a Standing Conference which co-ordinates the management of the series, provides advice to states parties and collaborates on promotional and enhancement activities (https://lecorbusier-worldheritage.org/en/managing-the-wh-series/). This work is supported by the Le Corbusier Foundation which acts as the Secretariat of the Permanent Conference and manages the archives. These and other transnational properties can provide useful comparanda for how the FRE cluster might work in the future.

The three Frontiers of the Roman Empire properties

The 'original' Frontiers of the Roman Empire World Heritage property, comprising three sections of linear frontier (Hadrian's Wall (fig. 3), the Upper German-Raetian Limes and the Antonine Wall) in two states parties (the UK and Germany), covers a length of some 728 km. It is governed by an Inter-Governmental Committee, advised by a Scientific Advisory Committee (the Bratislava Group) with the Management Group known as the Hexham Group (both Hexham and Bratislava named after the places where they first met).

Two sections were later added. The FRE: Danube Limes (Western Segment) comprises a series of structures along the river frontier covering some 600 km across three countries (Germany, Austria and Slovakia). It has an Inter-Governmental Committee and a Management Group, and also has the Bratislava Group. The FRE: Lower German Limes covers a length river frontier on the Lower Rhine of about 400 km across two states parties (the Netherlands and Germany). It also has an Inter-Governmental Committee, and a Dutch-German Management Group. Together this gives us a total of three cultural World Heritage properties across six countries covering over 1,700 km of frontier remains (some 2,161 ha in total). These are managed by three Inter-Governmental Committees with three separate Management Groups and the Bratislava Group acting as the structural framework for the 'cluster' (fig. 4; Sommer 2021).

What could the FRE look like in the future?

Proposals for WH status from potential FRE properties are in various stages of development. Zsolt Visy and the late Sebastian Sommer engaged in conversations with UNESCO representatives from states parties in the Middle East and North Africa which led to online workshops, championed by the Austrian Ambassador to UNESCO, Claudia Reinprecht, in 2021. Building on the Thematic Study and Nomination Strategy (Ployer *et al.* 2017), the FRE cluster could ultimately comprise between seven and nine World Heritage properties across at least 18 countries (possibly 20 or more) on three continents covering some 7,500 km of Roman frontier remains. There would be around seven Inter-Governmental Committees (proposed FREs such as the Dacian Limes would not need an Inter-Governmental Committee as it is sited in a single country – Romania) and potentially nine Management Groups plus many more local Management Groups and coordinators. Each property would need an appropriate management structure for that property, relevant to local needs.

Whilst we may be the first 'cluster' – what lessons can be learned from other complex transboundary properties? It can be observed from the examples given earlier that utilising pre-existing opportunities and structures (*e.g.* the Le Corbusier Foundation) have been invaluable, as has creating a secretariat. Whilst each individual WH property would need to assess how its management system and secretariat would operate, there is, at present, no imperative from UNESCO to establish a management system for the cluster beyond the stated framework role of the Bratislava Group. That therefore leaves the initiative in our hands to determine how it would work and make this happen.

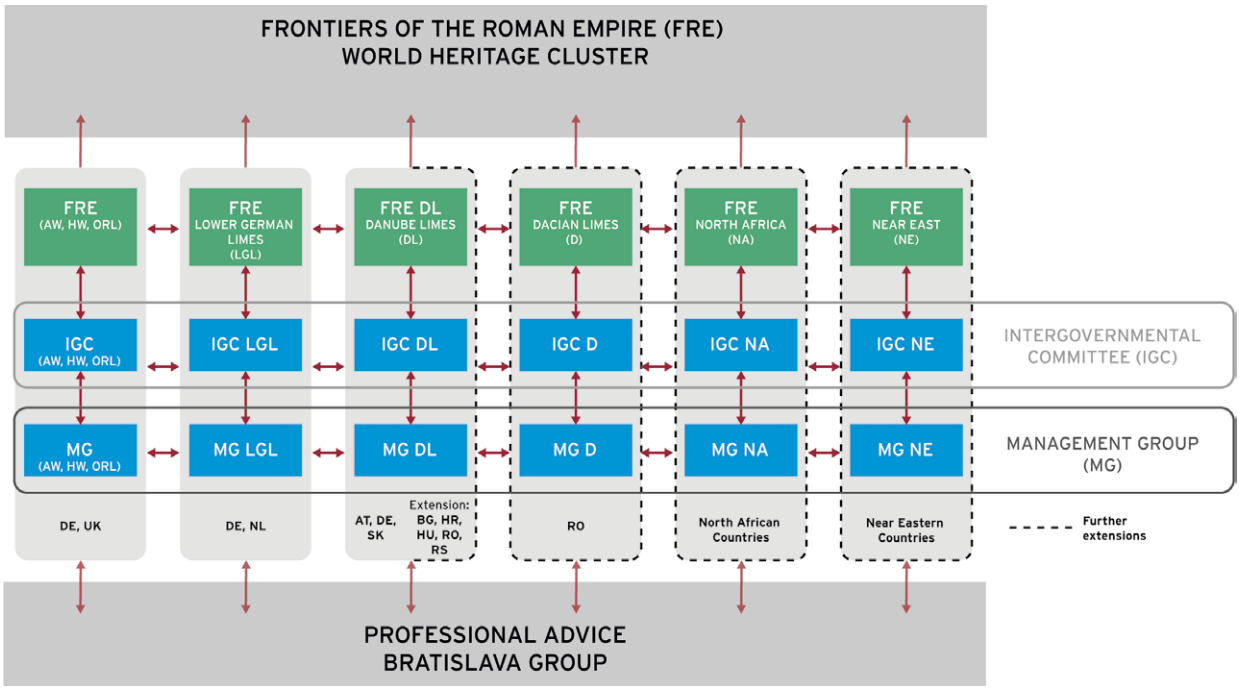

Figure 4. A diagram for the potential management of the FRE cluster (from C.S. Sommer, thanks to S. Matešić).

Suggestions for future management

There are numerous lessons to be learned both from existing World Heritage and transboundary World Heritage properties as well as from those countries with Roman remains who may wish to become part of the FRE: it is incumbent on the existing partners to provide support, advice and guidance, in line with UNESCO's values to promote collaboration amongst nations through education, science and culture. The Bratislava Group is at the core of this ambition, but recent discussions suggest that it may need to be renamed something more inclusive to countries outside Europe, whilst perhaps retaining an aspect of a name enshrined in the UNESCO inscriptions. It is up to the Group to decide, but something on the lines of the FRE Scientific Advisory Group / Committee (Bratislava) could be considered. Expansion of the Group has already started to include countries in the Middle East, North Africa and Turkey (MENAT). Sub-groups of Bratislava could be created to address specific identified needs, such as overarching FRE research and the pursuit of partnership funding. The 'Koblenz declaration' made in 2004 (Jilek 2008) created a definition of the FRE World Heritage properties. This works for the European parts but new declarations could and should be created to encompass frontier remains in other parts of the Roman Empire, led through the Bratislava Group.

Further opportunities for transnational collaboration should be sought. In line with modern agendas, the United Nations Sustainable Development Goals should provide a framework for collaboration, with an inclusive approach to community participation and education ensuring maximum sustainable benefit from our shared Roman heritage. The UNESCO Ambassadors network could be key in developing partnerships with countries not yet actively pursuing WH status for their Roman frontier remains. The management groups of all properties should continue to collaborate as far as possible, particularly around best practice in, for example, interpretation, research and community engagement. Recent meetings of the Hexham Group have involved coordinators from other properties and the various Management Groups can determine how often they need to meet within both their property and across different FRE WH properties.

Finally, the idea of a regular conference across all the partners is another way to cement relationships, looking at the idea of the Le Corbusier Standing Conference. But rather than re-invent the wheel, we have an existing well established series of Roman Frontier conferences – the Limes Congress – which meets triennially (usually) around the Frontiers (Breeze *et al.* 2022). The various FRE properties do not need to meet annually (indeed, the coordinating committee of the Struve Geodetic Arc only meets biennially). The triennial cycle could work well for providing an overarching management discussion of the cluster by delegates of the Inter-Governmental Committee (IGC), with routine management and advice undertaken by other groups (such as Bratislava) as required. Whilst many of the IGC delegates are senior government heritage representatives rather than archaeologists and would therefore not routinely attend the Limes Congress, timing these gatherings would enable meetings between a range

of site managers which could be beneficial in giving the government representatives confidence in the cluster partnership. Should we establish some form of secretariat for the cluster? If so, the options are potentially to ask all partners to contribute funding for a central coordination point, or the secretariat function rotates periodically around the partners, perhaps a more economical solution. If this were chosen, then it could rotate each three years, perhaps timed with the Limes Congress. Whichever way we take the FRE cluster forward, we can be confident that we are leading an exciting initiative which embodies UNESCO's mission to use education, science, culture, communication and information to foster mutual understanding and respect for our planet and shared humanity.

FRE cluster

When the Thematic Study and Nomination Strategy was presented to UNESCO, it proposed a management system and overarching framework to support international collaboration: A FRE World Heritage Cluster. This is the first such initiative for World Heritage.

"[the Cluster] will enable us to expand from individual sites and properties to an overarching European monument, which may grow to include parts from other continents in the future" (Ployer *et al.* 2017, 107).

If you consider that the founding mission of UNESCO in 1945 was to advance peace and security by promoting collaboration among nations through education, science and culture, transboundary WH properties should be held up as a paradigm of that desire to 'develop friendly relations among nations' and 'achieve international co-operation' (United Nations 1945, chapter 1, article 1). Yet the realities of both modern-day geopolitics and the necessary bureaucracy that is required both for inscription and staying on the World Heritage list, has resulted in various challenges and a change from the initial vision of a single World Heritage property covering some 20 countries to manageable segments, each defining their own Outstanding Universal Value as a Frontier of the Roman Empire. But the desire to somehow manage these together as a 'cluster' meets those high-level aspirations for countries to cooperate on the identification and management of their shared cultural heritage. This paper considers common approaches for a management system for the FRE cluster, looking at the methods used by other transboundary WH properties.

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Living Danube Limes Interreg project

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and Nemanja Mrđić

In this paper we present major results and activities of the project Interreg Living Danube limes. The project consortium comprises 19 universities, private and public companies from 10 Danube countries, and 27 associated strategic partners. Various research gaps were closed by applying modern non-invasive archaeological geo-prospection at chosen pilot sites. A Living Danube Limes app was created to host a comprehensive and easy-to-access archaeological and historical catalogue of the Danube region. Virtual and augmented reality reconstructions of the original Roman limes infrastructure was created from the data of the geophysical prosecutions at the project pilot sites and are now hosted on the Living Danube Limes app. The Institute of Archaeology from Zagreb (Croatia) and the Institute of archaeology from Belgrade (Serbia) were project partners in the consortium, and in this paper, we will present the results achieved during the project duration.

About the Living Danube limes project

Living Danube Limes is an EU funded Interreg Danube Transnational Programme project and focuses on connecting, enlivening, researching, preserving and highlighting the Roman Danube Limes as a transnational cultural heritage of enormous significance, in order to create a sound foundation for a future European Cultural Route. Living Danube Limes stands for: Valorizing cultural heritage and fostering sustainable tourism by **living** the common heritage on the **Danube Limes** as the basis for a cultural route. Living Danube Limes aimed to foster a common Roman brand for the Danube countries, pave the ground for a Cultural Route spanning the whole Danube Region, develop strategies for the preservation and management of cultural and natural heritage and foster green and sustainable tourism development. For reaching this goal, Living Danube Limes followed a holistic approach which was including archaeology and history, museums as dissemination hubs for both academia and the broad public, protection measures for cultural heritage and sustainable tourism solutions. Academia and broad public were directly linked via the reconstruction of the 4th century AD Danube patrol vessel, a *lusoria*, which is also the physical link between the identified pilot sites and the partner countries themselves (Kaiser 2022, 7-8). Living Danube Limes started in July 2020 and runs until December 2022. The partner consortium consists of 19 project partners and 27 associated strategic partners from Germany, Austria, the Czech Republic, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania, and the Republic of Moldova. In this paper we will focus on two main activities performed in Croatia and Serbia: characterization of pilot sites

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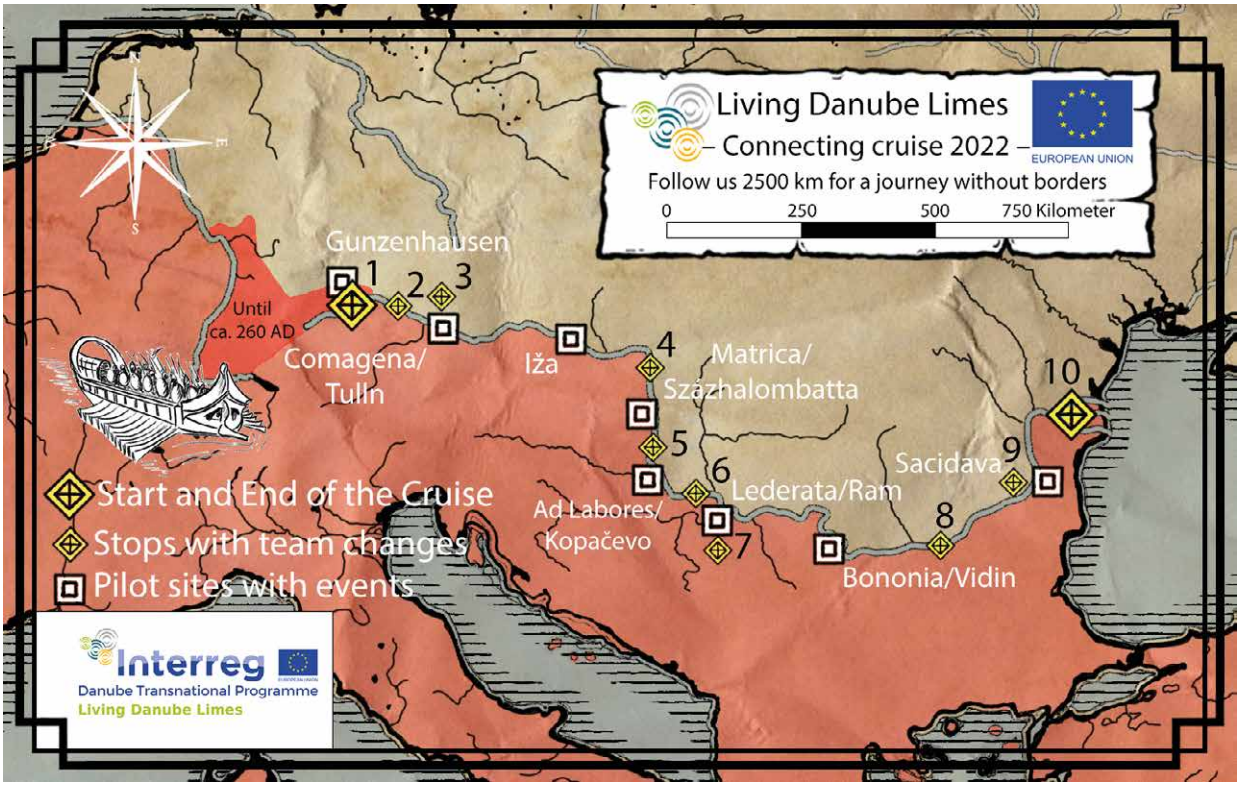

Figure 1. Connecting cruise map (archive Living Danube Limes).

and the organization of the connecting cruise of the ship *Danuvina Alacris*.

Pilot sites

In the 'Living Danube Limes', eight Roman heritage sites in eight partner countries along the river Danube (Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania) have been identified as project pilot sites following different selection criteria. Depending on the national needs and interests the partners evaluated various scientific, economical, touristic, logistical and practical parameters and based the decision concerning their national pilot site selection on this analysis. Therefore, the Living Danube Limes pilot sites span from Roman military forts, watchtowers and *vici* to certain sections of Roman roads (also in the hinterland) and necropolis, all of them showing different states of conservation as well as of visibility or even touristic use (fig. 1).

Pilot site Kopačevo *Ad Labores*

In the village of Kopačevo there was a small fort that was part of the Roman Danube Limes. This fortress is evidenced by the finds of graves, Roman ceramics and coins found in the village, as well as two stone inscriptions, or rather two smaller altars, dedicated to Jupiter, the main Roman deity, and the Mithraic cult. At the Croatian pilot site *Ad Labores* (Kopačevo) the primary area of interest – the site of the Roman fortress in the village – unfortunately could not be accessed so the team investigated areas around the village and north of the small fortress with the motorized GPR system. Data analysis revealed little evidence of archaeological features in the selected areas, but still the data is important for documentation of the Croatian part of the Danube Limes.

The site is situated near the Nature Park Kopački rit, and in the activities of the project a small open-air presentation of the Danube Limes and the site Kopačevo is now presented in the area of the park. A part of the presentation includes a replica of a votive inscription dedicated to Jupiter (CIL III.3560) that was found in the 1960's at the very entrance to the Kopački rit Nature Park. It dates back to the 2nd or 3rd century, and the inscription reads:

[i(ovi)] O(ptimo) M(aximo) F(ulguratori)
C(aius) AEL(ius) SURI
NUS DE
C(urio) COL(oniae) M(ursae) IIV
IRAL(is) Q(uin)Q(uennalis)
DES(ignatus)
V(otum) S(olvit) L(ibens) M(erito).

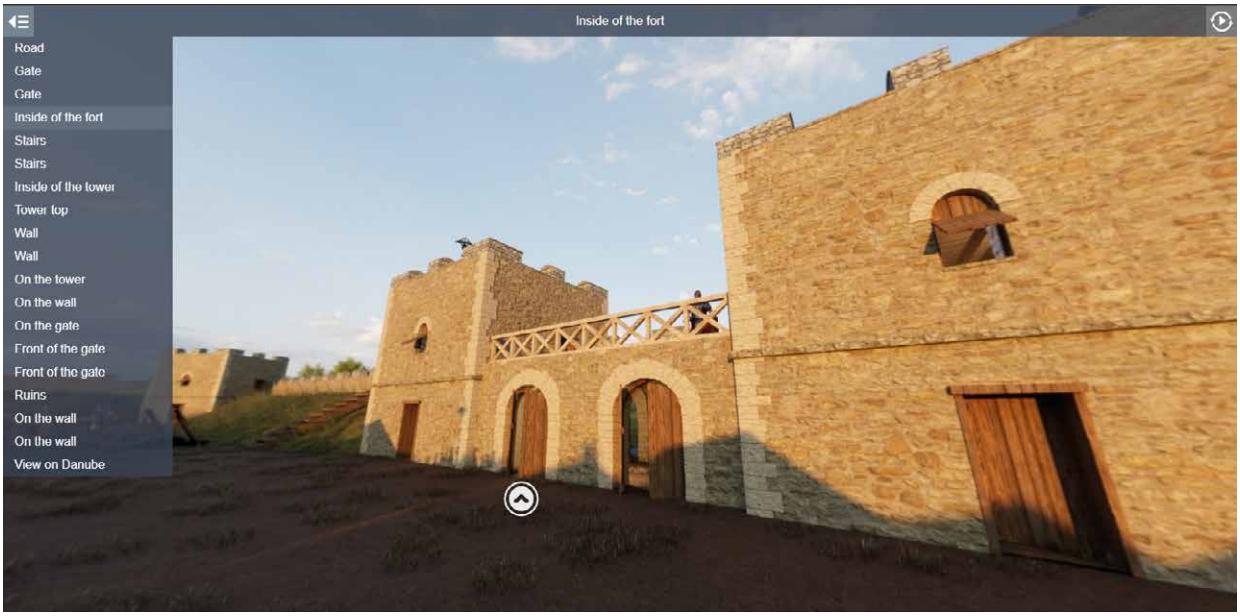

Figure 2. VR Room at local museum at Village Ram (Archive Institute of Archaeology, Beograd).

Caius Aelius Surius, the city magistrate in *Mursa*, was probably the owner of some farm in that area, and he had an altar to Jupiter erected there (Vukmanić 2017, 250; 2023, 11; Ožanić Roguljić & Fileš 2022b).

Pilot site *Lederata*

The archaeological site *Lederata*, auxiliary fort and river crossing, is one of the largest and most important strongholds on the Danube Limes in Serbia. Together with the nearby site below Ram fort (Roman road and rock inscription below the Turkish fort) it is a unique archaeological complex that is on the UNESCO Tentative List for the extension of the already inscribed property Danube Limes. The site covers the entire period from Prehistory to the Middle Ages and is historically related to several sites in the vicinity and adjacent municipalities. Its connection to the Danube, importance of the river Ram crossing (still in use today) enormously adds to the site importance. Although Roman fort covers only one part of the hill, settlement, cemetery, and Celtic *oppidum* are much larger and cross to the adjacent hills spreading to far wider area that is potential for future archaeological research. But the remoteness of the site from larger cities, difficult access and lack of asphalt roads all influenced the fact that the site is not popular for visits, was not systematically excavated and has no active presentation. Most important excavations were done between 1983 and 1990, 2012 and 2020. Walls that were not conserved after these excavations are in a bad shape. The focus was placed on conservation of towers, but buildings in the interior are not in a presentable state and need urgent attention. For this region, covering archaeological remains is very important and protective constructions provide advanced possibilities for both presentation and protection.

The site is safe from flooding, there is only a limited erosion, but a major problem is identified in strong winds and systematic looting that is seriously damaging the cultural layers. Problems with looting are long lasting and so far only the establishment of archaeological parks and the development of tourism forms a solution to this problem (example of *Viminacium* that had similar situation until formation of the Archaeological Park). An advantage for the site, its presentation and all needed interventions is that complete hill – the core of the site – is a public property. Only parts of the cemetery go into the area of the village outskirts and private property areas. The site is more less abandoned and it is not in use even for agriculture, so it is free for any potential and needed activity.

Among the identified problems is complete lack of any supporting infrastructure both roads, sanitation and any other buildings that can be set in function of the *Lederata* site. Another issue is the level of legal protection that forbids any building of the site so all facilities must be temporary objects not dug into the ground – like office containers standing on the surface of the earth without any earth disturbance during their installation. There is a river barge crossing in the near vicinity of this site and transit passenger can be diverted to visit cultural heritage in the area. An international river passenger terminal is also planned to be set up in the near vicinity close to the Ram fortress. Large Danube cruisers with hundreds of foreign visitors will be then able to visit the site.

Figure 3. *Danuvina Alacris* in Vukovar (Archive Institute of Archaeology, Zagreb).

Figure 4. Roman re-enactors in Croatia (Archive Institute of Archaeology, Zagreb).

Adaptation of the old village school into the small archaeological on-site museum by the Ram fortress is of enormous importance. This adaptation was done by the municipality of Veliko Gradište with their own budget funding. At the moment special room for VR is being prepared through adaptation of the classroom in order to facilitate VR room for the needs of this project. The whole Ram and its surroundings present wide and varied elements in a long history with variety of Cultural Heritage elements. For us the Roman heritage is the focus and the most important one as the professional dealing with antiquity region is a complex and rich with mythology religious and rural elements favourable for wide spectrum of visitors (fig. 2).

Connecting cruise of *Danuvina Alacris*

One of the main outputs of the Living Danube Limes project is the fully functionable reconstruction of a 4th century Danube patrol boat of the type *Lusoria* and with the name *Danuvina Alacris*. In his contribution to a 2020 conference

Figure 5. *Danuvina Alacris* in the Iron Gate Gorge (Archive Institute of Archaeology, Beograd).

organized by the Budapest University of Technology and Economics, Boris Dreyer of the Friedrich-Alexander University Erlangen-Nuremberg gives first insights into the reconstruction process (Kaiser 2022, 9).

***Danuvina Alacris* in Croatia** After Germany, Austria, Slovakia and Hungary, *Danuvina Alacris* arrived in Croatia on 1st September 1, 2022. Stops in Croatia were Batina, Aljmaš, Dalj, Vukovar and Ilok (fig. 3). On all stations, the broad public could view the ship, while the Living history event occurred in Aljmaš on 3rd-4th September 2022. A lecture by the shipbuilder Boris Dreyer was organized in the Kopački rit Nature Park. In Vukovar and Ilok, lectures and workshops for children were held. The city museum of Vukovar organized an appropriate pub quiz. The international crew visited most of the cultural institutions along the Danube. The main event in Aljmaš was called '*Legio VI Herculia* in Aljmaš'. During that event, visitors could try Roman military food in the fortress (made by Order of the Guardians of Zagreb, Marko Horvat and Ivana Ožanić Roguljić) or try Roman fencing and *plumbata*. *Legio VI Herculia* and *Prima Valentiniana* from *Cibalae* organized demonstrations of military formations (fig.4). Lectures and displays were organized on different topics like Roman medicine, history of limes and the Sixth Legion, Roman school and Roman board games. An interactive picture book for children was presented. Felix's journey along the Danube in collaboration with *Ženska opća gimnazija Družbe sestara milosrdnica*. *Danuvina Alacris* left Croatia on 9th September to be greeted by Serbian colleagues (Ožanić Roguljić & Fileš 2022b).

***Danuvina Alacris* in Serbia** The boat travelled through Serbia for 21 days between September 9th and 30th from Novi Sad to Prahovo – more than 450 km (fig. 5). During these 3 weeks cruise, 3 rowing teams changed, there were three Roman festivals in Novi Sad, Belgrade and Ram as well as many small local events welcoming replica of the Roman ship in cities along the Danube. Local communities of all ages were interested and organized small events along the way presenting local customs and exploring the Roman ship. A special event was passing of the ship under its own rowing power through two Danube Iron Gate dam locks, a unique experience as the ship had to be carried through locks located upstream from Serbia. Media closely followed the cruise reporting on the events and announcing those that are forthcoming. Serbia does not have a Roman re-enactment group so the extent of the Roman festivals was limited to the participation of *Viminacium* Archaeological Park animators and a few participants of Beli Orlovi mediaeval re-enactment group that used replicas of the Roman military equipment. The best effect the cruise had with the children who in groups organized by schools and kindergartens arrived in cheering excursions.

Conclusion

The project started at the peak of Corona crisis and a lot of initial activities were affected by the pandemic measures. But as the situation stabilized project gained momentum and goals were reached. Project resulted in several studies on the Roman frontiers and river navigation, produced 3D

reconstructions of the fortifications at the pilot sites, *etc*. Culmination was the Connecting Cruise that was the most effective way to promote navigation along the Danube, connect partners and promote Roman Cultural Heritage. Project added enormous value, material, and support to the nomination process of the Danube Limes to the UNESCO World Heritage List.

Both Institutes of Archaeology from Belgrade and Zagreb participated in EU projects but this one was among the most effective ones. Not only that it gathered experts from both EU and non-EU countries, it involved local populations, local authorities in the actions involved UNESCO nomination ultimately. The project had high visibility and high impact in the awareness of local communities related to cultural heritage not only in their own area, but within the Danube basin as a whole. Both pilot sites were originally not known on account of their important archaeological heritage. Now they are being incorporated into the tourist destinations of their respective regions and cultural heritage operators. The visibility of the sites was enormously enhanced through the VR reconstructions for those visitors who cannot travel or are not in possibility to visit them live.

Frontiers of the Roman Empire urgently needed this kind of promotion and visibility to support UNESCO nomination and protection of cultural heritage. Through the Danube Living Limes project this was effectively achieved and although in long term vision this is just the beginning results are more than satisfying.

Acknowledgments

We would like to thank the Archaeological Museum in Osijek Croatia (curator Igor Vukmanić and director Tomislav Hršak) for allowing us to make the replica of the altar from their Roman collection.

Abbreviation

CIL: *Corpus Inscriptionum Latinarum*

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The Eastern Limes

Observations towards a sustainable nomination strategy for the Anatolian Frontier

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Roman frontiers in Anatolia as potential World Heritage

Among segments considered for inclusion in the `Frontiers of the Roman Empire' (FRE) UNESCO World Heritage serial property, nomination potential of the Anatolian frontier appears to be the least studied. This has been despite the presence of completed (*e.g.* Mitford 2018) and ongoing surveys, and excavations especially of Roman garrisons, forts, and communication networks. On the issue of the garrisons, Zeugma is the most studied, by surveys under Institut Français d'Études Anatoliennes (IFEA) (1996-2005), rescue excavations of Gaziantep Museum (1994-2003), excavations (2013), and an archaeological research project of Oxford University (2001). At some of the forts (such as Cizre, Çattepe, and *Satala*) archaeological research by various regional universities has recently started (respectively by Batman University, Ege University, and Bartın University) while others (including Pağnik and Tille) were unearthed by international teams including the British Institute at Ankara (BIAA), Michigan University, Chicago University as well as Ankara University and Istanbul University during salvage excavations and later submerged under dams (see below).

Studies on the communication networks include D.H. French's (1981-2016) long-termed survey on Roman roads and milestones that was published by BIAA. The series has an interim catalogue of milestones published in 1981 and extended in 1988, a concluding album of maps (2016), and separate volumes on the milestones of the Republican period (2012), in *Galatia* (2012), *Cappadocia* (2012), *Pontus et Bithynia* (2013), *Asia* (2014), *Lycia et Pamphylia* (2014), and *Cilicia*, *Isauria et Lycaonia* (and South-West *Galatia*) (2014) as well as one on roads and itineraries (2015; 2016).

In this paper, this data is selectively used to illustrate some distinctive aspects the Anatolian frontier may have to contribute to the series of limes nominations while also highlighting some accompanying difficulties. The aim is to propose some key issues to be addressed as guidance for the planned expansion of the Thematic Study to include the extra-European frontier regions.

The introduction on the establishment of Roman control in Anatolia aims to highlight the diversity in the processes included under the umbrella term 'Romanization' (Curchin 1991, 2, 8 and 12-14; MacMullen 2000; Woolf 2000). The following two sections present the current state of research on the Eastern FRE and some distinctive aspects of the Anatolian Limes, leading to four concluding observations on a potential expansion

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Figure 1. Frontier road with fortresses and auxiliary forts along the Euphrates and Tigris documented in the excavations (based on Keban Project 1971; 1972; 1974; 1976; Lower Euphrates Project 1978-1979 Activities 1987; Mitchell 1993, 131).

of the Thematic Study to allow inscription of the complete Roman frontier around the Mediterranean basin on the UNESCO World Heritage List.

Establishment of Roman control and frontier in Anatolia

As is well known, after taking the Italian Peninsula under control, the Roman Republic followed an expansionist policy to extend its sovereignty in the east and west. While Roman control was expanding over the Iberian Peninsula in the 3rd century BC, Anatolia was under the control of Hellenistic kingdoms that disintegrated from Alexander the Great's short-lived Empire. By the start of the Punic Wars in Sicily in 264 BC, Celtic tribes had already reached Anatolia via Thrace in 278/277 BC, and a series of Hellenistic fortifications could not prevent their expansion in a central region eventually called *Galatia*. They were forced to confine themselves to that area by joined forces of Hellenized Anatolian cities under Attalus I of *Pergamon* in 232 BC, among rivalling kingdoms and rulers. Finally in 189 BC, Galatians were defeated by the Romans and henceforth stayed under Roman control under regional rulers, constituting a buffer with Rome's eastern rivals.

When the kings of *Pergamon* and *Bithynia* bequeathed their lands to Rome after their death respectively in 133 BC, and 74 BC (Magie 1950, 32 and 320), gradual provincial annexation of Anatolia started by inheriting and taking advantage of the established Hellenistic infrastructure and culture. While *Pontus* was transformed into a province as a result of the Mithridatic wars in 89-63 BC (Magie 1950, 209-211 and 369-370; Arslan 2007, 109-111 and 505-506) the client-states were transformed into Roman provinces with the deaths of the last kings of *Galatia* in AD 25, and *Cappadocia* and *Commagene* in AD 17 (Magie 1950, 446 and 453; Marek 2003, 44; Kaya 2005, 25). The policy of using client-kingdoms as buffer thus changed to direct border control.

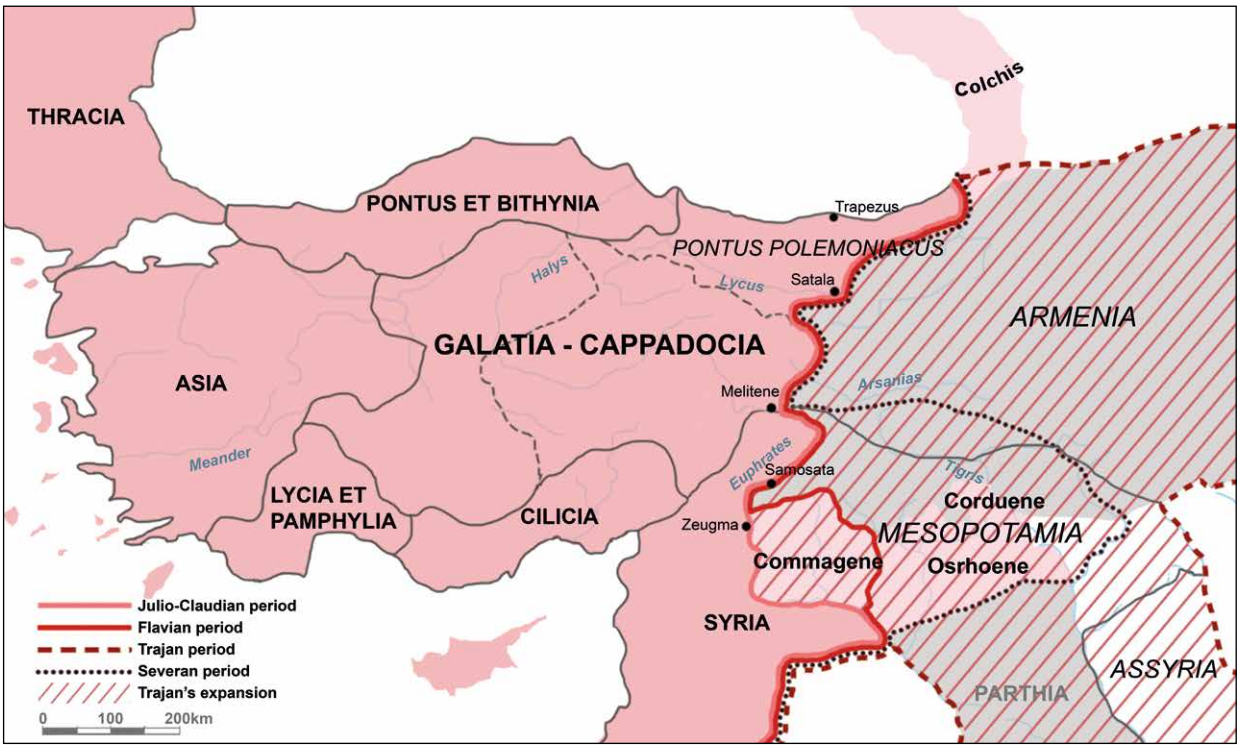

Figure 2. Borders of the Roman Empire in Julio-Claudian, Flavian, Trajanic, and Severan periods (based on Cornell & Matthews 1988; Cameron & Garnsey 1997, map 6. Asia Minor and the eastern provinces; Bowman *et al*. 2005, map 2. The Roman Empire in AD 211).

Already around 94 BC (Debevoise 1938, 46), during the consulate of Sulla (Bennett 2002, 302; 2006, 77-93), the Euphrates (Fırat) was negotiated and accepted as a border with the Parthian Empire. Direct control over the route to the *Caucasus*, through the inclusion of the Pontic Kingdom of *Polemon* into the province of *Cappadocia* in AD 64, necessitated its protection from tribal raids (Magie 1950, 561-562 and 575; Dabrowa 1989, 71; Mitford 2018, 37-38). Thus emerged the idea of a northeast frontier and some frontier structures during the reign of Nero (AD 54-68).

Systematic acceleration of frontier construction under Vespasian (Mitford 2018, 40) resulted in a composite chain of military installations consisting of main fortresses from north to south, – namely, *Satala* (Sadak/Kelkit/ Gümüşhane), *Melitene* (Battalgazi/Malatya), *Samosata* (Samsat/Adıyaman), and *Zeugma* (Nizip/ Gaziantep) – and secondary forts in-between, in addition to watchtowers and stations, and roads connecting to the rest of the Empire through bridges crossing the Euphrates or its branches (fig. 1). Although some settlements to the east of the Euphrates were occasionally dominated by the Romans to control *Armenia*, the Euphrates continued to be a stable frontier with this defensive system.

Yet, after the annexation of *Armenia* by Trajan in AD 114-117 (Magie 1950, 593 and 606-608) and of *Mesopotamia* by Severus in AD 193-211 (Magie 1950, 672-675), the Euphrates Frontier was abandoned, albeit for a short time. In the Severan period, the area north of the Euphrates, now within Turkey's borders, continued to serve as a frontier. But in the period of Trajan, the frontier line (fig. 2) may have been pushed between the river Araxes and the eastern border of *Armenia* (Mitford 2018, 67). In current FRE publications, the eastern frontier of the Empire is represented as centring on the Euphrates in Anatolia. Discovery of Roman frontier installations between the river Araxes and *Armenia*'s eastern border in ongoing studies may enable inclusion also of Armenia in the FRE project.

In that case, adherence to the Euphrates Frontier would mean to divert from the so far adapted strategy of nominating the frontiers at the Empire's largest expansion. Coexistence of Roman military installations dating as early as the period of Nero would, on the other hand, raise the possibility of a diachronic serial nomination for the Anatolian Segment. This may open the way for the inclusion also of the earliest Roman frontiers outside the Italic peninsula, as in *Iberia*.

Current state of conservation and research on Anatolian frontiers of the Roman Empire

Mostly passing through rural areas and continuing into *Syria*, the Euphrates still maintains its strategic importance

Figure 3. Aerial view of *Samosata* mound and village on the western bank of the Euphrates before submersion (Vici 2022-CC0/ no rights reserved).

as a natural border between modern provinces, and as the main water source of southeast Anatolia together with the river Tigris (Dicle). A series of dams were constructed on the Euphrates in the framework of Southeast Anatolia Project (known in Turkish as GAP) for regional development – namely, Keban in 1974, Karakaya in 1987, Atatürk in 1990, and Birecik and Karkamış in 1999. These affected the surrounding regions in many respects.

For the FRE project, their presence seriously challenges the idea(l) of a common management system in and involving Turkey, since they constitute a major physical and political discontinuity in the frontier landscape, justifying segmentation of the eastern frontier zone into north and south parts in the Thematic Study. Criticism by its neighbours of Turkey's water control policy through these dams is a major political obstacle in the way of a joint transnational nomination in the southern zone.

More specifically for Roman military heritage, the junction of the Euphrates and Arsanias, *Taurus* gorge, *Samosata* (fig. 3), and *Zeugma* (fig. 4) were affected by respective dam waters. *Samosata* fortress was totally, and *Zeugma* partially submerged under Atatürk and Birecik dam waters, alongside other important assets. On the other hand, dam constructions had also started systematic archaeological research and publications on this otherwise neglected region and heritage, among positive outcomes of the Southeast Anatolia Project for Roman frontier studies.

The earliest rescue excavations were carried out by the Centre for Research and Assessment of the Historic Environment (TAÇDAM in Turkish) in Middle East Technical University (METU) in Ankara between 1965-1974, at the Euphrates border of Elazığ and Tunceli provinces, which would be affected by the Keban dam. The main objective of the project was to explore, document, and rescue whenever possible material culture of all periods. The outcome was a cultural stratification going as early as Chalcolithic and as late as Ottoman periods, with settlement continuity through the Hittite, Urartu, Hellenistic, Roman, Byzantine, and Seljuk periods.

Important finds pertaining to the Roman period included military installations on the Euphrates frontier, such as Roman forts lined up between the earlier mentioned four fortresses. This rescue project

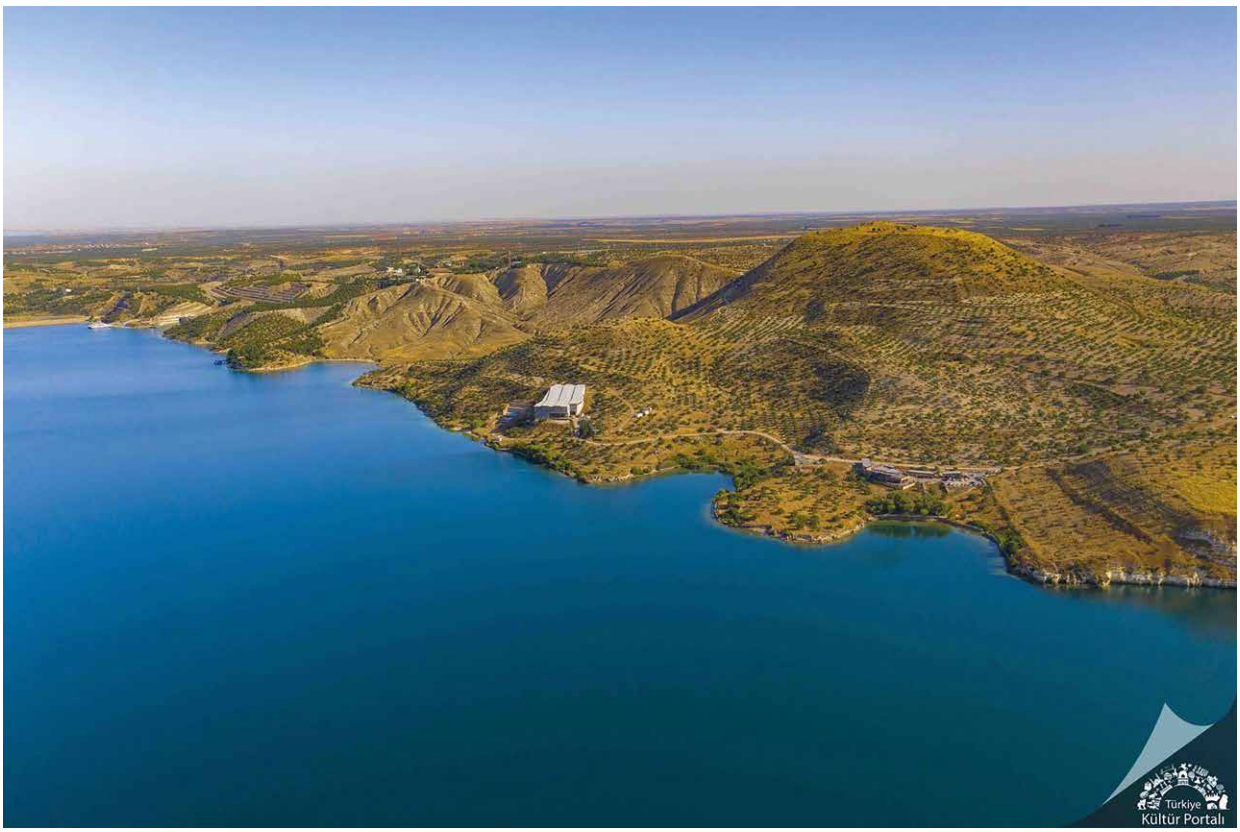

Figure 4. Aerial view of *Zeugma* on the western bank of the Euphrates. Protective shelter on top of the mosaics can be seen in the middle (© Gaziantep Museum Archive-Türkiye Kültür Portalı).

was later expanded to further south as the Lower Euphrates Project, which was carried out in 1975-1979 (Serdaroğlu 1977) on the borders of Malatya-Elazığ and Adıyaman-Şanlıurfa, where traces of several Roman military installations were revealed. Archaeological research continued at some of the sites in later decades, albeit sporadically. Research outcomes of both projects were published by METU, in two series respectively dating to 1970-1982 and 1977-1987 (Keban Project 1970; 1971-1982; Özdoğan 1977; Serdaroğlu 1977; Lower Euphrates Project 1987).

Parallel to the Keban Project, Timothy Bruce Mitford carried out fieldwork in Turkey in 1966-67 and 1972 for his PhD dissertation on 'The Roman Frontier Based on the Valley of the Upper Euphrates from the Black Sea to *Samosata*' (Mitford 1973). With grants from the British Academy, he later expanded his research to Syria between 1974 and 2002. Focusing on the sections in *Cappadocia* and *Armenia Minor* in the 1970's and 1980's, his publications include the two-volume 'East of Asia Minor. Rome's Hidden Frontier', which appeared in 2018 as the most comprehensive monograph on the topic (Mitford 1967; 1973; 1974; 1977; 1980a-b; 1989; 1998; 2018; 2021).

The British Institute at Ankara (BIA of Archaeology earlier, BIAA) also has the archives and publications of another fieldwork under its director David H. French between the 1970's and 1990's on Roman roads and related archaeological features in all the Roman provinces of Anatolia west of the Euphrates (for singular rescue projects Harper 1972; Mitchell 1980; Blaylock 1998). Additionally, BIAA's chairperson Stephen Mitchell (1983) edited and contributed in a colloquium on 'Armies and Frontiers in Roman and Byzantine Anatolia' in 1981, and later included a section on the Roman military posts and roads along the eastern frontier in his 1993 monograph on Anatolia (Mitchell 1993).

Other foreign research institutes actively participated in rescue excavations of the Ilısu-Karkamış Project coordinated by METU/TAÇDAM in 1998-2002, at the border of Gaziantep and Şanlıurfa provinces along the Euphrates, which are now submerged by the Karkamış dam (Tuna & Öztürk 1999; 2002; Tuna *et al.* 2000; 2004; Tuna & Doonan 2011). After surveys by the Institut Français d'Études Anatoliennes (IFEA) (Abadie-Reynal & Ergeç 1997; 1998) based in Istanbul, museum salvage operations at the Roman fortress of *Zeugma* revealed an excessive amount of high-quality mosaics, among other

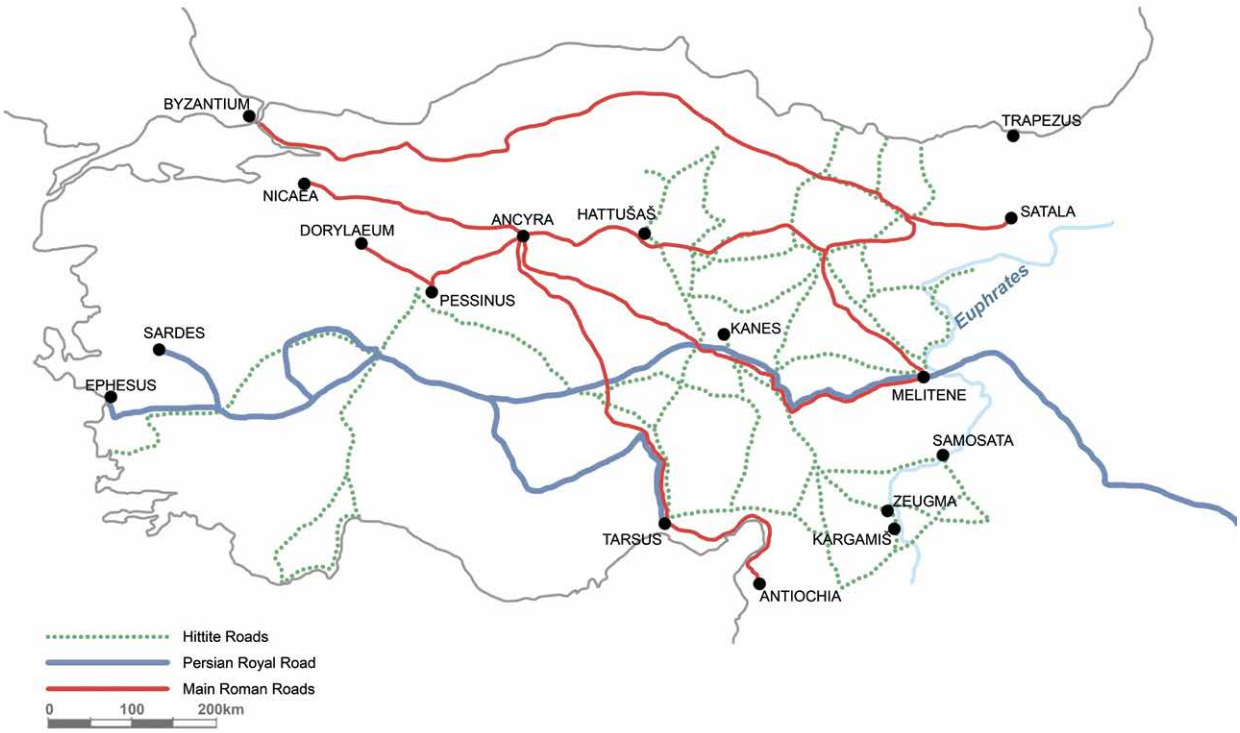

Figure 5. Anatolia roads in Hittites, Hellenistic, and Roman periods (based on Garstang 1943; French 1998, 39-41; 2016, volume 4, Fasc. 4.1, 8-9).

remains, that brought international attention to the site. These were partly removed to a newly opened mosaic museum in the closest provincial centre of Gaziantep, and partly displayed *in situ* under protective shelters.

Work in other fortresses is, so far, at the level of irregular surveys. Only in *Satala* systematic excavations began in 2017, following surveys of the 2000's (Yıldırım 2020). Additionally, 2nd and 3rd century Roman military installations to the east of the Euphrates are being excavated since the 2010's in Çattepe Höyük in Siirt (Algaze 1989; Sağlamtimur *et al.* 2018) and in Zerzevan castle in Diyarbakır (Coşkun 2016) on the Tigris. In the Keban Project, within the scope of rural heritage, some of the later submerged villages were investigated and documented (*i.e.* Han İbrahim Şah, Miyadin, Arozik, Alişam, Aşağı Ağınsı, Habusu, Ağmezra in Elazığ) (Keban Project 1970, 173-182; 1971, 131-138; 1972, 163-182; 1979, 127-142, 143-158; 1982, 139-199, 201-232, 233-265, 267-278), some monumental structures were relocated after documentation (*i.e.* Baysungur and Çelebi Ali Mosques in Tunceli, Karamağara Bridge in Elazığ) (Keban Project 1970, 183-190; 1974, 161-167; 1976, 195-213), also some anthropological and ethnohistorical studies were conducted (*i.e.* at Munzuroğlu and Han İbrahim Şah in Elazığ) (Keban Project 1976, 215-223; 1979, 127-142; 1982, 135-138). However, the rural heritage in the region was not much studied later.

Some distinctive aspects of the Anatolian Limes

Turkey is the only State Party with frontier heritage that has not yet announced its willingness to join the FRE project, partly due to the above-mentioned political and management difficulties caused by dam constructions. Yet, the interest in the Anatolian Limes as potential World Heritage is attested in the inscription of the 'Archaeological Site of *Zeugma*' and 'Zerzevan Castle and *Mithraeum*' on Turkey's Tentative List of World Heritage respectively in 2012 and 2020. Additional research and management planning studies towards their nomination would contribute greatly to an enlarged nomination to include Anatolia.

In the justification of the entry on the Tentative List, *Zeugma*'s meaning 'bridge' or 'crossing' in ancient Greek is explained by its location at a major ancient crossing on the Euphrates where twin Hellenistic cities established around 300 BC were later ruled by the Commagene Kingdom before becoming the major city on a main commercial route of the Eastern Limes in AD 72 (UNESCO WHC 2022). In addition to syncretism of Hellenistic and Semitic cultures, the remains at the site demonstrate daily life in a major Roman frontier city, as the proposed Outstanding Universal Value (OUV) of the property. This exemplifies the multi-layered

character and continuity materially traced in some Anatolian frontier components from the Bronze and up to the Middle Ages. As an earlier example, military equipment dating to the Iron Age Urartu Kingdom were unearthed at *Satala*.

Euphrates was the eastern frontier also of the Bronze Age Hittite Empire (Matessi 2021) as attested in military routes connecting posts close to the Euphrates such as Pingan and Kemah (Garstang 1943). There are remains from Hittite defensive walls and towers in currently excavated Porsuk-Zeyve Höyük in Niğde, on a political border formed during the gradual Roman progress in Anatolia, between the Roman province of *Cilicia* and the client kingdom of *Cappadocia* (Barat *et al*. 2022). Some castles (*i.e*. Samsat, Haraba-Şimşat, Horis Kale, Kaleköy and Lidar (Keban Project 1971, 39-46; Lower Euphrates Project 1978-1979 Activities 1987, 145-152, 153-176 and 249-264; Öney 1982; Özgüç 2009) located at the points controlling the Euphrates, were used for defence purposes also in the Seljuk and Ottoman periods. This chronological depth of frontier heritage, reaching as far back as the Hittite period and to that of Nero during Roman control may be among the Anatolian Segment's contributions to the FRE project. So, an extended Thematic Study may cover preceding and succeeding frontiers in Anatolia, and the networks they created, in search of parallelisms and continuities.

Also on the road network, French observes continuity in the route of the Persian Royal Road in the Roman period. Alongside the Hittite data, this supports a widely embraced proposal (French 1998) that the Roman road network in Anatolia may have been based on earlier networks, expanding, enlarging, linking and paving them wherever necessary, with acceleration parallel to frontier construction during the period of Vespasian (Mitchell 1993, 127-129). The main roads building on the Hellenistic Royal Road from *Sardis* to *Susa*, and the trade road from *Ephesus* to the Euphrates and beyond were enlarged to the frontier region for the Empire's eastern campaigns (fig. 5).

During the period of Vespasian, construction of roads connecting fortresses and forts on the eastern frontier accelerated. From south to north, there were two highways (one wide and one narrow) from *Samosata* to *Melitene*; a highway connected *Melitene* to *Satala*; and a more challenging route through mountain passes led from *Satala* to the Black Sea harbour of *Trapezus* (Trabzon) (Mitchell 1993, 124-129). These roads remained in use until at least the 7th century and later as caravan routes. This reveals an overlap of the Anatolian Segment of the FRE with the equally challenging global transnational Silk Roads World Heritage project.

The four main (*i.e*. northern, central, eastern, and northwest-southeast) routes in the Roman road network were also the main trade routes passing through Anatolia. This enabled development of major fortresses such as *Zeugma* into major trade centres where accumulated wealth enabled development in urbanism and arts to a level that is not common to all fortresses on the Roman limes. This may be another contribution of the Anatolian section to the FRE project.

In conclusion: Prospects for future studies on the Roman frontiers in Anatolia as World Heritage

The following four points would summarize the observations made so far:

1. The strategy of taking the widest frontiers of the Roman Empire in the 2nd century in FRE nominations may leave Turkey out of the map, due to the eastern expansion under Trajan beyond Turkey's borders. So, this strategy may be reconsidered in the expansion of the Thematic Study to the eastern frontiers. At this point a joint nomination with neighbouring States Parties do not appear likely due to political tension in the region.
2. In any case, it would be important to take into consideration also the earlier and later defensive and road networks in Anatolia, which were inherited by the Romans and were inherited by their successors, as a unique contribution from Anatolia to the OUV of FRE World Heritage property.
3. Dams and roads constructed in Southeast Anatolia since the 1960's resulted in partial submerge of FRE heritage while also enabling the start of its archaeological research through rescue excavations. Inventories of these excavations and surveys under the auspices of METU/TAÇDAM and BIAA since the 1960's provide a good starting point for cataloguing potential components of a serial FRE nomination from Turkey.
4. The same material may enable Turkey to join the FRE network in the digital media, for visual access to otherwise physically inaccessible heritage assets now submerged under dam waters.

Prior nomination and site management experience related to the already inscribed segments of the FRE on the World Heritage List would greatly contribute to progress along these four lines, through cooperation with the Bratislava and Hexam Groups. The authors recall with gratitude the encouragement and support provided by the late Sebastian Sommer (1956-2021) at the initiation of this attempt to formulate the potential contributions of the Anatolian Segment to the FRE World Heritage serial property, and also the potential threats along the way to nomination.

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Part 8

WALL TO WALL

Wall to Wall

A collaborative initiative between Hadrian's Wall and the Great Wall of China

David Brough

Wall to Wall is a collaboration initiative between heritage managers and academics from Hadrian's Wall and their counterparts from the Great Wall of China. Its purpose is to identify and pursue opportunities and best practice for the sharing and exchange of expertise and experience between European and Chinese scholars, and for working together to improve understanding, conservation and presentation of the two monuments. Two international seminars have been held to date, in Newcastle in March 2018 and at Jinshanling in November 2019. This paper provides an introduction to the Great Wall WHS the management challenges it presents and the approaches adopted by Chinese colleagues in the management and interpretation of the Great Wall. It also highlights potential project-based collaborations between the Great Wall of China World Heritage Site and the Frontiers of the Roman Empire World Heritage Site.

Overview of the Great Wall of China

To begin to understand the scale, complexity and history of the Great Wall of China, it is first important to realise that 'The Great Wall of China' is a misnomer; it should more accurately be called 'The Great **Walls** of China'. A series of monumental Walls were built over a period of *c.* 2,000 years (fig. 1). The first Great Walls were built during the late Spring and Autumn Period 8th-5th centuries BC and the Warring States Period (5th-3rd centuries BC) before the unification of China by Emperor Qin Shi Huang in 221 BC. These were built to delineate, demarcate and defend separate Chinese States from each other; the earliest of these is considered to be the Chu Great Wall situated in the southwest of Henan Province and dating from the 7th century BC. Over the centuries following China's unification, a series of Great Walls were built under many different emperors of several different dynasties (table 1).[1] The purpose of these Walls was to deter or prevent incursion or invasion by nomadic peoples from north of China. They were thus situated within a broad corridor across northern China from present-day Heilongjiang Province in the east to Gansu in the west, with ancillary installations extending further west into what is now Xinxiang Province. While most of the Walls adopted different geographical alignments, some in part replaced sections of preceding barriers. The most recently constructed of these, and the

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1 Other dynasties include: Northern Wei, Northern Qi, Sui, Tang, The Five Dynasties, Song, Western Xia and Liao Dynasties. The total length of the Walls Includes 4,320 km (35 %) of pre-Ming Walls which no longer remain visible.

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Figure 1. Map of the Great Wall of China (© NCHA: Drawing: Geo-Compass).

period	date (century)	no. of identified elements	% of total identified elements (%)	length of Walls (km)	% of total length
Spring and Autumn & Warring States Period	7th-3rd BC	3,355	8	3,080	15
Qin and Han Dynasties	3rd BC-3rd AD	4,999	11	3,680	17
Jin Dynasty	12th-13th AD	9,446	22	4,010	19
Ming Dynasty	14th-17th AD	24,072	55	8,852	42
other dynasties	4th-12th AD	1,849	4	1,574	7
total		43,721		21,196	

Table 1. Elements and Length of the Great Wall by Period of Construction (source The Great Wall Resource Survey).

greatest in extent, was the Ming Great Wall, built and rebuilt between the 14th-17th centuries AD, and which continued to be garrisoned into the 19th century.

Remains of all these Great Walls are included in the inscription of the Great Wall of China World Heritage Site, altogether situated across 15 present-day Provinces, Autonomous Regions and Direct Municipalities. The barriers themselves extend for nearly 21,200 km, across vastly different geographical terrains from the steppe lands of the northeast, the mountains of central-northern China, to the loess uplands and then the semi-deserts of the northwest.

Specific components and construction materials

While a number of sections of the Great Walls had been surveyed in the late 20th century, it was not until 2006 that work began on detailed survey of all components of these monuments. The Great Wall Resource Survey (The State Administration for Cultural Heritage 2016a) took six years to complete and identified nearly 48,000 elements of surviving remains, including: sections of Wall, defence towers, forts, fortresses, fortified passes, beacon towers and ancillary elements. There is considerable variation in design and form of each of these components, even within

Figure 2. The horse faces on the Wall, Shuozhou, Shanxi (Great Wall Resource Survey Shanxi Team I).

sections known to have been constructed at the same time under the same direction.

Defence towers may be solid or may contain one or more internal chambers; some may be surmounted by guard houses, again of varying design. Forts, fortresses and fortified passes vary in size, shape and internal configuration. Beacon towers may be stand-alone or clustered and may be square, rectangular or round. The linear barriers were not only curtain walls built from differing materials, often with a crenellated walkway, but also those created by cutting away sides of mountains to provide a sheer face, while sections of the Jin Great Wall of the 12th century AD consisted of a trench and mound. Other features include: *pin*, pits which are not dissimilar to the *lilia* pits found on both Hadrian's Wall and the Antonine Wall; horse-faces, which were ramparts or walls extending in front of the barrier to impede or hamper cavalry assaults (fig. 2); artillery platforms; and a number of concealed doors through the barriers themselves.

The materials used in construction of all of these elements of the frontier defence system varied according to their availability in each locality. Hence, broadly speaking: in more easterly sections they were primarily faced and capped with brick, with an earth or earth/rubble core; in central sections they were faced and capped in stone, with a rubble or earth/rubble core; while in the northwest rammed earth was used for most elements, with adobe brick being used for some beacon towers and other stand-alone structures.

Principal challenges facing the management of the Great Wall

The most demanding challenge facing the management of the Great Wall is its immediate and ongoing conservation. There are several dimensions to this. Firstly, in those sections where rammed earth was the principal original construction material the original fabric of the monument is extremely fragile and has to a great extent already disappeared due to centuries of weathering by wind and sandstorms alongside seasonal rain (fig. 3). Considerable research and investment has been made in the development of techniques to consolidate extant structures (Yu *et al.* 2021).

Secondly, due to the structures having been largely abandoned and no longer maintained for over a century, large sections of the monument have become overgrown with vegetation. In many instances roots from trees and shrubs have broken the previously sealed capping of brick or stone structures, thus allowing ingress of rainwater resulting in the washing-away of earth cores leading to spectacular and catastrophic collapse. Both these issues

Figure 3. In western province like Ningxia the Ming Great Wall was built of rammed-earth and has already deteriorated considerably (© Wang Yungang).

are further compounded by the remote location of most of the monument which is often without vehicular access, thereby making any remedial work both expensive and time-consuming (fig. 4).

A third dimension to the challenge of conserving the monument is the need to limit human damage to its fabric. While much has been done through the application of regulation to prevent inappropriate development on or around the monument, a greater challenge is to influence individual behaviour of both visitors and within communities living alongside the monument. Although measures are being taken to limit visitor numbers to the most popular and accessible sections of the Great Wall, custodians remain concerned about the pressures on its fabric caused by the sheer volume of visitors, particularly during the 'golden weeks' of National Holidays. Conservationists have equal concerns about damage done by individual visitors seeking to explore sections of the monument not officially open to the public, and particularly those sections known as 'the Wild Wall' where its fabric is already at risk due to overgrowth.

Thus, like many other World Heritage Sites, the Great Wall faces significant challenges in the management of visitors and the need to relieve pressure on particular pinch-points around its 'honey pot' attractions. Active consideration is being given to how the burden of visitor numbers may be spread more broadly, both spatially and temporally. Central to this is the need to improve and expand transport infrastructure and facilitate visitor access in the immediate vicinity of the monument, but do so without damaging the fabric of the monument or its historical landscape setting.

The risks to the monument caused by local communities primarily arise from its traditional role as a source of building materials, be they bricks or (partially) dressed stone. Considerable efforts are now being made to raise awareness within local communities of the monument's historical and cultural significance, its vulnerability and irreplaceability and hence the importance of its conservation. Again, as with many other World Heritage Sites, the degree to which the Great Wall is valued by its local communities has a direct bearing on their willingness to support its conservation or see it prioritised over other needs. This issue is particularly challenging for the 112 out of 404 counties in which the Great Wall is situated which are officially classified as 'National Poverty Counties' (State Administration of Cultural Heritage 2016b). It is therefore recognised that greater consideration needs to be given to realising the economic and social regeneration potential of the monument more widely and to a higher degree.

Given its vast geographical extent, the management of the Great Wall is inherently complex and involves an enormous number of different bodies. Specific responsibilities are split or shared between different administrative authorities and between many different national, provincial, municipal and county level authorities, presenting challenges for coordination of management functions. It is therefore hugely challenging

Figure 4. Most materials for conservation of the Great Wall in mountain areas have to be transported by hand. Conservation work at Jiankou Great Wall (Zhao Peng).

to ensure consistency in the application of policies or that management practices equally meet expected standards across the whole of the World Heritage Site. Even without this administrative complexity, the enormity of the Great Wall means that any Wall-wide undertaking, such as completing State of Conservation reports for UNESCO, requires a massive amount of work, time and expense.

Current management initiatives in response to these challenges

Over recent years a number of initiatives have been developed which have contributed significantly to improving the overall management, and in particular the conservation, of the Great Wall. Considerable investment has been made in monitoring the condition of the Great Wall, as part of a wider national initiative to monitor all China's World Heritage Sites and other historic sites of national significance (Zhang 2019, 245-271). This has led to the establishment of sophisticated database systems through which data can be collated and changes in the state of conservation can be tracked, analysed and appropriate remedial action taken in a timely manner. The collection of monitoring data has been enhanced by harnessing a variety of technologies including GIS, drone surveillance, 3D imaging plus mobile phone apps through which data can be recorded then uploaded into databases.

The day-to-day process of monitoring has been significantly boosted by the establishment of the Great Wall Patrollers. The Patrollers are primarily recruited from within local communities along the Great Wall and are employed part-time funded by local governments. Each Patroller is assigned a length of the Wall which they are required to inspect on a regular, although not daily, basis. There role is to identify, record and report any damage to the monument, while also undertaking regular fixed-point photography of specific elements which they then upload to a central database. Although there are now over 7,000 Great Wall Patrollers, not all sections of the monument yet have Patrollers assigned to them.

The Patrollers also play an important role in public engagement. They advise and provide guidance to visitors and provide assistance to those who may have accidents or get lost. In addition they work within their local communities advising on the importance of conservation of the monument. Their work with local schoolchildren is particularly important in this regard.

Engagement with the public more broadly has also been greatly enhanced through the development and application of IT, much of which has been supported by the Chinese tech giant Tencent Corporation and its philanthropic Foundation. This has led to the development of a series of computer games and on-line cartoon stories primarily targeted at schoolchildren, each based on the Great Wall and through which the importance of its conservation is promoted. These on-line platforms are also used to deliver lectures and seminars by experts on different aspects of the history and architecture of the Great Wall to the general public. They are also used as a means of fundraising from the general public to support specific conservation projects.

Figure 5. A working party of volunteers on the Great Wall (Zhang Jun).

Recent years have also seen a substantial growth in volunteering activities in relation to the Great Wall. These range from litter-picking to shrub clearance, to organising and supporting events, exhibitions and photographic and other competitions, to maintaining footpaths and other infrastructure and supporting the work of the Great Wall Patrollers (fig. 5). Volunteers have also developed a suite of educational materials related to the Great Wall, and provide support to schools in using those materials as part of the curriculum.

Two particular initiatives have done much to address some of the challenges of the complexity of managing the Great Wall discussed above. Firstly, the establishment of the Great Wall Alliance in 2018 has brought together most of the principal bodies responsible for management of the World Heritage Site. This has provided a forum through which experience and good practice can be shared across the whole monument. It also provides a mechanism through which new policies and initiatives can be disseminated and their application and implementation can be better coordinated. Secondly a broader, nationwide initiative is seeking to integrate the management of tourism with that of cultural heritage. It is hoped that through working together more closely both on day-to-day and longer-term issues most of the erstwhile conflicts and contentions between these two sectors may be resolved.

As noted above, some of the sections of the Great Wall are situated in areas of relative social and economic disadvantage. The establishment of a series of Great Wall National Cultural Parks is major initiative currently under implementation. Its purpose is to seek to utilise the Great Wall as a vehicle for economic and community regeneration, particularly in those often remote rural areas of disadvantage. Through the development of visitor infrastructure it aims to stimulate wider local investment, while promoting local cultural traditions and protecting the historic environment.

Opportunities for future collaborative projects

Two broad thematic areas suggest themselves as providing opportunities for mutual learning and benefit through further exchanges between the two World Heritage Sites. Clearly the use of technology is of increasing value across many aspects of understanding and managing these two historic monuments, and of other historic monuments. These range from survey and condition monitoring, to its application in archaeological research excavation analysis and in public engagement and educational activities. Many specific projects could arise from this.

Given the many characteristics shared between The Great Wall and the Frontiers of the Roman Empire World Heritage Sites there appear to be many potential opportunities for comparative projects to be undertaken. Discussions are already underway regarding the potential to establish a comparative exhibition of Roman military equipment with that of ancient China. This may readily invite comparison of our contemporary approaches to museology and interpretation more broadly. Similarly, there may be scope to explore historic comparisons and contrasts between these two, and potentially other, ancient military defensive systems and their structures.

These two thematic areas do not represent the entirety of potential areas for future collaborative activities, rather only those which are currently felt to be of most immediate mutual interest. Some other aspects of how we respectively manage and understand our monuments may offer greater benefits in one direction or the other. For example, Chinese colleagues are particularly keen to learn more about the concept and practice of historic landscape analysis and characterisation. Conversely, colleagues across Roman frontiers may be able to learn a great deal about some of financial benefits to the management and conservation of monuments through the development of on-line gaming and charitable fundraising. Colleagues from the German Limes and from the Antonine Wall have already participated in and contributed to elements of the Wall-to-Wall collaboration. It is hoped that colleagues from other Roman frontiers may similarly be able to join in as the Wall-to-Wall initiative goes forward.

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Vulnerability assessment of the natural disasters of the Great Wall in Ningxia Hui Autonomous Region, China

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The total length of the Great Wall of China is 21,196.18 km, distributed in 15 Provinces (Tongbin Chen *et al.* 2018, 4-14). The Great Wall was firstly built in the Warring States Period (475-221 BC), based on the defensive wall in Yan State, Zhao State, and Qin State. It has been developed in the Qin (221-207 BC), Han (207 BC-220 AD), Sui (581-618 AD) and Song (960-1279 AD) dynasties. In Ming Dynasty (1368-1644 AD), the Great Wall was constructed further and improved, which made it to be the longest military facility in the world. Most of the Great Wall seen now was built at this time. At an early stage, there were nine garrisons. Later on, the defensive zone was adjusted to 11 garrisons, because there was more responsibility for guarding the capital than before. In the end, there are 13 garrisons.

Ningxia Hui Autonomous Region, a small province, is located in the northwest of China. The area is only 66, 400 km^2. The length of defensive structures of the Great Wall in Ningxia is 1507 km (Yuyang Tang & Zhe Wang 2016, 212-213). There are more than 2,000 auxiliary installations. With the Great Wall existing for a long historical period, Ningxia is known as the Great Wall Museum of China (Renfang Wang & Ruifang Zhang 2012, 24-29; Renfang Wang 2018, 135-140; 2020, 140-14; Ningxia Institute of Cultural relics and Archaeology 2019, 13-19). Among them, the important ones are the Warring States Period and the Ming Dynasty (table 1). The heritage of the Great Wall in Ningxia during the Ming Dynasty was well preserved and the length is the longest, more than 1,000km. In addition, in the Ming Dynasty, there were 4 garrisons in the northwest, including 2 garrisons in Ningxia, namely the Ningxia garrison and the Guyuan garrison. Furthermore, as the trilateral highest office regime, Guyan Garrison became the military command center in the northwest in Ming Dynasty of China. This was a unique military model in the Nine Garrisons Defensive System (Jiubian).

At first Ningxia Garrison had three branches of defensive zones and developed into five later on, named as the East, the South, the West, the North and the Middle to guard different sections respectively. The branches of defensive zones of Guyuan Garrison were also divided into five successively, named as Xiamaguan, Jinglu, Lanzhou, Hezhou, Lutang (Chong Ai 1990, 14-16). Defensive elements of the Great Wall in Ningxia include the East Wall, the North Wall,

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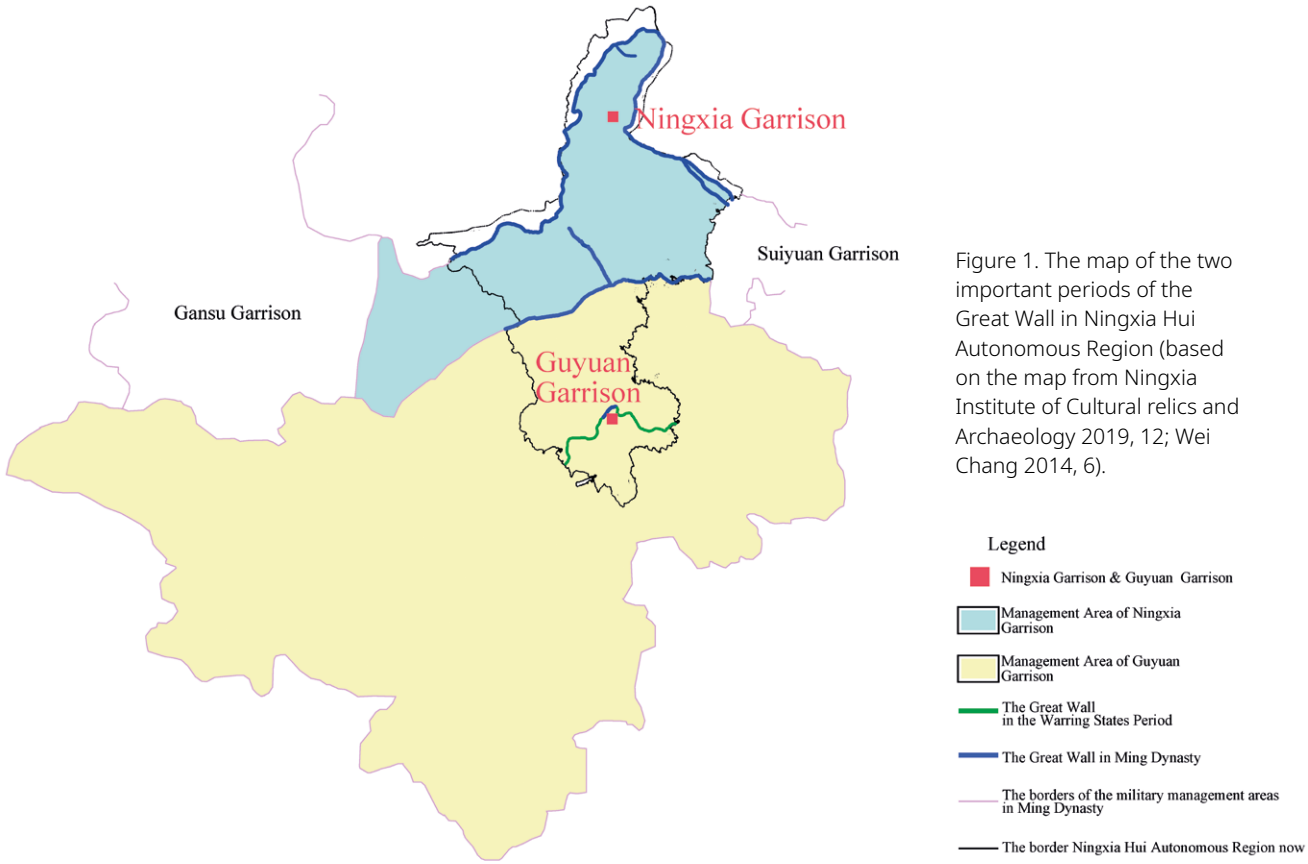

Figure 1. The map of the two important periods of the Great Wall in Ningxia Hui Autonomous Region (based on the map from Ningxia Institute of Cultural relics and Archaeology 2019, 12; Wei Chang 2014, 6).

period	location
The Warring States Period (475 BC-221 BC)	located in Xiji County, Yuanzhou District and Pengyang County, Guyuan City
Ming Dynasty (AD 1368 -AD 1644)	Ningxia Section: from Yanchi County, Wuzhong City in the east, passed through Yinchuan and Shizuishan City, to Shapotou District, Zhongwei City in the west
	Guyuan Section: from Yanchi County, Wuzhong City in the east, to Haiyuan County, Zhongwei City in the west; a small section in Guyuan City

Table 1. The Great Wall in two important periods in Ningxia.

the Old North Wall, the West Wall, Guyuan Internal Wall, Trench, Helan Mountain, and so on (fig. 1).

The three types of the defensive structures of the Great Wall in Ningxia Hui Autonomous Region

The Great Wall system is composed by defensive structures, military alarm transmission facilities; settlements; transportation facilities; trade area, and so on (Yukun Zhang & Yan Li 2005, 116-119 and 153). The functions of all the parts were clear and independent, but also must maintain a high degree of coordination. Among the system, the defensive structures were the very important parts, which includes of the rampart, trench and natural barrier. For example, the defensive structures of the Great Wall in Ming Dynasty is 8815.8 (table 2) (Bing Yu *et al.* 2015, 67-73). They have both natural and manual qualities. There were three types of the defensive structures of the Great Wall in Ningxia Hui Autonomous Region, which are manual construction, manual modification and natural formation.

Construction The defensive structures by the artificial construction were completely man-made, using loess, sand, adobe and other soil materials, mixed with plant roots such as *Achnatherum splendens* and reed branches, red willow branches; or using the materials such as bricks, stones, lime, *etc.* (Jianjun Ma & Peini Zhou 2012, 4-13).

type	length (km)	rate (%)
rampart (wall and tower)	6259.6	71
trench	359.7	4
natural barrier	2232.5	25

Table 2. Types of defensive structures of the Great Wall of Ming Dynasty.

1. Rammed earth / loess. The loess rammed wall was mostly a construction method of 'cutting and then ramming'. The bottom is the natural surface of the earth, and the upper part is a wall structure built artificially with layers of rammed earth.
2. Piled earth/loess. Using the various sandy soils, clay or loess as the main materials, they were piled up layer by layer from the natural surface of the earth, and the outer surface of the loess was built a wall. Firstly, a small amount of earth ridges were piled up along the defensive line when the wall was built. Then add another layer on the outer side of the earth ridge, and continue to extend to the inner side of the defensive line. The slope of the piled wall was small, and it was difficult to form an advantage in defense. Therefore, after the pile was completed, the soldiers shoveled the outer wall to make the wall steeper.
3. Stone masonry. In some areas where it was convenient to take stones, some sections of the walls of the Great Wall were built in layers with rough stones, flakes, and block stones. During the building process, mortar and other bonding materials have not been used between the stones. When the stones were of different sizes and irregular shapes, the structure of the unbonded stone wall was usually unclear, and there were many gaps between the stones filled with crushed stones.

Modification of natural topography Artificial modification was trimming and transforming the natural mountains, rivers, *etc*., and the new structures formed could meet the defensive needs of the Great Wall, including mountain sections that were excavated, trenches that were built nearby the rivers, and the traps that were dug in the open land.

1. Mountain sections by removing or adding components. When building the Great Wall, the steep mountains could be used as the defensive structures, they will be used as a part of the Great Wall. This undoubtedly saved manpower, material resources and construction time. At the same time, the stability and defence of the mountain sections have obvious advantages. For the mountain sections that were high, steep, difficult to climb, a steep slope could be used directly as a defensive structure. For the mountain that was high but not steep enough, the mountain was processed into a steep section by shovelling, in order to prevent people crossing over, called 'shovelling cliff' or 'splitting the mountain section'. In addition, there are minimal transformation to the mountains, such as: building or digging crenels on the ridge of the mountain to watch and launch arrows, digging steps on the slope of the mountain to make it easier for the guards to go up and down, and building the connecting-wall between the ridges of the peaks that were next to each other.
2. Trench. As the defensive structure of the ditch, trenches were built outside the Great Wall, or were set up independently. Some of the trenches were dug deeply to prevent the invading enemy from crossing over. There was a unique kind of the trench in Ningxia. It was linked to the natural ditches, built in the Warring States Period, conserved and used in Ming Dynasty.
3. Traps formed like the Chinese character 品. Pinzijiao (Traps formed like the Chinese character 品), also known as Pinkeng, were dug on the open area with relatively flat terrain and good sightlines outside of the Great Wall. They were excavated in a group of three, layout in the shape of the Chinese character 品, to prevent enemy cavalry from approaching and crossing over.

Natural formation Natural barriers refer to a type of defensive structure formed by completely utilizing natural mountains and rivers.

1. Mountain barrier is a defensive structure that completely utilized natural mountains as the physical structure of the Great Wall defence system. Ningxia was the frontier area and Helan Mountains was the border. Helan Mountains are rocky and the east sides are very steep, used as the mountain barriers.
2. River barrier is a type of defensive structure that completely utilized natural rivers as the physical structure of the Great Wall defence system. The Yellow River enters Ningxia Garrison from the southwest and flows diagonally across the entire Ningxia Garrison. Along the east side of the Yellow River, Hedongbianqiang (a section of the Great Wall along the east side of Yellow River) was built, and the Yellow River also became a part of the defensive structures.

Vulnerability of the Great Wall in Ningxia Hui Autonomous Region

The vulnerability of the Great Wall is the state before the disaster, its ability to adapt and respond to disasters, the degree of disaster at a specific location, and a qualitative or even quantitative assessment of its preservation status. The factors that determine its vulnerability mainly include the time of construction, exposure, sensitivity, and coping

Figure 2. The wall eroded, the Old North Wall.

period	length (km)	proportion (%)
Warring States Period (475 BC-221 BC)	171	11.3
221 BC-AD 1368	268	17.8
Ming Dynasty (AD 1368-1644)	1068	70.9
total	1507	100.0

Table 3. The proportion of the time of construction of the Great Wall in Ningxia Hui Autonomous Region.

ability. In general, the vulnerability of the Great Wall in Ningxia Hui Autonomous Region is high, based on the qualitative analysis. The construction time of the Great Wall in Ningxia Hui Autonomous Region is very early. The earliest construction was more than 2,000 years ago, and the latest construction was nearly 400 years ago. The vulnerability of the Great Wall in Ningxia Hui Autonomous Region is high, especially the earliest ones which the proportion occupied is 11.3 % (table 3) (Renfang Wang 2018, 135-140).

Exposure, sensitivity and coping capacity The exposure of the Great Wall in Ningxia Hui Autonomous Region refers to the slenderness ratio of the Great Wall. The vulnerability of the Great Wall is high if height-to-width ratio is high. For an example, the vulnerability of the tower is higher than the wall. The sensitivity of the Great Wall in Ningxia Hui Autonomous Region mainly includes the site type, the structure and structural stability. Among them, the structure type of the Great Wall can be divided based on the material and the construction method, such as the stone and adobe masonry, wood-loess mixed construction, lime and loess rammed construction, and so on. The structural stability includes structural damage and material degradation, such as loess wall cracking and eroding, the wall or the tower deformation, the collapse of the wall or the tower, and the loess sites degradation.

Taking the Great Wall of Ming Dynasty in Ningxia Hui Autonomous Region as an example, out of the total 100 %, it contains 51.6 % of loess walls, 2.8 % of stone walls, 9.3 % of mountain sections, 10.8 % of trenches, and 25.4 % of mountain barriers (Ningxia Institute of Cultural relics and Archeology 2019, 13-19). Sensitivity of the loess walls is the highest among them. The coping capacity is considered with the preservation and management of the Great Wall in Ningxia Hui Autonomous Region, including the maintenance frequency, conservation, and monitoring and warning system established, *etc*.

Natural disaster risk on the area of the Great Wall in Ningxia Hui Autonomous Region

Ningxia Hui Autonomous Region is high in the south and low in the north. The topography is diverse, including of the mountains, the plains, the hills and deserts, *etc*. (Shile Duan, Qing Lin 2021, 107-113; Wei Chang 2014, 21-23). The northern and southern parts are very different. The environment of Ningxia Garrison and Guyuan Garrison are different because the former was located on the north and the latter was located on the south. In the Ningxia Garrison, the topographies are mainly mountains, plains, deserts. Helan Mountains, along with the northwestern edge of Ningxia, were about 220 km from north to south and 20-40 km from east to west. It was the main mountain, and also was the Mountain Barrier in Ningxia Garrison (Dong Xiao & Fei Cheng 2022, 11-18). The Yellow River crosses the Ningxia Garrison diagonally. In the Guyuan Garrison, there are mainly the mountains, hills. Liupan

Figure 3. Desertification, the East Wall.

Figure 4. Holes and Gullies, the East Wall.

Mountains is located on the southwest of Ningxia. There are some tributaries from the Yellow River.

Sandstorms Tengger Desert, Ulan Buhe Desert and Mu Us Desert are located on the northwest, the north and northeast of Ningxia Hui Autonomous Region, respectively. The deserts are the main cause of damage such as cracking and erosion of the loess walls and towers of the Great Wall. The strong and continuous wind will keep increasing the damage to the pores of the Great Wall and early damaged parts. In addition, the strong wind from the desert will inevitably carry sand particles to form sandstorms, and its destructive power is stronger than the wind. The loess walls were eroded, especially at the bottom of the wall (fig. 2). Surrounded by the desert, the walls and towers of Ningxia Garrison are likely to experience desertification (fig. 3).

Heavy rain and flood Most of the walls and towers of the Great Wall in Ningxia Hui Autonomous Region were made of loess. The water resistance (disintegration resistance) is poor. When there was heavy rain, continuous rainfall or even floods, the construction of the Great Wall can be easily washed away, soaked and collapsed. In addition, there are frequent stormy rainstorms and strong winds, which will exacerbate the damage and collapse of the Great Wall. There are holes and gullies on the walls (fig. 4). The auxiliary installations of the mountain barriers could be influenced by the flood in summer because the Mountain barriers are steep.

Figure 5. Horizontal dislocation, the Old North Wall.

Earthquakes The Great Wall, mainly made of loess, is extremely vulnerable. The integrity of the walls depended only on the weight themselves, and there was no effective horizontal connection. The earthquakes can cause major damage. When an earthquake occurred in Qing Dynasty (3 January, 1739), the transverse seismic wave tended to break the Great Wall, or even collapse. The Old North Wall in the north of Ningxia Garrison were destroyed horizontally and the vertically in two places (fig. 5).

Conclusion

When the vulnerability of the Great Wall is obvious and the hazardous factor of the surrounding environment are triggered, the Great Wall will probably experience the destruction or even disappearance. At the same time, because natural disasters are an inherent phenomenon of the nature, it is impossible for humans to eliminate them. By scientific and effective management of their risks we can achieve continuous and stable protection of the Great Wall in a balance between the two. Due to the long history and a large amount of loess constructions, the Great Wall in Ningxia Hui Autonomous Region is relatively vulnerable, as there are various types of natural disasters. The preservation strategy of the Great Wall will be proposed, based on natural disaster risk management.

Firstly, the maintenance, preservation and conservation of the Great Wall in Ningxia Hui Autonomous Region will be strengthened to reduce the vulnerability of cultural heritage as much as possible. Routine and frequent maintenance is very important. Thus, the vulnerability of the Great Wall can be discovered in time by this way, and maintenance measures can be taken at the same time. Therefore, conservation will usually be carried out in order to make the Great Wall more durable.

Secondly, under the land and space planning system, the natural and cultural environment of the Great Wall in Ningxia Hui Autonomous Region need to be improved so the possibility of disasters caused by desertification, drought, and lack of plants will be reduced.

Finally, planning needs to be made. The first one is the natural disaster risk management plan of the Great Wall in Ningxia Hui Autonomous Region, the other one is natural disaster disposal plan of the Great Wall in Ningxia Hui Autonomous Region. The former should include assessment, zone division and management regulations, main measures and requirements, planning phases, budget estimates, and relevant plans and standards, *etc*. The latter should include information and value assessment of the Great Wall in Ningxia Hui Autonomous Region, risk assessment, emergency organizations and responsibilities, disaster prevention and warning system, emergency measures during disasters, post-disaster restoration, *etc*.

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Comparison of the military system of the China's Great Wall and the ancient Roman frontier

Li Yan, Zhai Yujie, Yao Wang and Li Zhe

The Great Wall defensive system was built during the Han Dynasty and the Ming Dynasty to ensure border security. Defensive systems consist of forts, wall structures, early warning and beacon transmission installations, and postal and logistics systems. The Roman Empire and the Han Dynasty were in the same period, and they had many similarities in their defensive systems. This article compares the time and space distribution of the defensive system, composition of the Wall system, the hierarchy of the fort system, the composition and transmission route of the post system, the transmission mode and transmission route of the beacon system between China and the ancient Rome. China's Great Wall and the Roman Frontier are an immeasurable wealth left by the ancients to future generations. The formation and development of these heritage give us a chance to watch the great creation of ancient architecture from a global perspective, and understand the similarity of the imperial border defensive system.

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History and distribution

The Roman frontier extends over a wide area from Britain, Germany to the Black Sea, the Red Sea, and through North Africa to the Atlantic Ocean. Hadrian's Wall and the German Limes are important parts of the ancient Roman frontier. Hadrian's Wall stretches from Tyne estuary on the east coast to Solway Bay on the west coast, the total length is about 117.5 km. The German Limes starts from the river Rhine near Neuwied to Passau on the river Danube, also known as the 'the Upper German-Raetian Limes', about 550 km in zigzag shape.

China's Wall started from the Spring and Autumn Period and the Warring States Period (7th century BC), Chu, Qi, Yan, Zhao, Wei, Qin, Zhongshan and other feudal states, and went through the Qin, Han, Northern Wei, Eastern Wei, Northern Qi, Northern Zhou, Sui, Tang, Song, Liao, Jin, Western Xia, Ming, and Qing dynasties for more than 2000 years, more than 20 states and dynasties have built the Great Wall. The Han Wall starts from Liaodong (Liaoning Province) in the east, passes through Yinshan Mountain and Hexi Corridor, and ends at Quli (Korla, Xinjiang) in the west, with a total length of more than 10,000 km. The Ming Wall starts from Liaodong (Hutou Mountain, Liaoning) in the east and ends at Jiayuguan (Gansu) in the west, with a total length of 8,851.8 km.

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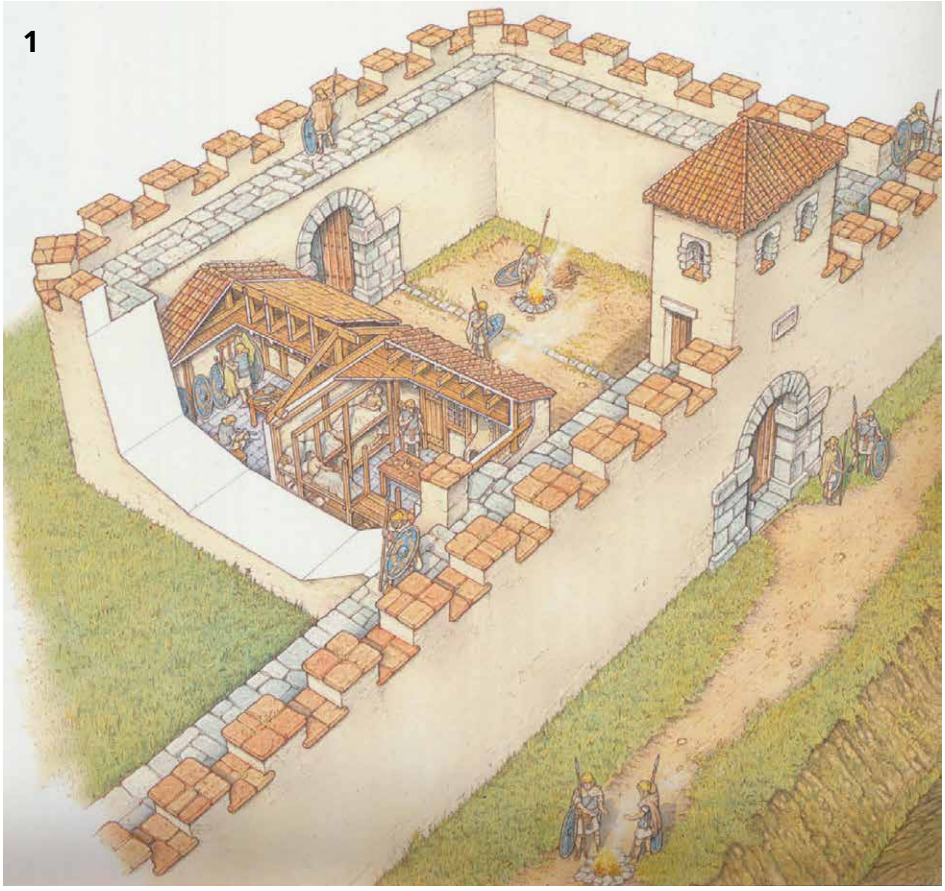


Figure 1. 1. MC 37 of Hadrian's Wall; 2. The Ming Dynasty wall and beacon tower of Shanxi-Zhen (1. afer Fields 2003; 2. Li Zhe).

Both the Chinese and Roman Frontier have defensive systems: wall system, fort system, early warning and beacon transmission system, and postal and logistics system. The construction sequence of each constituent element is different. The construction sequence of the Wall, forts and beacon towers of Han has not been clarified due to the wide area and lack of historical materials; Ming began to construct the fortress before the construction of the wall, this is 63 years after the founding of the Ming Dynasty. It has experienced the development process of setting up passes, building beacon towers, building and repairing the Walls.

Previous studies show the construction of Hadrian Wall went through the following processes:

1. Wall-fort-vallum-military way, building the Wall itself and the line of watch towers.
2. Adding forts into the Wall and narrowing the Wall.
3. Constructing the vallum on the south side.
4. From river Irthing to the west until milecastle 54, re-building the Wall with stones to replace the old turf Wall.
5. Retreating and reoccupying the Hadrian's wall, and building the Military Way (Breeze 2006).

The 'Limes' of the German Wall not only include the boundary itself defined by various linear facilities, but also patrol roads, palisade, earth walls and ditches (or stone walls), fortresses, forts and towers. The depth of the whole area is about 2-5 km (Schallmayer 2007). The construction of the German Wall experienced the following process (Fischer 2008):

1. Construction of the border, road and fortress-the wall-retreat of the wall and the establishment of the border.
2. Claudius-Domitian, check-point setting along the river and road while keeping a soft border.
3. Establishment Trajanic Upper German-Raetian frontier.
4. Hadrian-Antoninus, construction of a defensive line and finalizing the wall plan.
5. Severus, finalizing the defensive line construction.
6. Caracalla-Diocletian, withdrawal from the frontier, and establishment of the Danube-ller-Rhine border.

The Ming Wall is the same as the German Limes. The walls were built after the forts, and the forts were set up when a place was occupied. The construction of roads and beacon towers followed closely. Hadrian' Wall built the walls first, then the fortress. All three have carried out wall reinforcement works in the later stage. Some sections of the Ming Wall were later bricked, and hollow towers were added to the solid ones; The German Limes replaced the previous wooden towers with stone ones, and replaced the previous palisade with stone walls; Hadrian's Wall was widened, and the turf wall was rebuilt into a stone wall (fig. 1).

Wall system

Hadrian Wall has five linear elements from north to south: ditch, curtain-wall, vallum, military road and Stanegate. The ditch includes three parts: the north mound, the ditch, and the berm (ash pits are found in many places); the vallum includes the north mound, the marginal mound, ditch, the south mound. There is a 'Milecastle' (MC) built every other Roman mile (about 1481 m). Between the two MCs, there are two turrets for observation.

The river Tiantian runs parallel to the Han wall, it is paved with fine sand, to check the footprints of enemy soldiers and horses, and bell columns are set to tangle the horses' legs, ringing the alarm at the same time. In addition to the walls, there are trenches, water gates and other ancillary works along the wall. The Trench is a kind of fortification combining deep trench and trench wall. When the original restrictions such as terrain and soil quality are not convenient for building walls, the soil from trenches is piled up or quarries are cut on one or both sides of the trenches to form a low wall, which is called a trench wall. The Watergate was built at the intersection of the barrier wall and the river channel to block the enemies from entering the river channel.

The outer side of the Ming Wall is set up with boundary markers, set up hexagonal pits and horse pits. From the outside to the inside, there are two or even three walls, called the first-limes and the second-limes, which are used to strengthen defence. In 1437, Liaodong Zhen took the lead in building the walls. From Haizhou-wei to ShenyangZhong-wei, 'weaving wood into the wall' and laying nail boards and iron thistles along the road were the first wall projects in the Ming Dynasty (Li, F. 1985). This is similar to the early turf wall of the early Hadrian Wall and the palisade of the German Limes. The most similar to Hadrian's Great Wall is the Jin Trench which used the method of digging up soil and building trenches to stop the attack of Mongolian cavalry, this is also called 'boundary trench' because of its trench shape. According to the importance of the area, the Jin Trench is equipped with single trench and single wall, single trench and double wall, double trench and double wall, *etc*. (fig. 2).

The significant difference between China's Wall and ancient Roman frontiers is the way of opening on the wall. The MC of Hadrian's Wall is similar to the fortlet of Jin Trench, and beacon yards (watch tower with a ring of walls) in Ming Wall, these are the nodes (notch) connecting the inside and outside of the Wall. The forts on Hadrian's Wall communicates with the inside and outside of the Wall through two gates, while the passes of the Han and Ming do not open to the outside. To ensure safety, the opening

Figure 2. 1. T178 Beacon and the river Tiantian of the Han Wall (left); 2. No. 2 Erdeng-aobao of Jin Trench (1. Chen Zhixing; 2. Zhai Yujie).

on the wall of the Great Wall is very small, allowing only one person to enter. It is called a secret door, which is convenient for scouts to pass back military information (Li, Z. 2022). Due to the existence of the MC and the forts built afterward, 'gates' and 'passages' are rare on Hadrian's Wall. Porter's Gate (where Deer Street crosses Hadrian's Wall) and Negborn's Gate (near Household fortress) are currently found (Breeze 2006).

Fort system

Fort system refers to the large and small fortresses, with military defensive characteristics and the attributes of life. David J. Breeze (2006) said that Hadrian's Wall was a complete military system with a depth of more than 240 km, stretching from the most northerly outpost fort at High Rochester to the southern Pennines. The total depth of the Ming Wall system from north to south

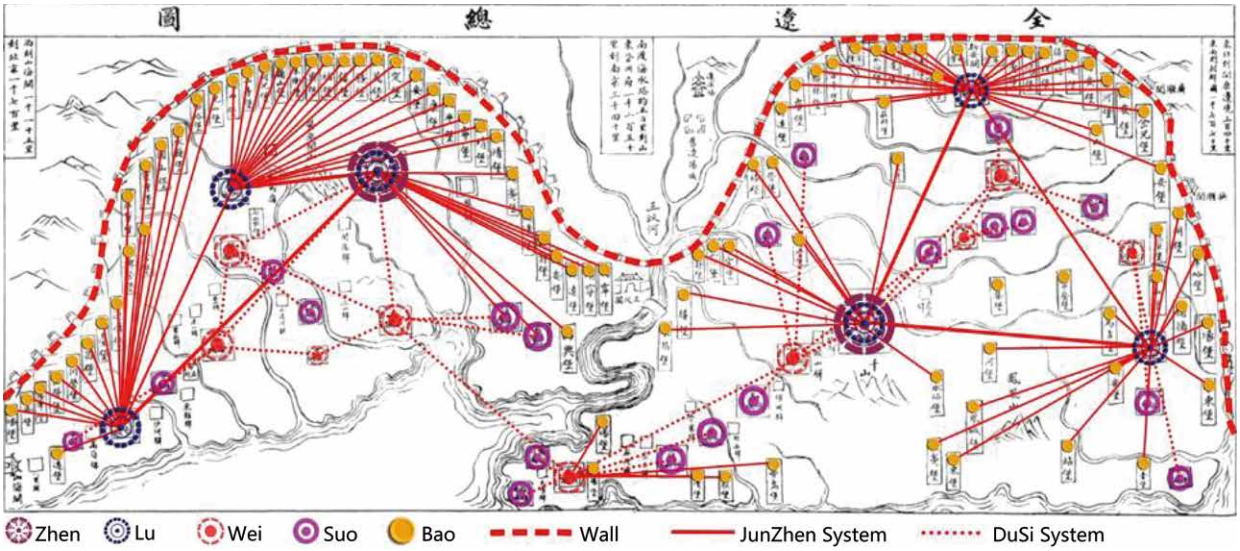


Figure 3. Schematic diagram of Liaodong Zhen defensive system in Ming Dynasty (Fan Xixuan).

is 790 km, which refers to the spatial distribution of fort system at all levels within the vast range.

The Roman army consisted of legions and auxiliary troops. The members of the legion were Roman citizens. Troops are subdivided into legions, battalions and centuries. The soldiers of the auxiliary troops came from the allied countries and the frontier provinces, divided into cavalry battalions, infantry battalions and mixed cavalry battalions, they can be divided into 500-strong and 1,000-strong cohorts according to the number of troops, stationed in the fortresses and forts along the frontier. Forts of German Limes are divided into three categories: fortresses, forts and fortlets/milecastles. There is no administrative relationship at this level, and the level is divided according to the garrisoned troops.

The forts around the Han Wall can be categorized into frontier fortresses, *zhang-sai*-fort (barrier-fort), and *wu*-fort (outskirt) according to their shape, size, location and function. Frontier fortresses, stationed commander Jun-Shou/Tai-Shou, the length of a side is between 500 and 1500 m. Zhang-Sai-fort, stationed commandeer Du-Wei, the length of a side is about 23 m, 46 m, 69 m and 130 m, 300 m can also be seen in special areas. *Wu*-fort (beacon yards), stationed head of the beacon tower, is surrounded by walls, there are generally 1-2 bedrooms inside, which can only accommodate several soldiers.

Ming Wall was the peak of the development of the defensive system. Figure 1 shows the nine *bians* and eleven *zhens* from east to west: Liaodong Zhen, Jizhen Zhen, Chang Zhen, Zhenbao Zhen, Xuanfu Zhen, Datong Zhen, Shanxi Zhen, Yulin Zhen, Guyuan Zhen and Gansu Zhen. There are 1091 garrison forts in total, including 13 *zhen*-forts, 45 *lu*-forts, 87 *wei*-forts, 64 *suo*-forts and 1048 *bao*-forts (LI, Y., 2021). Taking Liaodong Zhen for example, which had two *zhen*-forts, namely Guangning and Liaoyang. The Zongbing commanded Guangning Zhen-fort and the vice Zongbing commanded Liaoyang Zhen-fort. The two *zhen*-forts split the left and right parts of the 'M-shape' defensive zone, Liaoyang controlled north *lu*, east *lu*, while Guangning controlled south *lu*, west *lu* and middle *lu*. *Zhen*-forts command *lu*-forts, *lu*-forts command *bao*-forts. *Lu*-forts were located in the centre of the defensive zone, from which *bao*-forts under its command radiated out. Two *zhen*-forts were surrounded and defended by 25 *wei*-forts. The distance between the *bao*-forts was relatively short, mostly about 8 to 15 km. The fort system is divided into five levels from high to low: *Zhen*-fort, *lu*-fort, *wei*-forts, *suo*-forts and *bao*-forts. The forts at all levels are not isolated, they guard, cooperate and fight together (fig. 3).

To sum up, the Chinese and Roman forts can be divided into four categories according to their distance from the Great Wall, scale, level and function:

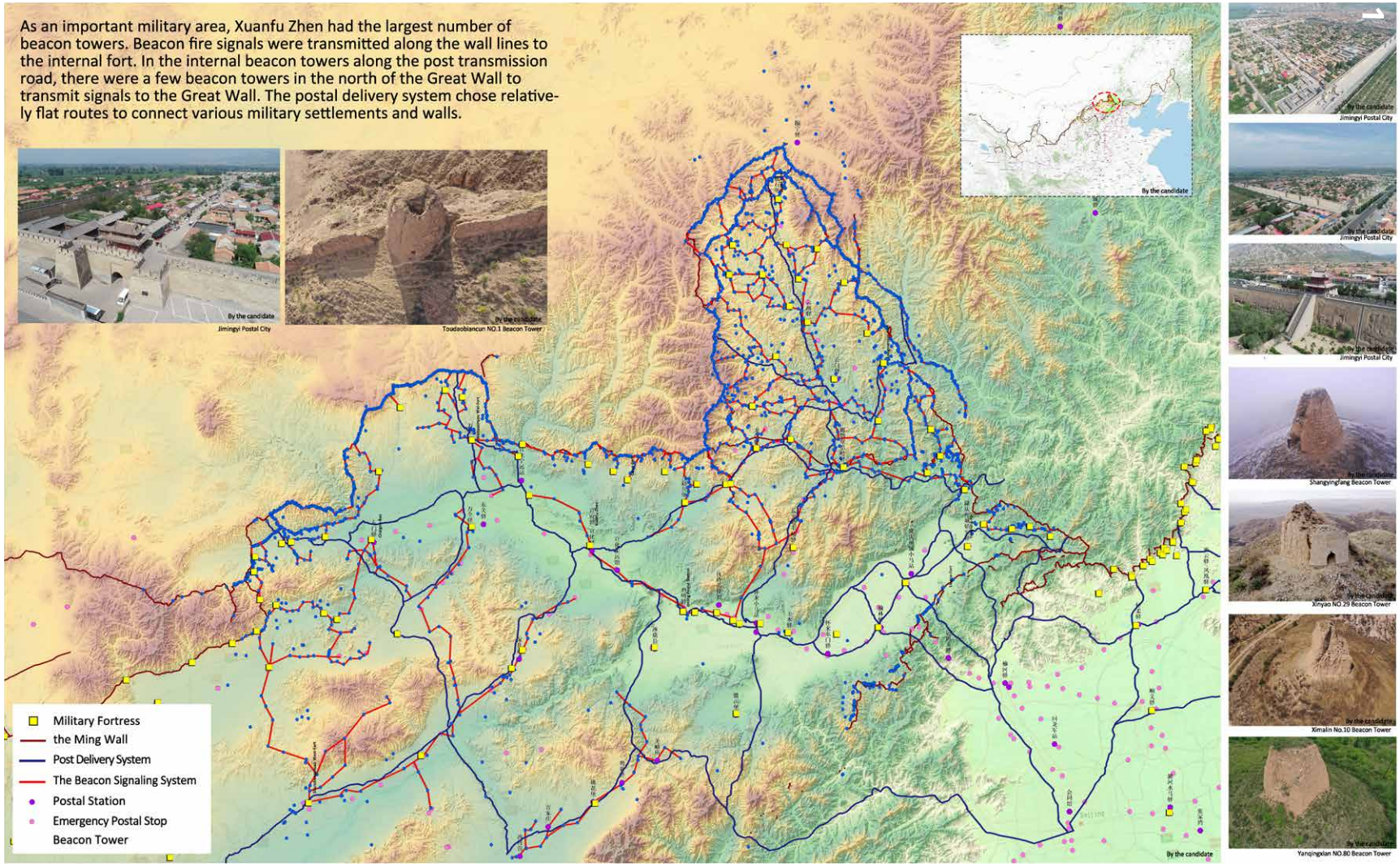
1. Command forts. It is located in the rear and far from the frontiers. The forts are of high level and large scale. It is heavily garrisoned with high-level generals. For example, Han Frontier fortresses, Jin Command Fort, Ming Zhen-fort, Roman fortresses.
2. Supply fort, located on the supply line and controls the main road of water and land transportation. The fort is large in scale and of medium level and is responsible for stationing troops and supplies. These are located on flat land and occupies a powerful military terrain that can be attacked, retreated and defended. For example, Han *sai*-fort (barrier-fort), Jin garrison fort, Ming *lu*-fort, Ming *wei*-fort, Ming *suo*-fort, supply fort of Hadrian's Wall.

Figure 4. 1. Command fort, Wuyao Fort; 2. Supply fort, Hexi-Dawan Fort; 3. Wall Fort, Jiaqu-Houguan site; 4. Watch fort P179, *zhang*-fort (all are in Han Dynasty) (1. Ma Deyu; 2-4. Li Zhe).

3. Wall fort. This is very close to the Wall, and its scale is small. The main task of the soldiers stationed is to fight at the first time. There are often beacon towers around it to keep close contact with the Wall, and the road accessibility is strong. For example, Han *zhang*-fort, Jin wall fort, Ming *bao*-fort, Wall fort of Hadrian's Wall.
4. Watch fort, located on the Wall, small in scale and with few troops. This is mainly responsible for lookout and is only used for short-term interception. For example, Han *zhang*-fort, Jin *zhang*-fort, Ming *wu*-fort, MC of Hadrian's Wall (fig. 4).

Postal and logistics system

The postal and logistic system refers to the post stations and transportation set up along the Wall for officials who delivering official documents, to live temporarily, to change horses and transport military materials. Hadrian's Wall has Stanegate forts and supply forts, similar to Ming post stations, such as *Vindolanda*. The postal and logistic system in the Han Dynasty was mainly housed in *zhi* and 'post pavilions'. *Zhi* were comprehensive facilities for officials to rest, providing food, vehicles and horses, 'post pavilion', a station during short distance walking, always set up together with a beacon. For example, Yumen Duwei has five mail pavilions (*sui*): Cangting Sui, Zhijian Sui (Dunziwan Pier), Qianqiu Sui, Yannian Pavilion and Mahuajia Pier. The *Old Han Guan Yi* says, "Ten *li* is a post pavilion, five *li* is a post, the postman is in the middle, and two and a half *li* away from each other" (Wang, L. 2017). Postal and logistics system consists of courier service, transport service for the supply, urgent delivery service. Courier service (using boats and horses): set up every 60 or 80 lis (30,000 or 40,000 m), responsible for disseminating government policies, sending military intelligence, receiving envoys, *etc*. courier service mainly used horses and boats to provide services, with fast delivery speed and wide coverage. Transport service for the supply: responsible for transporting military supplies and tribute, mainly using horses, boats, carriages, *etc*. The transport speed was relatively slow, and the scope of delivery remained flexible. Urgent delivery service: responsible for the delivery of daily important official documents, set up every 10 *lis* (5,000 m), and the delivery was made mainly on foot, so the delivery speed was low, and it was responsible for providing services to a designated area. The post road in the Ming Dynasty paralleled with the sidewalk tower, some beacons in the Han Dynasty assumed the function of 'post pavilion',


As an important military area, Xuanfu Zhen had the largest number of beacon towers. Beacon fire signals were transmitted along the wall lines to the internal fort. In the internal beacon towers along the post transmission road, there were a few beacon towers in the north of the Great Wall to transmit signals to the Great Wall. The postal delivery system chose relatively flat routes to connect various military settlements and walls.
By the candidate
Jimingyi Postal City
By the candidate
Toudaobiancun NO.1 Beacon Tower
Military Fortress
the Ming Wall
Post Delivery System
The Beacon Signaling System
Postal Station
Emergency Postal Stop
Beacon Tower
Shangyingfang Beacon Tower
Xinyao NO.29 Beacon Tower
Ximalin No.10 Beacon Tower
Yanqingxian NO.80 Beacon Tower

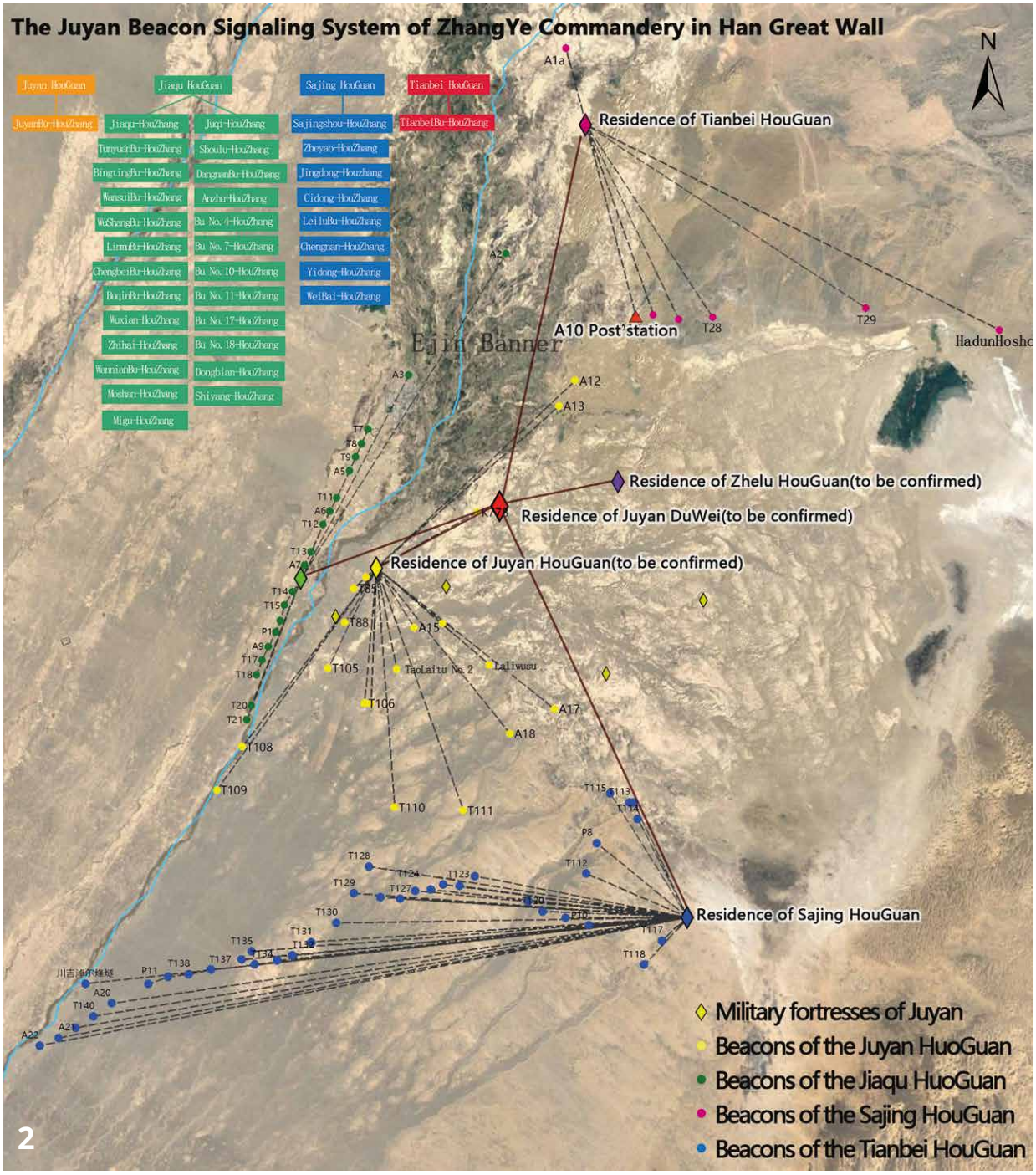


Figure 5. 1. Xuanfu Zhen beacon signalling system and postal delivery system; 2. Juyan beacon signalling system of ZhangYe commandery in the Han Dynasty (1. Wang Yingjin; 2. Yao Wang)

which shows that the post route and beacon route overlap in some sections. Figure 5.1 shows the parallel route of post and beacon transmission in Xuanfu Zhen.

Warning and beacon signalling systems

The early warning system is responsible for military intelligence reconnaissance outside Wall Line, and the beacon system is responsible for military information transmission within the Wall Line. The early warning and beacon signalling system of Hadrian's Wall consists of five outposts, watch towers and independent watchtowers (MC also plays a role). That of Ming Wall consists of sentry stations, scout-patrol stations, gun-signalling carriages, and watch towers. Both have similar signal transmission methods and routes, and both have cavalry or infantry who rush to the nearest fort to inform the enemy number in detail, reducing the risk of being tampered with or misread.

Roman frontier Ways of beacon transmission: In ancient Roman literature, some ancient signal modes with different complexity, functions and limitations were mentioned, such as beacon chains, synchronised water clocks, torch combination, semaphore, *etc*. (all three are recorded in ancient documents, no evidence). The publication 'Signalling and the design of Roman frontier systems' (Woolliscroft 1993) records the ways of beacon transmission along the German Limes (Section: Wp.4/47 – Fortress of Gross-Krotzenburg):

1. Signalling in the northern study sector: the beacon can have direct contact with the rear fortress.
2. Signalling in southern study sector: the fortress is mostly located on the low ground near the river, and the beacons pass laterally between the beacons.
3. 'Trans-Wetterau' signalling: Each fortress seems to be in charge of a certain length of paragraphs, and the fortresses cannot see each other, and other facilities are needed for transfer.

The Han Great Wall The official hierarchy for Hou-Wang (signalling) system is *hou*, *bu* and *sui*. Figure 5.2 shows the relationship between *hou* and *sui*

1. *Hou*, subordinate of the *du-wei*, is responsible for a section of the frontier fortress, the officer is called 'Hou' and located in a *zhang*-fort.
2. *Bu*, subordinate of the *hou*, the officer is called 'head of Hou' and 'Shili'. Shili is directly under the head of Hou, to be sent to each *bu* to supervise the garrison affairs.
3. *Sui*, subordinate of the *bu*. *Sui* is a beacon tower, it is the basic unit, the officer is called 'head of the beacon tower'. Each *sui* garrisons one or two soldiers at least and five or six at most (Chen, M. 2004).

Juyan Han Bamboo Slips record the beacon fire system in the Han Dynasty. **The system of the fire signals on plug** stipulates the basic principles for raising fire signals, including specifying the sequence of raising the fire signal (fire before smoke in the daytime), specifying different warning beacon signals according to the number of enemies and the invasion position of the enemy, distinguishing five beacon towers according to the five level enemy situation, and the contact way between beacon towers and other defensive departments (Cheng 1990). Beacon flights are distributed along the Great Wall. Most of them are located inside the Great Wall, and a few are outside which cooperate with scouts to monitor the enemy's activities. They are called '*Sui* outside the Wall'.

The Ming Great Wall Similar to the Han Dynasty, the Ming beacon fire system is connected by 'sound and colour language' such as flags, fire, smoke and guns. Each *zhen* uses different signals, mainly contains two aspects of information: the direction of invasion and number of enemies. For example, Liaodong Zhen signals the direction of invasion with flat colour in the day, and number of lanterns in the night; it signals the enemy number with number of smokes in the day, and number of fires in the night. The structures of beacon towers varied in forms, including beacon platforms (also called beacon mounds or smoke platforms), beacon yards (with enclosures), trench walls, attached beacons (mini-beacon tower), and firewood stacks. Attached to the beacon is a fire pool for setting off fireworks, with at least three and at most seven. The line of attached beacons and the Great Wall are perpendicular, so that attached beacons can help to indicate the number of enemies. Both China and ancient Rome have beacon fire transmission, but ancient Rome has no literature records about attached beacons.

The beacon towers are distributed according to the principle of 'even placement', and they are transmitted one by one or in separate towers. The transmission of separate towers is often on the Great Wall or when the beacon towers are close to each other, so as to prevent the error rate from rising due to too many times of transfer. According to the Ming Dynasty stone tablet unearthed at Shengouerdun in Gansu, each tower shall be equipped with "one stone cannon, one line gun, one bow, one sabre, thirty arrows, one yellow flag, one rope ladder, five firewood piles, and five attached beacons" (Qiu 2018). The beacon towers can be categorized into on-the-wall tower, inner-wall tower, outer-wall tower, sidewalk tower. There is also a special on-the-wall tower, which is responsible for transmitting the information from the wall to the inner-wall tower. It is temporarily named as 'node tower'. When the enemy coming, the information was transmitted one by one from the Wall to the *bao*-fort, *lu*-fort, *zhen*-fort and other forts.

Conclusion

The similarities between the China's Wall and the Roman Frontier show that the Wall is a common cultural phenomenon of mankind. Both Chinese and Roman Frontier have defensive systems: fort system, wall system, early warning and beacon transmission system, and postal and logistics system. Both have defensive facilities with walls and trenches, but the communication methods from inside to outside of the walls are different. Both have forts of different sizes and levels. Both have road forts, ancient documents have been unearthed in Han Xuanquan Zhi and *Vindolanda*. Both have transmission mode of front and back intervisibility, or use the 'node' tower to contact the beacon that cannot be seen each other. Both have beacon system, and there are two ways of transmission verification: beacon transmission and human transmission.

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Archaeology of Qingping fort site

Practicing the purpose and idea of archaeology of the Great Wall of China

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As the largest cultural heritage, the Great Wall is a linear or banded ancient architectural site. The Great Wall of China is mainly distributed in 15 provinces in the north. Its ruins are more than 20,000 km long and have been built for more than 2000 years. The Great Wall of the Ming Dynasty has the most mature and perfect form of expression of the Great Wall of China. Its building materials consist predominantly of earth, bricks, stones, wood and grass. The buildings have various forms and contain many elements, mainly including walls, towers, forts and markets places. In Shaanxi Province, there is a camp fort that we have chosen as a representative to conduct archaeological excavation, so as to comprehensively understand the details of the Great Wall, and explore the role of the Great Wall in the process of the inheritance and development of Chinese civilization.

Introduction to the Great Wall Qingping Fort site

Qingping Fort is a camp fort belonging to the Great Wall system of Yansui Town in the Ming Dynasty (fig. 1). The Ming Dynasty successively set up nine military units along the northern border, each with a certain station and defense area. Such stations and defense areas are called 'military towns.'

> "The people of the Yuan Dynasty came back to the north and tried to revive themselves. Yongle (1403-1424 AD) moved its capital to Peking, which was close to the fortress on three sides. After the orthodoxy, the enemy suffered more and more. Therefore, in the end of the Ming Dynasty, the border defense was very important. From river Yalu in the east to Jiayu Pass in the west, it stretched for ten thousands of miles, and was guarded by different regions. At the beginning, it set up four towns, Liaodong, Xuanfu, Datong, and Yansui. Then it set up three towns, Ningxia, Gansu, and Jizhou. The general army of Taiyuan was biased, and the trilateral government was stationed in Guyuan, also known as two towns, which is called Nine Border Towns." (Zhang Tingyu *et al.* 1974, Bingzhi 3, 2235).

Yansui Town is a military town located in the the Great Bend of the Huanghe River area in the north of Shaanxi Province. It is named Yansui from Yan'an Wei and Suide Wei, and the general troops are stationed in Suide. Later, Yulin Wei was set up, and the general moved

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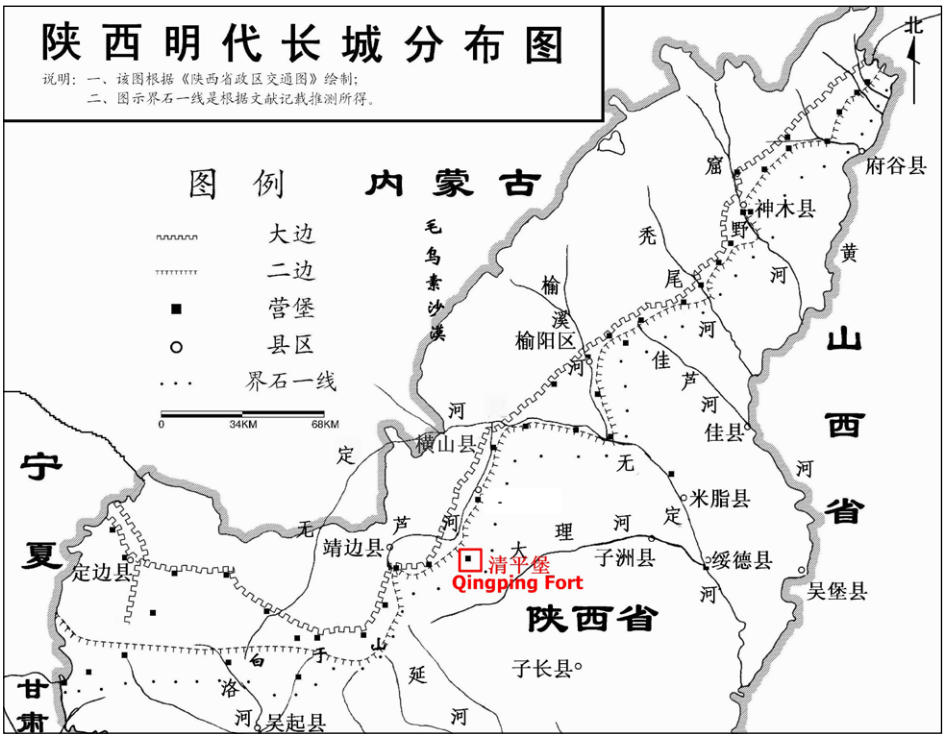

Figure 1. Map of the Great Wall system of Yansui Town in the Ming Dynasty.

to Yulin, also known as Yulin Town. It is mainly because the tribes that control the nomads in the Great Bend of the Huanghe River area go south, and the Great Wall in Yansui Town "stretches more than one thousand and two hundred miles from the west of Huangfu-chuan Fort to Dingbian-ying Fort, looks across the fort, cuts across the south part of the Great Bend of the river Huanghe, and cuts mountains and valleys inside. It is called" Jiaqiang (double Walls), Piantou "in the east", Ningxia and Guyuan "in the west. It is called Camel City by the northern people" (Zhang Tingyu *et al.* 1974, 2238).

The Great Wall in Yansui Town consists of First side, Second side and Thirty-six Forts between the two sides (Yu Chunlei 2013). It is basically distributed in Shaanxi Province, about 700 km from east to west, distributed in Yulin City and Yan'an City today. It is connected to the Great Wall in Taiyuan Town across the Yellow River in the northeast, and to the Great Wall in Ningxia Town in the west. The northern part of the Great Wall is the sandy grassland area on the southern edge of the Mu Us Desert, and the southern part is the hinterland of the Loess Plateau. The Great Wall in Yansui Town is basically made of rammed soil, mainly loess, and some rammed soil is mixed with black loessial soil or red clay. The survey shows that the thickness of the rammed layer is mainly within the range of 0.12-0.18 m, and the materials included are mainly gravel. The wall width mainly ranges from 3 to 8 m; The height is between 0.5 and 10 m. There are wrapped bricks and stones on the outside of piers and barracks, and the top is covered with Triassic soil to prevent water. Thirty-six forts are distributed between the first side and the second side. These were used for military garrison, family life, daily management, commercial trade and other activities. The garrisons were responsible for the defense of a section of the area, which is generally divided into three roads: east, middle and west.

Qingping Fort is a fort at the west end of the Middle Road. For the 11th year of Chenghua (1475 AD) in the Ming Dynasty, Wang Rui who was the first officer in Ministry of Army. "The fort is located in the mountain plain, which is a place of great impact. It is surrounded by three mails and eighty-four steps, and 13 buildings. Its' wall was raised in the sixth year of Longqing (1572 AD), and coated by brick the sixth year of Wanli (1578 AD)" (Liu Hanteng & Ji Yulian 2006, 26). It is about 600 m long from north to south and 300 m long from east to west. The fort is undulating and covered with quicksand. There are still two ruins of city retaining piers 100 to 200 m west side of the fort, and two ruins of brick arch bridges south side of the City Door.

Archaeological Achievements of Qingping Fort Site

From 2020 to 2022, Shaanxi Academy of Archaeology has excavated in the site of Qingping Fort. A total of 5000 m^2 were excavated, revealing the ruins of the central building, the south gate and the urn city, Xianying Palace, folk houses and shops, temples outside the castle, *etc.* A large number of building components, porcelain

Figure 2. Planimetric map of Qingping Fort.

Figure 3. The central building, dwellings and shops.

Figure 4. The brick three petal cicada wing sidewalk.

fragments of daily necessities, painted clay statues, religious supplies, and only a small amount of weapons and military supplies were unearthed (fig. 2).

The central building was originally a high-rise building, which was located in the planning center of Qingping Fort. Now there is only a part of the platform. There are four coupon holes under the platform to connect the four main streets in the fort. The inside of the platform is rammed, the outside is wrapped with black bricks, and the adhesive is lime. The platform is built for the two times. For the first time, a square platform with a plane side length of 12 m is built, and for the second time, a 5 m long part is built on the south side. The residual height of the platform body is about 4.2 m, and the rammed earth is wrapped with bricks, and 5 % is sealed. The lower four coupon holes are 3.6 m wide and 3.2 m high. In the north of the coupon hole on the west side of the platform, there is a step on the platform, which is 1 m wide (fig. 3).

Xianying Palace is located in the north of the west side of the central building. It is generally oriented from north to south. It is 65 m long from north to south and 25 m long from east to west. The plane is rectangular. The building structure is completely preserved, which is made of black bricks, and the adhesive is lime. From the south to the north are the screen wall, the gate, the stage, the east and west sides, the incense burner, the main hall, the bedroom, the wall and other parts. The overall distribution is axisymmetric. The stage face to face the main hall. A large number of bricks, tiles, owl kisses (*chi kiss*) and other building materials have been unearthed, as well as some religious artifacts. There are painted clay statues in the hallway, the east and west verandas, the main hall, and the bedroom. The shaping method is wooden bones and clay bodies, which are painted outside. The size of the unearthed clay statues can be divided into two categories, namely, the images in the style of the Ming Dynasty and the images in the style of Mongolia.

There is a street on the south side of the central building, which is the same width as the central building. On both sides of the street, more than 10 densely distributed small buildings have been exposed. These buildings are densely distributed, and most of them are 'one bright and two dark' unit structures. Taking F14 as an example, the overall width of the brick masonry is 10.2 m,

the depth is 4 m, and the courtyard is the same width. The room is located in the north, which is divided into three rooms. The middle one opens to the courtyard, and two pieces on both sides open to the middle room. There are brick heatable beds in the rooms on both sides. There are ruins of milling houses or mills in the courtyard, which are ordinary civilian residences for soldiers and civilians stationed in the fort at that time. A brick three petal cicada wing sidewalk was found outside the building wall on the west side of the street, which should be the external window of the small shops at that time (fig. 4).

Understanding of the relics exposed in Qingping Fort site

Through the above archaeological work, the following understandings have been formed about the relics exposed in Qingping Fort: The central building is the planning center of the camp fort. The four coupon holes opened under the high platform of the central building face the four main streets in the fort and connect with the city gate, dividing the camp fort into different areas. This pattern was the same in almost every city in the Ming Dynasty, forming a general rule. The building form of the central building is a square high platform, with a cross shaped four out coupon hole under the platform, and a two-story pavilion built on the platform. Because the building is located in the center of the camp fort, it is called the 'central building'. Later, the upper pavilion was generally used to worship the Jade Emperor, so it was also called the 'Jade Emperor Pavilion', with different names.

Looking back, such buildings were not found in city in the Tang Dynasty, nor in towns in the Han Dynasty. However, such a building can be traced back to the market of the Han Dynasty. A portrait brick of the Eastern Han Dynasty collected by the Sichuan Provincial Museum shows a five-ridge double-eave market building in the center of the market well, a drum on the market building, walls around it, doors in the middle of the wall, cross roads corresponding to the doors, and the market building is at the intersection of the center. The marketplace is divided into four columns, each of which is arranged in three to four rows of long corridors from east to west, and each column is connected into one by two long corridors. This is a map of the market layout of the Han Dynasty, which shows the appearance of the market at that time and provides us with valuable materials to understand the business situation of the Han Dynasty. The market building in the market center is also recorded in Han Dynasty documents. The specific image on this portrait brick provides a good reference for us to understand the cultural attribute of the central building of Qingping Fort, which shows that the central building has a strong cultural attribute of commercial market, and that it has its own attribute positioning as a market when it was built.

Xianying Palace is a temple dedicated to the City God. In the Ming Dynasty, the imperial court carried out the City God belief in China, and established the names and ranks of the City God at all levels. The Chenghuang Temple in Qingping Fort is called Xianying Palace, which corresponds to the City God at the county level. The plane layout of the building adopts an axisymmetric way, among which the most prominent form of brick house, the pattern of the former court and the rear bedroom, the pattern of the main hall facing the stage, and the screen wall outside the door are all concrete reflections of the Central Plains culture.

The small courtyards cleaned up in Qingping Fort are mainly 'one bright and two dark' buildings, which were used for the residence of ordinary people in the Warring States Period, called "*one house and two interior*" (*Bamboo slips of Qin Tomb in Shuihudi*, 149; Chen Wei 2014, 288-291). However, the heated bed in the house is a cultural relic in northern China. The residential buildings in this pattern have continued to modern times, and still occupy the mainstream position in the local area. These relics reflect the dense population and active commercial activities of Qingping Fort at that time. The heated bed and mill house in folk houses also reflect the exchange and integration of northern culture and Central Plains culture.

The brick three petal cicada wing slow road found on the west side of the street on the south side of the central building was recorded in the Song Dynasty's *Ying Zao Fa Shi*. It is an architectural form of settlement culture. It is generally set in front of the door and belongs to the doorway. The three-petal cicada wing slow road found in Qingping Castle is a reflection of the remains of a small shop and a specific relic of commercial activities in Qingping Fort.

Reflections on the archaeological purposes and ideas of the Great Wall

One of the responsibilities of Chinese archaeology is to prove that the Chinese civilization has a long history. Archaeology in the historical period is duty bound and irreplaceable to prove how the Chinese civilization can be inherited and developed step by step. Archaeology of the Great Wall is a part of archaeology in the historical period. The Great Wall is widely distributed and stretches for ten thousands of miles. Most of it is distributed in the farming pastoral ecotone. During the two thousand years of continuous construction, it has always been a place where nations and cultures collided, exchanged and merged. Therefore, archaeology of the Great Wall needs to reveal the relics and relics left by this exchange and fusion, so as to illustrate the role of the Great Wall in the process of the integration and development of the Chinese nation, Explain the role of the Great Wall in the process of the inheritance and development of Chinese civilization.

Qingping Fort is a camp in the Great Wall system. It lasted about 200 years from its completion to its abandonment. In this camp, ethnic collisions, exchanges and integration also occurred during this period. The process of occurrence has become history, but the broken walls buried under the yellow sand will tell us that the integration and development of the Chinese nation also occurred here. Therefore, the purpose and concept of the archaeological work carried out at the Qingping Fort site need to reveal the relics that can reflect the integration and development of Mongolian and Han nationalities in this small area in this small period of time. This is the case with Qingping Fort. All other piers, abutments and walls are the same. We need to continue to work, gradually add up in practical work, to achieve the overall goal of the Great Wall archaeology.

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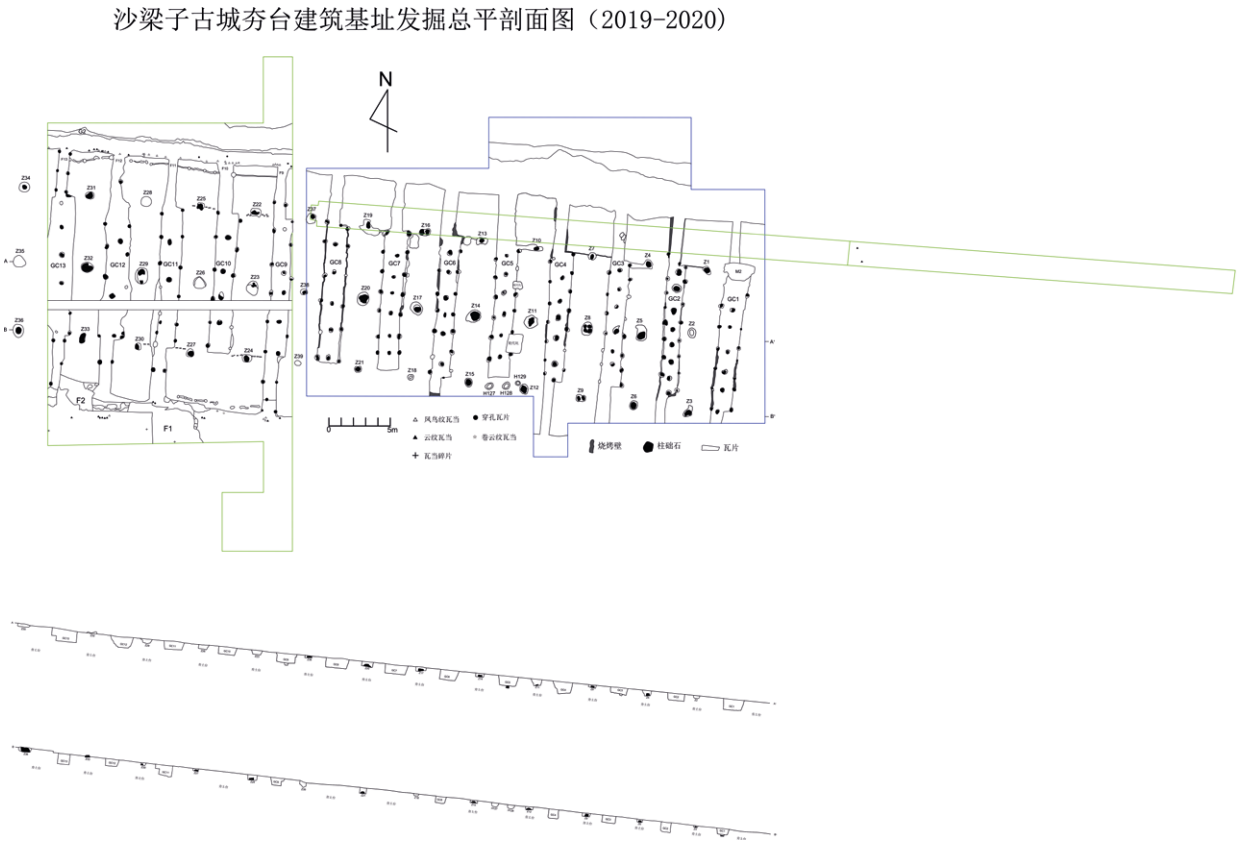

Figure 1. Plan of the 2019 and 2020 archaeological excavations, showing the distribution of the various types of remains (Liu Yang).

A large granary found along the Great Wall of Western Han Dynasty in Hetao Region

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Archaeological discoveries in the ancient town of Shaliangzi

The ancient town of Shaliangzi is located in the northwest of Shaliangzi Village in Xiaoheihe Town of Yuquan District, Hohhot, Inner Mongolia Autonomous Region. It is about 130 m south of river Dahei, a tributary of the Yellow River. In 2019-2020, the site was jointly excavated by two teams from Inner Mongolia Autonomous Region Institute of Cultural Relics and Archaeology and the School of Sociology and Anthropology of Sun Yat-sen University, and the excavation revealed a large single structure on the rammed-earth foundation.

The rectangular-shaped building foundation is located in the middle of town site facing in northwest-southeast direction with the dimension of approximately 170 m east to west and 20 m from north to south. The rammed-earth foundation is situated on the higher ground with wide rammed walls on all sides. There are pillar holes and trenches in north-south direction on the foundation site (fig.1). The pillar holes are structured in three rows north to south, and are approximately 5 m apart with the middle row of pillar holes being relatively large in size. There are stone foundations in most pillar holes, however, some of which are replaced by earth foundation. The archaeological excavation revealed 16 trenches evenly distributed at a 3 m interval between side walls, most of which is north-south through and perpendicular to the foundation. These trenches are regularly sized and square shaped, narrower on the north-south ends and wider in the middle section projecting to the east. In the trenches, there are six to seven wall posts on each of the walls facing in east and west direction. The freestanding posts in groups of six to seven are evenly distributed in the wider part of the trench facing north-south. Both types of posts structure have foundation stones. Charred wooden structures, which have been identified as pine, are visible on some wall posts and freestanding posts. The walls inside the trenches are covered with a layer of green clay and grass-mixed mud are applied on the exterior surface of wall posts, and traces of fire burning are also found on the wall surface. The wall posts and freestanding posts could be designed to serve as support structure for the floor above. The tip of trenches in the north-south direction is on the same line as the pillar holes in the rammed-earth foundation. The foundations of the south and north walls were found to overlap with the narrower parts of trenches in

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Figure 2. The excavated construction materials, arc-shaped tiles and barrel tiles for building roofs.

Figure 3. A roof tile with a phoenix or bird pattern on the surface.

north-south direction, and the structure of the south wall is partially paved with stones. Among some of the trenches in their narrower parts, adobe structures remaining after collapse of wall can be seen. There is also a drainage ditch cut into the north of rammed-earth foundation, which was constructed in the late stage of building lifespan.

The excavated artifacts consist mainly of a large number of construction materials such as slate tiles, arc-shaped tiles, tiles, square bricks with geometric patterns, *etc*. The excavated construction materials are comparable in size to those excavated from the palace in Chang'an, indicating that the buildings is large in scale and constructed in high standards (fig. 2-3). There is a clear distinction between early and late production of arc-shaped tiles. In the collapsed building structure, a pottery pot with the inscription 'Wan Shi' on the bottom and four partially remaining measuring tools were found (fig. 4).

The evenly spaced and well-structured trenches in the rammed-earth foundation were for ventilation and moisture prevention in comparison with Building 3 at Gui Palace in Chang'an and Huayin Jing Shi Warehouse. During the excavation of the building base, a row of cellars for storing grain were discovered under the rammed-earth foundations, and a relatively large number of grains of corn and millet were found inside. Corn and millet samples were also found during flotation of soil samples in the trenches. With the pottery pot inscribed 'Wan Shi' and measuring tools excavated, the preliminary judgement

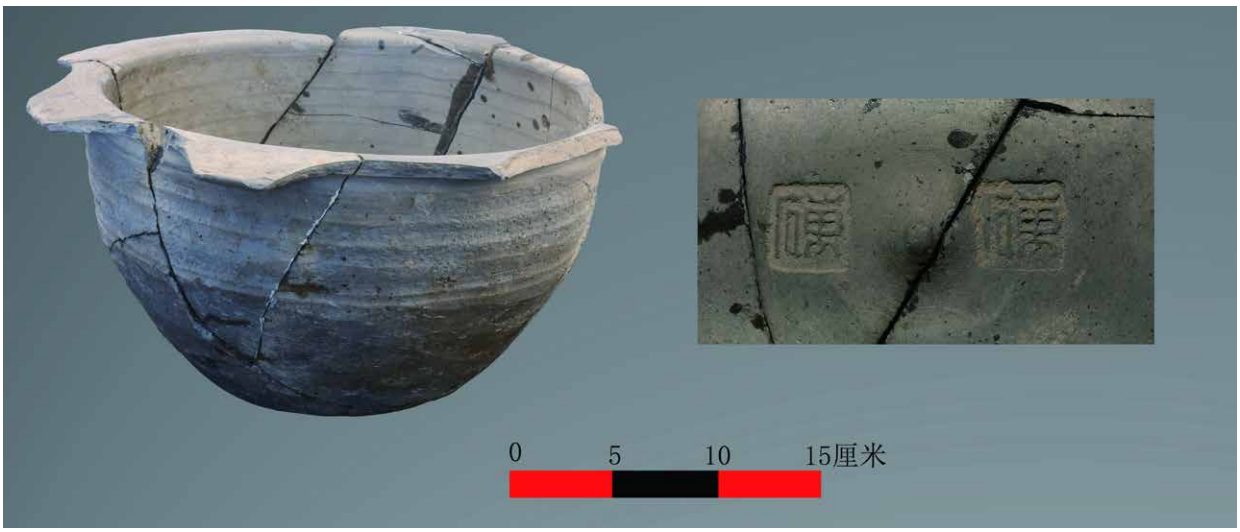

Figure 4. A pottery pot with the inscription 'Wan Shi' on the bottom.

points to a large granary, with a width of 16 rooms and a depth of 2 rooms, with an estimated calculation of its usable area to be nearly 1,800 m^2. The distribution and number of collapsed tiles as well as roof tiles suggest the structure comes with double-eave roof with quadruple slopes. The building dated from mid to late Western Han Dynasty and was repaired several times before being destroyed by fire.

Counties and the Great Wall in Hohhot region during Western Han Dynasty

During the Western Han Dynasty, Yunzhong and Dingxiang Counties were set up in the Hohhot Plain. Yunzhong County was located in the Hohhot Plain and Dingxiang County was located in the hilly area in the southeastern part of Hohhot Plain. Daqing Mountain is north of Hohhot, and to the east and west of Daqing Mountain lies the Yinshan Han Great Wall, which was built in Zhao of the Warring States period and used by Western Han Dynasty. The mountain is also home to the Yangshan Han Great Wall, which was built after Wei Qing's northern expedition in 127 BC. These two Great Walls formed a double line of defense for Yunzhong County. The Yinshan Han Great Wall was the main defense line of Yunzhong County, with the eastern captain (same as Taolin County, ancient town of Tali is in Xincheng district of Hohhot) and central captain (same as Beiyu County, ancient town of Bikeqi is in Tumote Banner of Hohhot) in charge from east to west, with the junction of two defense areas at Daqing Mountain Wugongba. In the Northern Wei dynasty, Wugongba was known as Baidaoling, a white road that ran north and south through Daqing Mountain. This route was opened in the Han Dynasty. The Great Wall of Han Dynasty, built on top of the Baidaoling, was the gateway from Yunzhong County to the 'Baidao Pass' north of Daqing Mountain.

The ancient town of Shaliangzi is about 15 km north of southern entrance to the ancient White Road, and about 30 km west of Yunzhong County (the ancient town of Guchengcun, Tuoketuo County of Hohhot) in the Qin and Han Dynasties, located on the southern bank of river Dahei. It is also about 30 km south of Chengle County, the capital of Dingxiang County in the Western Han Dynasty (the ancient town of Tuchengzi in Helingeer County of Hohhot), and about 16 km east of Yuanyang County in Yunzhong County in the Han Dynasty (the ancient town of Babai in Saihan District of Hohhot). This site of this ancient town of Shalangzi plays a vital role in transportation. The administrative setting of ancient town is believed to be a county of Yunzhong County of the Western Han Dynasty. There is also a speculation about being under Duhe County, but further examination is needed.

The ancient town of Shaliangzi and its granary buildings were first built under the emperor Wu of the Han Dynasty. In this period, the government established a large number of counties and prefectures in the Hetao region. Many people migrated and farmed in the region, creating a peak in agricultural development. Since the rammed-earth foundation is large in scale and constructed to high standards, the building may have been a national-level granary, used to store grain from the surrounding counties and to supply military rations along the Great Wall. In the mid-1st century BC, Huhanye, the leader (Chanyu) of a branch of the Huns, surrendered to the Han Empire and was assigned to defend the borders for the imperial regime. The northern frontiers had since then 'not seen warfare for generations. The region was populated with residents, cattle and horses.' This large granary is also a reflection of the peaceful and prosperous society along the border at the time.

Conclusion

Since the rammed-earth foundation is large in scale and built to high standards, the building may have been a national-level granary. The excavated pottery, roof tiles and other artifacts show that the building mainly dates from mid to late Western Han dynasty (141 BC to 8 AD). The tile products reflecting re-roofing endeavours, multiple layers of earth foundation and the later-added drainage on the ground outside rammed-earth foundation all indicate that the structure had been through several renovations and the building lifespan should extend throughout mid to late Western Han dynasty.

The excavation reveals for the first time the form of large granaries in Han-dynasty border towns, providing important physical data for the study of buildings in such a context. This is also the first time that a granary on the rammed-earth foundation has been discovered and excavated along the Great Wall in northern China, which fills a gap in the study of Han-dynasty border towns and is also of great significance to the research of Han-dynasty construction techniques, the central regime's strategy for the northern border during that period, and the economic patterns in the agricultural-pastoral transitional zone in the northern region.

Part 9

OVERVIEW OF SESSIONS AND PAPERS

Overview of Sessions and Papers

1 Roman imperialism and early frontier formation. The creation-reshuffling of tribal (id)entities

Session chairs Nico Roymans, Manuel Fernández-Götz & Erik Graafstal

Johann Schrempp, Alexander Heising, Lars Blöck & Uwe Müller: *Making Suebi. Roman frontier management in the southern Upper Rhine valley in the 1st century AD?*

Arno Braun & Sabine Hornung: *Westward! Population dynamics along the Middle and Upper Rhine during the 1st century BC*

Marion Brüggler: *The case of the Cugerni on the Lower Rhine*

Erik Graafstal: *Settlers from the North? A late-Augustan Landnahme in the Utrecht region*

Jasper de Bruin: *Agros vacuos. De- and repopulation of the Dutch coastal area c. 50 BC-AD 100*

Nico Roymans: *Ethnic recruitment and the genesis of the Batavi as a soldiering people. The numismatic evidence*

Julie Van Kerckhove & Gerard Boreel: *Evidence for immigration in the Batavian region in the pre-Claudian Era. The study of large handmade pottery assemblages using a combination of traditional and science-based techniques*

Manuel Fernández-Götz, Derek Hamilton, Dave Cowley, Sophie McDonald & Ian Hardwick: *Changing landscapes in the northern frontier. Contrasting settlement patterns north and south of Hadrian's wall*

Andrew Lawrence & Tanja Romankiewicz: *Exploring power and domination in Rome's northernmost frontier zone*

João Fonte & Ioana Oltean: *New data on the Roman military presence in the Gerês-Xurés Transboundary Biosphere Reserve and its impact on local landscapes and communities*

José Manuel & Jesús García Sánchez: *The siege of Cerro Castarreño. Reassessing the Roman-indigenous dynamics between the river Douro valley and the Cantabrian Mountains (Spain) during the 1st century BC*

Michel Reddé: *Le développement d'une zone frontière en milieu désertique. L'exemple de la Tripolitaine*

Timothy Hart: *Getae, Moesi, and Scythians. Ethnographic (re)configurations in Rome's early lower Danube borderland*

Bernd Steidl: *Indigenous and exogenous population groups in the Alpine foothills and the organisation of the province of Raetia et Vindelicia during the 1st century AD*

Damjan Donec: *The enemy within? Military forts behind the Danube frontier*

Dragos Mandescu & Ioan-Andi Pitigoi: *Before the Romans, their coins came. Hoards of Roman coins of Augustan Period in Late Iron Age South-Carpathian Dacia*

Szilvia Bíró: *From deserta Boiorum to civitas Boiorum*

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2 Organic Riches
Session chairs Silke Lange & Carol van Driel-Murray

Elizabeth Greene & Barbara Birley: *The potential of anaerobic archaeological environments. A case study investigating cultural contact in the community at Vindolanda*
Silke Lange: *From tree to post. Logistics and organisation around infrastructural works in the Lower Rhine limes*
Julia Chorus: *Timber joints and wickerwork. Organic remains in forts and vici in the Lower Rhine area*
Rob Sands: *Vindolanda. Wood, craft, life and connections. A view from the edge*
Tamara Vernimmen & Ivo Vossen: *As good as new? A special wood find from Houten (NL) suggesting a sustainable use of building materials in Roman times*

3 "Ripae et litora." Supply and security on the riverine and coastal edges of the Roman Empire
Session chairs Wouter Dhaeze, Erik Graafstal, Tom Hazenberg & Jeroen van Zoolingen

Alistair McCluskey: *Prisoners of ethno-geography. Transnational dynamics of warfare between Late Iron Age Ireland and the Roman frontier in Britain?*
Wouter Dhaeze: *Sea frontiers along the Channel and the North Sea. Development, purpose and tactics*
Jeroen van Zoolingen: *Defending dunes and marching along marshes. Details of the Antonine coastal limes between Rhine and Meuse*
Arjen Bosman: *The Roman bases at Velsen*
Jane Harrison: *The mystery of the marsh. The western end of Hadrian's Wall*
Philip Smither: *Shore-ing up Britain*
Christoph Rummel: *When's a fleet a fleet? Classes and legions on the water*
Kim Cohen: *Lower Rhine river palaeolandscape mapping. Understanding meander dynamics below and along and flood deposition around and above limes archaeological horizons*
Wilfried Hessing: *The Fossa Corbulonis. Keeping track on a multitude of small excavations, new ideas on its original purpose and further use*
Thomas Becker, Andreas Vött & Lea Obrocki: *River Main as route of military supply – new archaeologicial and geoarchaeological research*
Norbert Hanel & Thomas Frank: *Bridge construction and maintenance work at the ripa Rheni and on the upper course of the rivers Moenus and Mosa as strategic construction measures in the 4th century AD. Results from dendrochronological and historical studies*
Ian Longhurst: *Chesters Road Bridge*
Ronald Visser: *Securing the transport of timber on water*
Yardeni Vorst: *Operation Zwammerdam ships. Putting things together on rowing and steering on the Roman Rhine*

4 Digital Limes. The use of modern methods and advanced techniques for a better understanding of the Frontier development
Session chairs Roeland Emaus, Maarten Sepers & Wouter Vos

Esperanza Martin Hernandez, Dolabra, Felix Teichner & Florian Hermann: *Remote sensing and excavation in Villamontán camps*
Jennifer Schamper, Peter Henrich & Matthias Lang: *Everything but straight. New geophysical research on 75 km of the Upper German Limes*
Arnau Lario Devesa, Jordi Pérez González, Mateo González Vázquez & Carlos Palacín Copado: *A look into the big picture. Identification of trade patterns in the Western Roman border using network science*
Kamil Kopij, Adam Pilch, Monika Drab & Szymon Popławski: *Acoustics and proxemics of military contiones*

Claire Stocks, Barbara Birley & Richard Davison: *The missing dead. Reconstructing the past through digital gameplay at Roman Vindolanda*

5 Feeding the frontier. Agricultural economies, productive potential, and predictive modelling
Session chair Laura Kooistra

Steve Matthews: *Who were the logisticians? The men responsible for feeding the limes garrison*
Peter Guest, Richard Madgwick & Angela Lamb: *Feeding the Roman Army in Britain: Animal supply networks on the frontiers*
Sonja Vuković, Bojana Zorić & Ivan Bogdanović: *Feeding the army at Viminacium legionary fortress. Preliminary zooarchaeological evidence*
Jana Kopáčková & Hana Ivezić: *Material traces of viticulture in Southern Pannonia*
Birgitta Hoffmann: *Say 'cheese'. Trying to identify dairy production tools and sites around Roman military sites*

6 Feminists at the gates. Frontier research by female academics
Session chair Anna Walas

Catherine Teitz: *Walls don't stop women. An urban approach to frontier sites*
Jo Ball: *The visible invisibles. The epigraphic footprint of Roman women on the frontier in Britannia*
Anna Mech: *Women and Roman religion in provinces. Case study Dalmatia*
Mirna Cvetko & Iva Kaić: *Female archaeologists and Roman military research in Croatia*
Christine Meyer-Freuler & Regine Fellmann: *Women in Vindonissa. A glimpse at pioneer female researchers around 1950*
Kseniya Danilochkina: *Britannia Romana. Ambiguous image of a province*
Rebecca Jones: *Discussion*

7 Managing the Romans???? Preservation, protection and community management of frontiers. Opportunities, challenges, and use of 'citizen science'
Session chairs Tessa de Groot, Daniel Poulet & Nigel Mills

Andreas Schaflitzl: *Limes in the woods. Threats and chances*
Mateja Ravnik, Danijela Brišnik, Milana Klemen & Jure Krajšek: *The neverended story told in a new way. Roman legionary camp of the Legio II Italica, Ločica near Savinja river, Slovenia*
Mladen Jovičić, Emilija Nikolić, Ivana Delić-Nikolić, Ljiljana Miličić & Snezana Vucetic: *Mortar design for conservation. Danube Roman frontier 2000 years after*
Kerry Shaw: *Citizen science on Hadrian's Wall. A WallCAP case study*
Riona McMorrow: *Engaging disadvantaged communities in heritage-led regeneration. The rediscovering the Antonine Wall Project*
Nigel Mills: *Frontier voices. A participatory arts project exploring community connections and meanings of the World Heritage of the Roman frontiers. Part of the Hadrian's Wall 1900 Festival*
Simon Sulk: *Identity through art. How Weissenburg is strengthening its role as a Roman City in modern Bavaria*
Daniel Poulet: *Community involvement in the World Heritage Sites of Pécs (Sopianae)*

8 Home away from home. Roman frontiers as movers and mixers of people
Session chairs Tatiana Ivleva, Stijn Heeren & Pete Wilson

Martin Pitts: *Funerary objectscapes on Rome's third century CE northwest frontier. Moving people and things?*
Cristina Crizbasan & Roderick Geerts: *I am going on a trip, what am I going to pack? A comparative approach to the pottery of Batavians at home and abroad*

Trudi Buck: *Evidence for child migration and early death at Vindolanda on the northern frontier of Roman Britain*
Stijn Heeren & Lisette Kootker: *An archaeological and quantitative isotope study of population dynamics in the Late Roman Lower Rhine borderscape*
Michael Johannes Klein: *Mainz-Mogontiacum. An ethnic melting pot on the Rhine frontier in the 1st century AD*
Julia Kopf: *Soldiers, slaves, priests, administrative servants(?). Persons with Greek/oriental names in Rhaetia*
Eduard Nemeth: *Ex toto Orbe Romano. Ethnical diversity at the western frontier of Roman Dacia*
Kai Juntunen: Life after service. The retirement of the Roman auxiliary soldiers as seen in the light of discharge diploma discoveries

9 FINES. The mechanisms and politics of frontier collapse, and the afterlife of frontier installations
Session chair Rob Collins

Berber van der Meulen-van der Veen: *Who supplied the foederati? Aspects of military equipment production in the Late Roman West*
Ferdinand Heimerl: *Apud limitem Latina iura ceciderunt – processes of continuity and collapse on the middle Rhine frontier and its hinterland*
Raymond Brulet: *The abandonment of borders in northwestern Gaul in the middle of the 5th century. Role and responsibility of the Franks*
Tomasz Dziurdzik, Michał Pisz & Mirko Rašić: *A former military road. The afterlife of military installations in Trebižat river valley (Bosnia and Herzegovina)*
Dan Matei: *The latest functioning phase of the castra in the province of Dacia*
Ignacio Arce: *A tetrarchic fort underneath the Umayyad Palace of Khirbat al Mafjar at Jericho?*
Paul Kucera: *The borderlands of Egypt's Western Desert in late antiquity*
Nick Hodgson: *South Shields Roman fort as a case study in transition and abandonment at the end of empire*

10 Tales of glory. Narratives of Roman victory
Session chairs Martina Meyr & Christof Flügel

Kai Töpfer: *Visualizing Roman power in the provinces. A look at common features and remarkable differences*
Edwin Wood on behalf of John Pearce: *Capricorn in Somerset. An Augustan image at the edge of empire*
Michael den Hartog: *The Vynen Monument and commemorating a Greater Victory*
Martin Kemkes: *It's all just propaganda? Victoria depictions and inscriptions on the Upper German-Raetian Limes*
Monica Gui: *Bits and pieces of Rome's glory in Dacia*
Louisa Campbell: *Polychromy and epigraphic practice in the Provinces. A view from the Antonine Wall*
Julie Marchand & Joachim Le Bomin: *The painted iconographic programm of Deir el-Atrash fort. Roman control, protection and military presence in the Egyptian Eastern desert*
Eva Steigberger: *"My face and the Wolf song"*
David Breeze: *Commemorating the dead*

11 Recent research into the Roman military activities during the Republic. Archaeological evidence
Session chairs Janka Istenic & Angel Morillo Cerdan

Esther Rodrigo Requena, Joaquim Pera Isern, Cèsar Carreras Monfort & Núria Romaní Sala: *The castellum of Puig Castellar of Biosca (Catalonia, Spain). A republican fortress from the 2nd century BCE*

Joan Oller Guzmán on behalf of Oriol Olesti Vila: *The Roman army in the Oriental Pyrenees (2nd-1st c. BC). Territorial control and management of provincial ressources in the High Lands*

Federico Bernardini: *Grociana piccola Roman military fortifications (north-eastern Italy, 2nd-1st centuries BC)*

Loïc Buffat, Yahya Zaaraoui & Matthieu Guintrand: *The Battle of Arausio (105 B.C.). State of research*

Carlos Pereira & Ángel Morillo: *The Roman-Republican camp at Cáceres el Viejo (Spain). Old theories and new perspectives*

Feliciana Sala-Sellés, Sonia Bayo-Fuentes & Jesús Moratalla-Jávega: *A maritime frontier in Citerior Hispania during the Sertorian civil wars. A geostrategy story*

Magalie Kielb Zaaraoui, Loïc Buffat & Yahya Zaaraoui: *L'organisation interne d'un camp militaire romain au milieu du Ier s. av. J.-C. À propos du camp F de Lautagne (Valence, Drôme)*

Romain Andenmatten, Michel Aberson, Alessandra Armirotti & Tristan Allegro: *Roman troops in high mountains. The challenge of establishing Roman hegemony in the Poenine Alps*

Domagoj Perkić, Marko Dizdar, Hrvoje Potrebica & Ivan Pamić: *Archaeological traces of the Roman attack of Grad at Nakovana during Octavian's Illyrian War (Pelješac, Croatia)*

Domagoj Tončinić, Domagoj Bužanić & Mirjana Sanader: *Neue Beweise römischer militärischer Aktivitäten zwischen den Flüssen Krka i Cetina (Dalmatien, Kroatien)*

Janka Istenič & Boštjan Laharnar: *Ulaka-Nadleški hrib site complex in Loška dolina valley (south-western Slovenia)*

12 Legionary fortresses along the Rhine. State of research

Session chairs Jürgen Trumm & Steve Boedecker

Wouter K. Vos, Edwin Blom & Jasper de Bruin: *Valkenburg ZH. An unexpected legionary fortress near the mouth of the river Rhine (The Netherlands)*

Paul Franzen: *The capital that was not*

Vincent van der Veen: *Military equipment and horse gear from the Flavio-Trajanic castra and canabae legionis at Nijmegen*

Steve Bödecker: *Vetera castra and the role of topography. Or why Tacitus was wrong and Augustus right*

Matheus Morais Cruz: *Amphora studies in Xanten. From the local Roman legionary occupation to the imperial supply system*

Jens Wegmann: *Adding new pieces. Latest research in the legionary fortress of Bonn*

Salvatore Ortisi, Michael Schmauder & Jan Bemmann: *Vezereos-Bir Rhezen. A Roman frontier post and watering place on the western end of the Tripolitanian Limes*

Tünde Kaszab-Olschewski: *Hier auch. Webgewichte in den Legionslagern Bonn und Neuss*

Daniel Burger-Völlmecke: *Das Legionslager von Mogontiacum/Mainz. Neue Erkenntnisse zur Umwehrung und Chronologie*

Klaus Kortüm: *Rottweil. Ein flavisches Legionslager am oberen Neckar*

Jürgen Trumm: *Vindonissa and its legionary fortress. State of the research*

13 Childhood on the Roman frontiers

Session chair Maureen Caroll

Alexander Meyer: *Onomastics, children, and identity on Roman military diplomas*

April Pudsey: *The sons of auxiliary veterans in Roman Egypt. Family, status, and experience*

Maureen Carroll: *Gendered futures? Children's lives cut short and commemorated on the Roman frontiers*

Kelsey Madden: *Vulnerable victims. Barbarian children in Roman conflict iconography*

14 New research along the Danube
Session chair Gerld Grabherr

Gerald Grabherr & Stefan Traxler: *Military border control in the procuratorial province of Noricum*
Barbara Kainrath & Eva Thysell: *One thing leads to another. Settlement development in Stein-Enns*
Stefan Groh: *A tale of three fortresses*
Felix Lang on behalf of Stefan Traxler: *The lime kilns of the legio II Italica in Lauriacum/Enns*
Tino Leleković: *Roman burials on the Croatian part of the Danube Limes*
Kristin Opitz: *Life and death at the edge of the Roman Empire. Archaeological and anthropological data from late antique cemeteries at the Danube Limes*
Ana Kovačič, Maruša Urek, Kaja Stemberger Flegar & Ana Kovačič: *Military small finds from Castra Ad Fluvium Frigidum (Slovenia)*

15 Rome's hunger for metals. Roman mining in and outside the provinces and the part of the Roman military
Session chairs Markus Scholz & Daniel Burger-Völlmecke

Esperanza Martín Hernández on behalf of Brais X. Currás, F. Javier Sáchez-Palencia, Almudena Orejas & Inés Sastre: *Roman military activity in the gold mining areas of Hispania: an approach from landscape archaeology*
Mark Tucker: *Roman mining in the territory of the Dumnonii, an exploration of continuity and control*
Felix Teichner, Gabriele Körlin & Guntram Gassmann: *Die Erschließung des antiken Amselfeldes (Dardanien, Kosovo) durch Rom unter besonderer Berücksichtigung des Metallbergbaus*
Lorenzo Boragno: Missing Links. *The production of iron-made equipment on a provincial scale. The case of Roman Dacia*
Joan Oller Guzmán: *The 'Emerald legio' Involvement of III Legio Cyrenaica in the development of emerald mining in Roman Egypt*
Gabriele Rasbach: *Von Bergleuten, Händlern und römischem Militär im Lahntal (D) | Of miners, traders and Roman military in the Lahn Valley (D)*
Markus Scholz, Frederic Auth, Daniel Burger-Völlmecke & Peter Henrich: *Under the eyes of Roman army. Early Imperial mining on the Lower Lahn river (D)*

16/17 Dress and adornment in frontier communities
Session chairs Ursula Rothe, Anique Hamelink, Dorothee Olthof & Philip Smither

Elizabeth Wolfram Thill & Elizabeth Greene: *In someone else's shoes. Constructing identities on the Roman frontiers through footwear*
Anique Hamelink: *Dining 'Roman style'. Wearing the synthesis on funerary monuments in the Rhineland and Britain*
Hans Huisman & Dorothee Olthof: *Hairy problems. An experimental approach to the possible archaeology of spuma Batava*
Dan Aparaschivei: *Clothing accessories as indicators of daily life in the Province of Scythia. The case of Ibida walled town in the 4th-5th centuries AD*
Krzysztof Narloch: *A sign of good relations. Why did Roman soldiers wear the ridge helmets*?
Kelvin Wilson: *Survival of native dress. A visual compendium*

18 Reconstructing the limes. Roman archaeology as national and transnational heritage
Session chairs Saskia Stevens, Richard Hingley & Chiara Bonacchi

Koen Ottenheym: *Reception of the limes in cities along the Rhine and Danube in the 16th and 17th Centuries*

Catherine Visser, Marie-France van Oorsouw & Peter van der Ploeg: *The romantic limes. The current visualisation of Roman archaeology of Forum Hadriani in historical and cultural perspective*
David van Oeveren: *Educating the masses. National Antiquity and education in the Low Countries (1800-1945)*
Richard Hingley: *Performing diversity on Hadrian's Wall*
Sebastian Ristow: *Cologne Praetorium, new findings. The bath of the Governor*

19 Wall to Wall
Session chair Tony Wilmott

David Brough: *Introduction to the Wall to Wall initiative and overview of the Great Wall of China*
Yan Li, Yujie Zhai, Xiaoyue Shang, Zhe Li: *Comparison of the Great Wall of China and the frontiers of Imperial Rome*
Wenyan Liu: *Overview of the archaeological survey of the Great Wall*
Chunlei Yu: *Archaeology of the Great Wall of Ming Dynasty: Qingping Fort Site*
Jianxin Wang: *The centenary of Chinese archaeology*
Wenping Zhang: *Large granary found along the Great Wall of the Western Han Dynasty in Hetao area*
Jianwei Zhang: *An innovative digitalisation approach to the Intervention Process Management in the Great Wall Conservation and Maintenance Project*
Fei Cheng & Dong Xiao: *Fragility assessment of the natural disasters of the Great Wall in Ningxia, China*

20 Basilica and churches in military outposts
Session chairs Dominic Moreau & Ivan Gargano

Robert Darby: *The 4th century church at 'Ayn Gharandal (Arieldela) and the emergence of Christian architecture in the Late Roman army of Palestine*
Alan Rushworth: *Military churches, remodelled principia or fortified monasteries? A comparative analysis of basilicas in forts of the North African frontier*
Andrew Birley & Marta Alberti: *Late Roman and post-Roman Christianity on Hadrian's Wall and the remarkable new evidence from Vindolanda*

21 Funeral at the frontier
Session chairs Arjan Ruiter & Lourens van der Feijst

Henry Bishop-Wright: *Across the Southern Frontier. Roman objects in Meroitic graves at Faras, Sudanese Nubia*
Kaja Stemberger Flegar: *Overview of burial customs in Roman period Slovenia*
Bebina Milovanović, Snežana Golubović & Ilija Mikić: *Burial in lead sarcophagi on the Roman limes. Examples of Viminacium*
Joep Hendriks: *The rural burial landscape in the hinterland of Roman Nijmegen*
Frederique Reigersman-van Lidth de Jeude: *Buried with the dead*
Neeke Hammers & Cornelie Moolhuizen: *The significance of bulbous oat grass (Arrhenatherum elatius ssp. bulbosum) finds in cremation graves along the Dutch Limes*
Lisa Huber, Maria Marschler, Andrea Stadlmayr & Stefan Traxler: *Life and death at the Danube Limes. The cemeteries of Lauriacum/Enns*
Ana Zora Maspoli, Cornelia Alder, Ernst Akeret, Sabine Deschler-Erb, Claudia Gerling & Natalie Schmocker: *A funerary chaîne opératoire at Vindonissa*

22 Speaking of the dead. Returning to funerary customs and grave goods from late Roman military burials
Session chairs Vince Van Thienen & Sofie Vanhoutte

Sofie Vanhoutte: *The late Roman coastal fort at Oudenburg (Belgium). from reassessment of new and old burial data towards new ideas on the chronology, identity, and lifestyle of a late Roman military community*
Sofie Vanhoutte, Vince van Thienen on behalf of Olivier Vrielynck, Fabienne Vilvorder, Laurent Verslype & Christian Lauwers: *Late Roman graves of the Vieuxville cemetery (province of Liege, Belgium)*
Bernarda Županek, Špela Karo, Mateja Ravnik, Alenka Miškec & Gojko Tica: *Late Roman funerary customs and grave goods on the burial ground at Kozolec (Emona/ Ljubljana, Slovenia)*
Rebecca Nashan: *Challenging late antique chronology. Graves as indicators of continuity*
Julie Flahaut, Olivier Blamangin, Angélique Demon & Christine Hoët Van Cauwenberghe: *The late Roman grave of the children of the triarch Domitianus at Boulogne-sur-Mer: A re-interpretation*
James Dodd: *Foederati and the villa landscape? Small-scale burials in Germania secunda in Late Antiquity*
Steven Vandewal: *Solitary and deviant burials in late Antique Tongeren*

23 Small finds everywhere
Session chairs Hannes Flück & Orsolya Láng

Douglas Carr: *The Northern Frontier of Britannia and its coinage*
Rahel Otte: *The Roman army on the Rhine and the monetization of the rural hinterland*
Edwin Wood: *Military artefacts in the civil province of Britannia, a case study. Trompetenmuster mounts*
Stefanie Hoss: *New insights into the distribution of Roman metal finds with PAN*
Boris Alexander Burandt: *Are you not entertained? Different perceptions of gladiator fights at the frontiers of the Roman Empire as reflected in small finds*
Hannes Flück: *The Capulets vs. The Montagues? Exploring differences within a settlement through their spectrum of brooches*
Orsolya Láng & Andrew Wilson: *What material analyses of the Aquincum millstones can tell us about function and the local economy?*

24 The Limes Moesiae-Scythiae. Dynamic landscapes and places
Session chairs Jonathan Quiery & Matthew Previto

Dominic Moreau: *The Limes Moesiae/Scythiae according to the historical sources*
Martin Lemke: *From imperial guardians to local patriots: the defenders of Novae (Moesia inferior) in Late Antiquity and their relationship to state, church and neighborhood*

25 The military vicus. Everyday life in the vicinity of the forts
Session chairs Julia Chorus & Monica Dütting

Eric Sponville: *Zwischen Lararium und Tempel. Ein Privatheiligtum im Nordvicus von Krefeld-Gellep*
Dorit Engster: *Vulcan, Neptun und Hercules. Götter der Arbeitswelt und ihre Verehrung im Vicus*
Juan Manuel Bermúdez Lorenzo: *Where is this amphora going? Differentiating Roman trade possibilities through vicus and camps supply*
Lennart Schönemann: *The early-Roman military vicus of Speyer (Rhineland-Palatinate, Germany). First results*
Tony Wilmott & Ian Haynes: *The Birdoswald Extra-Mural Settlement Project*

26 'In the Empire of Desert, Water is the King'. Water, and local peoples on the arid frontiers of the Roman Empire
Session chairs Anna-Katharina Rieger & Mark Driessen

Brahim M'Barek: *A settlement pattern to control the eastern desert fringes late 3rd-early 4th century AD from Jordan to Tur Abdin. Military sites, civil settlements, control, development and exploitation of the territory*

Andrew Smith: *Soldiers and farmers in Roman Arabia. Evidence of Diocletian's reforms in the hinterland of Petra*
Craig Harvey on behalf of John Oleson: *Competition, collaboration, and innovation. Organization of the water supply for the Trajanic Frontier fort in the Nabataean Settlement of Hawara (Southern Jordan)*
Mark Driessen & Fawzi Abudanah: *A green desert in the hinterland of Petra. Water, agriculture and military control in the Udhruh region (southern Jordan)*
Walter Ward: *Water and control along the later Roman Empire's south-eastern border*
Gaëlle Tallet & Jean-Paul Bravard: *Irrigating the land, provisioning the caravans: water decline and military settlement at el-Deir (Kharga Oasis, Western Desert of Egypt), 3rd-5th century AD*

27 Brickyards of the Roman Army
Session chairs Eckhard Deschler-Erb & Clarissa Agricola

Rüdiger Schwarz, Anna Langgartner, Thomas Hauck & Tim Clerbaut: *From loam to kiln, from clay to tile. Making Roman ceramic building materials the whole way*
Tomáš Janek: *Roman military manufacture of tegulae. The production techniques and their transfer*
Craig Harvey: *Just another brick (kiln) in the wall? The newly discovered brickyard at Vindolanda and its relevance to brick production along Hadrian's Wall*
Tim Clerbaut & Marion Brüggler: *The military brickyard of Xanten. Research history and a current status quo*
Michelle Rossa: *Ziegelproduktion im Norden von Köln. Die römische Ziegelei von Feldkassel*
Ljubomir Jevtović & Ivan Bogdanović: *Who built the Castra Legionis in Viminacium?*
Alexandru Flutur: *The brickyards of Legion IIII Flavia Felix from Dacia by early 2nd century AD*
Janusz Recław: *Brickyards of Legio I Italica*

28 Revisiting Roman imports beyond the frontier. Investigating processes of movement
Session chairs Thomas Schierl, Fraser Hunter, Szilvia Bíró & Thomas Grane

Hannes Buchmann: *Luxury or resources? Roman objects in Germanic settlements. On the example of Ostwestfalen-Lippe*
Balázs Komoróczy, Marek Vlach & Michaela Zelíková: *Dealing with changes of qualitative and quantitative aspects of the imported Roman metal objects within the Marcomannic settlement zone in the era of metal detecting*
Stanislav Sofka & Marek Vlach: *Spatio-temporal patterns and interpretation possibilities of Roman pottery in the barbarian context of the Middle Danube region*
Karen Murad: *Asking 'why'. Exploring motivations behind the movement of Roman goods and concepts into Ireland*
Marcus Ady Roxburgh: *The shadow in the North; the influence of Roman metal exports on eastern Baltic communities*
Suzana Matešić: *Germani ite domum? Indications for transfer and Germanic reception of Roman military equipment*
Anna Flückiger: *Hackbronze and money. Two sides of the same coin on both sides of the Limes?*

29 Cult and religious practices
Session chair Ivan Radman-Livaja

Anton Ye. Baryshnikov & Ljubica Perinic: *Of pigs and borders. Lost in translation, found in interpretation?*
Ozren Domiter: *The Danube Horsemen Cult*
Ivan Radman-Livaja: *A puzzling votive inscription by an officer of Cohors I Belgarum*

Kelly Gillikin Schoueri: *Home is where the aedes is. Simulating Roman military identity and loyalty in locations of transition*

30 The Pontic, Middle East and North African Frontier
Session chairs Radosław Karasiewicz-Szczypiorski, Emzar Kakhidze & Piotr Jaworski

Maciej Czapski, Radosław Karasiewicz-Szczypiorski, Aomar Akerraz, Fadwa Benjaafar, Layla Es-Sadra & Mustapha Atki: *Roman watchtowers' system in the light of works of Polish Moroccan mission Tingitana Frontier Project*
José Ángel Expósito Álvarez, Darío Bernal-Casasola & Tarik Moujoud: *Leisure facilities at the borders. The baths of the Roman castellum of Tamuda (Tetouan, Morocco)*
Ran Ortner: *The location of the base of Legio X Fretensis in Jerusalem after 70 AD*
Mark Hassler: *Two Roman military conquests at Khirbet el-Maqatir, Israel. Archaeological findings from the First and Second Jewish Revolts against Rome*
Eckhard Deschler-Erb & Sebastian A. Knura: *Tel Shalem. A Roman military camp in the Jordan valley*
Victor Humennyi: *Fearing the Parthian threat? Pontic-Cappadocian frontier area and Flavian military policy in the East*
Piotr Jaworski: *Legio X Fretensis in Colchis? Latest numismatic evidence from the Roman fort in Apsaros*
Radosław Karasiewicz-Szczypiorski & Shota Mamuladze: *Apsaros fortress and its surroundings in the 1st and 2nd century AD. The first steps to reconstruction*

31 Simulating the limes. Challenges to computational modelling in Roman Studies
Session chair Philip Verhagen

Iza Romanowska, Olympia Bobou & Rubina Raja: *Modelling the social, economic and demographic trends at the Roman eastern frontier*
Nathaniel Durant: *Lost and found on the frontier. Modeling forts and landscape in Scythia Minor (4th-7th centuries AD)*
Philip Verhagen: *Subsistence, surplus and trade along the Lower German limes. Modelling rural-urban socio-economic interactions*
Toon Bongers: *Are all nodes born equal? The application of spatial network analysis to assess the role of rivers in the Roman-era transport network of the Meuse basin*
Nicholas Bartos: *Exploring economic regionalism through maritime mobility. The Roman Red Sea and beyond*
Ioana A. Oltean & Ciprian Lungescu: *Connectivity and the Roman army on the Lower Danube. A GIS approach*
Marek Vlach & Balázs Komoróczy: *Modelling supply logistics and strategic aspects of the Roman military presence in the Middle Danube region during the Marcomannic wars*
Kira Lappé: *The weight of Roman reign*
Adam Pažout, Tom Brughmans & Pau de Soto: *Take me home. Roman road: a model of the Roman terrestrial transport network. Challenges of data collection along the limes*

32 Frontiers of the Roman Empire. World Heritage across three continents
Session chairs Marinus Polak, René Ployer & Stéphanie Guédon

Rien Polak, Stéphanie Guédon & René Ployer: *Frontiers of the Roman Empire. World Heritage across three continents. Context of the session*
Markus Gschwind: *Roman Syria in view of the UNESCO World Heritage Cluster Frontiers of the Roman Empire*
Aomar Akerraz: *Le limes de Tingitane*
Mustapha Khanoussi: *The frontiers of the Roman Empire in North Africa*
Stéphanie Guédon: *Frontiers of the Roman Empire. UNESCO World Heritage and frontier perspectives*
Christof Flügel: *Comunicating The Frontiers of the Roman Empire. European interpretation frameworks as a blueprint for the North African Limes?*

Ivana Ozanic Roguljić, Mislav Fileš & Nemanja Mrdjic: *Living Danube Limes*
Ivana Kosanović, Milica Marjanović & Nemanja Mrđić: *From Limes Invisibilis to the UNESCO World Heritage Property. The Danube Frontier in Serbia*
Rebecca Jones: *Developing a management system for the FRE WHS?*

33 General session I
Session chairs Harry van Enckevort & Tatiana Ivleva

Paul Kessener: *The Roman aqueduct of Noviomagus*
Dmitry Karelin & Alexandra Medennikova: *Depictions of fortifications in Roman art as source for their reconstructions*
Angel Morillo, Brais Curras, Almudena Orejas & Agostino Nobilini: *Evidences of practice camps in Hispania. The legio military complex*
Željko Miletić & Silvia Bekavac: *The last legion on the Limes Delmaticus – VIII Augusta*
Martijn A. Wijnhoven: *Semi-rigid scale armour. New insights into a classical Roman armour through a systematic study of the evidence*
Jared Kreiner: *Challenges for auxilia veterans in going home*
Eberhard Sauer: *Alchester. Life in a fortress of the AD 40's*
Michaela Zelíková, Balázs Komoróczy, Marek Vlach & Gabriele Rasbach: *Recent research of Roman military intervention during the Marcomannic wars in the territory of today's Moravia*
Ildar Kayumov: *Reconstructing Heron's cheiroballistra. A century and a half of 'Getting it right'*
Dé C. Steures: *Reading the Roman inscriptions exhibited in Lower Germany in Latin and in English, Dutch or German translation*
Jan Verhagen: *Roman waterworks in the Rhine-Meuse delta*

34 New research Moesia
Session chair Nemanja Mrđić

Nemanja Mrđić, Milica Marjanović & Snežana Golubović: *Legionary fortress at Viminacium and the Principia of VII Claudia Legion*
Piotr Zakrzewski: *What did and what did not change in the fortification system of Novae (Lower Moesia). The legionary base of legio VIII Augusta and I Italica?*
Ivan Bogdanović & Ljubomir Jevtović: *Is anybody out there? Viminacium legionary fortress in Late Antiquity*

35 New research Dacia
Session chair Rada Varga

Felix Marcu: *A battlefield of the Dacian Wars*
Zsolt Visy: *Die Ausdehnung und die Grenzen der Provinz Dakien*
Rada Varga, George Bounegru, Cristina Crizbășan & Imola Boda: *The Batavian riders of Roman Dacia. Between ethnic and cultural identity*
George Cupcea: *Revealing the function of a building through inscriptions. The case of the carcera in the fortress of Apulum, Dacia*

36 Germany
Session chair Clive Bridger

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CURRENT APPROACHES TO ROMAN FRONTIERS

This publication – Current Approaches to Roman Frontiers – is the first volume of the LIMES XXV's congress proceedings arranged around the original sessions, in order to form coherent thematical collections that make the vast output more accessible to generalists and specialists alike. This volume starts with a recap of the congress. Regarding the themes it deals with a contemporary feminist approach; new digital methodologies and computational modelling; three themes on archaeological heritage management dealing inter alia with preservation, protection, citizen science and World Heritage aspects, and a comparison between the Roman Limes and the Great Wall of China. It ends with an overview of the sessions and lectures of the congress in Nijmegen.

Frontiers are zones, or lines, of contact and coercion, of exchange and exclusion. As such they often express some of the most typical elements of the socio-political spaces that are defined by them. Spanning some 6,000 km along rivers, mountain ranges, artificial barriers and fringes of semi-desert, the frontiers of the Roman empire offer a wide variety of avenues and topics for a very diverse community of scholars. They are the central subject of the International Congress of Roman Frontier Studies (or just Limes Congress after the Latin word for 'border'), organised every three years since 1949. This four-volume publication contains most of the papers presented at the 25th edition which was hosted by the municipality of Nijmegen in August 2022.

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