



FRONTIERS OF THE ROMAN EMPIRE

THE EUROPEAN DIMENSION OF A WORLD HERITAGE SITE

Edited by
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Preface

7 March, the anniversary of the death of Antoninus Pius and the accession of Marcus and Lucius

The European Union's Culture 2000 programme, 'Frontiers of the Roman Empire', sprang from the proposal to create a World Heritage Site which might encompass all the frontiers of the Roman empire. Roman archaeologists working on the frontiers of the Roman empire in Europe responded to this challenge by calling a meeting to discuss the creation of a research strategy which would embrace all the European frontiers. The need for finance to proceed further was immediately apparent and an application to the Culture 2000 programme made. In 2005, the application was successful.

The twin primary aims of the project are to inform the public about the frontiers of the Roman empire and to improve the data base, which in turn will enhance the levels of information available to a wider community. The former task will be achieved through the creation of a web portal for the frontiers of the Roman empire and the provision of material for exhibitions in museums along the frontier and elsewhere. Meanwhile, further research on Roman frontiers, in particular through geophysical survey, is expanding our knowledge. This information is fed into the web portal and into publications on Roman frontiers. The production and dissemination of a free DVD on the frontiers of the Roman empire offers a further way of providing information to a wide audience. At the same time, consideration is being given as to how Roman military sites might be better protected, conserved and presented to the public so that the archaeological resource is adequately protected and the visiting public appropriately informed. In undertaking all these tasks, the wide ranging knowledge, experience and skills of the representatives of the eight partner countries is applied.

The meetings of the project partners have been held across Europe from Spain to Bulgaria. In many instances, we have been able to meet and discuss our work with local archaeologists and institutions, such as the Bulgarian Archaeological Institute. The partners have also lectured on the project at conferences and seminars, making contact with other bodies interested in working on frontiers, such as the Dutch Limes Organisation.

One of the most exciting aspects of the project has been the ways in which it has developed from its original concept, not least through contacts with colleagues working in similar or related fields. New proposals include the DVD on Roman frontiers produced by Boundary Productions and the projects to twin museums and schools along frontiers. These projects will continue after the end of the Culture 2000 programme, as will the international links within Europe and with colleagues in the Middle East which have been formed.

A project such as this naturally creates elements which need to continue after its formal close. We are grateful to the Royal Commission on the Ancient and Historical Monuments of Scotland for agreeing to host the 'Frontiers of the Roman Empire web portal'.

This project would never have got off the ground and prospered without the dedicated support of Sonja Jilek and Klaus Behrbohm who submitted the original application and acted as co-ordinators of the project throughout its life of three years. To both, I express the thanks of the eight partners and the wider archaeological community.

David J. Breeze
Chairman of the Culture 2000 Frontiers of the Roman Empire project
Edinburgh



Fig. 1 The participants of the opening workshop in Sopron (H) in September 2005 (Photo: Zs. Visy)



Fig. 2 The first presentation of the FRE booklet at Historic Scotland in Edinburgh (UK) (Photo: Historic Scotland)



Fig. 3 The opening of the exhibition on *Novae* in Warsaw in 2006 (Photo: CAR Novae; P. Dyczek)

THE CULTURE 2000 PROJECT 'FRONTIERS OF THE ROMAN EMPIRE'

David J. Breeze, Edinburgh and Sonja Jilek, Vienna

The gradual move towards the creation of the European Union over the last 50 years has been accompanied by increasing co-operation among the member states on various levels. Archaeology knows no boundaries and archaeologists in Europe (and, of course, beyond) have long worked together, exchanging information and discussing their results. The creation of a multi-national '*Frontiers of the Roman Empire World Heritage Site*' (FRE WHS) gave encouragement to archaeologists to extend and deepen their existing relationships. The formation of this World Heritage Site also led to a requirement for new strategies for international co-operation (see Breeze and Jilek in this vol. 24–8 and Jilek 52–5). Across Europe individual countries operate to different standards and traditions in the care of their monuments. A new framework for co-operation was needed and it was natural to look to the European Union for the financial assistance to help realise this new vision.

In 2004 an application to the European Union's Culture 2000 programme was submitted by Historic Scotland, a government agency within the Scottish Government (UK), on behalf of partners in Austria, Germany, Hungary, Poland, Romania, Slovakia, Slovenia and Spain. The proposal for a three-year grant was prepared by David Breeze from Historic Scotland, Sonja Jilek, as joint secretary of the European Archaeological Association working party (see Breeze and Jilek in this vol. 24–8) and Klaus Behrbohm, a facilitator recommended by the Austrian government. At the second attempt, the project received a grant of 800,000 euros towards a project worth 1.35m euros.

The Culture 2000 project '*Frontiers of the Roman Empire*' started in July 2005 and encompassed seven partners in Europe (Austria, Germany, Hungary, Slovakia, Slovenia, Spain, Poland and the UK), but it has embraced during the last two years many other countries who have been touched by the truly international scale of the project. It was a surprise to us five years ago that the first expression of interest was from Latvia, far removed from the Roman empire, but whose museums today proclaim the ancient link with Rome.

Our working concept for the Culture 2000 project was focussed on four main objectives:

- the creation of a web-portal which provides publicly accessible information on all the European frontiers;
- a series of exhibitions on Roman frontiers;
- the improvement of documentation on Roman frontiers;
- the formulation of guide-lines for the protection, preservation, management, presentation and interpretation of Roman military sites.

The first two elements of the programme relate to informing the general public, the third to improving the data bases for Roman frontiers across Europe while the final project not only looks to the long-term future of Roman military sites but also about their relationship to the visiting public.

Work was undertaken by the individual partners in their own countries and across the four main projects, including 7 workshops (Sopron/H (Fig. 1), Esslingen/D, Airth Castle/UK, Bratislava/Rusovce/SK, Svištov/*Novae*/BG, Pécs/H, Neustadt/D) and 2 conferences (Léon/ES and Edinburgh/UK).

Has the Culture 2000 project '*Frontiers of the Roman Empire*' been successful?

The answer is a resounding "yes". All four aims of the project have been achieved. Various legacies were created: a web portal and exhibitions about Roman frontiers, improved knowledge about the frontiers, the linking of museums and schools along the frontiers, and a DVD in at least five European languages and

Arabic. But more than that, we have created networks of archaeologists and cultural resource managers across a far wider area of Europe than the former Roman empire, and are demonstrating that scholars, archaeologists and cultural resource managers from countries with very different traditions within Europe can work together to create and enhance a truly multi-national WHS.

Informing the public

FRE booklet

Our very first task was to inform the public about the principal background of the FRE WHS (Fig. 2). This was achieved by producing a booklet, which presents an overall view on Roman frontiers in Europe, the Middle East and North Africa, published in English, French, German and Arabic. It provides information about the various structures of the *Limes* monuments and their history, brings back the heritage to people and formulates common aspirations for the future. Download facilities in pdf format are provided via the FRE web portal.

FRE web portal

The '*Frontiers of the Roman Empire web portal*' has been created (see Borgulya, Jilek, Schaller and Szentgáli in this vol. 15–7) to present basic information in several languages within a relatively simple portal, which also builds a unifying bridge to the main information in different countries in Europe and beyond. The project has provided the finance to support the creation of the portal and the national elements of the web portal.

This project has led on to further tasks: the preparation of a new map of the Roman empire at the time of the Emperors Hadrian and Antoninus Pius (117–161), the creation of a multilingual thesaurus of technical terms and the provision of links to tourist web sites about Roman frontiers.

FRE DVD

The Culture 2000 programme has allowed the FRE project to commission a new DVD of the frontiers of the Roman empire (see Dobat and Walkshofer in this vol. 163–5). Previously, the videos and the DVDs only covered Germany and the UK. Now, the European project allowed us to embrace the rest of the frontier from Austria through Slovakia and Hungary to Bulgaria and Romania. The first edition of the DVD, released in September 2007, presents an overall view on the monuments and landscapes along the European frontiers of the Roman empire in a 17-minute film. There are additional short films (5 to 7 minutes each) which concentrate on the characteristic features and challenges of protection of individual stretches of Hadrian's Wall, the Antonine Wall, the Upper German-Raetian *Limes* and the Danube *Limes* in Austria, Slovakia, Hungary, Romania and Bulgaria. The second edition will be amended geographically to include frontier sections in Jordan.

Hundreds of copies of the resulting DVD have been distributed including to museums and schools where it can be regularly shown. Also download facilities from the FRE web portal are in preparation. The DVD was created by Boundary Productions, which has already produced DVDs of the frontiers in Britain and Germany. The difference, however, is that the new DVD is distributed free of charge courtesy of Culture 2000.

Posters

Additionally, a series of posters have been arranged, which can be forwarded electronically to any museum or other body seeking them. The virtual exhibition to which all the project partners contribute provides the international context for national *Limes* presentations. The posters cover the following topics:

- the World Heritage Site '*Frontiers of the Roman empire*';
- the Culture 2000 project '*Frontiers of the Roman empire*';
- development and history of the Roman *Limes*;
- elements of the frontier;
- function of the frontier;
- Roman army structure;

- Roman army in action;
- people on both sides;
- life on the frontier;
- civilians along the frontier;
- frontiers today;
- management and the raid of antiquity;
- FRE as a parallel for modern Europe.

National websites on Scotland, Germany, Austria, Slovakia and Hungary

New or improved national websites in Scotland, Germany, Austria, Slovakia, Hungary and Poland/Bulgaria provide detailed information about hundred of sites with different levels of information. In Scotland, the Hunterian Museum in the University of Glasgow has created the national web site and has agreed to continue to maintain it (see Devine in this vol. 181–5). Apart from the museum’s own information, the main link is to the national archaeological data base for Roman Scotland in the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS). The Austrian *Limes* website has been built as a best practise example (see Kuttner in this vol. 94–8), and was used to set up the new *Limes* website for Slovakia. Both websites include Google-maps with icons of visible sites and links to tourism information.

Because the relationships between heritage protection and tourism concepts are not entirely unproblematic, the websites try to interpret heritage and integrate it in the contemporary society. To enhance local awareness of the FRE heritage the idea is to go to the communities to offer them the possibility of links.

Twinning museums and schools

The other two projects are the twinning of schools and museums along the frontier, the former led by Austria and the latter by Bavaria (see Flügel and Francis in this vol. 178–80). Both fit securely within the projects which UNESCO is seeking to promote in relation to WHS.

Museums have a significant role in increasing public awareness of the *Limes* monuments. To enhance more international co-operation, cultural resource managers and museum curators from Bavaria and Hadrian’s Wall developed and implemented a joint website of their local museums in Ruffenhofen/Bavaria and Maryport/Cumbria (www.senhousemuseum.co.uk; www.roemerpark-ruffenhofen.de). This special attempt could be used as a role model to create a professional *Limes* museum network to promote further research and knowledge sharing across Europe (see Flügel in this vol. 174–8).

Meeting the Romans

Apart from the two WHS Sites ‘*Hadrian’s Wall*’ and ‘*The Upper German-Raetian Limes*’ the public perception of Roman frontier installations across Europe is rather vague. On the other hand one can see a virtual explosion of interest in the dynamics of “soft tourism” during the last two decades. This includes the use of environment friendly transportation (bicycles, boats, walking), and is considered to be the best, and most authentic way to rediscover archaeological landscapes, and to arouse public interest in the cultural and natural environment of the various regions. Part of the Culture 2000 project was the intention to raise greater public awareness with the possibility of creating a cultural route along the frontiers of the Roman empire.

To improve the dialogue with a broader audience the town museum of Bratislava organised the event “Roman Days” in September 2007 with the aim to open up the *Limes* site of Rusovce through cultural and leisure activities. Research and general project results were also presented at the annual open air Scientific Picnic in Warsaw in June 2006 (Fig. 3).

The improvement of documentation on Roman frontiers

The FRE Culture 2000 programme has allowed significant research and recording to be carried out across Europe (see Breeze in this vol. 56–9 and 60–3, Jones and Thiel 99–105; Sommer 70–3; Dyczek et al. 74–8; Morillo 106–8). In Germany and Scotland, geophysical surveys were undertaken of many different elements of the frontier, the component parts of the barrier itself, forts and fortlets, civil settlements and minor features

(see Stephens, Jones and Gater in this vol. 79–93; Sommer 70–3). The funding has allowed the techniques of geophysical survey to be refined in order to achieve more information. In Austria, Slovakia and Hungary, an important element of the project has been the cataloguing of a vast range of material relating to the frontier running through that country (see Dyczek et al. in this vol. 74–8).

Data bases

To achieve UNESCO heritage status it is of vital importance for all national project institutions to submit a full inventory of data for the proposed monuments. Therefore the core activities of all project partners in Scotland, Germany, Austria, Slovakia, Hungary and Poland was to collect and complete their GIS based *Limes* records through various archaeological prospection methods and archive work (see Sommer in this vol. 79–83; Dyczek et al. 74–8; Kuttner 94–8). One of the most important challenges for the project laid in the differing definition of artificial and river barriers (see Jilek in this vol. 64–9).

In Scotland, Austria, Slovakia and Hungary, an important element of the project has been the cataloguing of a vast range of material relating to the frontier running through those countries. As a summary, Scottish and German partners formulated guidelines for the documentation of physical boundaries which are presented in this volume (see Jones and Thiel in this vol. 99–105). A problem with “invisible” sites is that even their existence might not be known. While some sections of the frontier have been well explored, others are far less well known. Sometimes smaller remains, especially if built in timber, are only found by chance, or as the result of a hypothesis being based on earlier discoveries and then tested on the ground. This pattern of discovery requires a flexible approach to extending the boundary of the WHS as knowledge continues to grow.

Mapping

Preservation and promotion of WHS requires accurate documentation and understanding of the features that make up the Site in its entirety. In the case of complex linear structures, such as Roman frontiers, accurate mapping is a key tool for the heritage bodies involved in site protection and management. A sophisticated mapping programme for the Antonine Wall was set up for the World Heritage application. The ways in which the mapping of Roman frontiers can be enhanced and developed led, in consultation with colleagues from across Europe, to the formulation of guidelines for mapping the frontier installations (see Jones and Thiel in this vol. 98–105).

The protection of the World Heritage Sites in urban areas causes particular problems because many structures of Roman military sites especially along the rivers Rhine and Danube have survived under the very core of modern settlements and even capital cities. To provide an adequate protection, the Bayerisches Landesamt für Denkmalpflege started a pilot project on positive-negative mapping of surviving and destroyed parts in the cadastre of Straubing (see Sommer in this vol. 119–21). In future this could be used as a best practise model for integrating heritage in urban planning and spatial design.

Aerial photography

Aerial photography helped to identify and/or improve knowledge about individual military sites in Bavaria, Slovakia (Iža) and along the Danube *Limes* in Hungary and Bulgaria in the area around *Novae* (see Sommer in this vol. 70–3). In co-operation with three local institutions a larger stretch of the eastern *Limes* in Romania was identified and documented by a Hungarian, Romanian and German archaeological team.

Geophysical work

In Germany and Scotland, geophysical surveys were undertaken of many different elements of the frontier, the component parts of the barrier itself, forts and fortlets, civil settlements and minor features. The funding has allowed the techniques of geophysical survey to be refined in order to achieve more information. (see Stephens, Jones and Gater in this vol. 79–93; Sommer 70–3; Dyczek et al. 74–8).

Large scale geophysical work allowed the identification of more monuments on the frontier line and adjacent military installations in Slovakia, Hungary and Bulgaria. New temporary camps were investigated close to the fort of Iža in Slovakia and *Novae* (BG). On the basis of geo-radar analysis the complete fort layout of Intercisa (H) has been transformed into a 3-D reconstruction via the special application of a chronoscope.

Archaeological survey

In spring 2007 an archaeological survey along the Bulgarian part of the Danube *Limes* was undertaken. Research started at Vidin (*Bononia*) and stretched up to Silistra (*Durostorum*). Previous documentation was confronted with the current state of preservation. Iconographic documentation and topographic measurements were made, surface material was collected.

Excavations

Excavations in the forts of Rusovce (Fig. 4) and Iža (SK) and in the legionary fortress of *Novae* (BG) were undertaken before the formulation of any conservation measures to provide reliable information on the history of the sites. The ruins of the hospital of *Novae* unearthed in relatively good condition have led to extensive preservation work and allowed 3D modelling of parts of the site. Fieldwork focused on the legionary hospital and initial prospection of the lower layers of the Flavian legionary baths. The entire east wing of the hospital was uncovered, including the *portico* on the side of the *via praetoria*. In hospital rooms original floors and red plaster were found and preserved. Based on these works new presentation measures including virtual reconstructions have been carried out for the public.

Summer school for young professionals in Slovakia

The Institute of Archaeology of the Slovak Academy of Sciences organized in collaboration with the Department of Classical Archaeology, University of Trnava (SK), the Institute of Classical Archaeology Charles University Prague (CZ), the Institute of Archaeology Jagiellonian University Kraków (PL), the Institute of Archaeology Warsaw University (PL) and the Office of the Village Iža in the area of Roman fort at Iža the summer school of archaeology in the period from 1 July to 24 August 2007 (Fig. 5).

The aim of the project was the education and training of young people from Central Europe in the field of excavation, restoration, protection and presentation of an antique monument - the Roman fort at Iža (*Kelemantia*, SK). The project was intended as the summer school for university students of archaeology and history under a professional leadership and with a connection to the public – visitors and tourists. The project was prepared as an alternative form of archaeological research, including lectures, excursions and workshops.



Fig. 4 Field training during the Iža summer school 2007. Mapping and survey course (Photo: Slovakian Academy of Sciences, Nitra)



Fig. 5 Excavation and conservation measures in the fort of Rusovce (*Gerulata*) (Photo: Bratislava Town Museum)

Preservation, conservation, presentation and the formulation of guidelines

It is not enough just to provide information on a web site or through exhibitions, catalogue existing information, or make new discoveries, but the long-term preservation and conservation of the archaeological resource itself is essential as is the presentation and interpretation of the surviving and visible remains on the ground. Visits to monuments in all countries involved in the project together with the cultural resource



Fig. 6 The participants of the project workshop in Rusovce in November 2006 discussing conservation measures in the fort of Gerulata, SK (Photo: J. Schmidtova, Town Museum Bratislava)

managers responsible for their care and the archaeologists who know and understand the frontiers has been an important element in the project. A wide range of sites and methods of conservation and presentation have been seen. Older members of the profession have been able to share their knowledge and experience with their more junior colleagues and all learn from the widening of their horizons. Undoubtedly, the visiting public will benefit from these modern cultural exchanges.

Preservation and conservation of sites along the Danube frontier in Slovakia, Hungary and Bulgaria

Preservation and conservation measures have been carried out in Slovakia, Hungary and Bulgaria (see Sommer in this vol. 128–39). Many aspects of the protection, management and display of the Roman frontier installations have been discussed (see Breeze in this vol. 109–11 and 141–7; Thiel 148–52; Becker 153–62)(Fig. 6). Among those the following are the most challenging:

- final delimitation of the protected area(s) and its buffer zone(s);
- regulation of ownership rights and management of the monument;
- way of conservation and display of the monument.

For resolving these problems new overall maps were created which became the base for delimitation of the protected areas in Rusovce and Iža (SK). The Municipality of Iža, the museum in Komárno and the Slovakian Institute of Archaeology are trying to establish the association that would administrate and take care of the development of the frontier monument. Among their objectives is also the establishment of a new museum in Iža, a new exhibition in the museum in the nearby town of Komárno and their interconnection with the Roman monuments at the opposite bank of the Danube in Kómarom in Hungary. All measures were completed by the creation of new information boards and systems.

At *Novae* the legionary hospital walls and partially the latrine were conserved (see Sommer in this vol. 128–39, Fig. 12). During reconstruction, the antique structure was clearly distinguished from the reconstructed parts. The hospital roof was partially reconstructed. A *lapidarium* was prepared, where the most important epigraphic finds were placed after conservation.

The protection of the WHS in urban areas caused particular problems in Rusovce (SK) as in many other sites all across Europe, when cultural resource managers are faced with threats such as the building of new houses, factories, even petrol stations, pipe-lines, roads etc. (see Enckevort in this vol. 122–7; Breeze 140–7). But the extensive rescue excavations have produced important results for the topography and structure of the military installations and the adjacent civil town of Roman *Gerulata* (Rusovce).

Presentation of sites

Several project workshops in various countries across Europe provided an excellent opportunity for the project partners to see and discuss individual presentation methods starting from the beginning of the last century (e.g. in Eining, Bavaria) to the most recent ones in *Novae* on the Danube *Limes* in Bulgaria. All examples have shown us a wide variety of possible solutions (see Breeze in this vol. 140–7, Thiel 148–52, Becker 153–62; Sommer 128–39), more traditional ones as well as alternative methods.

Alternative methods of presentation of the FRE project focussed on virtual reconstructions of buildings, forts and landscapes; there is a great advantage in this because it allows results to be made visible via the computer screen. Projects ranged from the simple views of a building through 3-D external views such as the barrack-blocks in the earth-and-timber fort of Iža (SK), the Roman villa close to Rusovce (SK) or the legionary hospital in *Novae* (BG) to more complex 3-D videos of archaeological landscapes. The RCAHMS (UK) worked on contour modelling in using Geographic Information System (GIS) for 3-D landscape models. This aids the definition of the monument and help understanding of its setting.

The German Limeskommission investigated new visual presentation methods in collaboration with nature preservation bodies and the University of Freiburg (see Höchtl et al. in this vol. 166–73). One method to improve the visibility lies in the visualization of the monument through planting trees, shrubs or plants. In an ideal case this also shows clearly how the military installation is embedded in the surrounding landscape. Another way of on-site presentation is the chronoscope developed by the Institute for Computerization of the Hungarian Academy of Science in Budapest. It allows visitors more readily to interrelate the physical remains of the monument and its interpretation. A special application of the chronoscope presents the complete fort of Intercisa (H) on the basis of geo-radar research.

Management of *Limes* sites

The institution for the protection of archaeological monuments in Bavaria initiated a '*Limes development plan*' for the protection and utilisation of the Bavarian part of the present WHS (see Sommer in this vol. 128–39). This goal was achieved in close co-operation with the various stakeholders of the *Limes* heritage in local municipalities and regional governments.

A management plan was prepared by Historic Scotland to accompany the World Heritage application including a research agenda and the designation of buffer zone for the proposed WHS (see Dower in this vol. 112–7) (Fig. 7). To support the nomination and the management plan, the whole of the mapping of the



Fig. 7 The Minister for Tourism, Culture and Sport in Scotland, Patricia Ferguson, MSP, signs a concordat for the better protection, management and presentation of the Antonine Wall with representatives of the five local authorities along the frontier, East Dunbartonshire, Falkirk, the City of Glasgow, North Lanarkshire and West Dunbartonshire Councils (Photo: Historic Scotland)

Antonine Wall was revised (see Jones and Thiel in this vol. 99–105) while all “events” (that is actions such as surveys and excavations) which had taken place on the frontier were recorded on a special GIS layer. This is available to cultural resource managers in order to aid the protection and management of the monument. Geophysical surveys were undertaken and special reports commissioned on the environment and on place-names in order to improve the knowledge base.

Guidelines

Based on existing conventions related to the conservation, management, reconstruction and display of archaeological sites and historic buildings several guidelines were formulated which focus on the general management of the FRE WHS (see Jeschke in this vol. 186–95) or deal with special challenges such as the definition of buffer zones for WHS (see Dower in this vol. 112–7), the conservation of sites (see Sommer in this vol. 128–37) or the integration of *Limes* museums (see Flügel in this vol. 174–8 and 196–9). They can be applied on Roman military sites, a unique type of archaeological site across Europe, to aid their interpretation and presentation.

International co-operation

This project has brought together archaeologists of different ages, experience and backgrounds from many European countries. All have benefited from the discussions which have taken place over the internet, in face-to-face meetings and on archaeological sites from the Atlantic to the Black Sea. But while the professional archaeologists have benefited, so has the general public who now has access to much more information about the frontiers which once girt the Roman empire. This information is available, too, in a variety of forms, on the web, in museums and libraries, in publications and in DVDs.

The future

One of the great excitements of this project has been the ideas which have naturally flowed when enthusiastic practitioners gather together. The Culture 2000 programme has allowed us to enhance a much closer co-operation with colleagues especially from the Eastern European countries.

The Culture 2000 project also provided the appropriate milieu where Dr Ian Francis’ suggestion that museums along the frontier might be twinned could be explored. Dr Francis’ museum is the Senhouse Roman Museum in Maryport, a small private museum but containing an important collection of Roman inscriptions and sculpture. The Bavarian museums service provides the other element in this trial at twinning museums. The project has gone live on the internet and is actively looking for new partners.

The other twinning project relates to schools. So obvious, but not undertaken before. This idea was taken up enthusiastically by the Austrian schools authority and the Hunterian Museum in the University of Glasgow.

For these projects, as in all the others envisaged four years before, the European Union Culture 2000 project has provided the framework within which the ideas could be developed – and achieved. Furthermore, a group of archaeologists who now know each other better and can therefore work together more creatively has been created, a body now actively looking forward to its next international project.

THE FRONTIERS OF THE ROMAN EMPIRE WEB PORTAL

Gergely Borgulya, Budapest, Sonja Jilek, Vienna, Kurt Schaller, Salzburg and Ádam Szentgáli, Budapest

Tasks of the Web Portal

The information system is designed to act as a central information source and a multi-lingual entry to the 'Frontiers of the Roman Empire World Heritage Site' (FRE WHS) (Fig. 1). It aims to impart the targets of the project to the public as well as to cultural heritage and scientific institutions and to serve as a technical network/framework for the integration of data resources provided by the FRE project partners in the individual countries across Europe (see Breeze and Jilek in this vol. 6–14). In this it connects various national and regional websites (see Devine in this vol. 181–85). It provides also basic information on the FRE World Heritage Site status and the scientific background and the results of the Culture 2000 project. The general information is supplemented by a multi-lingual thesaurus, which is used as a base to link various other websites.

Targets groups and resulting consequences

The new web portal aims to provide information to diverse groups of users: e.g. to the general public, to the academic community and also to decision makers in the fields of politics and cultural heritage management. The basic content has been prepared according to different categories concerning its complexity and multi-lingual aspects. It forms a kind of "entry level" to national *Limes* websites, where no special academic (archaeological) knowledge is required.

What kind of data is available?

Information derives from miscellaneous data resources provided by the FRE project partners. Wherever applicable, information is available in English as well as in the national languages of the partner countries to guarantee a deep integration of all available data. Of course this is greatly influenced by the fact that the common cultural heritage of the *Limes* is scattered over a large number of modern national states. Academic efforts and the general conditions under which these efforts took place, reflect specific national peculiarities and also produce results representing different states of realisation (see Kuttner in this vol. 94–8). The implication for the project was: although the basic archaeological knowledge is inhomogeneous in every thinkable way a common presentation is aspired that is intended to be as homogeneous as possible.

The best achieved results based on available data, temporal limits and financial potentials

The only possible way to achieve the project goal was by defining minimum standards that are within reach of every contributing partner. Such sorts of standards (e.g. regarding standardized 'National Index Pages') form the initial basis of the FRE web portal, which can be later broadened and upgraded by the individual national partners. The result is an information system that gives access to a large number of independent data sources.

The system is constricted to a number of well-defined core tasks: it contains information regarding the Culture 2000 project itself and offers the possibilities to characterize the individual national frontier sections, partners and contributing institutions. In a further step it also forms a framework for the integration and description of inhomogeneous data sources and offers some fundamental search routines. The hosting, further development and enlargement of the specific data sources e.g. the various national *Limes* websites, lie within the authority of the individual partners themselves. In order not to delay the realisation of the information system into the remote future the technically advanced and time-consuming resource-integrating search routines will be part of a longer term concept.

Technical solutions

The information system is technically robust, user-friendly and easy administrable. The latter means, that all levels and zones, including maps and database-connected features, are editable without advanced computer skills. In order to match these preconditions the whole web portal is manageable with a Content



Fig. 1 The entry page to the FRE web portal (Copyright: FRE project and Boundary Productions)

Management System (CMS). This CMS provides the ability to the academic administrators to change and actualise the content of all pages, modify the maps and add and describe new data resources. Some characteristics of a CMS are:

- pages usually get generated dynamically;
- their content is stored in databases or multi-lingual text-files on a web server;
- to change these contents the administrators can access the databases via the Internet by using any web-browser as a front end.

An adequate navigation of the web-based information system lets the user switch from every part of the website to all other parts in a simple and intuitive way. A navigation structure was employed, which is familiar to the users from many other websites to achieve as flat a learning curve as possible. The user interface follows some basic rules for design and usability:

- few, clearly defined interactive elements;
- no "technoid" interface, loaded with tiny icons;
- clear styling, low-key colouring;
- no "pretty" artwork for "decoration";
- sufficient contrasts and "white space"; no overcrowded pages;
- "short pages": the content of each page should possible fit on a standard screen (1024 x 768 to maximum 1280 x 1024 pixels);
- flexible, scaleable windows, able to use the full width of the screen;
- longer texts are always induced by short descriptions on the next upper hierarchy-level.

There is hardly another discipline in which "form follows function" can produce more welcome results than in web-design. Or, to cite Neville Brody freely: *'Good design is always at the edge to no-design'*.

Due to the usability of the information system it works on a basis without using Plug-Ins (e.g. SVG) or Java-applets. Pixel- and vector-based maps are managed quite well with rather powerful PHP scripts.

Main features

Entry

The web portal can be entered without login as a common user. The entry page was designed by Boundary Productions. The main pull-down menu is presented at the right upper edge combined with context-sensitive sub-menus on the left side. This main menu gives access to information concerning the FRE WHS project and its targets, the Culture 2000 project results and the descriptions of the frontier monuments,

including an interactive map of the Roman empire during its greatest extent in the 2nd century AD and various search features.

Multi-lingualism

To display the content in several languages has been a central part of the initial concept. The selected languages are: English, German, Hungarian, Slovak and Polish, with extensions possible to further languages. Multi-lingual features afford rather “abstract” programming. There are several aspects that have been combined:

- *user interface* – the multi-lingual user interface offers all the functions and status messages the user needs to navigate around the site;
- *value lists* – all sorts of “controlled vocabulary” and keywords are the most important items to support the user in exploring the information system. The user also gets information about what kind of information he can look for;
- *texts* – in contrast to the user interface and to value lists texts are very inhomogeneous and not formalised. This resulted in rather time-consuming translations. Technically considered, the efforts are comparable to the items mentioned above.

If there are no specific “language tags” available, the application switches to “English” by default. This means, that every “text” is available at least in an English version.

Monuments

The Popup menu “Monuments” displays information on all participating countries in a short overview (‘National Index Page’) and give access to the national websites of the individual countries (if available). Their design follows a standardized scheme and gives access to a broad variety of data resources. Information is offered about various frontier sections and their installations (location, topography, state of conservation, history, Roman troops).

Map view

A clickable, interactive navigation map forms one of the most prominent ways to guide the user to the diverse digital resources offered by the information system. A click on any spot of the map will bring the user to a more detailed view. Eventually the user can add or omit additional information by switching on/off different layers. The map offers the borders of modern states or Roman provinces for basic exploration. It guides the user to the individual sections of the frontier and more important archaeological sites, where links are provided by clicking to the ‘National Index Pages’, respectively the site description files (e.g. Roman provincial capitals, legionary fortresses).

Thesaurus and glossary

Within the project several units containing “controlled vocabulary” (e.g. value lists) were created. In a medium-term view this vocabulary may form the basis of some deeper integration. Another factor might be the assimilation of user interfaces and search routines of an increasing number of the implemented data sources step by step.

Links and downloads

Nearly all materials provided by the Culture 2000 project (e.g. guidelines, texts, pictures thesauri) can be downloaded here. This includes the FRE booklet and the FRE DVD and the short films about the individual frontiers sections in UK, Germany, Austria, Slovakia, Hungary and Bulgaria produced by Boundary Productions.

Maintenance

Considerable thought was given to the continuing maintenance of the web portal. The concept of the FRE web-application, which was set up with a technical straightforwardness, involves the possibility that in the case of need it can be run with a minimum of funding. In the meantime RCAHMS has agreed to host the FRE web portal and Dr Sonja Jilek, archaeological co-ordinator of the FRE Culture 2000 project, will ensure that the archaeological information is kept up-to-date.



Visiting the archaeological museum in *Novae* (Svištov, BG), during the workshop May 2007



Participants discussing conservation measures in Rusovce (*Gerulata*, SK), November 2006

THE FRONTIERS OF THE ROMAN EMPIRE PROJECT PICTURE BOOK



Participants of the workshop in Airth Castle, Scotland in June 2006



Visiting the Antonine Wall, workshop Scotland in June 2006



Participants of the workshop in *Novae* (BG), in May 2007



Workshop in *Novae* (BG), May 2007



Workshop in Scotland, June 2006



Workshop in *Novae* (BG), May 2007



Visiting the Antonine Wall, June 2006



Workshop in *Novae* (BG), May 2007



Workshop in *Novae* (BG), May 2007



Workshop in Scotland, June 2006



Opening workshop in Sopron (H), September 2005



Workshop in *Novae* (BG), May 2007



Workshop in *Novae* (BG), May 2007



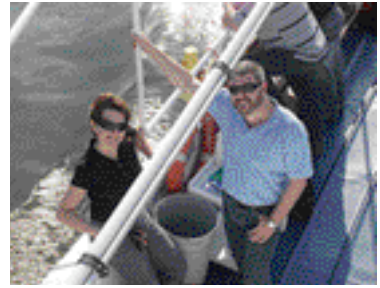
Workshop in Esslingen, March 2006



Participants of the workshop in *Novae* (BG), May 2007



Workshop in *Novae* (BG), May 2007



Workshop in *Novae* (BG), May 2007



Opening workshop in Sopron (H), September 2005



Workshop in *Novae* (BG), May 2007



visit to the Raetian *Limes*, workshop Neustadt (D), February 2008



Exploring sites, *Novae* (BG), May 2007



Workshop in *Novae* (BG), May 2007



Conference "Visiting the Past, meeting the Limes", Utrecht (NL), 2007



Workshop in *Novae* (BG), 2007



Shipping on the Danube, workshop in Neustadt (D), February 2008



Fig. 1 Hadrian's Wall at Cuddy's Crag near Housesteads, UK (Photo: S. Halliday)



Fig. 2 The ditch at Watling Lodge on the Antonine Wall (Scotland) retains almost its original profile (Crown copyright: Historic Scotland)



Fig. 3 The very well preserved fort of Qasr Bshir in Jordan (Photo: S. Jilek)

THE FRONTIERS OF THE ROMAN EMPIRE WORLD HERITAGE SITE

David J. Breeze, Edinburgh and Sonja Jilek, Vienna

In 1987, Hadrian's Wall (UK) was declared a World Heritage Site (Fig. 1). In 2005 it was joined by the Upper German-Raetian *Limes* and, at the meeting of the World Heritage Committee at Durban in that year, a new World Heritage Site was created, the '*Frontiers of the Roman Empire*' (FRE). This is a phased, serial trans-national World Heritage Site (WHS). The long-term aim is to bring within it all appropriately preserved elements of the frontiers of the Roman empire in Europe, the Middle East and North Africa. This will create a truly unusual WHS in that it will encompass archaeological remains in many countries rather than just one or two countries as is the present situation with WHS: it will, in short, be a multi-national WHS.

In 1996, it was proposed that the Upper German-Raetian *Limes* should be nominated as a WHS and in 1999 a working group met to forward the proposal. From June 1999 to February 2001, Professor Zsolt Visy, then President of the Hungarian National World Heritage Committee, held discussions with the delegates of other countries containing sections of the Roman frontier with a view to promoting the concept of a multi-national WHS encompassing different sections of the frontier in Europe. In September 2001, a group of Roman archaeologists and cultural resource managers (Dr Henry Cleere, Professor Siegmund von Schnurbein, Dr Sebastian Sommer, Dr Andreas Thiel, Dr Christopher Young and Professor David Breeze) meeting at the European Archaeological Association's Annual Conference at Esslingen agreed that the creation of a single WHS encompassing all the frontiers of the Roman empire would be a laudable aim. Such a WHS would have the twin effects of encouraging colleagues to work together internationally as well as reducing the number of WHS emanating from Europe.

Progress has been made towards that aim. Following the ascription of Hadrian's Wall and the German *Limes* as part of the '*Frontiers of the Roman Empire World Heritage Site*' the Antonine Wall in Scotland, the most northerly and one of the most developed frontiers of the empire, is now under consideration as a next extension of the Site (Fig. 2), while Austria, Hungary, Slovakia and Croatia have all stated their intention to nominate their section of the Roman frontier as part of the WHS. Roman forts in Syria and Jordan are already on the Tentative Lists for these countries (Fig. 3), and it is therefore not difficult to envisage a trans-national WHS encompassing frontier installations in Asia and Africa.

The frontiers of the Roman empire stretched from the Atlantic coast of Scotland, along the Rhine and Danube rivers, with a salient out into Transylvania – modern Romania – using the Carpathian Mountains as the boundary, to the Black Sea; from Trabzon on the southern shore of the Black Sea through the Middle East to the Red Sea; and thence across North Africa, along the northern edge of the Sahara Desert, to the Atlantic coast of Morocco (Fig. 4). These frontiers, over 5,000 km long, defined the Roman empire, one of the greatest states which the world has seen, and an idea and ideal which still inspires us today. Great books, exciting films and even the location of the signing of the founding treaty of the European Union all attest to this.

Along these frontiers today lie the visible remains of forts both great and small dating from the first to the fourth century AD, and, in the East, beyond. Within Europe, they include iconic sites such as Housesteads on Hadrian's Wall, the Saalburg in Germany, fourth century fort towers still standing to full height in Austria, and late Roman defensive works in Hungary and Romania, as well as artificial barriers in Britain and in Germany.

The frontiers of Rome are in many ways natural complements to the great cities and monuments of the more peaceful provinces of the empire which are already WHS. These include Rome itself, Cyrene, Leptis Magna, Sabratha, Timgad, Tipasa and Volubilis in Africa and Masada, Palmyra and Petra in Asia. Beside the greater cities of Mérida, Tarraco and Lugo in Spain, engineering works such as the Pont du Gard and the Segovia aqueduct, temple complexes like those at Baalbek, and the theatre and arch at Orange acquired World Heritage status. Furthermore Roman archaeological remains are included in the World Heritage List



Fig. 4 The Roman empire in the second century AD (Copyright: FRE project)

such as: Pompeii, Herculaneum and Torre Annunziata, Aquileia and Ravenna (Italy), Split (Croatia), Butrint (Albania), Arles and Strasbourg (France), the *Porta Nigra* and other Roman monuments in Trier (Germany) and the early Christian tombs at Pécs in Hungary.

The frontiers which protected these places and of course the whole of the Roman empire link many modern countries around the Mediterranean Sea in a very particular way. Even today, one could march along the remnants of these frontiers, along Roman roads, from country to country around the edge of Rome's empire. Yet, the frontiers also relate to countries beyond the Roman empire. It was through these frontiers that Roman goods passed out to the people beyond the Roman world. These trade and cultural links stretched right across northern Europe, as far as Scandinavia and the countries round the Baltic Sea. Today, one of the best collections of Roman material is on display in the National Museum in Copenhagen (the recording of these finds is a special project run by the Römisch-Germanische Kommission in Frankfurt '*Roman Finds in Barbaricum*').

Roman frontiers have left their mark on today's landscape in a variety of ways. The great line of the Upper

German-Raetian *Limes* can still be seen from the air as a marker across the landscape (Fig. 5). Hadrian's Wall has served as an administrative, parish and estate boundary for centuries and also remains a very visible feature in the landscape. The plan of the legionary fortresses at Regensburg and Vienna (both WHS) still govern the layout of the historic cores of these great cities.

WHS are chosen by the World Heritage Committee. As part of the nomination process considerable work has to be undertaken to define each proposed new Site, ensure that it is adequately protected, conserved and presented, and, in every sense of the term, properly managed. In order to help this process and advice on archaeological matters relating to the WHS, a scientific committee made up of the archaeological coordinators appointed by each country for its section of the Roman frontier has been created. Named the '*Bratislava Group*' after the location of the first meeting (see Jilek in the same vol. 201–3), it offers advice to the state parties, through the inter-governmental body established by Germany and the UK to manage the new WHS. To date, the '*Bratislava Group*' has met in Germany, Hungary, the Netherlands, Slovakia, Spain, France and the UK. At each meeting we offer our national colleagues a workshop to keep them abreast of developments and discuss problems of mutual interest. Our main problems at present are the protection of military remains in urban environments and reconstructions on the frontier.

Each WHS must have a Management Plan. A multi-national WHS requires a special approach to the Management Plan. In acknowledgement of the differing traditions of the various countries proposing to join



Fig. 5 The Raetian *Limes* at Haghof from the air (Copyright: Deutsche Limeskommission)

the WHS, the World Heritage Committee has approved the formulation of individual Management Plans for each section of the frontier rather than a single Plan embracing the whole WHS. Each Plan, of course, must relate to the management philosophy for WHS laid down by UNESCO and ICOMOS.

Each Management Plan for a WHS is required to contain a research strategy. Six years ago, a group of Roman military archaeologists decided to take the bold step of trying to create a research strategy for all the European frontiers of the Roman empire. A discussion, organised by David Breeze, Andreas Thiel and Sonja Jilek, was held at the European Archaeological Association's Annual Conference (EAA) at Thessaloniki (GR) in 2002. At its final plenary session, the EAA gave its support for the formation of a WHS encompassing the frontiers of the Roman empire as a long-term context for protection and management

policies and welcomed the creation of a research framework for the European frontiers of the Roman empire, part of the process being through the creation of international access to national data bases (*The European Archaeologist* 18 (2002) 20). A working party was established and a programme devised. The programme contained six modules:

- the creation of an international data base relating to the European frontiers of the Roman empire;
- the creation of basic standards of site management for the sites on the frontier;
- the definition of gaps in basic information about the frontiers;
- the definition of frontier zones (bearing in mind the narrow definition of the 'Hadrian's Wall WHS' and the proposed 'Upper German-Raetian Limes WHS');
- the definition of other potential WHS within the European over-arching framework;
- improved public access to information about Roman frontiers.

Since then two more working group meetings were organised during the EAA conferences in Lyon 2005 and Zadar 2007.

The workshop organised in Lyon (FR) in 2005 focussed on the complexities of defining a multi-national WHS. The considerable complexity of a frontier system, which developed through time and finally stretched for over 5000 km, naturally provokes a series of questions concerning problems of defining the remains of the frontier within the individuality of the different stretches. The subject of debate were the implications of the nomination(s) regarding the proper identification, recording, mapping, protection and understanding of the monument, including the presentation of previous experiences in nominating and managing trans-boundary WHS. The discussion among international experts helped to develop a common viewpoint in respect of the scientific framework for the whole WHS, as well as being relevant to other complex multi-national WHS.

Questions about the perception of prehistoric and Roman sites and their presentation to the public were in the centre of the EAA workshop in Zadar in September 2007. One is faced with the fact that many archaeological sites in the middle and in the north of Europe are not particularly attractive and more often only visible as crop marks, partly covered up or even completely invisible. Several contributions by colleagues from United Kingdom, The Netherlands, Croatia, Serbia and Romania tried to investigate how much intervention is acceptable to preserve and present the ancient monuments. It turned out that the nature of the presentation of archaeological monuments to the public relates closely to the individual state's views on their conservation. Many countries agree that the most important is the primacy of the archaeological remains, which should be left to speak for themselves (this is also acknowledged by UNESCO in considering potential WHS for authenticity and integrity, see Breeze and Young in this vol. 29–35). But the wish for rebuildings, reconstructions and other forms of visualisation easily lead to conflicts between conservation and development and presentation measures (see Sommer in this vol. 128–39). Critical assessments of present approaches examined this heritage management dilemma and emphasized that we have to learn to "play" with the authenticity and significance of the invisible architecture and communicating those values to the public (see Lengkeek in this vol. 36–51).

Over the last years we have created networks of archaeologists and cultural resource managers across a far wider area of Europe than the former Roman empire, and are demonstrating that scholars, archaeologists and cultural resource managers from countries with very different traditions within Europe can work together to create and enhance a truly multi-national WHS.

Further reading

Breeze, D. J., Jilek, S. and Thiel, A. (2005), *Frontiers of the Roman Empire*. Edinburgh, Esslingen, Wien.

<http://www.deutsche-limeskommission.de>

Enhancing the value of the UNESCO World Heritage Site 'Upper German-Raetian Limes' through landscape management:

<http://www.landespflege-freiburg.de/forschung/limes.en.html>

<http://www.historic-scotland.gov.uk/antoninewall>

FRONTIERS OF THE ROMAN EMPIRE WORLD HERITAGE SITE SUMMARY NOMINATION STATEMENT

David J. Breeze, Edinburgh and Chris Young, London

1. Identification of the Property

1.1 The Roman empire extended at its height into three continents. During the waxing and waning of Roman power over a period of more than a millennium, a number of different frontier lines were established. At its greatest extent, in the second century AD, the imperial frontier stretched for over 5,000 km, starting on the western coast of northern Britain. The frontier in Europe then ran along the rivers Rhine and Danube, looping round the Carpathian mountains to the Black Sea. The Eastern frontier from the Black Sea to the Red Sea and running through mountains, great river valleys and the desert, faced Rome's greatest enemy, Parthia. To the south, Rome's protective cordon embraced Egypt and then ran along the northern edge of the Sahara Desert to the Atlantic shore in Morocco.

1.2 Remains of Roman frontier installations survive and can be seen in the United Kingdom, The Netherlands, Belgium, Germany, Switzerland, Austria, Slovakia, Hungary, Slovenia, Croatia, Serbia, Bulgaria and Romania and possibly others within Europe. East and south of the Mediterranean, there are remains in Turkey, Syria, Jordan, Israel, Iraq, Egypt, Libya, Algeria, Tunisia and Morocco.

1.3 The inscription of the Hadrian's Wall World Heritage Site has resulted in the definition of what a *'Frontiers of the Roman Empire World Heritage Site'* might contain:

- a linear barrier in its entirety;
- sites along a natural boundary, such as a sea or river;
- the network of military installations, other ancillary features and their linking roads, on, behind and beyond the frontier.

All these may encompass both visible and buried archaeology. Together, all form an extensive historic landscape.

1.4 Detailed location information will be given for each section of the frontier as it is nominated for inscription.

1.5 The Site would be known overall as the *'Frontiers of the Roman Empire World Heritage Site'*. Individual elements of the Site would be listed by their local names as being part of the Frontiers of the Roman Empire World Heritage Site – e.g. Hadrian's Wall (part of the Frontiers of the Roman Empire World Heritage Site).

2. Justification for inscription

2.a Statement of Significance

2.a.1 The Roman empire is of undoubted outstanding universal value. Spanning three continents, the empire developed and transmitted over large parts of Europe a universal culture based on Greek and Roman civilisation. Its influence reached far beyond its actual boundaries in Europe and around the Mediterranean. Its culture framed and guided the cultures of Europe and beyond up to and including the present day.

2.a.2 The frontiers of the Roman empire form the single largest monument to this civilisation. They helped define the very extent and nature of the Roman empire. As a whole, they represent the definition of the

Roman empire as a world state. They also played a crucial role in defining the development of the successor states to the Roman empire. The frontiers and their garrisons were also a crucial tool of Romanisation on both sides of the border line.

2.a.3 The frontiers also have high significance as illustrating the complexity and organisational abilities of the Roman empire. With only the technology and communications of a pre-industrial society, the empire was able to plan, create and protect a frontier of some 5000 km and garrisons of tens of thousands of men. It was then able to manage and use this system, on the whole successfully, for periods of many centuries, both as a physical barrier, and also as the basis for diplomatic and military intervention far beyond the actual frontier line itself.

2.a.4 Physically, the frontiers demonstrate the variety and sophistication of the responses of the Roman empire to the common need to demarcate, control and defend its boundaries. This had to be done in widely differing circumstances, reflecting the interaction of political, military and topographical features. Mostly, the empire faced a variety of tribal groups, but on their eastern front they were confronted by the Parthian empire, a state of equal sophistication and complexity.

2.a.5 In some places the boundary ran along rivers. Elsewhere it edged the desert and elsewhere again it ran through areas with no natural barriers. In each case, the Romans developed a local solution, making use of topographical features and political circumstances to provide a barrier that was an effective control of movement across the frontier as well as a strong military defence. The variety of physical remains have outstanding value in demonstrating the complexity and success of this society in using boundary works to define and protect itself in ways appropriate in each case to the local circumstances.

2.b Comparative Analysis

2.b.1 Protection of boundaries was a problem common to all pre-industrial empires. Only two (Rome and China) seem to have used the solution of a linear barrier. The only direct comparator to the frontiers of the Roman empire is therefore the Great Wall of China, inscribed as a World Heritage Site in 1987. The Great Wall is 6,000 km in length, thus forming the largest single military structure in the world.

2.b.2 The frontiers of the Roman empire, though shorter overall than the Great Wall of China, had to respond to more varied conditions, both political and physical. It therefore uses a wider variety of defensive systems, demonstrating the complexity and organisational ability of the Roman state to these varying conditions. It is possibly a more complex response than that developed by the Chinese.

2.c Authenticity and Integrity

It will be necessary for each individual nomination of a section of the *'Frontiers of the Roman Empire World Heritage Site'* to demonstrate the authenticity and integrity of that section.

2.d Criteria under which inscription is proposed

2.d.1 The *'Frontiers of the Roman Empire World Heritage Site'* meets three criteria for inscription as a cultural World Heritage Site. These are:

(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

2.d.2 Taken as a whole, the frontiers of the Roman empire show the development of Roman military architecture from temporary camps through winter quarters for whole armies to the establishment of permanent forts and fortresses. These show through time a development from simple defences to much more complex arrangements.

2.d.3 Linked to this is the development of the infrastructure of roads and waterways along with systems of linear barriers and watch-towers. The frontier also promoted the development of urbanisation particularly in central and western Europe from which it had previously been largely absent.

(iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared

2.d.4 The Roman frontier is the largest monument of the Roman empire, one of the greatest of the world's pre-industrial empires. The physical remains of the frontier line, of the forts and fortresses along it, as well as of the cities, towns and settlements associated with it, and dependent upon it, demonstrate the complexities of Roman culture and its spread across Europe and the Mediterranean world.

2.d.5 Unlike the great monuments from the urban centres around the Mediterranean already inscribed as World Heritage Sites, the frontiers show a more mundane aspect of Roman culture, both military and civilian. As such they are evidence of the spread of Roman culture and its adoption by the empire's subject peoples.

2.d.6 Inscriptions and other evidence demonstrate the extent to which the frontier led to an interchange of peoples across the empire. To a large extent, this was the result of the movement of military units (e.g. British units in Romania, or Iraqi boatmen in northern Britain) but there is also strong evidence of civilian movement (e.g. merchants from the Middle East who settled in Britain, Germany and Hungary). The frontiers also acted as the base for the movement of Roman goods (and presumably ideas) to pass well beyond the empire.

(iv) be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates a significant stage in human history

2.d.7 The physical remains of the frontiers of the Roman empire demonstrate the power and might and civilization of the Romans. As such they are evidence of the development of the Roman empire and its spread across much of Europe and parts of Asia and Africa. They therefore illustrate the spread of classical culture and of Romanisation which shaped much of the subsequent development of Europe.

3. Description

3.a Description of Property

3.a.1 The 'Frontiers of the Roman Empire World Heritage Site' will embrace the frontier in its entirety, acknowledging that sometimes it was just a linear barrier or even just a line on a map but elsewhere may extend to a broad military zone, which is a network both physical in form but also intangible in nature. This network encompasses a support structure both behind and in front of the barrier, and the effect of the Roman military presence on the people on, behind and in front of the frontier, extending far beyond the formal boundaries of the Roman empire. Thus, the frontier both divides and connects the ancient and modern peoples of Europe and the Mediterranean world.

3.a.2 A mere catalogue does not do justice to the wide range of military and associated civilian remains visible on the frontiers of the Roman empire. While there are certain generic types – legionary fortresses, forts, fortlets, towers – these are geographically distinct. A tower may be a tower, but it is not the same structure in Britain, Austria or Hungary. Forts follow basic plans, but retain distinctive qualities unique to that part of the empire in which they were constructed. The remains of the great cities which sprang up outside the fortresses of the middle Danube do not occur on the frontiers in Britain. The terrain of the frontier – river, marsh, mountain – as well as the climate also dictated the sort of military installations constructed.

3.a.3 In some places, the frontier followed river lines strengthened by fortresses and forts. Elsewhere in desert area, networks of roads and forts sufficed. In more settled areas without natural defences, permanent artificial barriers were needed. These could be timber or earth as in the Upper German *Limes* and, in Scotland, the Antonine Wall or more elaborate structures such as Hadrian's Wall.

3.a.4 Probably the frontier had different purposes in different parts of the empire. In some places, it was probably intended principally for simple policing of the border line. Elsewhere, it may have had a more robust military function.

3.a.5 Its role may have changed over time, too. Physical changes over time can also be noted: the great Constantinian and Valentinianic building programmes of the fourth century may be seen in the Rhineland

(Germany), Austria and Hungary, but rarely elsewhere. Even later modifications survive on the lower Danube, on the Eastern frontier and in North Africa. Time and space have combined to create a unique range of structures which together form a greater whole and an enormously complex corpus of material for preservation and study.

3.a.6 Remains of Roman frontier installations survive and can be seen in the United Kingdom, The Netherlands, Belgium, Germany, Switzerland, Austria, Slovakia, Hungary, Slovenia, Croatia, Serbia, Bulgaria and Romania within Europe. Along the Eastern frontier, there are remains in Turkey, Syria, Iraq, Jordan and Israel. In North Africa military works survive in Egypt, Libya, Algeria, Tunisia and Morocco. The state of preservation and knowledge varies greatly from country to country. Much has been destroyed or built over, and is now only accessible through excavation. Even sites that are ploughed flat and are only visible through the media of aerial photography or geophysical research form extremely significant reserve areas for archaeological research. Yet much stands proud, revealed by excavation or, remarkably, still in use, as the gates and towers of Austria illustrate. They all offer evocative reminders of the former power and greatness of this formidable empire.

3.a.7 Hadrian's Wall in the United Kingdom is the best preserved frontier. This is largely because it was built in stone. Visible on the ground, in addition to long stretches of the linear barrier itself, are forts such as Housesteads and Chesters, linked by a road, The Military Way, milecastles and turrets (about 6 and 12 visible respectively) and civil settlements, for example Vindolanda; uniquely on this frontier there is an extra earthwork, the Vallum running along the rear of the linear barrier. Beyond the eastern end of the Wall lay a supply base at South Shields, while to the west, on the Cumbrian Coast, is visible the fort at Maryport and an adjacent fortlet. The Antonine Wall in Scotland, UK, constructed of turf, survives remarkably well in many areas. The earthworks of the fort at Rough Castle and bath-houses at Bar Hill and Bearsden are visible, as are six 'expansions' which were probably beacon platforms. The type of fortlet/milecastle found on these two frontiers is unique to Britain.

3.a.8 In Germany several long stretches of the linear barrier are visible as bank and ditch or low rubble walls, and it is often very clear from the air. A very distinctive feature of this frontier is its mathematical straightness for long lengths, ignoring the topography of the land. Generally the forts and fortlets are rather larger than in Britain (e.g. Feldberg, Harlach) and even entrances through the frontier such as Dalkingen are visible. Many of the forts are visible including: The Saalburg, Osterburken, Mainhardt, Rainau-Buch, Welzheim, Aalen, Weissenburg, Eining and Passau. Towers in differing states of survival and/or restored at various times, occur (e.g. Bad Hoeningen, Zugmantel, Mahdholz).

3.a.9 Forts are also visible in other European countries along the frontier including: Zwammerdam in The Netherlands; Mautern, Traismauer, Tulln and Zeiselmauer in Austria; Tokod, Visegrád, Ulcisia Castra, Contra Aquincum and Intercisa in Hungary; Capidava, Dinogetia, Carsium and Porolissum in Romania. Towers are also visible in Austria (e.g. Bacharnsdorf) and Hungary (e.g. Leányfalú).

3.a.10 Some remains of the large legionary fortresses may be seen, e.g. Vindonissa in Switzerland, Regensburg in Germany, and Aquincum in Hungary while earthworks of others survive at, for example, Inchtuthil in Scotland and Lauriacum in Austria.

3.a.11 The remains include ancillary features such as bath-houses and amphitheatres built by the army. Civilian settlements also lay outside most forts, such as Vindolanda beside Hadrian's Wall; some grew to great cities such as Carnuntum in Austria and Aquincum in Hungary. Here may be seen houses, shops, markets and temples in once-thriving communities.

3.a.12 In the East and in North Africa, climate and different social traditions often produced forts of different types to those in Europe. On the eastern frontier, troops were frequently quartered in towns such as Dura Europos in Syria and Hatra in Iraq, but elsewhere occur 'normal' forts. Legionary fortresses are visible at Satala in Turkey, and El-Lejjun and Udruh in Jordan. Forts include Ain Sinu in Iraq, Sa'neh, Khan el-Hallabat and Deir-Semali in Syria, Qasr el-Azraq, Da'ajaniya and Qasr Bshir in Jordan and Upper Zohar in Israel. Towers often lay beside the roads along the frontier, the *Via Novae Traiana* and the *Strata Diocletiana*, which form an important element in the system and in the remains today.

3.a.13 In North Africa many forts lie in what is today desert. Some, such as Bu Njem and Gheriat el-Garbia (Libya), now lie deep into the Sahara. In Tunisia and Algeria many of the forts which protected the rich coastal cities are still visible, with notable remains at the legionary fortress at Lambaesis; its predecessor, Timgad, was transformed into a Roman colony which is remarkably well preserved. In Algeria and Morocco, too, large stretches survive of the *Fossatum Africae*, the barrier erected by the Romans to divide the sown from the nomad and control transhumance. The wall incorporated both gates and towers, still visible today. In Egypt forts such as Mons Claudianus were specially constructed to house the troops controlling quarrying.

3.a.14 It is important to note that much of the works of the Roman frontier are buried and invisible on the surface. Nonetheless, such archaeological deposits are an integral and significant part of the '*Frontiers of the Roman Empire World Heritage Site*'.

3.a.15 It must be emphasised that all these visible structural remains are complemented by museums in all countries. Many of these are of international reputation and display material of the highest quality. It is appreciated that museums are not eligible for World Heritage Site status.

3.b History and Development

3.b.1 Rome's frontiers are indeed a reflection of the empire's former might. But earlier Romans would not have seen it that way. The ethos of the Roman Republic and the reign of the first Emperor Augustus (27 BC–14 AD) were expansionist. The momentum of the long reign of Augustus ended in two great rebellions towards the close of his life and thereafter the frontiers of the empire gradually consolidated on the borders he established. Regiments stationed in groups with invasion in mind were gradually re-disposed along the frontier. Forts were supplemented by smaller installations such as fortlets and towers. Under Hadrian (117–138), physical barriers were erected in both Germany and Britain, while the *Fossatum Africae* in Algeria probably dates, at least in part, to the same reign.

3.b.2 The borders of the empire established by Augustus did not remain static. Britain was conquered by his nephew Claudius; Domitian made an advance into Germany; Trajan conquered Dacia in modern Romania and attempted to advance the eastern frontier to the Euphrates and Tigris. Later emperors made other changes. Two important frontiers date to the reign of the Emperor Antoninus Pius, the Antonine Wall in Scotland and parts of the *Limes* in Germany. In the late Roman period, frontier defences were updated and modernised. In some areas, inner lines were provided while from the third century coastal defences were developed against sea raiders.

3.b.3 As a result there are thousands of military installations spread along the frontiers of the empire. These include camps, frontiers, double and single legionary fortresses, supply bases, forts, fortlets and towers, built and occupied over a period of 400 years from the reign of Augustus to the final years of the fourth century (and, in the East, beyond). They were constructed in a variety of materials – timber, turf, stone, mudbrick – and survive differentially. Some sites are iconic monuments, such as Hadrian's Wall in Britain, The Saalburg and Eining in Germany, Porolissum in Romania, Qasr Bshir in Jordan and Lambaesis in Algeria. Sometimes the civil settlements associated with the military remains have acquired similar fame: Carnuntum in Austria and Aquincum in Hungary. These are but the tip of an iceberg which contains a vast number of visible military remains.

3.b.4 Since the end of the Roman occupation many great fortresses have become the bases of medieval and modern cities such as Strasbourg in France, Regensburg in Germany, Vienna in Austria, Budapest in Hungary and Belgrade in Serbia. Other parts of the frontier survive as ruins while much more remains as buried archaeology, visible not at all or only as earthworks.

3.c Form and date of most recent records of site

3.c.1 The modern era of excavation began in many countries in the 1890s and has produced a huge body of archaeological material. Many frontiers have been recorded in detail, in particular by the Römisch-Germanische Kommission in Germany and the Limeskommission in Austria, while the Eastern frontier was studied by Antoine Poidebard and the *Fossatum Africae* by Jean Baradez. Reconstructions of parts of the frontier similarly began early and the fort at the Saalburg, raised at the instigation of Kaiser Wilhelm II, is

now a period piece in its own right. Over the last 20 or 30 years, fort gates and towers have been favoured items for reconstruction.

4. Management

4.1 Responsibility for the management of individual parts of the World Heritage Site must rest with the individual States Parties and be carried out by each in accordance with their legislative and management systems. Equally, it is essential that individual parts of the World Heritage Site are managed within an overall framework of cooperation to achieve common standards of identification, recording, research, protection, conservation, management, presentation and understanding of the Roman frontier, above and below ground, in an inter-disciplinary manner and within a sustainable framework.

4.2 The World Heritage Centre has advised that any future nominations of further parts of the Site must be endorsed and approved by those States Parties who already manage parts of the Site. States Parties wishing to nominate parts of the *'Frontiers of the Roman Empire World Heritage Site'* must therefore undertake to work to develop this common framework with existing States Parties of the Site.

4.3 The United Kingdom government and the German authorities have undertaken to work with each other to develop this common framework based on the management principles set out below. As further States Parties propose parts of the frontier for inclusion in the World Heritage Site, the United Kingdom government and the German authorities will discuss with them possibilities of a more formal structure for international cooperation.

4.4 The United Kingdom government and the German authorities will be supported in the development of the *'Frontiers of the Roman Empire World Heritage Site'* by the *'Bratislava Group'*.

4.5 This international group was created in 2003. So-called after the city in which it first met, it is made up of experts of the history and archaeology of the Roman frontiers and of those involved in its management. It currently has members from the United Kingdom, Germany, Austria, Slovakia, Hungary and Croatia, but could be expanded to include experts from ICOMOS and the World Heritage Centre as well as from further countries which intend to nominate future sections of the World Heritage Site.

4.6 The "Bratislava Group" aims to share knowledge and experience of Roman frontiers and their identification, protection, conservation, management and presentation, leading to the distillation of a common viewpoint, and through technical and professional advice provide the scientific framework for the whole World Heritage Site. The "Bratislava Group" should form the core of an international scientific advisory group on the *'Frontiers of the Roman Empire World Heritage Site'*. Its role should be to support States Parties in the creation of the *'Frontiers of the Roman Empire World Heritage Site'* by:

- advising States Parties on the significance of the Roman frontiers and on the development of best-practice guides for its management and improving its understanding;
- developing support structures such as an overall research strategy, an international Roman frontiers database and websites.

4.7 Management Principles

The United Kingdom government and the German authorities propose the following management principles which they will apply to their parts of the *'Frontiers of the Roman Empire World Heritage Site'* and which should be applied to future parts of the Site also:

4.7.1 The aim of participating States Parties is, by stages through international co-operation, to create a World Heritage Site encompassing all the frontiers of the Roman Empire, based on its proper identification, recording, protection, conservation, management, presentation and understanding as evidence of the remains of one of the world's greatest civilisations and as a symbol of a common heritage.

4.7.2 This will be achieved through:

- the establishment of a common approach to the identification, recording, research, protection,

- conservation, management, presentation and understanding of the Roman frontier, above and below ground, in an inter-disciplinary manner and within a sustainable framework;
- the enhancement of respect for the surviving remains of the frontier and the transmission of these remains to future generations;
- acknowledgement of the Roman frontier and its associations as a common feature for bringing people together;
- improved public knowledge, utilising modern information systems.

4.7.3 States Parties will be supported in this by the work of the “Bratislava Group”, augmented as necessary, as an international scientific advisory group.

4.7.4 Any future nominations for extensions of the *‘Frontiers of the Roman Empire World Heritage Site’* must be endorsed by existing States Parties within the *‘Frontiers of the Roman Empire World Heritage Site’* who must confirm that they believe that the new nomination has outstanding universal value and that the management proposals for the proposed extension adhere to these management principles. Such nominations would need to demonstrate:

- outstanding universal value of the whole Site;
- the values of the part being nominated;
- authenticity;
- appropriate legal protection and management arrangements for the Site including a Management Plan or other appropriate management systems.

4.7.5 Internationally, goals over the next five years are:

- definition of areas of outstanding universal value which could be included in the WHS;
- agreement on an overall statement of outstanding universal value for the whole *‘Frontiers of the Roman Empire World Heritage Site’*;
- a common vision for the whole *‘Frontiers of the Roman Empire World Heritage Site’*;
- long term aims for the whole *‘Frontiers of the Roman Empire World Heritage Site’*;
- support and advice to those preparing nominations for additions to the WHS;
- the creation of a web portal;
- the linking of national data bases;
- the development of a trans-European exhibition to raise awareness;
- the development of common standards for identification, recording, conservation, management and display;
- the development of research frameworks for the WHS.

4.7.6 Nationally, the management systems for each part of the Site would need to address, within the overall framework set out above, identification and definition of the area’s significance, as well as its conservation, access to it, the interests and involvement of all appropriate organisations and communities from national to local level, and its sustainable economic use.

4.7.7 Within each State Party’s existing legislative and management systems there should be developed for the nominated extension an appropriate management system, normally expressed through a Management Plan for the identification, protection, conservation and sustainable use of the Site within the context of these management principles. Points (in addition to those outlined in 4.7.4 above) that would normally need to be covered within this include:

- commitment to involvement of local communities (cf *Operational Guidelines*)
- commitment to achieving appropriate balance between conservation, access, the interests of local communities and sustainable economic use of the Site;
- commitment to co-ordination of activities and participation in the co-ordination mechanism;
- an effective implementation and monitoring system for the Management Plan.



Fig 1 Reconstructed watch-tower near Utrecht (NL)



Fig 2 Roman soldiers parading in Woerden (NL)



Fig 3 Roman games at the watch-tower site close to Utrecht (NL)



Fig 4 Roman Museum Castellum in Alphen aan den Rijn (NL)

THE AUTHENTICITY DISCOURSE OF HERITAGE ¹

Jaap Lengkeek, Wageningen

Introduction: heritage tourism and tourism debates

Old stuff is hot. Archeological excavations, historical ruins, old battlefields, buildings from the past, landscapes and their narratives, areas with traditional folklore, they all have become favorite destinations for tourists (Fig. 1–4). This interest in the past had grown tremendously in the last decades. UNESCO has listed a vast number of sites as World Heritage, including not only cultural but also natural resources. They offer 'great' narratives to the tourists. Even at the smallest scale communities and social groups define their own historic highlights and offer them as 'small' narratives to a public of visitors.

The scientific debates on the phenomena of heritage tourism, aiming at understanding the attraction of old remnants only show a gradual increasing intensity, even though the interest of a wide audience in historic sites has become almost self-evident. Different themes emerge, such as the process of designation as heritage, conflicts between conservation and development, heritage management dilemmas and conceptual frameworks (Robinson et al. 2000).

Heritage tourism definitions show a variety of elements and approaches, starting either from the supply side or the demand side. The heritage sites must have characteristics of history and traditions, which motivate tourists to visit those places (see e.g. Garrod and Fyall 2001). A general definition, to take as a starting point for further scrutinizing the phenomenon of heritage tourism, is formulated by the US 'National Trust for Historic Preservation' as: *'traveling to experience the places, artifacts and activities that authentically represent the stories and people of the past and the present'* (Hargrove 2002). This definition places the concept of authenticity at the heart of this type of tourism, as authenticity links the genuine characteristics of a site to the longing of heritage tourists for the real past.

Authenticity plays a key-role in many discussions about the value and significance of tourism and tourist experiences. Attractions 'made' purposeful for tourists are considered not to be authentic, but staged, newly created, and not genuine (Waller and Lea 1998, 125). Only where the past can be presented 'as it was' the tourist is able to see something 'real'. This basically creates a tension between tourism production and heritage conservation and dilemmas how to deal with that. According to Halewood and Hannam (2001, 574) creators of heritage tourism are 'very much concerned with the degree of authenticity they are putting forward'.

The question 'what is authentic?' cannot be answered so easily. The debates about the ambiguities of the authenticity concept related to tourism are extensive and well documented (see e.g. Pearce and Moscardo 1986; Waller and Lea 1998; Waitt 2000). The concept has been used to suggest that members of the modern societies feel alienated and cut off from the genuine sources. Therefore, they search for authenticity outside their own social contexts. Authenticity has also been used to indicate the need for something 'real' and valuable within a predominantly vulgar tourist world. I will only briefly touch upon these debates, while looking at other contexts of authenticity debates and explore whether there are useful parallel discussions and suggestions from other fields of knowledge.

But, authenticity debates, how intellectually interesting they are, do not answer the question so easily: what to do with heritage as part of tourism products. In this article, I will suggest to dispose of the very concept of authenticity in relation to tourism as history itself, but focus on useful considerations which came up in discussing and contesting the authenticity concept. Some insights, which are 'behind' the concept of authenticity, provide useful considerations for conservation, restoration and development.

A contested concept

The discussions on authenticity started by Boorstin and later MacCannell in the sixties and seventies, accompanied the growing interest in heritage tourism. After almost 50 years authenticity still appears to

¹ The paper was first published in: Proceedings XVI World Congress of Sociology, Willetton, Australia, 23–29 July 2006. [Durban RSA 2006]. It is reprinted here to widen and challenge our views on the authenticity of (archaeological) heritage.

be a highly problematic concept. Ning Wang (1999) explained very well the varying interpretations of authenticity. He distinguished three approaches: *an objectivist*, a *constructivist* and an *existential* one.

Objectivist authenticity points at the definition of experts concerning objects or elements as authentic. Their originality as historic objects is scientifically tested. Heritage tourists then, are people who visit places and objects defined in this way as authentic. Although Wang does not consider constructivist authenticity a coherent doctrine, a basic assumption is that nothing in the external world can be known apart from mental activities and language. What is understood as 'real', or in this case 'authentic', is the result of 'interpretations or constructions'. This means that the authenticity of something is established within inter-subjective communication, negotiated and projected on the object. Tourists in search of authenticity at least have to buy the idea that the object is genuine and original.

The existential approach refers to the true Self. Tourism in search of authenticity comprises a variety of activities, which help to find the true Self of people involved. The toured object is nothing but a medium for discovering oneself or one's community instead of any authentic Other. In this sense the approach touches upon the philosophical debates on authenticity which centres around the authentic subject (Adorno 1973; Waller and Lea 1998, 111).

The objectivist and constructivist approaches both aim at understanding the object. The existential approach is basically different as not being related to the object, but to the subject. These fundamental differences in approach do not make it any easier to apply it to heritage tourism and heritage management. Aramberri (2001, 740) even shows the concept of authenticity the shortest way to the dustbin. People cannot agree on what is authentic and, as Aramberri puts it, *'most gatekeepers of authenticity are academics'. To him, this academic staging of authenticity is not convincing and in the end 'a cold trail'.*

But authenticity is not dead yet. Many scientists and policy makers still use the concept. It has also become part of the language of tourist advertising and part of the language of everyday life. It is not only about the word 'authenticity', it is also caught in the notion of something 'real' or 'genuine' which is important to people. Waller and Lea (1998), exploring conceptions of the 'real' Spain, equated the real and the authentic (as word being too difficult for interviewees) and found that there is a tendency to 'perceive authenticity, in the sense of discovering the "real Spain", in the same way' (id. 126). Clearly, there is a notion of something 'real'. They confirm an earlier statement of MacCannell that all tourists tend to demand authenticity, although some identifiable groups of tourists find the real more important than others. As Gordon Waitt (2000) puts it, tourists are not part of any post-structuralist or constructivist debates, but very well believe in true or false representations of the past (id. 846). Like Waller and Lea, he contends that *'authenticity can be defined in the tourist's own terms'* (id. 847). Chhabra and Healy (2003) also found an articulated perception of authenticity by tourists. An everyday language notion of authenticity can be brought about and a sense of the genuine can be negotiated (Waitts, op.cit. 848). This negotiation takes place in the context of the production of tourist attractions and advertisement. It is here where the inheritance elements, the representations and the perceptions converge.

In his article on the convergence process of the demand and the supply side in heritage tourism, Apostolakis (2003, 801) describes the role of authenticity in this process still as *'pivotal as it revolves around the idea that it offers a conceptual guide to solve several problems of dealing with 'inheritance'.* But it *'evolves from a static into a flow concept'* (idem). In this way, heritage tourism becomes more a process, a process of negotiation, than only a product.

These theoretical considerations do not solve the problem of how to conserve, restore, reconstruct or even develop inheritance. Negotiation processes must link up to substantial conditions and considerations of at least the following interests involved:

- the professional assessment of the significance and value of relics from the past;
- the diversified meanings of inheritance for different categories of tourists and locals;
- collective meanings of the inheritance looked after by governmental authorities;
- and market potentials of relics which provide means for maintaining and transforming them.

Garrod and Fyall (2000) argue that there is close connection between heritage tourism and sustainable tourism. In the case of authenticity it is all about 'value' that has to be taken to heart and fostered for the future. The use and misuse of the concept of sustainability illustrates that the concept as such is fuzzy (e.g. Mowforth and Munt 2003). Sustainability is a contested concept, but in its diverse elaboration and debates shows much use. These concepts are like doors. A door invites. People can recognize the door without exactly knowing where it leads to. One can point at the door suggesting a direction. In other words, a door is a promise. It is only when the door opens that it is the doorway where the light comes through. For our discussion this means moving beyond the concept of authenticity and stepping into what is beyond.

In the next paragraphs I will build upon Wang's three approaches, starting with two broad discourses on the object followed by a more phenomenological interpretation from the subject perspective.

What is 'objective' inheritance?

Ownerships of the genuine

As Aramberri (idem. 740) puts it: *'In the end, authentic is what academics and other social scientists define as such, and the question of why should an ecotour in the Amazon be a more genuine experience than a visit to Disneyworld begs a final answer: because some scholars say so'*. In many discussions on the authentic object the role of experts is paramount even when we look further than only the tourism realm. Academic experts are in search of at least relative truth, using verifiable methods and techniques to support their findings. Their academic status and their systematic approach provide them with authority on the object. And certainly, they have something to say.

It appears to be a variety of experts – biologists, art historians, landscape architects, anthropologists and so forth – who largely determine what can plausibly be considered materially real and original. They influence what happens in the respective domain. When a convincing notion of the original is established, this expresses itself in far-reaching implications for dealing with the object in question. One Dutch example is an old estate (Beeckestein), dating back from the seventeenth century, and located in a small coastal village not far from Amsterdam. The estate had fallen into dilapidation, but recently the house and gardens have been restored. The latter have been returned to their eighteenth century splendour and, following the original 1772 design, a romantic, English landscape garden is reconstructed with fan-like flower beds, a labyrinth and a historic fruit orchard. In order to achieve this radical restoration many of the trees on the estate, some of which have taken more than two hundred years to mature, have been felled. An old rhododendron hedge, an unwanted nineteenth century addition – an anachronism and not original – has been uprooted (De Raadt 1995). There have been many such cases in the Netherlands. During the restoration of King William III's palace 'Het Loo', for example, the neglected Romantic English landscape garden has been entirely removed and replaced by the original formal garden.

Similar happenings have taken place in the field of nature conservation and development in the Netherlands. First, left waste land was placed under protection a 'nature-monument'. Later on, nature organisations brought cultivated land back to a primeval state, imagined as being the case when mankind had no significant influence on nature. The objective was to return the environment to a more 'natural' and original state and to bring back species of animals and plants that have disappeared. Keeping man out! This concept developed into the notion of real nature as ruled by principles of self-regulation and ecosystems. Generally speaking, it is the biologists and other experts whose aspirations and images determine to a large extent the face of true nature (Windt 1995).

In the conservation of monuments, attitudes towards authentic conditions and restoration have changed with the ideas of architects and architectural historians. In earlier periods the objective was a radical recovery of the original condition. Today it is more usual to let a historic building show the changes it has undergone and parts altered or added over the years are left intact. The search for authenticity is not confined to the period in which the building was constructed but involves everything that happened to the building after that.

In music too, what is at stake is a credible approach to authentic practices of past centuries. Performances given on old instruments or faithful copies following the well-documented and original instructions left by

early composers have seen a tremendous development and have been greeted with much appreciation. As they indulge in vehement discussions about correct practices, the critical role played by experts becomes increasingly clear.

Not only objects and spaces, but also culture is associated with the question of authenticity. Tourists flock to remote areas in search of authentic cultures. A Dutch anthropologist chose the significant title '*Anthropologists are not tourists*' for a critical article (Abbink 1995). Abbink contended that tourists violate and spoil social relationships in other cultures. They buy their experience with money and in doing so introduce a system of exchange alien to the original social context. Such tirades against the disastrous impact of tourism on hitherto unspoiled environments are not unusual and we should notice the way the anthropologist, the expert in this case, appropriates to himself the role of the one with a 'better' and more appreciative attitude towards the original condition. The anthropological expert does not buy his experience of other cultures, he 'deserves it' because he is truly interested in and ready to communicate with the exotic other. In some respects, the anthropologist plays the same role as the biologist we encountered earlier: both define what is genuine.

In all these examples we observe a strong tendency towards conservation. The acceptance of decay, or at least change, whether in buildings, objects or natural and cultural patterns is no longer something self-evident. The desire to stop processes of change gives rise to three strategies: reconstruction (via simulacra), conservation, and restoration (Ex 1993). All three strategies imply active interference in the temporal, natural and social processes that normally destroy objects. We now postpone their loss, transforming them and protecting them from certain influences. Authenticity is then designated as '*material originality*'. But here we face a fundamental paradox. Time always brings to any object or a living culture change and decay. Reconstruction, conservation and restoration ignore the working of time and seem intrinsically inauthentic.

The partial solution to this paradox has been the before mentioned strategy to show not only original 'states', but changes over time as well. For example, the restoration of a 13th century church leaves 16th and 19th century annexes untouched. A distinction between *historical* and *a-historical* 'authenticity' can therefore be made. Within the field of art, both a historical and a-historical approach is relevant to the issue of whether an object should be restored to its old glory. Those who are sensitive to *historical* authenticity prefer to show that a painting has a history of change. The impact of age, life experience and change are left for all to be seen. Later painted fig leaves to cover genitals, bullet holes and early restorations remain undisturbed. The work of art is conserved in the condition in which it was found. Those who choose for *a-historical* authenticity, however, remove the visible traces of life history. The object has to be brought back to the state in which it began its life. The only complication that is often ignored is that most objects, natural species, landscapes and folkways have no clear starting point, being the original.

To leave out the authenticity concept clears the ground of the paradox. What remains is a simple dilemma: do we want to represent a particular 'state' or a 'process'? The answer to that lies not in a mythical authenticity requirement, but in the value the experts want to attribute. '*The more we conserve*', Lowenthal (1985, 410) observed, '*the more we become aware that we are constantly changing and reinterpreting remnants of the past*'. As a consequence, the experts are part of the social (re)construction of the past. They have to underpin their answer with scientific arguments. Often, they need power to enforce their conceptions within practices of conservation. Knowledge and power tends to lead to 'ownership'. As John Muir, one of the founding fathers of the American nature conservation movement put it: '*In order to preserve the purity of the wilderness, we must regrettably occupy her*' (Schama 1995, 9).

The expert definition of authenticity, originality or the genuine is never final nor objective. In this sense there is no opposition between objective and constructivist definitions. There are always complications beyond the historical material question. Lowenthal (1989) refers to more layers of originality in his article '*Art and Authenticity*'. If we wish to preserve something we can either remain faithful to the originated object, the original context or the original objective (or concept). Wetering (1987), in '*The Tower of Babel*', also referred to more forms of originality: the original material, the original function and the hypothesised original appearance. To bring these distinctions together, in addition to the material, there is a conceptual (what was it like), contextual (how is it related to the environment) and functional (what was it for) dimen-

sion of the inherited and how it can be represented (Ex and Lengkeek 1996). Cutting across these distinctions there is the above-mentioned issue of historical and a-historical genuineness.

	Material	Conceptual	Functional	Contextual
A-historic				
Historic				

Fig. 1 Different representational dimensions and historicity

The following examples from the world of art illustrate these dimensions.

Who is afraid of red, yellow and blue?

The controversy that surrounded the restoration of the painting *'Who is afraid of red yellow and blue'* by Barnett Newman and which hung in the Stedelijk Museum in Amsterdam provides some insight here. A disturbed visitor cut the red section of the painting to pieces with a Stanley knife in 1986. The American restoration expert Daniel Goldreyer claimed he had worked away the damage by retouching the canvas with two million little dots of paint. Nothing was farther from the truth. Goldreyer had taken a paint roller and, with synthetic paint, had re-painted the whole area red. This gave rise to considerable indignation. Painting over original material is still an ethical taboo in restoration work. Even so, Goldreyer was defended by the Director of the Stedelijk Museum. He argued that the importance of conceptual authenticity exceeded that of retaining material purity. Newman had intended to create an immaculate monochrome red surface, with two small strips of yellow and blue on either side. By repairing the damage and ensuring that it was invisible, Goldreyer had restored the unity of the red. Moreover the Director of the museum argued if Goldreyer had not painted over the canvas the damage would have always been visible. Thus, the hand of the master was dismissed as nothing more than a sentimental problem. In this example, conceptual authenticity corresponds to what we understand as a-historical authenticity: returning an object to its (one and only) original condition. However, this correspondence is not inevitable as is clear from the *'Zwerge'* (dwarfs), sculpted in chocolate by Dieter Roth. Dwarfs had been built into a chocolate tower and only their red pointed caps stuck out. The sculpture was intended for where dwarfs belong: outside in the open air such that the work would be slowly broken down and destroyed by rain and wind and worms and slugs. At least that was the sculptor's idea. The Staatliche Museum in Kassel saw it differently. In order to preserve the sculpture for as long as possible it decided to erect it inside the museum and took the added precaution of putting it in a glass case. In order to guard material authenticity, the idea of the creator (conceptual authenticity) was disregarded and the *Zwerge* was removed from its own environment (contextual authenticity).

Whenever works of art are exhibited in a museum, they are torn out of their original context. In the first place, almost all works of art were not made for museums. Religious art belongs in temples or churches and the more worldly forms of art were probably intended for private retreats. Secondly, in a museum they are hung against a background that allows them to be shown to what in contemporary opinion is considered to be the best advantage. In the past, for example, such a work would probably have found itself in quite a different context, hung against leather wall coverings with little light or in the dimness of a church. An attempt can be made to recreate the original context within the limitations of a museum, but the fact remains that the museum setting impinges on contextual authenticity. In a museum the object acquires another significance, perhaps quite different from the original one. Sometimes only the context remains of the past, as is the case with most historical battlefields.

Even when an object remains in its original context, it may no longer have the same function as it did in the past. A good example of an attempt to retain contextual and functional authenticity can be found in a number of Canadian anthropological museums where ritual American Indian objects are exhibited. These objects are regularly returned to the Indian tribes so that they can be used for their original ritual function. With an eye to possible future restoration work some restorers from the Museum of Alberta have been introduced into the secrets of Indian culture.

There are many issues at stake as far as functional purity is concerned. Keeping windmills, unique barrel organs and antique clocks in use means wear and tear and the gradual wearing down of the original material. The collector who wants to preserve a vintage car cannot justify parking this treasure on a street where it may become prey to vandals. The conservation of motor and bodywork are diametrically opposed to the

car's functional authenticity as a motor vehicle. Ultimately, the car may be removed from its own context and end up gleaming and well preserved in the motor museum.

Genuineness in all its facets can never be attained. A choice is made for one form or another and perhaps, if the situation is favourable, for a few additional ones. The form chosen depends on the more or less conscious view of how important the work of art is and the significance attached to it. Again, overall authenticity as a concept blurs the view on the complexity of the inheritance as it is handed down to us.

On social constructions

The 'biography of the landscape' fallacy

The historical approach instead of the a-historical offers a rich significance of objects and situations. But the historical approach also is highly problematic. Time deposits layers upon layers. Heinrich Schliemann found not one Troy, but many Troys (if it was Troy) built upon each other. Particularly the landscape is composed of layers and traces of earlier use, in different forms and of different times. Landscape is full of memory, either by deposited material remainders and structures, or by stories linked to place and former times (Schama, 19). It is tempting to look at the landscape as a book. One can read a book, starting from the beginning to the happy end. One has to read the landscape in reverse, scratching away the later pages, which take away the sight of the beginning. In the Netherlands a program for scientific research on conservation and development of archaeological heritage placed this idea in the vanguard of its ambitions, specifying the idea into a specific type of book: the biography (Hidding et al. 2001).

An interesting consequence of the biography concept is that it has been presented as a starting point for landscape design based on respect for the past, conservation and reconstruction. The landscape surface functions as the cover of the book and also the index of what to find where. A consistent story of the biography provides and legitimizes the value of the landscape. In this respect it resembles ecology, which in turn a good story about the value of the physical environment. The challenge for landscape design is to safeguard the historical values and to articulate the memorial qualities. Spatial planning helps to optimize the designed landscape perspectives and policy can bring them to reality.

The biography concept, nevertheless, has serious limitations. If we embrace the metaphor of the biography, we can assume that no biography is final. Bookshelves are filled with biographies highlighting different angles of the same person, about historical key persons whether it concerns Napoleon, Hitler, Mao or Churchill. No scientific determination of the nature of certain layers of the landscape is final nor undisputable objective. Scientific insights and interpretations differ and shift over time. Often insights are opposing. In other words the biography of the landscape cannot offer a single story. The stories of the past are no direct reflections of the past, but scientific constructions depending on the methodology chosen, the sources, perspectives and concepts used (Lorenz 1998). Some perspectives are factual, others are narrative.

The perspectives on the landscape biography from separate disciplines may differ significantly. The integration of mono-, multi- or interdisciplinary conceived biographies into a 'great narrative' never succeeds, because knowledge is in itself constructed and does not enable simple adding up (Assche 2004). As Foucault (1988) contended, a discipline is also a 'discourse' with a multitude of interests organized around a way (and language) of dealing with reality (see also Bourdieu 1981a; Bourdieu 1981b; Kuhn 1970). The construction of knowledge takes place inside an 'institutionalized' context which creates its own requirements to what types of knowledge and the ways of acquiring knowledge (see Zijderveld 2000). The patterns of the institution regulate to a certain extent the internal world of persons, scientists in this case.

Amateur history

History is not a realm only for scientific explorations. The changes in landscapes over time offer as much a context of reference for non-scientists, lays, inhabitants, amateurs and so on (Jones 1995). In villages and towns historic or archaeological societies of amateurs flourish. Amateurs often are just what the word means: lovers whose love is over-nice in the choice of the beloved. Their fascination points at certain types of archaeological objects, periods, historical patterns etc. Some amateurs produce with monkish dedication the origins of street names, the history of local trades and so on and so forth.

Villagers share their common past in collections of old postcards or old furniture, costumes and tools. The surroundings are loaded with stories of the past, sometimes affirmed by official names of terrains. The past in this local perspective seems to go back as far as stories can be handed over from one generation to the other. Recent research underpins the idea that local and regional past is stereotyped and symbolized by characterizing buildings and particular stories. This local biographical approach comprises not the full past, but mainly a recent and selective part of it (Koedoot 2004). The collective past is complemented by personal memories and biographies, linking individuals and their direct relatives to the local history.

The fallacy of an unambiguous spatial biography concept illustrates that the meaning of the past results from many resources, which can be complementary or contradictory. There are many storylines at the same time. Another and practical problem of the biography metaphor is the very fact that the chronology is not neatly stored in layers. Diachronic processes have partly left their traces. Elements have disappeared. Other elements from a certain period of time are juxtaposed to elements of other phases. People have intervened in the past and transformed what has been left. In other words, the present state of history can be a mess.

How the past (re-)appears depends on a re-ordering of the elements left according to scientific knowledge and the everyday imagination of people who are in some way connected to the past. Scientific debates on historic periods and occupational patterns are well documented in scientific studies. But how are people who are non-archaeologists or non-historians connecting to this disorderly past?

Distances: own or foreign country

Clearly there is the issue of distance in time and space. People can be spatially distanced or close to elements of the past. With regard to distance, not only tourists have interest in heritage, also people living next to or on top of relics have a notion of inheritance. The elements can be more or less old, closer or further away in time. We can present this issue of distance in the following schematic way.

Distance in space	in time	Recent	Long ago
Living near (locals)			
Far from (visitors; tourists)			

Fig. 2 Distance from inheritance in time and space

Of course, this presentation of oppositions (recent – long ago; far – near) has to be understood in terms of all the shades between the opposites. Most places have histories that leave traces of recent and older pasts. Visitors can come from all over the world being attracted by particular archaeological or historical elements. When we leave out the experts for a moment and for the sake of the argument, one can easily understand that people living on or near historical remnants understand their past in a way different from visitors coming from elsewhere.

Lowenthal (1985) in his book *'The Past is a Foreign Country'* tries to grasp the fascination of people, who want to overstep the line between the present and the past. On the borders of time people find coins, ruins, buildings, landscapes, structures and stories to trigger the fantasy about what lies at the other side of time. The metaphor of 'a foreign country' points at the fact that we can cross borders of other nations and cultures, but we cannot, just like that, be a real part of it. The only way to understand the foreign country is to re-structure it and in a sense re-invent it according to our own mental and cultural framework. Lowenthal (op.cit.) gives different motivational aspects of the historical interest. A first category of aspects has to do with own-ness: the need to feel continuity, familiarity, reaffirmation, guidance and identity. A second set of aspects is linked to other-ness: escape, enrichment, sequence and termination (op.cit. 36–63). Own-ness and other-ness are no descriptive concepts of Lowenthal himself, but in my opinion they are crucial distinctions. Urry (1990, 112) asserts that history – in the case of history of the coalmines in Wales – becomes part of the present and appropriated by groups as 'own history' (see also the debate mentioned in Selwyn 1996, 8). This cannot be said of tourists from Scandinavia visiting the pyramids of Egypt. There other-ness plays a role.

When we start with two examples of the past, drawn from research in The Netherlands, nearby in place, but varied in time, I can illustrate that own-ness and other-ness play a significant role and that the meanings of the past differ significantly from the interpretations by the experts. The first example concerns an agricultural landscape. This area called De Gouw and Groetpolder, lies in the north of the Dutch province of Noordholland (Koedoot 2004). The area has been chosen for the provisional World Heritage list of the UNESCO, containing a vast Neolithic site. In the area small towns, villages and dispersed farmhouses show strong stylistic features of the West-Frisian culture. The archaeological remnants lie close to the surface and are easily damaged by ploughing and other agricultural use. In order to protect the heritage site the authorities appealed to the local population and the farmers in particular to be careful. A central argument used in this appeal was that the heritage had to be seen as part of the past of the local population and contributes to local identity. This argument did not work at all. The local population identified with a much more recent past. Since 1500 this area showed rapid changes when dikes were constructed, land and marshland was reclaimed and new agricultural practices related to water management were introduced. Since then, the West-Frisian culture began to flourish. The West-Frisians showed a strong tendency towards autonomy since the later Middle Ages, culminating in the murder of one Count of Holland who tried to pacify them. This historical feat of arms, the flourishing of West-Frisian culture, still manifests in buildings, dialect and local stories and the local histories of the last one and half century are paramount in the historical identity of the people in the area. Neolithic past is too far for locals.

Local fascinations and initiatives

Another example is about the defensive works in an Eastern part of the Netherlands, called IJssel Line, created in 1953 at the height of the Cold War and meant to inundate a large area to keep out the Russians (Koedoot and Duineveld 2004). The works comprised floating flood control dams and many military pillboxes made of solid concrete. The Line became obsolete soon after its creation and disappeared visually more or less from the landscape. Pillboxes became overgrown. Some concrete structures were demolished. Floating parts were sunk into the river. After that, practically nobody understood and therefore saw what remained.

Two publications about the Line, one from a war-heritage society and one from a private amateur, revived the interest in this recent history. The Line covered almost 100 kilometres, including one of the bigger cities in the Netherlands, Arnhem. Only in a small town, called Olst, did they take up interest in this special history. The remnants are well visible. The two publications triggered the attention of a representative of a small foundation for 'functional pillbox management' and in turn he mobilized the landowner, a regional Landscape Foundation, on whose land were many remainders. They organized a public meeting together with the Olst History Society and some 800 local people turned up. The results of all this is manifold: a museum, restored pillboxes, commando-post, medical-post, and many volunteers to assist with the public exposure.

Two things were striking. In contrast with Olst, in Arnhem where many traces of the Line were also present and visible, no interest was mobilized at all. Local landowners, among which a Company for Inspection on Electricity and Safety, considered the Line as insignificant. No private initiatives. No local awareness arose. It could be hypothesized that an urban context lends itself less easy for mobilizing collective historic awareness than rural settings.

The other issue is that the interest in local (recent) history in no way matched the official criteria of heritage policy, public terrain management and the so-called Archaeological Values Map. A consequence of this is that local initiatives for heritage management sometimes do not easily find official support or even are discouraged. Selwyn (1996) distinguishes between *cool* authenticity, referring to the scientific knowledge of experts, and *hot* authenticity, the emotional connection with the original developed by just 'ordinary' people. McIntosh and Prentice (1999) assert that the personal relation to heritage attractions is not only cognitive, but also affective and associative. In Olst an emotional relationship with recent inheritance developed, at least for a considerable group of locals.

The reconstruction of the Defensive Line in Olst became an item for tourists. First, information became available in tourist brochures. Then, on Internet the site for the Line became a place for comments from visitors, such as a hikers society and individual visitors. The definition of the past is strongly formulated in

these kinds of exchanges within 'cultural communities' of like-minded people. There exists, for example, a considerable community of war tourists (Lloyd 1998; Seaton 1999; Smart 1999) or even 'thanatourists' (Seaton 1996; Lennon and Foley 2000; Slade 2003). Places with local history which do not attract a general public of tourists, because the inheritance is too specific, may very well attract specialized tourists in their quest for discovery of the specific. Tourism is full of special interests and emotions, not taking for granted what experts proclaim as true stories (Chronis 2005, 392).

For tourists in general the hot spots for heritage tourism are embedded in different narratives and significance. Here the impact of expert knowledge is important. Official history, large scale exposure by mass media and books, all contribute to a more or less formal 'canon' of 'must sees' which is supported and enlarged by the tourism industry.

Seeing the great sites and hearing the great narratives can meet emotions or evoke them. This type of hot authenticity (if we re-use the word authenticity for the time being) varies much in temperature, as I will contend later on. Tourists come from far and take considerable notice from the past from long ago. But there, the past is a double foreign country, far off, difficult to fathom and on other peoples territories.

Distanced

The managers of the great sites attribute on the average a modest or marginal role to the locals. In his book *Tales of the Alhambra*, the 19th century American writer Washington Irving (1978 orig. 1838) described how gypsies and locals inhabited the ruins of the palaces. Today the area is cleaned up of any traces of 19th century inhabitants. Only the book that is sold on the site tells the story.

Other heritage attractions of great status marginalize locals often in the roles of guides, donkey drivers and sellers of suspect souvenirs. There is a vast industrial network for forging archaeological objects. Smart souvenir sellers keep them back behind the apparently new souvenirs, only offering them if the tourist shows greater interest and selling them as found or stolen genuine objects.

Two effects can easily occur, as is the case with for example Petra in Jordan: First, the history of the local is entirely ignored, even so if they have lived at the site for more than many centuries. Nearby in space and far off in time do not match very well. Second and consequently, the a-historical approach of the past dominates. The long ago rules over the recent past.

As is the case with the great nature parks, there is an overall tendency with attractions of great importance to expel locals from the site who live in the remnants or occupy the same area as their habitat. Krüger Park recently faced claims from dislodged African tribes trying to regain their original grounds (see Mowforth and Muntz, op.cit. 237). Masaai can make use of the Kenyan and Tanzanian savannahs only under strict conditions forbidding many elements of their traditional ways of life and culture. No more killing of lions as initiation ritual. Traditional hunting became poaching. Conservation eradicates at least some contexts and functions of tradition.

The position of heritage as linked to the collective memory of residents differs significantly from the meaning of heritage as a more or less remote 'foreign country'. Not only does the proximity of residents to the relics of their past influence their attitudes to the past, but, as Uriely et al (2001) showed, it also influences their attitudes toward visitors or tourists. If a sense of the real or authentic has to be negotiated it depends strongly on the distance from the past in time and space of the people involved. But there is more than only distance or proximity in time and space.

Collective memory as well as the particular historic narratives and representations not only arise from 'just' interaction and communication. Narratives and representation can be seen as the production of meaning through language (Hall 1997). But language is purposeful. Often representations of the past reflect power relations. Some representations better fit the interests of certain groups. Interests are not only linked to experts, but imply even plain political objectives. Centralist regimes bring particular representations of history to the fore in order to symbolize and enhance national identity. Where power is at work, the social constructions of the past may clash.

From the subject side: contested as well

Distance may appear in another look. People 'feel' connected to the past in various degrees. Where authenticity or the 'real' plays a role in everyday language and notions, some people have a stronger demand for it than others (Waller and Lea, op.cit. 126–127; Waitt, op.cit. 857; Cheung 1999). As McIntosh and Prentice (op.cit., 607) show, people differ in their 'mindful' (i.e. cognitive) and emotional approaches to heritage. In this sense people are more or less 'connected'.

Following Cohen's five modes of experience (Cohen 1979), I have been working on for over ten years, after modifying them according to different insights, to empirically test fundamental differences in tourists' experiences (Keken et al. 1995; Elands and Lengkeek 2000; Cottrell, Lengkeek and Marwijk 2005). The explanations of the different (modified) modes are based on a growing cognitive and affective concern of the tourist for the object, based on distancing from everyday life and everyday reality (Lengkeek 2001, 15–16; Lengkeek 2002).

Mode of amusement – the stories and metaphors that suspend reality are so well known and trusted that they do not create any tension with everyday reality. In order to avoid confusion with outdoor recreation it is better to use the term amusement to refer to that which Cohen called the 'recreational'. The carefree separation from the ordinary can have an effect on many different types of reality parameters. The traditional fair offers the most innocent 'array' of possibilities: fearful creatures in the haunted house, being spun around on the merry-go-round, having a look at the freaks, having your fortune told and rising high above the earth on the Big Wheel.

Mode of change – the difference with normal, everyday life is more strongly felt. Cohen couples his diversionary mode to a need to break out for a time. This mode refers to a more structural tendency amongst people to experience their identity by sometimes breaking loose (dissociation) from paramount reality. The metaphor that dominates here is that of recharging energy. The suspension of reality may no longer be embedded in the self-evident but the out-there-ness has, as yet, little form.

Mode of interest – the implications in the stories and metaphors are much stronger here than what has been made explicit above. Out-there-ness is created in the sense of attractions, as sketched by MacCannell and repeated by Cohen. Signs, clichés and travel guides bring fantasy into being. On the one hand they have considerable power of attraction; on the other, they contain the quality of the mystical and of something that cannot be fully understood. Fear and respect begin to play a role: a view of an immense depth, stories of human sacrifices made by the Incas, the untamable nature of the primitive Other, the feeling that there is more between heaven and earth than we can understand – all are found here.

Mode of rapture – here the tension between the suspension of the ordinary and the inaccessibility of the 'Other' reaches its climax. Amazement and rapture flow from this confrontation. It is not for nothing that Cohen placed the emphasis here on the experience of 'Self' (see also Wang 2000). The confrontation once again makes the individual aware of his limitations and creates a determination to begin anew and to advance further. Nevertheless, rapture may also be directly linked to space (immensity), time (eternity), sociality (paradise lost) and tension of consciousness (contemplative amazement).

Mode of dedication – the unknown and the inaccessible are opened up, thanks to a new masking of doubt. A new belief comes into being that incorporates the earlier, unreachable out-there-ness. New ideas arise about what 'nature' really is. A hobby becomes fulfillment in life. Migration takes the individual to the Promised Land. The extraordinary becomes ordinary or is mastered within a niche in everyday life, which has been created for it.

These modes have been theoretically designed for any leisure activity. The modes have been the starting point for a qualitative research among walkers, hikers and long distance runners (Koert 1997) and for nature campers (Kooi and Lengkeek 1998). They also have been translated into survey items and subject to quantitative research in contexts of leisure, recreation and tourism (Elands and Lengkeek 2000).

The modes can very well apply to the experience of cultural inheritance within tourist attractions. In figure 3, I bring the dimensions of experience and presentation of the inheritance together.

	Material Object	Concept	Function	Context	Historical	A-historical
Amusement						
Change						
Interest						
Rapture						
Dedication						

Fig. 3 Tourists concern with inheritance representations

Although it is not easy (and not yet empirically tested) to link certain modes to preferred representations of inheritance, some assumptions force themselves on the researcher:

- people in the amusement or change mode are not much concerned with the material object, but more with the concept. A nice replica will do;
- for the mode of interest the concept, function and context can be staged in an educating setting; the real material is still less important and the a-historical approach will be the most appealing. This offers a clear and unambiguous image;
- rapture presupposes a confrontation with original material and possibly the context. The landscape can dramatically underpin the situation of original material. Any educational addition will spoil the encounter with the past. Where Wang (op.cit) talks about the experience of the authentic Self, he probably touches the mode of rapture. The state of shock will probably not differentiate between a historic or a-historic representation. Rapture seems a once-only experience. People either turn back to interest or move on to the following experiential mode;
- dedication is a strong concern. For amateurs it mainly implies an eclectic fascination for either a historical period, or only material or a context (sense of place) and so on. Dedicated amateurs can grow into fully experienced historians or archeologists. But often the fascination is very focused as is the case with the majority of amateur archeologists who crave for material remainders of the past (Duineveld 2004). They collect potsherds, coins, flint utensils, glass, copper objects and so on and so forth. Dedication also implies repeated visits and a sense of appropriation of the object(s).

Cohen connected the concept of authenticity only to his experiential mode, which here most resembles the mode of interest. In the above-presented model a certain feeling for the past and connection to the object increases with every mode, culminating in the mode of dedication.

The modes do not differentiate among tourists per se. They differentiate among experiences. The same tourist can move from one kind of experience to the other and back. Nevertheless, tourists can be understood and differentiated as mainly concerned with a particular mode or combination of modes (Elands and Lengkeek 2000), when we embrace a constructivist approach. Experience is awareness based on sensory confrontations and memory (Jacobs 2005). People build up their frame of reference and preference based on earlier experiences. This at least influences their potential interest or lack of interest and is required for any state of shock or dedication. Historical frames of reference are embedded in culture and vary with the 'cultural capital' of more or less educated social layers. There is probably a great difference in cultural background, frame of reference and degrees of concern among tourists coming from Western and non-western countries.

As the social constructions of the past are contested and battle fields of 'truth', so are the modes of experiences possible reasons for conflicts. The dedicated tourist can be annoyed, to say the least, by behaviour of tourists in a mode of amusement or change. Even the presence of amusement seekers may destroy the exquisite sensation of tourists in a state of rapture or solemn dedication.

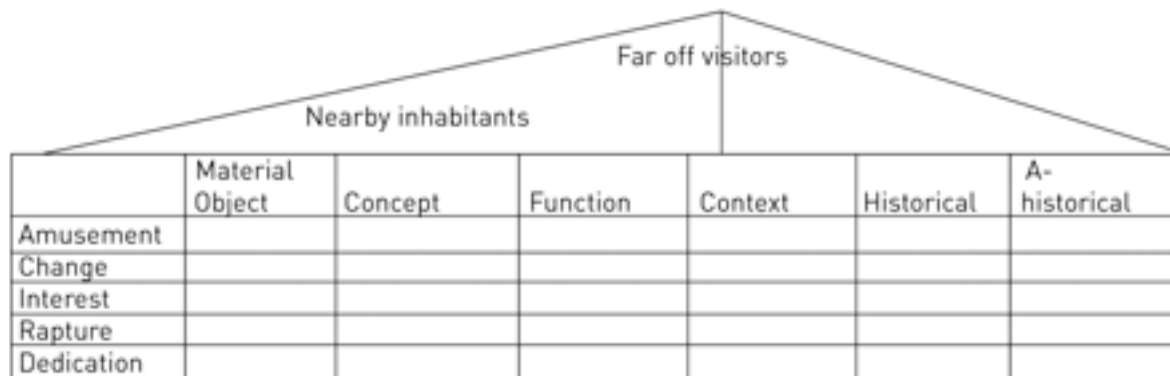
Heritage management and design beyond authenticity

In the foregoing paragraphs at least three main dimensions of heritage tourism came within view:

- The representation of inheritance in relation to conservation, reconstruction and restoration, taking into account the material remainders, the concept of the historic object, the function(s), the context, as well as the historical or a-historical approach.

- The significance of the inheritance: for local people, for regional or national entities and for visitors from elsewhere, related to distance from the inheritance in time and space.
- The degree of connection of visitors to the object expressed in modes of experience.

All three dimensions may imply struggle between interests, conceptions, convictions, preferences and direct experiences. Basic principles for conservation, restoration or development of inheritance, therefore, are difficult to find and seldom unequivocal. Managers have a model at hand for better-deliberated and conditional policy decisions by bringing these dimensions and considerations together. The following figure is meant to visualize the three-dimensionality of considerations.



On the one hand, these dimensions provide for a possible empirical assessment of significances of the past. One can find out what aspects matter, under which conditions (uniqueness, interest) and how they are interrelated. For example, how is an a-historical approach to a unique archeological site matching the (mode of) interest of visitors from far away? To what extent serves a reconstructed context the mode of rapture experiences of visitors from far away. Or, how is the original material of a historic place conserved and meeting the dedicated inhabitant, safe from noisy fun-seeking day-trippers.

On the other hand, linked to insights from empirical research, the three dimensional framework may provide direct concepts for management and design: what would the management like to offer and related to what considerations. An example will help to clarify this statement.

Hunebedden

The example is derived from the work of a Dutch team consisting of an archeologist, a landscape architect, a theater producer, a sociologist, a forester and a planner (Brinkhuijsen et al. 2005). The project was an attempt to include 'experience' explicitly in spatial design, in this case the experience of inheritance. The inheritance concerned 17 megalithic tomb chambers (Hunebedden) in the province of Drenthe in the Netherlands. The task in this project was to link the megaliths together by spatial design in a way appealing to the experience of the visitors. The group of megaliths consists of some well preserved, some in bad condition, partly disappeared, some in total seclusion somewhere in the forest or in agricultural land, some in the middle of a housing area. The resulting design gave a beautiful approach to differentiation within the heritage attraction. Starting point for the network of megaliths was a small 'Hunebedden' museum. A big megalithic chamber finds itself close to the museum. The designers planned a new museum-like context for the tomb chamber and placed it on a concrete 'plate' as if serving it to the public. A terrace, where people can have a drink and a snack, views over the tomb. Kids are allowed to climb the heap of megalithic stones, run around it and play in it. Here a combination of interest (museum, education) and amusement offers the visitors from elsewhere an orientation on the inheritance. Roads and paths link the other megaliths from here. On a closer range you can visit more objects, less ostentatious presented, in order to satisfy a general interest. The track along the megaliths perfectly serves the visitor only looking for change. The disappeared or bad state megaliths are mostly restructured as hillocks with vegetation marking them

off in the environment. Some far away megaliths, which still have an impressive appearance, are not or hardly indicated, but can be discovered by really fascinated people. The direct environment context received much attention in the design: an open space around the object but hidden from the eye by surrounding higher vegetation. The context of mystery is not 'authentic' or original, but contributes perfectly to a moment of rapture for the people who take the trouble to get there and who suddenly encounter the object. The context underpins the experiential significance of the object. The dedicated megalith 'knight' can use the whole infrastructural network and the lot of megaliths to find the Holy Grail of the Past, come back when the mainstream of visitors has gone, or go regularly to places where most visitors never come. The megaliths do not present themselves only to visitors from elsewhere; one tomb chamber is situated in the middle of a village opposite a bus stop. Here the past is fully incorporated in the present. Bicycles are regularly parked against it and village youth may gather now and then at the spot, hanging around. The tomb is their property.

Conclusions

There are many ways of using the conceptual model offered above. The megaliths project used a combination of marking (including education), zoning and landscaping. Of course, there is a multitude of conditions defining the optimal connections between object characteristics, histories, distances to the past and experiences. This article does not deal with the logics of management organization, tourist product and market development, nor with the logics of excavation and conservation, or the logic of a political context which takes interest in the representations of the past. These logics exist and play decisive roles in the way inheritance is transformed into tourist attractions.

The concept of authenticity suggests that the representation of the past has to be done in a certain way, doing justice to the original or 'real'. This is the very essence of the problematic side of the concept: its consequences. Because authenticity is a vague and contradictory concept, it is often misused by people in order to legitimize their own opinion and objectives. In this way they manage to present their solutions as a logic consequence of one kind of authenticity (Duineveld forthcoming).

Hopefully, my analysis shows that the critical debates on the concept indeed make sense and that even after disposing of the concept there are many more, and more useful concepts to approach the problem related to conservation, reconstruction or restoration. Behind the door of authenticity a lot of tangible issues pop up. Akin to sustainability the concept served a purpose for some time to start up debates on understanding and policy making. Moving beyond this we can leave authenticity as a concept *as being history* and concentrate on more articulated issues. We can dissect the scientific interpretations of the past from the social meanings and subjective meanings of inheritance. We can investigate how different meanings and interests confront each other in heritage sites, without mistaking one interest for the other. Here, we can create more transparency of the problem.

Authenticity *is history*. History is the realm of making sense, gradually bringing pieces of evidence together, exploring and discourse. In that realm there is plurality and ambiguity, by definition. Of course, authenticity will keep playing a role as it has found its place in everyday language. There it simplifies complexity. A scientific concept of authenticity does not solve complexity, only hides it. So let's dispose of it.

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Fig 1 Participants of the national workshop on the Antonine Wall in 2004 including representatives of the Austrian Government Institutions (Photo: Historic Scotland)



Fig 2 Antonine Wall workshop 2004. Meeting Frank McAveety (MTCS), Sonja Jilek, Christa Farka, Franz Neuwirth, David Breeze (Photo: Historic Scotland)



Fig 3 Antonine Primary School Bonnybridge in 2005, experiences the Romans (Photo: Historic Scotland)

THE FRONTIERS OF THE ROMAN EMPIRE A CHANCE FOR INTERDISCIPLINARY AND INTERNATIONAL CO-OPERATION

Sonja Jilek, Vienna

Within the framework of efforts to preserve the archaeological elements of the Roman heritage in Europe, the frontiers of the Roman empire, which form the single largest monument to this civilisation, have a very special role, especially within the context of the newly created trans-national '*Frontiers of the Roman Empire World Heritage Site*' (FRE WHS). This WHS forms a unique multi-national Site created and accepted by the UNESCO Commission and all involved parties in 2005. It was set up as a serial phased WHS, which implies that individual countries sharing a section of the Roman *Limes*, can join. Beside the UK and Germany already 4 more countries (Austria, Slovakia, Hungary and Croatia) have indicated the intention to nominate their sections by putting them on the national Tentative Lists for the UNESCO inscription (see Breeze and Jilek in this vol. 24–8).

The only direct comparator to the frontiers of the Roman empire on the WHS list is the Great Wall of China. The frontiers of the Roman empire, though overall shorter than the Great Wall of China, had to respond to more varied conditions, both political and physical (see Breeze and Young in this vol. 29–35). The monument encompasses both visible and buried archaeology and the archaeological deposits often invisible on the surface are an integral and significant part of the FRE WHS. Together they form an extensive historic landscape (see Breeze and Young in this vol. 29–35 and Jeschke 186–195).

The wider implications

For more than 200 years now recording and displaying Roman sites and finds was mostly part of the tasks of the national, regional and local archaeological and cultural heritage institutions in the individual European countries. As time goes by, we are faced with a more globalised world and the emphasis shifts to more cooperation between countries as well as national and regional policy makers.

In a globalised world continents compete with each other in various fields, such as economical developments, industrialization and research. Cultural competence is no exception to this development. Compared to other continents Europe has a wide variety of cultural monuments concentrated within a small area, many of them already inscribed as WHSs. They are spread over numerous countries, which cultivate their very own culture and traditions. Many of them have a unique character, which attracts millions of visitors year by year. Herein lies a great potential for the wider future of the continent. Cultural tourism is already a major element of the individual states income. This leads us to the very need to develop new strategies to preserve the past in the interest of a prosperous future.

All countries around the Mediterranean Sea share sections of the new FRE WHS. The *Limes* as monument of trans-European dimension ideally links up specific tasks and interests of a variety of regions in 12 countries in Europe. Such a project necessarily needs a cross sectoral approach: in order to develop comprehensive solutions for the historical landscapes across Europe, it is necessary to analyse and document the implications with other fields like agriculture, forestry, tourism and leisure management. The constructive co-operation between different countries, institutions and disciplines sets up the base for realistic and applicable common action- and management plans, which will lead to more impulses for a common Europe. Vertical links between stakeholders and specific target groups can be established by integrating actors from different administration levels as well as thematic fields and land owners. All those activities can create a firm base for a common, co-ordinated acceptance of measures, which contribute to the sustainability of our shared cultural heritage and the transmission of these remains to future generations.

National aspirations and challenges

Efforts to preserve the *Limes* monuments as historical witnesses for future generations certainly collides with the necessities of modern urban development and the utilization of our countryside. Hundred thousands of Euros are spent year by year by regional and local communities to excavate and document this heritage. Rescue excavations have become the very basic instrument to acquire new information, which is afterwards stored in archives and hopefully, published. This is more or less the case in every European country. Although the tasks and interests of the monument preservation institutions lie in recording the monuments within their broad cultural and historical roots, this approach must necessarily be extended beyond the individual interests towards a wider relationship (Fig. 1–2). It is vital to set up a commitment to achieve appropriate balance between preservation, conservation, access, the interests of local communities and sustainable economic use of our archaeological sites. So far information is available only for a small group of experts. During the last decade we can recognize a massive interest at the communal level for an increased use of the monuments. It is understandable that communities now want to benefit from this huge archaeological potential.

The main target group beside cultural resource managers (“Denkmalämter”, research and university institutions, museums) are the policy makers, the regional and local authorities administering and living within the distinctive archaeological area. They are involved in spatial planning and guarantee the sustainable development based on cultural and economic considerations. This group consists of policy makers from various institutions (protection of cultural landscape, planning authorities, rural development, regional management, agriculture) in different administrative levels (EU-wide, national, regional, local, owner of property). Among the many objectives of an enlarged WHS is the intention to optimise all available resources.

A new spatial planning approach in connection with the strategic environmental impact assessment could improve the effectiveness of cultural heritage protection policy. A close cross-sector collaboration with agriculture, forestry, spatial planning and tourism will not only create a more efficient management, but also improve the awareness for the cultural heritage (see Breeze in this vol. 109–11; Sommer et al. 128–39). The collaboration and cooperation of the big museums with the many small local museums could provide new information with modern presentation means not only for the local population but also for the tourists. The integration of the monuments in already existing tourism infrastructure and cultural routes could be better achieved by a transnational co-operation between museums and municipalities (see Flügel in this vol. 174–78 and 196–99). The operational objectives to achieve this goal are:

- development of an overall strategy and implementation plan for the extension of the protected cultural landscape in the various countries;
- involvement of *Limes*-communities and collaboration between the individual regions - making use of the cultural potential of regions in partner-countries to develop sustainable tourism;
- integration of the *Limes*-areas in spatial development strategies;
- creating and strengthening the Pan-European cultural awareness.

In developing a thematic layer for a “*historic cultural landscape*” areas of “hope” can be defined for cultural heritage – using the transnational Roman *Limes* as an example (see Sommer in this vol. 118–21). These specific areas can be integrated into the Geo-Information Systems of the federal states/departments for spatial planning. With the transnational extension of the Roman *Limes* this approach can be adopted in the other areas. These thematic layers could also be part of considerations about the strategic environmental impact assessment.

Analogous to the target groups there is a number of public administrations and institutions, which will directly benefit from such a future prospect. By the integration of the thematic layer “*cultural landscape Limes*” into the spatial planning instrument municipalities and regional administrations reach an improved level of information. The harmonisation with other thematic fields is facilitated considerably, so the protection strategy can be implemented easier. All cultural resource manager can benefit from the fundamentals and standardisations as well as from the alternative, non-destructive methods of presentation. By cross-linking the museums and communities a lasting impact on tourism development can be awaited. This will be enhanced by the planned connection to cultural routes. People living within and around the archaeologi-

cal site(s) can expect an increased awareness (and maybe investment).

In communicating our archaeological research to members of the public, it is important that we recognize that the next generation needs our special attention (Fig. 3). We need to think about new ways of making the shared past and its material culture interesting to the public, especially to children. For many of them archaeology is an exciting subject and a good platform for a wide range of other subjects. But most images and stories in popular books and other media, whether their source be a professional archaeologist or a person whose interest in the subject is personal, tend to ignore a debate in a wider context. Our guide books are full of specific archaeological information but lack discussions about the very nature of monument preservation, and their impact and importance for the future of Europe. This future of our cultural heritage is partly in the hands of educators, who shape the perspective of the next generation. We should not hesitate to inform schools, museums and archaeological centres at all levels about the discussion and raise awareness about many of our problems of safeguarding the cultural heritage around us as well as all over Europe. The multi-national WHS "*Frontiers of the Roman Empire*" and its remains could be an outstanding positive example that cultural heritage is not restricted to a specific nation, but is a symbol for a common heritage that can foster international connections and dialogue.

We are all conscious of the different traditions operating across Europe in the nature of research, care and management of monuments. Therefore it is necessary to create a kind of management philosophy for the preservation, management and display of Roman frontiers within which each country can maintain its own traditions and values. The FRE WHS concept offers the best opportunity to refine and adjust a comprehensive and integrated management philosophy for a truly European monument on national levels in the relevant countries. It offers a wide approach to protect this distinctive cultural landscape as a common heritage across the European countries. There is an opportunity to harmonize the different standards and traditions in the care of monuments. Using new and improved planning instruments the municipalities and authorities involved will offer a much better public service and a higher planning security in spatial planning. Elaborated concepts and improved awareness provide a number of new opportunities for investment attractions as well as regional development.



Fig. 1 The timber palisade in Germany, excavated in 1894
 (Copyright: Römisch-Germanische Kommission des DAI Frankfurt)



Fig. 2 The Museum Carnuntinum in Austria built in 1904 in the style of a Roman villa (Photo: S. Jilek)



Fig. 3 At the end of the 1929 excavation at Birdoswald Roman fort on Hadrian's Wall an offering was made to Fortune. The foreground group (left to right) are John Charlton, Eric Birley, a student, James MacIntyre, F.G. Simpson, a student, Kurt Stade, Shimon Applebaum and R.G. Collingwood. The photograph was taken by I. A. Richmond (Copyright: G. Simpson)

RESEARCH ON ROMAN FRONTIERS

David J. Breeze, Edinburgh

Research on Roman frontiers might be said to have started while they were still in use in so far as our only literary sources for the construction of both Hadrian's Wall and the Antonine Wall (UK) were written during the late Roman empire, 200 years after they were built. Immediately after the fall of the Western Empire, writers offered comments on their date and purpose, culminating in the authoritative statements of the Venerable Bede in his *'History of the English Church'* written in the early 8th century. Bede's view was holding the field for nearly a thousand years.

In the 15th and 16th centuries, those with an interest in history began visiting the remains of Roman frontiers and recording what they saw. Their letters, journals and books are a valuable source of information about sites now destroyed or changed out of all recognition, and inscriptions and sculpture subsequently lost or defaced. This "antiquarian" interest continued into the 19th century, and became popular enough to excite the interest of Sir Walter Scott who wrote a book, *'The Antiquary'*, about a mythical antiquarian, Jonathan Oldbuck.

In the 19th century, a new tool appeared, excavation. These early explorers laid bare Roman buildings and recorded their discoveries, albeit in a simple manner. Ancient historians also showed a closer interest in Roman military remains. The result was to turn over previously accepted views of the frontiers. In 1863, John Collingwood Bruce published his first guide-book to Hadrian's Wall, offering a statement of its purpose: it was, he wrote, a great fortification intended to act not only as a fence against a northern enemy, but to be used as the basis of military operations against a foe on either side of it. At the same time, the great German historian, Theodore Mommsen, was comparing the German and British frontiers. He suggested that the greater strength of the British frontiers indicated that the enemies which they faced were fiercer than Rome's foes in Germany. Now, frontier studies had moved into a new world with scholars considering the purpose of frontiers and comparing one with another. Mommsen was also involved in the creation of a great tool to aid frontier studies, the publication of all known Roman inscriptions. This was the *Corpus Inscriptionum Latinarum*, which commented its work in 1853.

The end of the 19th century witnessed a significant step forward with the beginning of scientific excavation (Fig. 1). The process started across Europe at about the same time. The approach could be methodical, as witnessed by the creation in 1892 of the Reichs-Limeskommission in Germany, a body which was to take 40 years to record the 500 and more km of the German frontier. A commission for the study of the Roman *Limes* in Upper and Lower Austria was formed in 1897. Meanwhile in Scotland, in 1890 the Glasgow Archaeological Society set out to determine if the Antonine Wall really was of turf, as the ancient sources said. Simple curiosity played a part in causing other excavations, but by the beginning of the twentieth century some work was being undertaken in advance of developments such as housing and factories: the modern world was obtruding into the old.

The growing body of archaeological material led to the building of new museums to house it. These museums were established at both national and local level (see Flügel in this vol. 196–99). They included museums at Budapest in 1802, Leiden in 1818, Bonn in 1820, Cluj in 1859 and Carnuntum in 1904 (Fig. 2). A museum of a rather different nature was created in Germany with the rebuilding of part of the fort at the Saalburg and the formation of a museum within it.

Rescue excavation grew in significance over the next hundred years, but research excavations continued too (Fig. 3). Research on Roman frontiers received valuable support from the development of techniques of study. In the middle decades of the 20th century, aerial photography led to the discovery of many new sites (see Sommer et al. in this vol. 128–39). This is not a uniformly successful tool as its success depends upon appropriate agricultural regimes as well as the right soil conditions and humidity. Nevertheless, it has led to pushed forward our knowledge of military remains beyond the empire, for example, through the identi-

fication of camps and forts. The end of the Iron Curtain led to an expansion of aerial survey into Eastern Europe, providing many more details of military and civilian settlement within the empire as well as activities beyond. Equally significantly, much of the work has been undertaken through internationally based projects.

More recently, a new tool has transformed our knowledge of fort layouts, but perhaps more importantly the civil settlements which lay beyond their gates: geophysical survey (see Stevens, Jones, Gater in this vol. 79–93; Sommer 70–3). While this technique of remote sensing will not date archaeological remains below ground, it can provide plans. These surveys have demonstrated that civil settlements outside forts are far larger than previously envisaged: this is quite simply a revolution in our knowledge.

The study of Roman frontiers has always been site specific. The site might be large like a Roman camp, legionary base or indeed the whole linear barrier itself. Now, we are better placed to consider these within a wider environment. Pollen analysis has led to a greater understanding of the nature of the landscape through which soldiers marched and built forts. Terrestrial and aerial survey has led to increased knowledge of the indigenous populations of the land through which these frontiers were built. The invention of a new branch of archaeology, landscape archaeology, has led to a desire to understand frontiers and military deployment within a wider framework, a landscape framework (see Jones and Thiel in this vol. 99–105; Höchtl 166–73).

Here lies one of the future lines of development for Roman frontier studies. Roman military archaeologists want to place their sites in the landscape and participate in the development of landscape studies. Indeed, the wealth of material available to Roman archaeologists as a result of centuries of study, a hundred years of excavation and decades of aerial archaeology places us in a very good position to operate in this new genre. Yet, understanding of the wider picture still depends upon knowing and interpreting correctly the detail. We will continue to excavate individual sites, but we will strive harder to locate them in their wider setting.

In this approach, Roman military archaeologists are helped by the political changes of the last two decades. Eastern Europe has been opened up to aerial photography. The expansion of the European Union has led to greater co-operation across modern frontiers. This is essential when the hinterland of one fort lies within the territory of a different modern country, as Mihail Zahariade of Romania has pointed out. Old rivalries are being placed to one side making it more easy to study wide areas rather than individual sites. The practical manifestation of this is the European Union's Culture 2000 programme (see Breeze and Jilek in this vol. 6–14). In this programme archaeologists from as many as eight European countries have worked together to create a series of outcomes which embrace practically the whole Roman frontier in Europe. These outcomes are the formation of a web portal on the *'Frontiers of the Roman Empire'* (see Borgulya et al. in this vol. 15–7), the creation of material for exhibitions, advice on the presentation and interpretation of archaeological sites, and improved documentation of Roman military sites.

This work has been aided by the existence of another body, the Congress of Roman Frontier Studies, founded in 1949. The idea of an international conference on Roman frontier studies had been conceived in the 1930s by Kurt Stade (Frankfurt) and Eric Birley (Durham) after they had excavated together on Hadrian's Wall in 1929, but war had prevented its realisation for 20 years. Since 1949, roughly every three years, archaeologists and ancient historians from across the world have met to discuss their subject (see Morilo in this vol. 107–8)(Fig. 2). The existing co-operation between Roman military archaeologists has materially aided the success of the Culture 2000 Frontiers of the Roman Empire project – as well as the progress towards creating a multi-national Frontiers of the *'Roman Empire World Heritage Site'* (Fig. 4).

The various locations of the meetings of the Congress of Roman Frontier Studies have been closely related to the politics of the last 60 years. Too few meetings have been held outside Europe, but they have occurred and we trust that there will be more. They will help all of us to place Roman frontiers in their widest context, an empire-wide basis.

Further reading

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Fig. 4 Participants of the Bratislava Group meeting visiting the Roman monuments at Woerden in The Netherlands (Photo: T. Hazenberg)



Fig. 1 The fort of Manqoura in the Syrian desert (Photo: DAI Damascus)



Fig. 3 Reconstruction of a section of the palisade and a tower in Germany (Photo: A. Thiel)



Fig. 2 The expansion of the Roman empire from the Republican times into the 2nd century AD (compiled and edited by Zs. Visy from the basic FRE map)

THE ROMAN ARMY IN ITS LANDSCAPE SETTING

David J. Breeze, Edinburgh

Maps of the Roman empire tend to reflect the political entity. They show its boundaries, usually during the brief and abnormal period after Trajan had conquered Parthia, sometimes the provinces, occasionally differentiating between imperial and senatorial provinces. Some maps show geographical features, but these are restricted to seas, rivers and mountains: deserts, a key element in the location of frontiers, are not usually marked (Fig. 1). All these geographical features were major elements in the determination of the location of frontiers.

These maps imply a stable political situation, the position of the frontier rarely changing. Yet they mask considerable changes on the frontiers of the empire over several centuries (Fig. 2). These are well known to students of the Roman empire. They include the break-up of the strong army groups of earlier years leading to the spreading of troops along the frontier lines, and the steady move of military resources from the Rhine to the Danube. It is not my intention to consider these long-term changes, but the more detailed frontier arrangements, within the wider pattern of the landscape within which Roman military installations sat.

In that the more expansive world of late Republican generals and the first Emperor, Augustus, military dispositions related to lines of attack rather than defence. Frontiers as such did not exist – though obviously the empire had boundaries – but here was no need to undertake measures to specially protect the frontier because the army was soon going to move forward and conquer new land. The change from that situation to a static defence line did not happen overnight. We can trace its progress through the first century AD to the time of Hadrian, who came to the throne in 117. The apogee of frontiers was in the middle of the second century when new frontier lines were constructed in Britain and in Germany. These frontiers were in part a reaction to the need for defence, but also a response to the wish of the Roman to control their space. Regulations governed entry into and exit from their empire. Strong physical features were helpful in defining the point at which the empire was entered: the rivers Rhine, Danube or Euphrates, the Carpathian Mountains or the deserts of the Middle East and North Africa. Only when these were absent did they erect artificial barriers, such as Hadrian's Wall, the Antonine Wall and the German *Limes* (Fig. 3).

These phases – expansion, frontier construction and, ultimately, failure – related to changing political and military situations. But, as we have seen, they did not occur in isolation from a further dimension, the landscape.

Roman forts sat in a landscape, or rather two landscapes. The first was the physical landscape, seas, rivers, mountains, deserts, which were used in the way I have just described. The second landscape was the landscape of people, not just the location of the people themselves, or rather their settlements, but the landscape they formed, where they had created agricultural land and where they left forests. In considering the relationship between Roman military dispositions and the landscape within which they sat, we might ask specific questions:

- were forts sited deliberately in relation to the landscape, or were landscape features merely used when convenient in a location chosen for other reasons, or did a mixture of reasons affect military deployment?
- what was the purpose of the fort and its occupants. Were forts located deliberately to control people, or to exploit resources and trade? Or were these only part of a wider consideration?

All these factors were relevant, but their relevance might change over time. In the early years of conquest, forts were often built within a newly conquered area to control the new provincials and only later to be moved up to the frontier to aid their defence.

Forts tended to be placed in the major river valleys where the newly conquered people lived, and whose farms could help feed the Roman army. While, in general, forts were about 20–25 km apart, a day's march, the topography forced variations. A long gap might be broken by a fortlet, as can be observed in Southern Scotland.

Even when frontier lines had been established and most regiments moved on or close to it, some forts might be retained in order to help control important activities such as mining operations (Fig. 4). Some regiments were always based in cities with troublesome inhabitants such as Alexandria or Jerusalem.

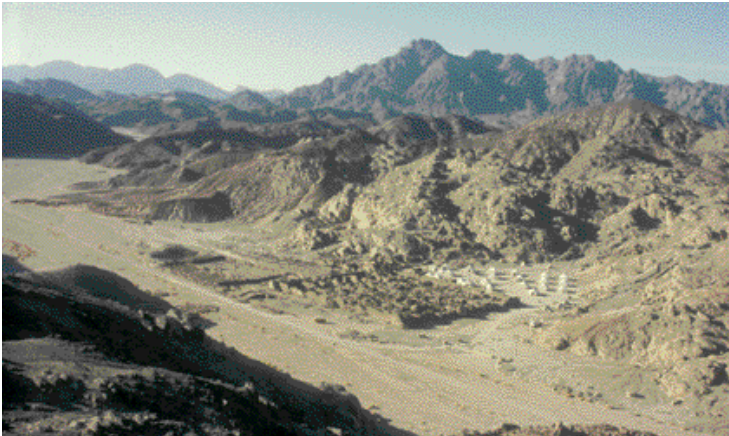


Fig. 4 The military base at Mons Claudianus in Egypt (Photo: V. A. Maxfield)

Forts were also located in relation to people living beyond the empire – in the early empire, the army saw no reason to place forts where there no people beyond the frontier, a situation which can be observed in Upper Austria where there were no forts along the Danube facing the heavily forested land beyond.

Forts were located in relation to routes, either of potential invasion, such as Antioch in Syria, the focal point for the army of the province, or military communication. They might also relate to trade, as evidenced by Carnuntum in modern Austria, which guarded the Amber Route.

The move from retaining regiments in large army groups ready for the move forward to create strongly defended frontier lines was a slow process. At Vetera and at Mainz in Germany, these army groups were very substantial, each consisting of two legions, that is about 10,000 men, supported by smaller regiments. Their very size may have encouraged change. The brigading of two legions together formed a temptation for some would-be emperors, so all such groups were gradually broken up. Pressures on other frontiers led to troop movements: as we have seen, there was a steady drain of legions from the Rhine to the Danube basin which was more threatened by external invasion, reducing the size of the army in Roman Germany. Other reasons we can only guess. The feeding of 10,000 men stationed in one base may have caused logistical problems and perhaps it was easier to spread out troops along the frontier line. Yet, the forces of inertia are always strong and some legions remained in the forts where they had been originally based for decades. It is therefore difficult to know whether a real threat from the outside existed, or whether geographical inertia won.

As we move into the second century, we can see more clearly the effect of the failure to advance. In north Britain, forts had tended to be constructed about 20–25 km, a day's march apart, for mutual support and ease of communication. Now, on frontiers, this distance was often halved. A spacing of 11–12 km has been recognised on Hadrian's Wall, the Antonine Wall, and on the outer *Limes* in Germany while the distance between the forts on the Antonine Wall in its final phase was only about 3 km. Yet, still topography affected the location of individual forts. Chesters on Hadrian's Wall is not in its correct location, presumably so that it could be placed beside the river. The over-long gap to the west subsequently had to be filled by a new fort. The control of passes remained important, and can be recognised on the Odenwald section of the German frontier. Along the Rhine and the Danube, forts were generally placed at points where minor rivers or streams flowed into the main river. This general move to standardisation resulted in all sections of the frontier in Europe having forts, even where, as in Upper Austria, there was no enemy beyond the border.

We have now moved from a position in which the army bases related to specific issues – a threat being internal or external, an invasion line, a trade route – to a situation whereby units are located at close intervals along the whole of the European frontier. Routes remained important – we can see that from the location of the cavalry units on the Middle Danube frontiers (Fig. 5).

In the early empire, we can clearly see the importance of the wider landscape. Physical features governed the routes taken by armies and so these lines of activity were restricted in number. As the empire stopped expanding different elements of the landscape became important. Significant natural features were used to define the empire, but within that broad pattern, when it came to the location of individual forts, particular features of topography won: the presence or absence of food and water supplies, raiding routes rather than invasion lines, the need to supervise specific operations like mining, and so on. These particular ele-

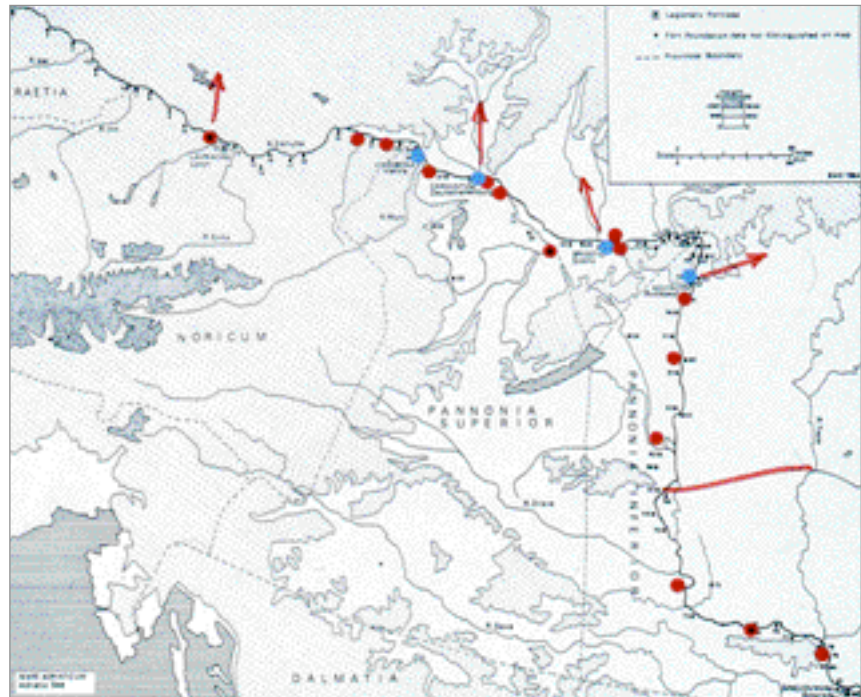


Fig. 5 Location of cavalry units on the Middle Danube frontier (Copyright: D. J. Breeze)

ments also could dictate the type of unit used, for on the Antonine Wall few cavalry were located, perhaps because of the boggy ground to the north. This is not to say that earlier concerns with routes were abandoned: such issues remained of concern to the army.

What can we learn from this? Landscape was of great relevance to the Roman army. On every frontier, the landscape affected both location of the frontier and the details of military deployment. The location of the army to control routes remained of fundamental importance in all periods. The landscape dictated the location of these routes. Rivers were seen as convenient demarcation marks. Where they did not exist, artificial frontiers were erected, such as Hadrian's Wall and the Antonine Wall in Britain, and the German *Limes*. Passes were controlled, river and stream junctions were regarded as important. Provincials needed protection from attack, defence was necessary against people living beyond the frontier. However, what was also regarded as important was the location of people, and people lived where there was good agricultural land, so we are back to landscape (the Romans, of course, had an effect on the landscape they occupied, not only through their numerous building programmes and those of their civilian dependents, but also in response to the requirements of their own troops). On every frontier of the Roman empire, the link between landscape and military deployment was essential, overlain by changing Roman political and military intentions and requirements. In order to understand these Roman military deployments better, we need to know more about the vegetation history of the areas within which the forts and frontiers sat and distribution of the peoples to which they related. Such knowledge will help us to take a significant step forward.



Fig. 1 At the very centre of Regensburg, Germany lies the legionary fortress. In the foreground the course of the fortress' wall is visible in the street grid (Photo: Stadt Regensburg, P. Ferstl)



Fig. 2 Roman ship from Woerden (NL) excavated during the last decade (Photo: Programmabureau de LIMES)



Fig. 3 The Danube river in Bulgaria (Photo: CAR Novae; P. Dyczek)

THE DEFINITION OF RIVER FRONTIERS

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In most countries in the centre of Europe, the frontier followed natural boundaries like rivers such as the Rhine and the Danube. In contrast to artificial barriers such as the Upper-German Raetian *Limes*, which have undergone several changes in advancing lines, the river frontiers of the Roman empire in Europe established by the first century AD remained rather static. There are few exceptions to this, mainly on the Balkan, where the Emperor Trajan crossed the Danube around 101/102 AD, conquered *Dacia* in modern Romania and established a new province, which lasted till 270/275 AD. As a consequence the military installations along the river frontiers in Europe were occupied over a period of 400 years mostly from the reign of Augustus to the final years of the fourth, and on the Lower Danube even to the fifth and sixth century. In the late Roman period, those frontier defences were modernized and turned into strongly fortified military bases. The remains, which in many cases survived astonishingly well to the present day, in- and outside of settlements and in the open countryside, are the most distinctive and still visible witnesses of the European river frontiers. The consequences of this situation are extremely complex military sites, in chronological as well as archaeological respect.

Since the end of the Roman occupation many great fortresses have become the bases of medieval and modern cities such as Nijmegen in The Netherlands, Cologne, Bonn and Regensburg in Germany (Fig. 1), Vienna in Austria, Budapest in Hungary and Belgrade in Serbia. Other forts and fortlets are at the very core of later settlements: for example Utrecht and Woerden in The Netherlands, Passau in Germany, Traismauer, Mautern, Tulln, Zeiselmauer and Klosterneuburg in Austria, Rusovce in Slovakia, Győr and Solva in Hungary, Batina and Ilok in Croatia, Aquae and Ratiaria in Serbia or Ruse in Bulgaria.

Whereas the definition/proof of linearity in relation to artificial frontiers is fairly easy to establish via the barriers itself (see Jones and Thiel in this vol. 99–105), this causes different problems of definition along river frontiers. The largest stretches of the artificial barriers (wall or palisade, rampart/ditch) such as Hadrian's Wall, the Antonine Wall in the UK and the Upper German-Raetian *Limes* in Germany lay in the open countryside or run through woodland, and are therefore in most cases clear to discern. River frontiers lack such a connecting element. Military installations along river frontiers are connected by roads and by the river itself.

Therefore in the case of river frontiers, such as the Rhine and Danube frontiers, the definition and enhancement of the linearity is a key element for the heritage bodies involved in site protection and management. The ways in which the river frontiers can be defined were considered through several discussions within the workshops of the FRE project.

The Lower Rhine *Limes* in the Netherlands and Germany

One of the best investigated stretches of the Roman frontiers along the Rhine, the so called '*Lower Rhine Limes*' runs through The Netherlands and North Rhine Westphalia. The task to establish a demarcation and defence line of forts and watch-towers on this low lying wetland with its soft clay and alluvial sedimentary soils and numerous floods must have been a real challenge to the Roman soldiers and engineers. The first installation for regulating the river dates from the time of Drusus but a more formalized line of watch-towers was set up in Claudian times. Nowadays for the archaeologists the wet ground is a blessing as the remains of the frontier monuments, especially the ships made of timber and used for the transportation of building material and army supply have been extremely well preserved (Fig. 2). These fortuitous conditions of conservation and the intense archaeological research projects of the last years turned the Dutch stretch of the Roman border into an internationally important subject for research.

Most research during the last decades has been carried out, following the tradition of the Netherlands in the context of landscape archaeology, in the forts and civil settlements of Alphen aan den Rijn, Utrecht, Valkenburg, Vleuten-De Meern, Woerden, Zwammerdam, the harbour defenses at Velsen and the large



Fig. 4 The bridgehead „Contra Aquincum” on the left side of the Danube in the very centre of Budapest, Hungary (Photo: Zs. Visy)



Fig. 7 The late Roman tower at the fortress Mautern in Austria, which still stand 2 storeys high (Photo: Boundary Productions)



Fig. 6 The reconstruction of a Roman ship, sailing down the Danube in Lower Austria in September 2007 (Photo: Boundary Productions)



Fig. 8 The remains of the gate of the legionary fortress in Budapest (H) lay close to a densely populated city district (Photo: Zs. Visy)



Fig. 5 Roman fleet bases in Europe

scale excavations in Nijmegen (see Enckevort in this vol. 122–27). The results of these excavations form the basis for large national research programmes concentrating on the synthesis of this information about the Dutch *Limes*, its hinterland and the zone in front of it.

The Dutch *Limes* does not have the status of a WHS but is protected by the national government. National aspirations were summarized in the establishment of the official '*Programmabureau de LIMES*' which acts as a centre of expertise for the marketing and communication of *the Limes* (www.limes.nl).

The Lower Rhine *Limes* in Germany was part of the heartland for the military advance into *Germania Magna* during the reign of Augustus. Along this stretch large scale fortifications were established such as Neuss, Xanten, Köln and Bonn, which acted as spring boards and supply bases for the garrisons stationed along the Lippe. At times those fortresses housed even two legions and additional auxiliary forces and played a major role for the Romanization of the Rhineland. Additional forts, such as Altkalkar were established a little later, when the Roman policy decided for the river Rhine as the frontier line. One of the largest bases for the Rhine fleet was set up in Cologne. The existence of fortlets and watch-towers is proven between the larger fortifications. Due to the meandering of the Rhine many of those smaller installations, built on the lower terraces, have been washed away during the post Roman period.

In the later 1st century near all military bases in this region suffered badly by the attacks of local Batavian tribes, which ended in a province-wide rebellion. The revolt was subdued but many fortifications had to be rebuilt. Later on the majority of the large army forces stationed in the Germanic provinces were transferred to the Danube frontier(s). A legionary base continued to be in use in Bonn, new forts were built in Krefeld-Gellep and Dormagen. The third century was characterized by external and internal threads which even lead to the break down of the frontier line. The rebuilding of the fortifications began during the reign of Constantine and continued to the times of the Emperor Valentinian. Although some fortifications were abandoned, new ones were built, for example opposite Cologne and Dormagen on the right side of the Rhine (*Divitia*; Haus Bürgl) to protect the access to and the traffic on the river from Barbarian attacks.

Archaeological research has a long tradition on the Lower Rhine *Limes* in Germany. Many places have been investigated from the end of the 19th century onwards and research still continues. The situation is complicated by the fact that many of the important sites lay in urban areas. Archaeologists are faced with metre high layers due to the complex history of the larger military bases. Great efforts are undertaken by the regional institutions to record the whole length of the frontier. Surviving remains of the Roman frontier installations are preserved in- and outside of urban settlements and archaeological reserved areas such as the archaeological park in Xanten are iconic sites on the Lower Rhine *Limes*.

The Danube *Limes*

The approximate 2000 km long section of the Danube *Limes* from Eining in Bavaria to the river delta in Romania runs through 8 modern countries: Germany (Bavaria), Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria (Fig. 3) and Romania. It formed the northern borderline of the Roman empire from the time of the Emperor Augustus to the 6th century AD. It was one of the most important frontier sections of the Roman empire which is proved by the strong military power concentrated along the line. There are hundreds of Roman military installations along the Danube in various states of survival (see Sommer in this vol. 70–3; Dyczek et al. 74–8). But there are still sites on this borderline where the exact location and size of the *Limes* monuments is not known and/or recorded.

A first demarcation line along the Danube was set up in the first half of the first century AD. Several legionary bases were established during the next 2 centuries in Regensburg (D); Enns, Vienna and Carnuntum (A); Komárno and Budapest (H); Belgrade and Viminacium (YU); in Gigen, *Novae* and Silistra (BG). More than 200 auxiliary forts, temporary camps, several late Roman fortresses and bridgeheads (Fig. 4) and hundreds of watch-towers were found on the territories of the 8 countries. Along the frontierline the forts are 10 to 30 km apart. The density of watch-towers varies according to the topographical conditions in which they lay. The watch- and signal-towers recorded in Hungary for example – particularly during the later Roman period – were built 1 to 2 km apart from each other. In most cases additional physical earthworks or barriers were unnecessary, as it was provided by the river itself. Altogether they form extremely significant reserve areas for archaeological research.

Physical changes over time can also be noted. The section of the *Limes* between *Viminacium* and Belene in the west of *Novae* lost its military purpose as a border defence after the establishment of the Dacian provinces in AD 106. When the Roman army withdrew from the Dacian provinces north of the Danube in 270/275, the fortifications on the right bank of the river Danube were restructured. The great building programmes of the fourth century may be seen in all countries, and even later modifications survive on the lower Danube.

The Roman fleet played an important role in the *Limes* system (Fig. 5). Rivers were important shipping routes not only for the transport of heavy building materials but also because of the supply of the troops stationed in the various sections of the border (Fig. 6). There were shipyards for example during the late Roman period in *Ratiaria* (Arčar), and the existence of a harbour is very likely at *Sexaginta Prista* (Ruse). Harbour installations can also be expected at many other places along the banks of the Danube. In most cases they have been destroyed due to the flooding of the Danube through the course of time.

After the Second World War the archaeological research greatly increased and some excavations even involved international cooperation for example in Arčar (*Ratiaria*) with Italy, in Svištov (*Novae*) with Poland (see Dyczek et. al. in this vol. 74–8, and in Krivina (*Iatrus*) with Germany. Many have been investigated already, while aerial photography and geophysical prospection are providing new examples every year.

Many Roman military sites on the Middle Danube *Limes* lay in intensively used areas. Much has been destroyed or built over already, and is now only accessible through excavation. Excavations in urban centres and beneath other buildings often reveal Roman features and artefacts thereby demonstrating the archaeological potential of such areas. Other sites are under threat by intensively used agricultural land. They are ploughed flat and are only visible through the media of aerial photography or geophysical research form. On the Lower Danube the *Limes* monuments are more often embedded in the surrounding landscape. Sites like *Viminacium*, *Diana* (YU), Gigen, *Novae*, *Iatrus* or *Dinogetia* lay in the open countryside and are still striking landscape elements.

There is an astonishing high number of visible monuments. Some monuments, such as the gates and towers along the Austrian stretch of the frontier still stand up to the second storey (Fig. 7) and parts of them are still in use. Other large sites such as Regensburg (D), Carnuntum (A), *Aquincum* (Budapest, H), *Viminacium* (YU) or *Novae* (BG), revealed by excavation, demonstrate the importance of the Roman history, which often lay at the core of the cities development. Remains of the Roman *Limes* monuments along the Danube such as forts and watch-towers in Hungary survived under different condition. Some are well preserved while others are under constant threat (see Dyczek et al. in this vol. 74–8).

The WHS-nomination process provides the major opportunity to identify and protect this huge archaeological potential especially in the east-European countries. Being new members of the European Union by May 1st 2004, large economical and strategical developments in land utilization plans can be expected. Generally this goes hand in hand with a major threat to our cultural heritage. Therefore on a long-term basis it is necessary to establish a full inventory of all monuments.

The definition of river frontiers

Part of the very essence of a linear frontier system is that it forms a continuous line. In general, artificially constructed barriers have no major problems to demonstrate this linearity, the fortification system itself with its structural details (walls, palisades, rampart/ditches) provides the necessary link between individual monuments (watch-towers, fortlets, forts) (see Jones and Thiel in this vol. 99–105). Even forts which are placed behind the active demarcation line, like those on the Upper German-Raetian *Limes*, stand in a fairly obvious relationship to the outer frontier installations. Walking along the frontier on Hadrian's Wall brings the visitor from watch-towers to milecastles and forts. The relationship between the individual frontier elements is clearly visible.

River frontiers lack those most obvious connecting elements. Although the rivers form a linear obstacle, which connects the individual monuments, the line itself is less easy to define and to present. Forts along the Rhine and Danube frontiers are 10 to 30 km apart, and intervisibility does not often exist. Watch-towers, the intermediate elements in the archaeological landscape, are not so easy to detect. There

are long stretches of frontiers where we do not know much about watch-towers, especially those of the earlier Roman empire when they were mainly constructed of timber. An exception to this situation is the new research on the Lower Rhine *Limes*, where a longer section of the earliest frontier system was investigated during rescue excavations in the area around Woerden (NL). Here it is clearly demonstrated that wooden watch-towers were a distinct element of the borderline along the river connected by a (*Limes*) road. Late Roman examples are easier to discern because of their massive stone construction. More than 200 watch-towers, mostly stone towers, are recorded along the Danube banks in Hungary, which form a very tight defence system. It can be assumed that similar systems existed on the other frontiers sections too.

A most distinctive feature of river frontiers of course is the river itself. But over the last 2000 years the river beds often changed for long lengths. Because of these changes and floods many sites on the lower grounds were destroyed by the water. In the 19th century many rivers underwent certain regulatory measures, which did not help to preserve the monuments. But quite a lot of them have been detected and investigated through those activities. An even larger threat are the water power stations with their dams and reservoirs. When the power stations were built in Serbia during the 80ies of the last century, many parts of the Roman frontier, e.g. forts, fortlets, watch-towers and the road through the Iron Gate were flooded and are not visible any longer. A distinctive feature of river frontiers are bridgeheads. We do know about very few bridgehead fortifications in the earlier Roman frontier system, such as the fort of Iža in Slovakia and the fort of Dierna in Serbia. Both of them were constructed when Roman politics necessitated the army to advance into Barbarian territory. We do not know of any permanent bridges which crossed the major river frontiers. The stone bridge, which spanned the Danube close to the forts of *Pontes* and *Diana* in Serbia, was built after Trajan's decision to turn the territory north of the Danube into the Roman province of *Dacia*. In Late Roman times more bridgeheads such as Cologne-Deutz and Haus Bürgl in Germany or Contra Aquincum (Budapest) in Hungary (Fig. 4) were established to control, and more so to protect, the crossing points and the traffic on the river. These installations were heavily fortified and several of them survived quite well on the left side of the Danube in Hungary.

Closely related to the establishment of river frontiers is also the development of the infrastructure. The *Limes* road linked the individual military installations and other ancillary features. Quite often along a natural boundary, the *Limes* road runs well behind the course of the river, dictated by the terrain. Watch-towers and fortlets and sometimes also forts are connected to the supra-regional *Limes* road with minor roads. Often the *Limes* road is not so easy to be identified in woods, heavily agricultural or densely populated areas. Although similar patterns can be recognized there is still a lot of research work to do.

The nature of river frontiers also promoted the development of urbanisation particularly in the very centre of Europe. This is a major problem, when it comes to record and protect the monuments. Whereas only 8% of the Upper German-Raetian *Limes* WHS lies in settled areas (and this is similar to the percentage recorded on Hadrian's Wall or the Antonine Wall), many segments of the river lines are situated in intensively used (urban) areas. Excavations of Roman remains are often undertaken in advance of building projects to extend the city suburbs or redevelop old inner cities. Many parts have already been destroyed and are lost for research. To protect and preserve those sites is equally problematic (see Breeze in this vol. 109–11; Enckevort 122–27; Sommer et al. 128–39 (Fig. 8). A solution for the future lays in better prevention activities, such as the establishment of archaeological cadastres (see Sommer in this vol. 118–21).

There is a great chance for the large Roman river frontiers to survive inside a potential and unifying 'Frontiers of the Roman Empire WHS'. Common standards to the definition, recording and protection would support the individual efforts. Appropriate legal protection and management arrangement are necessary to be installed and harmonized. If the sites along river frontiers are reduced to individual sections, the whole system loses authenticity and breaks up the unique feature of the monument: the continuous frontier (see Jones and Thiel in this vol. 99–105). According to the experiences of the former WHS applications this fragmentation could easily lead to differing standards of monument preservation and further on to less well-protected areas suffering long-term damage. The aim, therefore, should be to have all the surviving remains of the ancient frontier installations accorded World Heritage status, if possible.



Fig. 1 Pförring, Germany. Aerial photograph of the fort with *principia* and granary (top left), roads and buildings of the military vicus (centre and bottom left) (Copyright: BLfD 7136/068B 7750-4, 10.6. 1997; K. Leidorf)

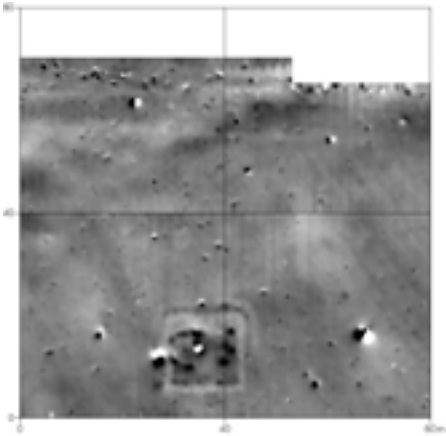


Fig. 2 Tower-position 15/45 on the Raetian *Limes*, Germany. Magnetogram of what turned out to be a fortlet about 20 m square; the light line at the top of the image may represent the *Limes* Wall (Copyright: BLfD 7136/071b; J. Fassbinder)

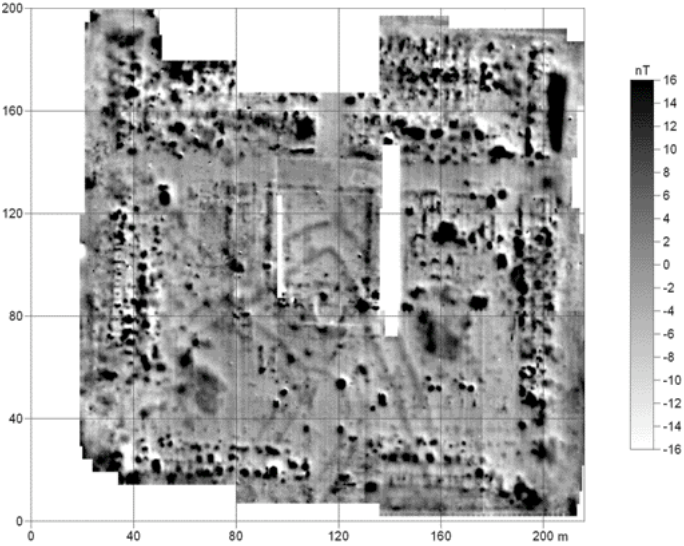


Fig. 3 Pförring, Germany. Magnetogram of the fort (Copyright: BLfD 7136/068B; J. Fassbinder/K. Berghausen)

DOCUMENTING THE FRONTIERS OF THE ROMAN EMPIRE WORK ON THE LIMES IN BAVARIA

C. Sebastian Sommer, Munich

Introduction

"*You can only protect what you know*". This statement, which sounds like common sense, has often been neglected when dealing with archaeological remains as part of our universal cultural heritage. The – intrinsic – problems of the archaeological heritage are that

- the acquisition of detailed knowledge through excavation leads to the destruction of the evidence;
- even after more than a century of inventories, a majority of sites which once existed remain undiscovered.
- the state of preservation of all sites is difficult to prove.

A recent 48 km long pipeline project in Bavaria in Germany showed that of twelve registered monuments only three still existed. However, another 99 sites were newly discovered (Berg-Hobohm/Loré 2007, 176). Although this applied to an area with strong agricultural activity, similar questions arise elsewhere.

The description of the monuments based on an up-to-date inventory as the required basis of all WHS-applications therefore causes particular problems for archaeological sites: our knowledge is increasing all the time. In its concern with large stretches of the Roman frontiers of Europe, the FRE Culture 2000 project saw a major task in working towards standards in documentation. According to the outline of the Culture 2000 project, it was intended to develop and apply various methods on existing as well as possible future WHSs, i.e. the Antonine Wall, the Raetian *Limes* in Bavaria and the Danube *Limes* in Austria, Slovakia and Hungary (see Dyczek et al. in this vol. 74–8).

Non-destructive documentation

Whereas the archaeological cadastre has an emphasis on the positive-negative evidence as well as on planning and heritage-management (see Sommer in this vol. 70–3), the public and the archaeologist want to know more about the content of protected sites. As mentioned in the introduction, archaeological excavation, the standard technique to gain information, regularly leads to the destruction of the actual evidence which heritage resource managers are seeking to protect. Accordingly, in recent years efforts to develop and apply non-destructive ways have increased. Within the FRE project three techniques were applied in order to extend knowledge of the existing WHS "Raetian *Limes*", the proposed WHS "Antonine Wall" as well as the other sections of the Danube *Limes*.

1. Aerial photography

Although aerial photography is an instrument which has been used for survey purposes and regular documentation of archaeological monuments for more than 60 years, it has not lost any of its validity of detection and recording (Braasch 2005 with literature). The FRE project enabled the Bayerische Landesamt für Denkmalpflege to commission several contracts to fly along the *Limes*. In due course the pilot and photographer K. Leidorf did not discover any new *Limes*-sites but added valuable details to the knowledge of several stretches of the *Limes* as well as several sites (Fig. 1) (see also Dyczek et al. in this vol. 74–8).

2. Geophysics

Over the past years the methods of geophysical prospecting have been developed and refined. The various techniques adapted to low depths allow detailed insights into archaeological sites (Fassbinder/Irlinger 1999). Extensive geophysical survey has also been done along many sections of the Antonine Wall, UK (see Stephens, Jones and Gater in this vol. 79–93) and on the Danube *Limes* (see Dyczek et al. in this vol. 74–8). Of particular value in this field is magnetic prospecting as it combines accuracy with fairly high speed (Becker/Fassbinder 2001). The FRE-project enabled the Bayerische Landesamt für Denkmalpflege to

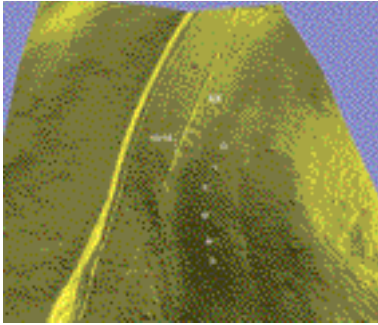


Fig. 4 Köschinger forest, Germany. Raetian Wall (straight line) with tower 15/18, fortlet "Güßgraben" and possible quarry pits (Copyright: LIDAR-scan; Bayerische Vermessungsverwaltung)

employ additional staff to record Roman sites along the Raetian *Limes* in particular. Using the Scintrex Caesium-Magnetometer Smartmag SM-4G Special with duo-sensor-array at several stretches where the course of the *Limes* was uncertain the line of the wall and the line of the earlier palisade were confirmed. In the magnetic prospecting the site of tower 15/45 turned out to be a fortlet measuring c. 18 x 18 m with a gate towards the *Limes*. Apparently the rectangular structure was surrounded by a ditch now partially filled with the collapsed wall of the installation (Fig. 2). Particularly spectacular were the results at two of the forts behind the *Limes*, though both WHS. At Weißenburg, Roman *Biriciana*, it turned out that the earlier excavations and subsequent intensive restoration work had done much less damage to the site than feared. The barracks of the cavalry unit once stationed here caused very clear anomalies. The interpretation shows that the unit comprised 12 or 14 subunits – *turmae* (Fassbinder/Pietsch 2007). In contrast to its layout of the barracks parallel to the main road, at Pförring, Roman *Celeusium*, the magnetogram shows an arrangement of the barracks parallel to all four sides (Fig. 3). The reason for this untypical layout allowing the accommodation of 14 subunits is unknown yet. However, the magnetic prospecting clearly showed that the garrison of this 3.9 ha fort must have been a cavalry unit as the front rooms of each barrack contained drains, often filled with burned debris causing quite high anomalies. This has been interpreted as evidence for men and horses living under the same roof with the animals (three?) in each front room and the men in the back room (Fassbinder, Sommer and Berghausen 2007).

A side product of this additional research was the formulation of standards for geophysical prospecting (see appendix). In parts they refer to the 'Standards of good practice' issued by English Heritage. As the new standards are circulated through the Deutsche Limeskommission they will set the standard for all geophysical work along the *Limes* in Germany.

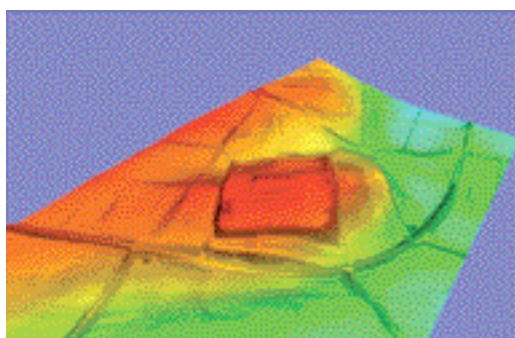


Fig. 5 LIDAR-scan of the fort of Pförring and its surrounding from southwest (Copyright: Bayerische Vermessungsverwaltung)

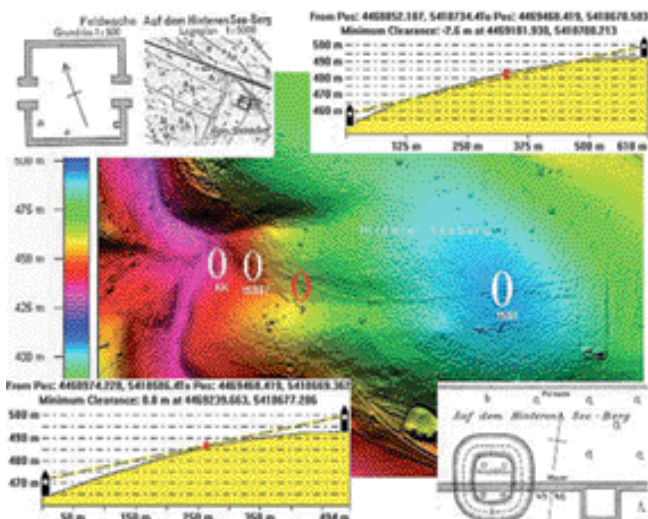


Fig. 6 Raetian Limes, Germany. Study about the intervisibility of towers 15/22? and 15/23 (top right) and a possible new tower and 15/23, based on LIDAR-scan (Copyright: BLfD, H. Kerscher; Bayerische Vermessungsverwaltung)

3. Airborne Laserscanning

In recent years airborne laserscanning (LIDAR) developed into the standard method of topographical survey used by many ordnance survey units in Europe. From the beginning, it was clear that the method had such accuracy that very faint topographical features (Fig. 3) and even small-scale archaeological elements, like watch-towers along the *Limes*, are revealed. Data provided by the Bavarian topographical unit (Bayerische Vermessungsverwaltung) showed not only the WHS itself but also anomalies which can be interpreted as parts of the infrastructure for the erection of the Raetian Wall, i.e. a sequence of small quarries along its course in the Köschinger forest (Fig. 4) or the structure of the surrounding military civil settlement (Fig. 5). Additionally, the digital terrain model led to a discussion of the position of some of the presumed watch-towers. Now, through view-shed analysis it has become possible to assess the visibility from tower to tower in a more accurate way (Kerscher 2007; Fig. 6).

The clearness in which this method shows even the slightest elevations not only in open terrain but also in forests (when not too dense) was the reason to commission a laserscan of the whole line of the Raetian *Limes* in Bavaria. The higher density of measure points will be the basis for future research but also for presenting the evidence to a wider public. The method is a perfect way to document quickly archaeological remains even in remote areas inaccessible on foot.

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Standards for geophysical prospecting in Bavaria see
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Fig. 1 Excavation work in the fort of Rusovce, Slovakia (Photo: J. Schmidtova, City Museum Bratislava)



Fig. 2 Model of the villa rustica in the local museum at Rusovce, Slovakia (Photo: J. Schmidtova, City Museum Bratislava)



Fig. 3 The presentation of finds from the site of Rusovce (*Gerulata*) in the local museum (Photo: City Museum Bratislava)

DOCUMENTING THE FRONTIERS OF THE ROMAN EMPIRE WORK ON THE DANUBE LIMES IN AUSTRIA, SLOVAKIA, HUNGARY, ROMANIA AND BULGARIA

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The following compilation of FRE project results in documenting the Roman frontier in Austria, Slovakia, Hungary and Bulgaria relates to the similar nature of the monuments connected by the river Danube. Most work was done as a preparatory research for presenting the Danube *Limes* for inclusion on the UNESCO WHS list.

Austria

The situation in Austria, in which the concerns of culture are divided among different authorities of the Federal and Provincial governments, has led to the decision to concentrate the FRE project activities on recording and unifying the available mass of information on the Roman *Limes* in Austria in a database. These data records are now and for the first time available via the Web (www.limes-oesterreich.at). This approach was chosen as a first step to create a network of information for all interested parties to bridge the legal and administrative problems concerning a future Austrian WHS application.

The records encompass all the Roman military installations, sites and ancillary features along the Danube from Passau/Haibach in Upper Austria to Hainburg in Lower Austria and beyond. The concept was that the entire information about individual sites of the frontier is presented uniformly in content and cartography. The detailed data records present all the individual features of sites, such as forts and fortresses, watch-towers, adjacent civil settlements and funerary sites with bibliographical references. This includes the description of all archaeological interventions at a site, which were recorded and published over the time by various scientific institutions. Historic maps are provided, which demonstrate the topography and environment of the sites before the regulation of the Danube river in the middle of the 19th century. Evidence was also gathered through site visits and archive work. Entries were created which demonstrate the present state of the monument – including a photographic documentation and if and which parts are scheduled. The work programme involved the collection of tourism information and Google maps show the location of sites and museums. The presentation of the Roman frontier in Austria is supplemented by a short DVD, which was produced by Boundary Productions.

In the set up of the central database the Austrian project partner collaborated with Dr Christine Schwanzar of the Landesmuseum Linz. Dr Sonja Jilek prepared the website structure and the general information about the *Limes* in Austria. Kurt Schaller from the Cultural Computing Heritage Institute provided the technical background for the national website on the Roman frontier in Austria with the help of Jakob Egger. The detailed entries to the individual sites were collected by Eva Kuttner.

This dataset, accessible to the public as well as to the bodies involved in the heritage management of the Austrian *Limes*, provides a tool for the further interpretation and exploitation.

The Austrian project partner also prepared a new digital and interactive map of the frontiers of the Roman empire in the mid second century for all project relevant publications and media: the FRE web portal, the national websites, the FRE DVD, the poster exhibition and for many other publications and presentations. The documentation work was done by Andrea Faber supported by Kurt Schaller and Jakob Egger.

Slovakia

Rusovce (*Gerulata*)

Excavations in the village of Rusovce

The rescue excavations in Rusovce concentrated on the Roman fort (Fig. 1) as well as on the civil settlement. Two new ditches were found, one of the first earth-and-timber fortification, the second belongs to the buildings phases of the 2nd or 3rd century fort. Excavations brought to light parts of the internal building structure of the stone fort, beside older features from the La-Téne period. In the civil settlement a house, built from stone, was found. It belongs to the 4th century AD and had two building phases.

The reconstruction model of the villa rustica in Čunovo

The military site of Rusovce is connected with its hinterland by major roads. Road connections exist to the Amber Route and to Carnuntum (A), the neighbouring capital of *Pannonia Superior*. In the districts of Jarovce, Rusovce and Čunovo the City Museum Bratislava investigated 11 archaeological sites of the 2nd and 3rd century AD. The site in Čunovo, which was excavated by the City Museum Bratislava in 1995, turned out to be a villa rustica with 6 individual building structures enclosed by a stone wall. Most of these settlements, which were occupied by former Roman soldiers, were involved in the supply of the Roman troops at the fort of Rusovce (*Gerulata*). The Culture 2000 project provided the opportunity to create a reconstruction model of this important site, which is now presented in the local site museum at Rusovce (Fig. 2 and 3).

The Iža (*Kelemantia*) project – summer school of archaeology

The Institute of Archaeology of the Slovakian Academy of Sciences organized in collaboration with the Department of Classical Archaeology, the University of Trnava (SK), the Institute of Classical Archaeology Charles University Prague (CZ), the Institute of Archaeology Jagiellonian University Kraków (PL), the Institute of Archaeology Warsaw University (PL) and the Office of the Village Iža in the area of Roman fort the summer school of archaeology in the period from 1 July to 24 August 2007.

The aim of the project was to educate and train young professionals in the field of excavation, restoration, protection and presentation of an ancient frontier monument (see Breeze and Jilek in this vol. 7–14, Fig. 4). The project was intended as a summer school course for university students of archaeology and history under a professional leadership, including contact with visitors and tourists. The project was prepared as an alternative form of archaeological research, with lectures, excursions and workshops. During the excursions the following Roman sites and museums were visited: Komárno (SK), Komárom and Győr (H), Rusovce (SK) and Bratislava (SK).

The FRE Culture 2000 project enabled the students to apply their theoretical knowledge in practice and to broaden their knowledge about the documentation and preservation of a Roman frontier monument in the middle Danube region. Details of the project about the Roman fort of Iža can be found on the website, which is presented in four languages (Slovak, German, English, Hungarian) (<http://www.archeol.sav.sk/kelemantia/>)

Castle Devín

The castle of Devín is among the most significant historical sites in the Middle Danube region (Fig. 4), representing a long history from the Stone to the Middle Ages. It is situated close to the crossing of the Amber Route. The City Museum of Bratislava has carried out systematic research since 1965 and administers and uses the castle area as a top grade tourism attraction.

The FRE Culture 2000 project activities concentrated on the Roman phase, when the Roman empire moved its boundaries to the Danube at the end of the 1st century BC. During this time Devín was incorporated as a strategic outpost in the sophisticated fortification system on the limits of the empire. The project work in Devín concentrated on the preservation of the Roman remains and finds, which are presented at the local museum. Small scale excavation took place in the lower parts of the castle area, where the Roman presence could be acknowledged.

Hungary

The FRE Culture 2000 project activities concentrated on the improvement of the Hungarian *Limes* database. It was developed by the Seminar of Archaeology of the University in Pécs on the basic elements created by Zsolt Visy. Maté Szabó worked on the collection of the aerial photographs and managed the entries into the Hungarian *Limes* database. Together they prepared a general map of the Pannonian *Limes* including all fortresses, forts and watch-towers (Fig. 5). Colleagues from many regional and local museums and scientific institutions were involved to gather the archaeological material for the Roman *Limes* sites. This includes topographical details, the description of monuments and management references.

Additional information was gained by aerial photography. Together with Dr Otto Braasch the whole length of the Hungarian frontier has been surveyed during the last 3 years. A lot of pictures with new and important site information were incorporated into the *Limes* archive. The Computer and Automation Research Institute of the Hungarian Academy of Sciences prepared a 3-D reconstruction of the fort of Intercisa, where the general map and the main instructions were given by Zsolt Visy. Csaba Pozsárkó prepared the plans for the reconstruction, which will lead to set up a chronoscope in the area of the fort of Intercisa.



Fig. 4 Exploring Castle Devín by foot, Slovakia (Photo: City Museum Bratislava)



Fig. 6 The ruins of the hospital in the legionary fortress of *Novae*, Bulgaria (Photo: CAR Novae, P. Dyczek)



Fig. 5 The remains of the Roman watch-tower of Nográdveroca close to the river Danube, Hungary (Photo. Zs. Visy)

Bulgaria

The project activities of the Polish partners were concentrated on the Roman frontier in Bulgaria, especially on the area around and in *Novae* (see Sommer et al in this vol. 128–39, Fig. 12). All maps presenting the Bulgarian part of the *Limes* from ancient times to the 20th century have been gathered. This record will be published in the first volume of the *Novae* excavation monograph. Part of this material was acquired during a study visit to the RGK in Frankfurt. The majority of the documented Roman remains were drawn on terrain maps, including Roman fortifications and roads behind the frontier line. All documentation regarding *Novae* and other *Limes* sites is stored in a digital archive; this included copying old glass-slides. The digital databases concerning the site information and the material from *Novae* have been updated. New plans, which show the individual construction phases of *Novae* from the 1st through the 14th century have been prepared. Analysis of satellite and aerial photography, which has been carried in the *Novae* region, brought new information about topographical details in the settlement structure, which can be used as a preparations for further geophysical research. The finds project included chemical analysis of pottery, as well as DNA sampling and C¹⁴ dating.

It may well be said that the documentation work at *Novae* began in the 17th century. At that time the description of a diplomatic journey in 1691 was published by Luigi Fernando Marsigli (Marsigli 1744). His *'Description du Danube'* included the first description of the ruins at *Novae*. They also were mentioned in various documents related to the crossing of the Danube by Russian forces on July 14th 1877. V. Mančev's book (Mančev 1982) include the notion of the ruins of a theatre to the east of *Novae*. *Novae* also appears in many geographic descriptions from the time of the Ottoman Empire. An important source is also the article on Roman roads in northern Bulgaria published in 1905 by Karel Škorpil (Škorpil 1905), that included a plan of *Novae*. Between the World Wars, S. Stefanov published information on the routes of Roman waterways and roads (Stefanov 1928/29). The landscape survey carried out in spring 2006 on the Bulgarian *Limes* and the surroundings of *Novae* as well as aerial photography analysis (Fig. 6) allowed additional documentation of the ancient remains. An iconographic documentation for the current state of preservation of sites between Vidin (*Bononia*) and Silistra (*Durostorum*) has been prepared. Some of the ruins have been copied into topographic maps in scale. The aerial photos of *Novae* and surroundings allowed to recognize elements of late Roman architecture and the main roads leading to the fortress. Also parts of the Roman road leading from antique *Dimum* (Belene) to *Melta* (Loveč) and the main Danubian road around *Dimum*, *Novae* and on the stretch *Novae* and *Iatrus* were identified.

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GEOPHYSICAL SURVEY ON THE ANTONINE WALL

Claire Stephens (GSB), Richard Jones (University of Glasgow) and John Gater (GSB)

This paper presents selected results of ongoing geophysical investigations commissioned by Historic Scotland and carried out by GSB Prospection Ltd. and the University of Glasgow along sections of the Antonine Wall in Scotland (Fig. 1). The initial aims of the project were to identify and accurately locate the key elements of the Wall and the associated Military Way, with particular emphasis on the latter as it is the least documented element of the frontier system, within narrow (40 m wide) strips, and seek to identify the location of civil settlements with larger-scale surveys: the former survey work was undertaken by GSB and the latter by Glasgow University. Following a review of the first phase of work, the survey strategy was changed. Instead of attempting to locate the individual linear features in narrow strips investigated by both magnetic and resistance survey techniques, extensive gradiometer survey was carried out at each site, with smaller areas of resistance survey at key locations. With larger areas it is often easier to discern patterns in the results, thereby aiding interpretation. It was also hoped that geophysics might be able to locate the large post-holes of towers within the base of the Wall (if they existed), especially over those areas where the rampart is believed to have been largely destroyed. The opportunity was taken to improve our knowledge of fortlets. The project as a whole probably represents the most-sustained programme of geophysical survey in Scotland to date on sites belonging to a single monument.

Geophysical survey has a well-established track record in successfully revealing detail at Roman sites in England, both military (Gaffney and Gater 2003, Chapter 7) and civilian (for example on Hadrian's Wall by Biggins and Taylor 1999, and in parts of Wales by Gwynedd Archaeological Trust reported in recent volumes of *Britannia*). Corresponding effort north of Hadrian's Wall, although smaller scale, has yielded encouraging results, as indicated at Drumlanrig (reported in *Britannia* 36 (2005) 401), on the Gask Ridge by D Woolliscroft (see *Britannia* 36 (2005) 395–7) and on the Antonine Wall and at Ardoch (Jones, Johnson and Leslie 2006).

Introduction

The Antonine Wall was built in the reign of the Emperor Antoninus Pius and constructed in the years following 142, the Wall remaining in use for about a generation. The frontier extended from the River Clyde in the west to the Firth of Forth in the east, a distance of nearly 60 km (40 Roman miles) and for much of its length runs along the southern edge of the central valley of Scotland. Forts were positioned at roughly 3 km intervals along the southern edge of the Wall, 17 of which have currently been identified. Additionally smaller fortlets are thought to have existed at intervals of 1 Roman mile along the Wall, although only nine have so far been identified (Breeze 2006).

The Wall comprises four elements: ditch, rampart, berm, and outer mound, of which the first two are the key components. The first excavations across the Wall were carried out between 1890 and 1893 and since then a considerable amount of archaeological information has been amassed regarding the make-up and dimensions of the key elements, in particular the ditch and rampart (e.g. Keppie 1974). From this, a set of "standard" measurements has been derived (e.g. Robertson 1979); although considerable variations are noted at several points.

Running to the south of the Wall, the Military Way formed the main transport route along its entire length and, as such, is a key component of the frontier system. It was constructed of cobbles with drainage ditches on either side and was between 4.8 m and 5.4 m wide. The exact position of the road with respect to the Wall has proved more difficult to determine conclusively. As a relatively shallow surface feature it will have been subject to a greater level of damage/destruction than the rampart or ditch and by the early 20th century long sections of it had disappeared: Macdonald (1934, 93) stated that '*for a large part of its course it has been either buried or torn up so completely that its disappearance must be regarded as absolute*'. Where it has been identified, its position – between 15 m and 45 m to the south of the Wall – shows con



Fig. 1 Sites investigated by geophysical survey (Photo: GSB & Glasgow University)

siderable variation and there are indications that in places it may lie even further south. In particular, the line of the road deviated from the Wall at all but three of the forts, where it seems to have formed the *via principalis*.

As a result of the now discontinuous nature of the visible archaeological remains of the Antonine Wall, mapping is essential in demonstrating that it is in reality a single unified monument. The management of the Wall as a whole relies on the accurate plotting of its entire course (see Jones and Thiel in this vol. 99–105).

Antiquarian maps of the Wall were based entirely on the visible surface remains. They are of little use in a modern context, not only because of inaccuracies in measurement, but also because, in places, their interpretation of those remains was questionable or contradictory (a full assessment of these sources is given in Macdonald, 1934, 74–95). The first usable map of the Wall was produced by the Ordnance Survey, based on the comprehensive research of Sir George Macdonald, including his own excavations (Macdonald 1934). The line was reviewed in 1951 and again in 1980 when the OS undertook a thorough revision of the Wall line, entailing a complete resurvey of the monument, collating all information on the monument and incorporating new evidence from excavations and aerial photographs (Linge 2004). The results of this work now form the established modern line used on all subsequent OS mapping. The plan is to a certain extent, schematic: topographic depiction is only used in areas where the elements survive as coherent well defined features, for the remainder of the route the ditch and rampart are represented as paired parallel lines based on standardised measurements established by Keppie (1974). Also of particular note is that the Military Way is only shown where '*the course is known with any certainty*' (OS 1980). Too few sections of this feature survive to enable a reasonable extrapolation between them.

Geophysical survey: methodology and techniques

In theory, the key elements of the monument should present “straightforward” targets for geophysics. In practice, investigation of the Antonine Wall, running through sections of the Central Belt of Scotland which have seen major settlement, industrial and agricultural developments particularly during the last two centuries, has to confront significant challenges. More specifically, the identification of the key elements is often complicated by factors in addition to those of geology and archaeological uncertainties; they include modern intrusions such as pipe lines, post-medieval agricultural activity, the construction in the 18th century of the Forth–Clyde Canal, which impinged on Auchendavy, and perhaps most serious of all at certain sites, the remodelling, also during the early 19th century, of the land around the fort (Stuart 1852, 327). As an example of the geological factor, survey at Castlecary first by GSB (1994) and later by Glasgow University (Jones, Leslie and Nelson 2007) revealed widespread magnetic noise in the data set which was the product of the underlying igneous geology. As a result, recourse was made to electrical survey. In addition, there are issues associated with the expected geophysical signature of certain features. For instance, geophysical investigations along Hadrian’s Wall (Gater 1981) have demonstrated that the Vallum ditch often shows

as a high resistance anomaly, contrary to the theoretical norm. This is due partly to the size of the ditch which is broadly similar to that associated with the Antonine Wall. In the case of the rampart and Military Way, the poor state of preservation of these elements makes them anything but 'straightforward' to identify. Given the difficulties, a variety of geophysical techniques have been employed in an attempt to resolve the varying issues. There is insufficient space in this paper to describe the above techniques in detail; full explanations can be found in Gaffney & Gater (2003).

All the sites discussed below were investigated by magnetic (fluxgate gradiometer) survey. Resistance survey also featured, but in Glasgow's case only to a limited extent in view of its disappointing performance in previous surveys of Roman sites in central Scotland (Jones, Johnson and Leslie 2006). At most of the locations investigated by Glasgow where the emphasis was on exploring the areas immediately adjacent to the fort, magnetic survey deliberately included parts of the fort as a convenient means of monitoring the response from the forts' ditches and known features within. Ground-penetrating radar (GPR) survey was carried out at selected sites in an attempt to clarify the nature of certain magnetic and resistance anomalies. In the first phase of work, Electrical Imaging and Seismics were also employed, but the results yielded insufficient additional information to merit their continued use (GSB 2006a) and they are not discussed in this paper. Magnetic susceptibility measurements were taken on a limited basis at Auchendavy and Carriden.

The magnetic survey was carried out using Bartington Grad 601-2 instruments; data were collected at 0.25m intervals along traverses spaced 1 m apart. The resistance survey utilised a Geoscan RM15/MPX system in a twin probe configuration with a 0.5 m probe separation; data were collected at 1 m intervals with a traverse spacing of 1m. GPR data were collected either with the Sensors & Software Noggin Plus Smart Cart or a Pulse Ekko 1000 instrument using a 225MHz antenna (Glasgow: Utsi Electronics Groundvue 1 using a 200-600 MHz antenna). With both systems, readings were logged continuously along the traverse; the number of traverse spacing varied from site to site. A Bartington MS2D coil system was used to measure magnetic susceptibility at 5 m intervals along traverses arranged 5 m apart. For all the techniques, the traverses were aligned roughly perpendicular to the Wall to maximise the definition of any resultant responses.

Results

To date, seven locations have been investigated by Glasgow University and eleven locations by GSB, of which five examples are discussed below.

The rampart and ditch

Balmuildy Bridge (Fig. 2) (NGR: NS 580 718)

The line of the Wall as it runs first northwards and then westwards from Balmuildy fort is relatively well mapped, with the ditch visible at several places as slight depressions in the field boundaries. It was hoped that investigations here could identify typical or "signature" responses for the main elements of the Wall and the Military Way. Magnetic and resistance surveys were carried out in five areas, each 20 m wide and varying in length. For the resistance survey, in addition to the 0.5 m twin data, the areas were re-surveyed using a 1.5 m probe separation to assess whether the slightly greater depth penetration would prove beneficial. Single lines of GPR data were collected in two of the areas. The topography is undulating, with some steeper slopes and the land use is mixed arable (ploughed and young crop) and grazing (short pasture). The results are summarised below and data plots for three of the areas are shown in Figure 2.

The ditch was clearly identified by both resistance and magnetic techniques; it appears as a combination of high and low resistance linears R1, and a broad coherent negative magnetic anomaly, with some adjacent narrower, positive responses M1. The resistance anomalies are better defined in the 1.5 m twin probe dataset which might be expected as this probe separation is sampling the feature at slightly greater depth, without the background noise produced by surface variations. The high resistance and negative magnetic results are the opposite of those typical for a ditch; however, the interpretation was confirmed by the GPR survey which showed a clear reflector with a V-shaped profile G1 in the radar gram. The anomalies coincide roughly with the mapped position of the ditch, confirming its position.

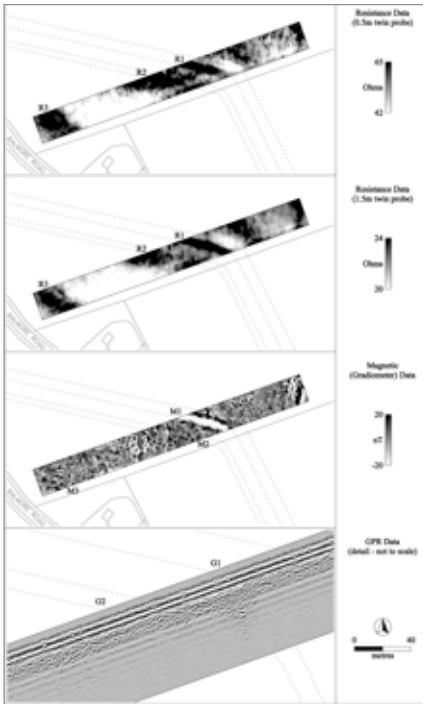


Fig. 2 North and west of Balmuldy Bridge: Resistance, Magnetic and GPR results (Photo: GSB)

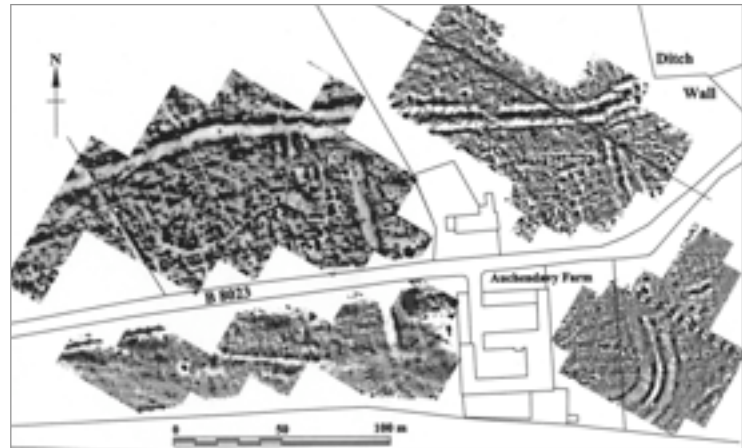


Fig. 3 Grey-scale plot of the earlier magnetic survey at Auchendavy reported by Jones, Leslie and Johnson (Photo: Glasgow University)

That the ditch should produce a high resistance response is not entirely surprising; given the evidence from other sites (for example, Hadrian's Wall, Gater 1981). High resistance anomalies are possible where the ditch fill comprises densely packed material and/or is better drained (i.e. drier) than the surrounding matrix. The results from the magnetic survey are somewhat more unexpected and difficult to explain. The characteristic positive ditch type response is caused by a build up of magnetically enhanced materials in the fill. Even if the upper layers of the ditch had been filled with highly magnetic material (e.g. brick or cinders as part of a deliberate modern infill) one would expect a band of noise with many individual dipolar (positive/negative) responses, rather than the very clean pronounced negative seen in the results. One possible way in which such an anomaly could arise is if a ditch were cut into an extremely magnetic material, such as an igneous deposit. In this case, the igneous material would produce a generally high background (as is detected here); cutting the ditch would remove some of this magnetic material, and replace it over time with less magnetic soil infill and this would result in a pronounced negative gradient over the ditch.

Since the majority of the rampart has disappeared, detecting its remains depends largely on the state of preservation of its stone/cobble base. An intact base would be expected to produce a discrete high resistance linear. The magnetic response over the rampart depends on the properties of the stones; either a discrete band of noise (if the cobbles are magnetic) or a well defined band of negative or reduced response (if the stones are non-magnetic). No such definitive magnetic or resistance anomalies were identified in any of the survey areas.

The responses expected over an intact Roman road are similar to those expected from the rampart base; that is; high resistance and either noisy positive or negative/reduced response in the magnetic data, depending on the presence or absence of metallurgy and the properties of the underlying cobbles. Two of the survey areas produced anomalies on an alignment that might suggest an association with the Military Way, though the interpretation is far from certain. In Figure 2 the anomalies in question are R3 and M3, located roughly 45 m from the mapped rampart line. The band of high resistance R3 is somewhat amorphous in the 0.5 m data, becoming more discrete in the 1.5 m results, suggesting the feature is buried slightly deeper. Since the road was a surface feature in antiquity, one might expect it to appear more clearly in the shallower data-set. However, the anomaly is in the lowest part of the field and it could be that an increased amount of topsoil overburden is present. At its most coherent, the response is some 9 m wide, roughly 4 m wider than the standard dimensions of the road. M3 comprises three short parallel positive magnetic anomalies, spaced roughly 4 m apart (slightly narrower than standard road dimensions) giving a maximum width for the group of approximately 8 m. The anomalies are indistinct and do not continue

across the width of the survey area. Between them the data are marginally less noisy than the surrounding area, but could not be classified definitively as “reduced response”. Clearly there is a buried feature here of some sort; but whether anthropogenic or natural, modern or ancient is difficult to determine

The survey indicated that, despite complications arising from natural/geological factors, the ditch should prove easily detectable, but was likely to take the forms opposite from the theoretical norm. It failed to identify any “characteristic” responses that could be associated with the rampart or Military Way and highlighted, in particular, the problems of identifying and interpreting less distinct or weaker linear anomalies in a narrow survey strip. In subsequent surveys a width of 40 m was used, where possible, for all survey areas. Comparison of the two resistance data-sets suggested that surveying with a wider probe separation, while producing clearer results over the ditch, would not significantly assist in identifying the near surface features.

Glasgow University also picked up the ditch a part of their wider work at the fort. (Fig. 7). As a marked negative magnetic anomaly, its course is clear enough, somewhat less so at the eastern extremity of the survey. Over the 100 m eastwards from the fort the ditch is c. 8 wide and the upcast on the northern side is evident as narrow positive anomaly. In the corresponding electric survey to the north-west of the fort the ditch shows up well with a 10 m width and low resistivity signature.

Auchendavy (Fig. 3) (NGR: NS 678 749)

At Auchendavy Glasgow University traced the ditch with ease to the west and in front of the fort, but with considerably less ease to the east (GPR also detected the ditch on the fort’s north-west corner, as discussed below). The ditch appears as a typical negative magnetic anomaly as it runs from the west to within 40 m from the north-west corner of the fort, whereupon it becomes not only markedly broader – 12–14 m wide – but its signature changes to a sandwich effect of a central positive anomaly (which may be the ditch’s drainage slot) flanked by two bands of negative values which are themselves flanked by two very narrow positive bands. Whatever the explanation of that characteristic of the ditch, it continues up to, but apparently no further than 25 m east of the fort to the edge of the modern field where the present-day terrain deteriorates in the form of an area of poor drainage, a field boundary, a prominent modern ditch running parallel with that boundary, as well as several fences. Despite the difficulties encountered in surveying there, a short stretch of the ditch was detected where it is clear it has reverted to the narrower form it takes to the west of the fort. Frustratingly, the ditch’s eastward course is unclear: it could either follow the line of the modern fence or turn to the north-east. If the latter option is preferred on the grounds that the ditch follows the natural contour, then for whatever reason the ditch has not been detected in the north-east sector of the survey area. As for the Wall itself, this may be evident, albeit weakly, immediately south of the narrow linear positive anomaly behind the ditch.

Shirva (NGR: NS 688 754)

The line of the Wall between Wester Shirva and Shirva farms is uncertain. Macdonald (1934) places it north of the modern road, following a “dog leg” course, while the OS 1980 survey argues for a straight line south of the road. More recently, investigations by CFA suggest a location north of the road, but with a less pronounced angle than Macdonald’s line (Glendinning 1998; Glendinning & Cressey 1999). Accordingly, GSB was asked to try to identify the correct line of the Wall here.

The results in the fields closest to Wester Shirva Farm are badly affected by ferrous disturbance from pipes and surface debris, while the most of field south of the road between the Board Burn and Shirva farm was severely boggy and overgrown, precluding successful data collection (thus the line postulated by the OS could not be fully investigated). Despite these complications, the ditch has been identified as discrete negative anomalies M10 and M11, following a line that accords most closely with the CFA results.

South of M10 several positive and negative anomalies have a position and alignment that could associate them with the rampart. Most of these are linear, but a few larger “pit-type” responses are also present, that could represent postholes containing a magnetically enhanced fill. However, the overall pattern of the results is confusing and analysis is hindered by modern disturbance and natural factors, making any interpretation tentative. In the vicinity of M11, the rampart is likely to lie close to or under the modern field boundary and road and has therefore not been identified.

The Military Way

Cleddans Road (Fig. 4) [NGR NS 50520 72260]

This area is located on the south-eastern outskirts of Duntocher, immediately south of Cleddans Road and roughly 500 m east of the A8014. The ground adjacent to the road is generally flat, sloping downwards to the southern edge of the field. The ground cover at the time of survey was rough pasture.

In 2000 the Centre for Field Archaeology (CFA) carried out excavations at Cleddans prior to the laying of an underground electricity cable (Strachan 2000 and Cameron 2000 also in Dunwell *et. al.* 2002, 288–293). These identified sections of the outer mound and ditch in the golf course north of Cleddans Road and the rampart and Military Way south of the road. Both the rampart base and the Military Way lay between 0.3 m and 0.6 m below the ground surface. The Military Way consisted of a slight depression c. 4 m wide and 0.10 m deep which contained an ill defined spread of small to medium size pebbles within a silty-clay deposit. A ditch c. 0.35 m wide by 0.29 m deep was identified south of and parallel to the pebbled area. The feature lies approximately 18 m south of the rampart, and is described as running “roughly parallel” to the Cleddans Road (Cameron 2000).

This areas was chosen for survey by GSB in the hope that it would be possible to identify the Military Way adjacent to this known instance and establish a “typical” response pattern for the road (GSB 2006b). As a test site the ideal location of the survey grids would be immediately adjacent to the excavation trench. Unfortunately, at the time of survey, the entire north-western corner of the field (the area of the electricity works) had been cordoned off by steel fencing and wooden boards placed over the ground surface, precluding any data collection in the immediate vicinity.

The range of resistance values in this block is significantly narrower than those recorded in the previous and following examples and the magnetic data are comparatively “quiet”. This is probably due in part to the fact that the survey area is limited to level ground having a fairly uniform (and substantial) depth of soils and subsoil’s over bedrock. An intact Roman road would be expected to produce a high resistance linear response. If much of the cobbling had been removed, the shallow depression of silty clay described in the excavation report might still be detectable as a lower resistance anomaly, but only if the depression had retained moisture, compared to the surrounding matrix.

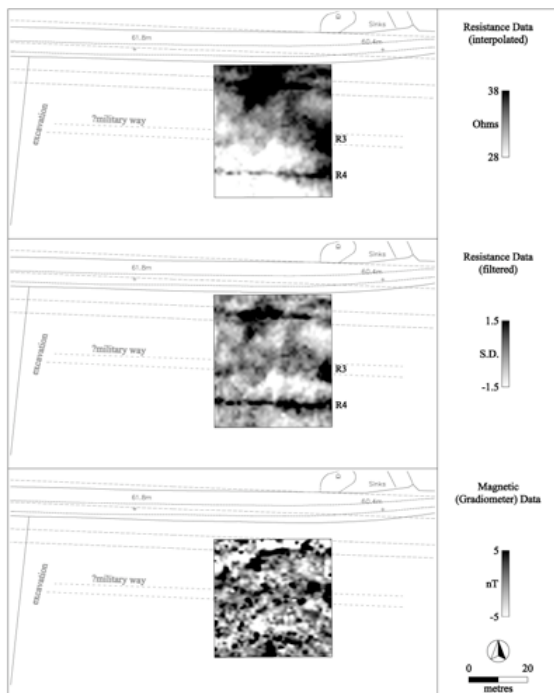


Fig. 4 Cleddans Road: Resistance and Magnetic results (Photo: GSB)

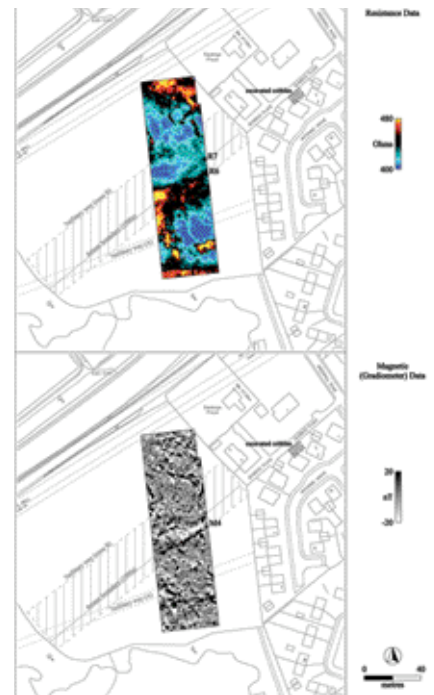


Fig. 5 East of Seabegs Wood: Resistance and Magnetic results (Photo: GSB)

No linear high or low resistance anomalies are present on the projected line of the Military Way. High resistance response R4, most distinct in the filtered data, occupies the correct position but is not linear. A wider area of high resistance extends from this, but appears to curve away to the north. The significance of these anomalies remains unclear, but natural factors seem most probable. No linear magnetic anomalies are present along the projected line and there are no obvious reflectors in the GPR data to suggest the presence of a road surface at this location. It may be that the road has become even more denuded across the survey area, but this seems unlikely over such a short distance. If the projected line of the Military Way is correct and the road survives as described in the excavation report, this level of preservation is insufficient to be detected by geophysical means.

A discrete high resistance linear R5 runs parallel to the rampart and c. 28 m to the south; it varies in width, from c. 4 m at the less well defined eastern end to only 1 m (a single reading) in places. It is too narrow to reflect the road surface, but an accumulation of cobbles in and around the roadside ditch could produce such a response. However, a rubble filled field drain would produce the same kind of anomaly. The GPR survey has recorded a linear anomaly corresponding to R5 but the form of the response is no help in assessing its precise origin. The feature does not appear in the magnetic data, indicating only that the feature is non-magnetic in nature (thus not a brick or clay drain). As such any potential significance attached to this response is highly tentative. If it is associated with the Roman road this would indicate the feature deviated from its strictly parallel course for some reason.

At the northern edge of the grid, a zone of high resistance is present within which a more discrete linear anomaly can be discerned. This has the correct position and alignment to be associated with the rampart and seems likely to reflect partially intact remains of this feature. Although natural factors cannot be entirely discounted, it seems probable that a spread of cobbles and silty clay from the rampart have contributed to the broader zone of high resistance.

Parallel positive and negative magnetic linears are present at the same location; the responses do not extend the full width of the survey area and the negative anomaly lies on the grid edge (the survey was not expanded to the field edge to avoid magnetic disturbance from the wire fence). They follow the line of the rampart and may therefore be significant, though without the corroborative map, excavation and resistance evidence, an archaeological interpretation for these would be highly tentative. If an archaeological interpretation is correct, the negative anomaly could indicate the rampart edge stones (non magnetic sandstone) while the positive responses reflect a build up of magnetic soils at the rampart edge.

Seabegs Wood (Fig. 5) (NGR: NS 81760 79440)

This survey area occupies a pasture field situated between Seabegs Wood to the east and Seabegs Place (now modern housing) to the west, bounded to the north by the B816. The central portion of the field occupies a high ridge; the ground slopes relatively steeply down to the north and south. At the time of survey, the ground cover was rough grass. The line of the Wall across the field is generally uncontroversial – lying at the northern edge of the field and shortly thereafter running under the modern road – and was not a target for investigation in this area.

The Roman road survives in Seabegs Wood immediately west of the field, apparent mostly as a level track with loose stones, but in places surviving fully intact, with a width of c. 5 m. Sections cut across the road revealed a standard construction of compacted cobbling. In 1989 an evaluation was carried out in the field immediately east of the current area prior to construction of the modern housing (reported, but without plans or illustrations, in Keppie et. al. (1995) 629–630). The excavations revealed a shallow topsoil cover (in places as little as 0.2 m). The only archaeological feature identified was a slight depression (approximately 10 m long c. 7 m wide and 0.7 m deep) within which was found random stonework comprising rounded cobbles, lying under a primarily Victorian overburden. No definitive dating evidence was found and the interpretation of this feature was uncertain. It was thought either to relate to the Military Way or to be medieval in date and associated with the Place of Seabegs. The approximate position of this feature, based on the descriptions, is shown in Figure 3 as “excavated cobbles”.

The possible course of the Military Way across the current investigation area is unknown. Continuing in a straight line from its mapped position in Seabegs Wood would place it at (A), a route that seems less like-

ly as it increasingly diverges from Wall. Based on the above mentioned excavation results, antiquarian observations (described in OS 1980) and Macdonald's working maps held in the OS archive, the line of the Roman road is likely to be somewhere in zone (B). Unhelpfully, from the geophysical point of view, a former boundary shown on early 20th century maps (but not those from the 1800s) is also present in this zone.

A broad band of high and very high resistance extends across the centre of the survey area. Natural factors are likely to have contributed significantly to these values, but at the eastern end hints of a more discrete linear R6 can be discerned, which could reflect the denuded remains of a cobbled feature such as the Military Way. However, its edges only appear with any clarity in filtered data and it does not extend the full width of the grid, making the interpretation tentative. Occupying the same position, anomalies M4 comprise a relatively well defined positive linear and a shorter, less distinct negative band, with a maximum width of c. 5 m. Elsewhere along the Wall, this pairing of parallel positive and negative linears has been associated with substantial ditch features, where the ditch has been cut into the natural. However, in this case the negative anomaly does not extend the full width of the grid and it could reflect the denuded remains of a (non-magnetic) cobbled surface with the positive response representing one of the roadside ditches. This, though, is only one of many possible interpretations (e.g. a boundary ditch, or drainage feature). There is an added element of caution to this interpretation as the GPR survey suggests the presence of a substantial ditch or natural hollow at this point. It is possible that such a feature, infilled over time, would provide a reasonable surface on which to construct a road, but this is purely speculative.

Anomaly R7 although weaker, is more distinctly linear. It is only c. 2 m wide, therefore too narrow to reflect an intact cobbled feature, but might have been produced if material from the road had collected in and around one of the roadside ditches. If this were the case R7 might indicate the northern edge and R6 (see above) the southern edge with the space between them (roughly 4.4 m wide) marking the line where the road once ran. It should be stressed however, that R7 coincides with the former boundary and may equally reflect the remains of this early 20th century feature.

A group of high resistance anomalies and trends have been detected on the lower ground at the north end of the field. Some of these lie within a broader area of high resistance and have only been highlighted as a result of filtering; nonetheless they appear to form a broadly rectangular pattern with dimensions of c. 20 m by 25 m and hints of possible internal divisions. As such, they could indicate structural remains. The responses are aligned with the Antonine Wall and situated approximately 15–20 m from the mapped line of the rampart and may, therefore, reflect associated features.

Balmuilty, Auchendavy, Westerwood and Castlecary

Glasgow University investigated the Military Way at four sites. To the east of Balmuilty it was sought by on the south side of Balmuilty Road in Area F (Fig. 7), but neither magnetic nor electric survey convincingly revealed any traces of it. In light of this, Jones, Leslie and Nelson (2006) suggested that the road may follow the Balmuilty Road thereby skirting the fort to its south. At Auchendavy, survey in the north-west field revealed a narrow positive anomaly, (Fig. 3) close to the modern road which itself is thought to follow the course of the Military Way; the anomaly is more likely to be associated with the edge of the field than to the MW. Results were better at Westerwood where a clear stretch of the road with a hint of a ditch running along its northern side, is evident in the magnetic survey. Running from the fort's west gate, 5–5.5 m wide and ending abruptly after 30 m, its course can be ascertained to continue probably for a further 40 m westwards (Fig. WW1). The Military Way on the east side of the fort at Castlecary is evident only as an ephemeral low resistance 'shadow' of limited extent (Fig. 11).

Forts, fortlets and settlements

Balmuilty (Fig. 6-7) (NGR: NS 580 718)

The fort and environs of Balmuilty were fully investigated by Glasgow University. To the north and east of the fort a modern water pipe dominates the graphic of the magnetic survey. Another intrusion is the negative-positive-negative anomaly due to a low-lying power line running north-south and lying to the east of the fort. Subsequent electric survey revealed two high resistance sub-rectangular features, lying, perhaps significantly, on a knoll (where the present-day pole carrying the power line is situated), separated by a ditch. Whether or not this is a fortlet cannot yet be ascertained. No other structures are apparent in Area A.

The effects of current agricultural activity in the fields surveyed to the south of the fort at Balmuldy were keenly apparent. Nevertheless, some usually weak anomalies were identified: those in Area B were probably modern; in Area C they were associated with settlement probably of prehistoric date (Baker 1997) and included two rectangular structures observed in aerial photographs; a few anomalies at the west end of Area D probably link with those in Area C; otherwise Areas D and E yielded results of dubious archaeological significance.

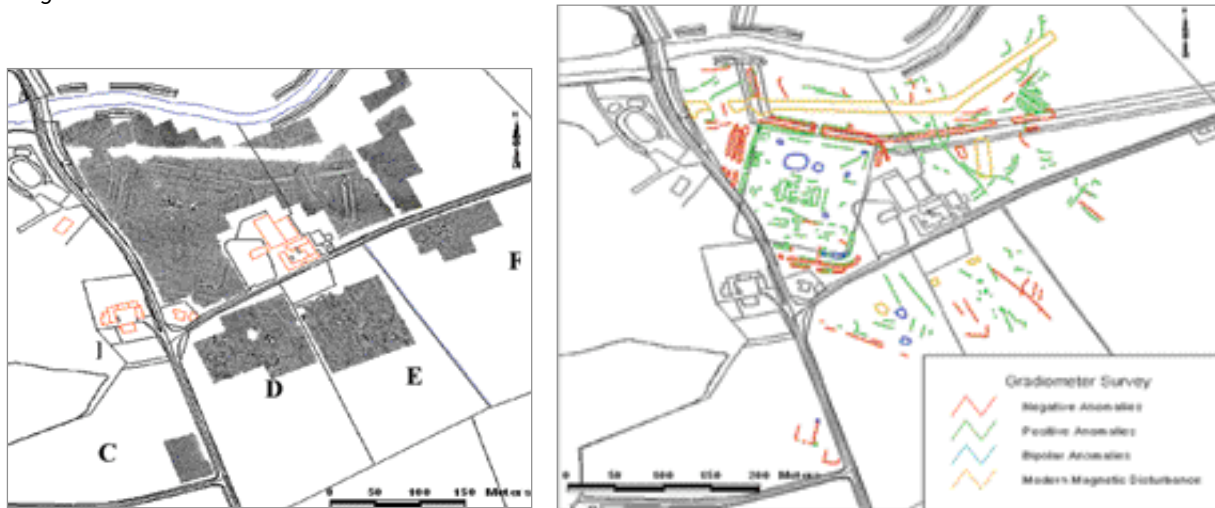


Fig 6-7 Composite grey-scale graphics of the magnetic survey at Balmuldy and interpretation plan (Photo: Glasgow University)

Auchendavy (Fig. 3) (NGR: NS 677 749)

Auchendavy has received much attention by Glasgow University. Jones, Leslie and Johnson (2006) have reported on the magnetic survey in the north-east sector of the fort and the environs of the fort as a whole. From this earlier survey it is the picture emerging from the north-east sector that is relevant here since it revealed useful detail of structures within the fort, as well as the *porta praetoria* (no particular features to note were recorded to the south-east and south-west of the fort). Examination and interpretation of the break across the ditch at the *porta praetoria* and the relationship between the fort's eastern ramparts and the ditch persuaded Jones, Leslie and Johnson (2006, 14) that Auchendavy should be regarded as a primary fort of the Antonine Wall. The recent surveys have concentrated particularly in the large north-west field, where promising results were obtained in the earlier work, but also to the east of the fort. Among the many features appearing in the north-west field, some are geological, and modern field boundaries account for several of the linear features. Attention can be drawn to the point where the ditch narrows and it is here that two prominent parallel ditches subtend southwards but for less than 10 m. The (single) main west ditch of the fort is visible and the area between this ditch and a short outer ditch is far from sterile; whatever hint of a structure there is shadowed by magnetic noise. Resistance survey in this location indicated the presence of a sub-rectangular structure and a low resistance ditch. The fort ditch appears to terminate as it approaches the main (east-west) ditch, and yet there is a hint that it has been cut by, but continues north of, the main ditch.

The above results have been supported by GPR in the form of timeslices, and will be reported elsewhere.

Bar Hill (Fig. 8) (NGR: NS 706 758)

Survey by Glasgow University to the immediate west of the fort at Bar Hill yielded nothing of significance in Roman terms. The fort's south-west corner and southern ramparts are evident, with the latter apparently extending in a straight line south-westwards immediately adjacent to the present-day visitor's path leading to the fort. This strong bipolar linear anomaly (1a) may be modern. The ditch of the small temporary camp explored by Keppie and Walker (1989, 152) appears at 4, and to its north it is truncated by 19th century mining activity in the area marked by 5. On the east side of the fort, where conditions were difficult owing to the unstable ground surface due to recent logging, the results in two very small areas were potentially interesting but their significance must await larger-scale survey.

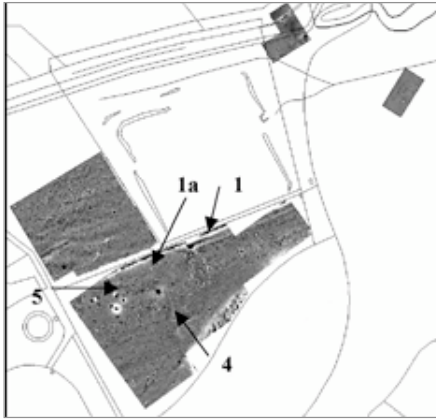


Fig. 8 Composite grey-scale graphic of the magnetic survey of Bar Hill (Photo: GSB)

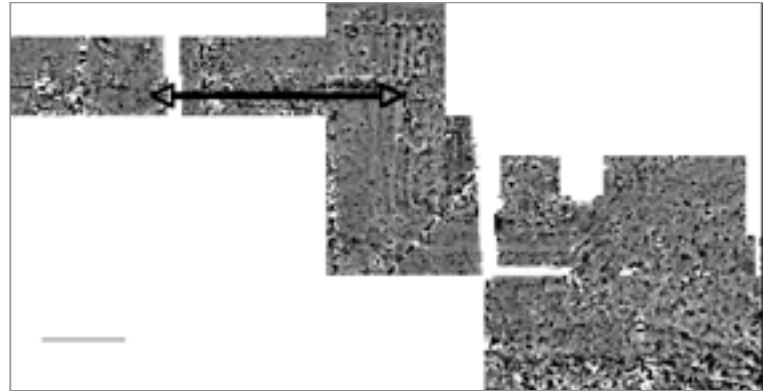


Fig. 9 Grey-scale graphic of the magnetic survey at Westerwood. The arrow shows the extent of the Military Way detected by the survey (Photo: Glasgow University)

Westerwood (Fig. 9) (NGR: NS 760 774)

The survey at Westerwood, also by Glasgow University, revealed some detail of the interior of the fort. To its south there are indications of two weak parallel features, probably narrow ditches, running southwards from the fort's ditches; after 60 m the westerly ditch is interrupted by the area of magnetic disturbance attributable to the landscaping connected with the creation of the golf course, while the easterly ditch seems to continue southwards. Jones, Leslie and Nelson (2007) have drawn attention to a possible association of the weak anomaly emerging from the fort's south-east corner in a north-east direction with an annexe. There is nothing to suggest settlement to the west of the fort, though traces associated with cultivation and timber buildings were recorded here in 1986–8 (Robertson 2001, 82).

Castlecary (Figs. 10 and 11) (NGR: NS 790 782)

The area east of the fort at Castlecary surveyed by Glasgow University (A in Fig. 10) yielded informative, yet complex results arising from the resistivity survey (Fig. 11). Focusing on the main anomalies from west to east, the east gate and (stone) wall, 1 and 2, give way to two regular low resistance ditches, 3a,b followed by a third, 3c, that is somewhat broader and less well defined at its northern end. Cutting across 3c are two parallel features, 3d, possible former excavation trenches, one of which may relate to the exposure of a street (Macdonald 1934, fig. 27). There is then a well-defined high resistance anomaly, 4, with associated narrow ditch on either side, parallel with the fort, c. 50 m from it, and terminating at its northern end where the Military Way would have run. At its southern end it is joined with a poorly-defined high resistance feature, 5. Lying between 4 and the annexe ditch, 6, which runs across the survey area in a NE direction, there is a myriad of anomalies, most of which seem to be cut by 6. Attention is drawn to the round features, 7, and, to their east, the high resistance area, 8, representing loose stone and stone piles, some of them appearing on both sides of the Annexe ditch. The (Roman) pits referred to by Macdonald (1934, 249) in this area may be relevant here. Underlying the annexe ditch and starting to the east of it is another but narrower (probable) ditch, 9, which seems to end at its western end close to where the Military Way would have run. Also underlying the annexe ditch is the probable wall, 10, parallel to both 4 and the fort, which meets the high resistance area 8. Is the area enclosed by 4 and 8 significant, and does it predate the annexe delineated by 6?

Carriden (Figs. 12 and 13) (NGR: NT 027 807)

The main focus of attention in the Glasgow University survey at Carriden has been in the large field east of the fort where the magnetic survey revealed a complex mosaic of anomalies (Jones et. al. 2008). Moving eastwards across the field from the fort, the ditch system on the fort's east side is clearly apparent. Field boundaries are evident, as is at least one phase of field system and associated rig and furrow. Many short stretches of (modern) drain occur at the north edge of the field; this modern intrusion is also observed in the north-west corner of the field where the response from the fort's ditches is significantly diminished. Fig. 13 presents a colour-coded interpretation of the graphic. Aside from the fort's defences, the outer ditch of which is damaged at its northern end, the proposed Roman phase (in red) consists of (a) the road lead-

ing out from the fort's gate in a SE direction, and (b) a linear, weak ditch-like feature whose orientation parallels that of the fort; it is c. 100 m east of the fort's ditches, its southern extent seems to be the road (a), but its northern termination is somewhat unclear. Within the area encompassed by (b) and the fort's ditches are what have just been referred to as the two prominent, roughly linear features; these are approximately parallel to each other, a few m in width, and they underlie the fort's ditches and road (a). In Fig. 13 one of them is a proposed palaeochannel, the other an undated linear feature (black and light blue respectively). If the interpretation of the former is correct, it is strange that it runs parallel to the shore line rather than draining northwards to the Forth. The other features in this 'Roman enclosed area' are consistently small-scale and shallow, and yet for the most part they are definably linear in shape.

Turning now to the results from the south and west of the fort, an east-west running pipe line which at its west end turns northward dominates the picture. On either side of the pipe line is a ditch-like feature, 12, consisting of two linear stretches, one of them running E-W, the other at an angle of c. 100o to it and apparently aligned with the hedge in the garden of Carriden House. The southern ditch of the annexe is observed as 13 (with the arrowed line showing direction). 14 is the modern cinder-surfaced track leading to the Steadings, and 15 is a weak, negative curved feature.



Fig 10 Plan showing the fort at Castlecary (Photo: Glasgow University)

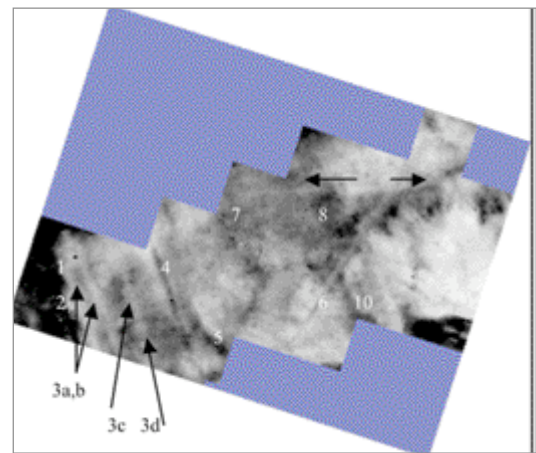


Fig. 11 Grey-scale graphic of the magnetic survey east of the fort at Castlecary (Photo: Glasgow University)

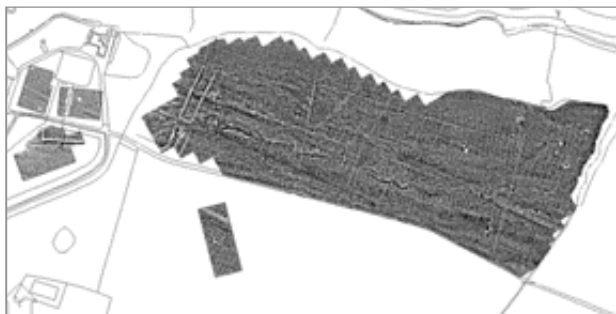


Fig. 12 Grey-scale graphic of the magnetic survey at Carriden (Photo: Glasgow University)

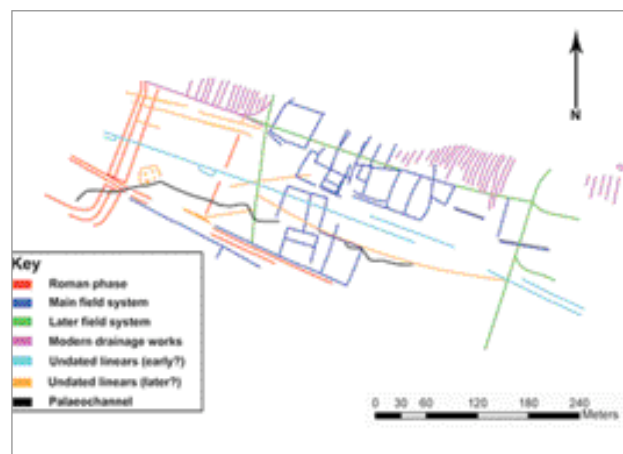


Fig. 13 An interpretation plan of the magnetic results in the east field at Carriden (Photo: Glasgow University)

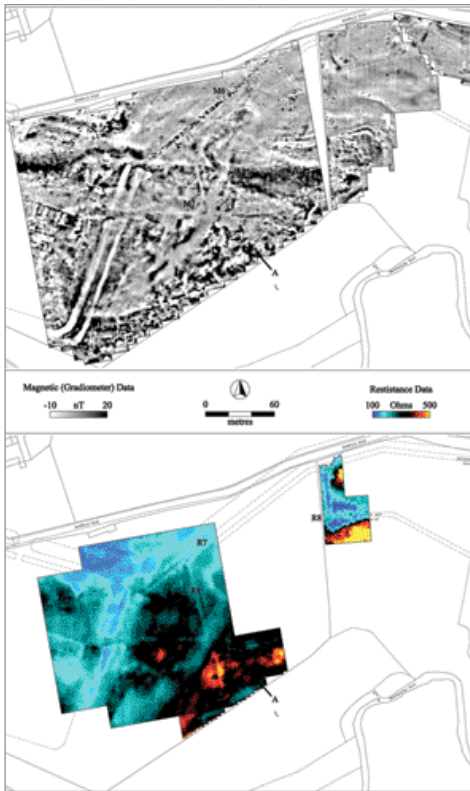


Fig. 14 Mumrills: Magnetic results (Photo: GSB)

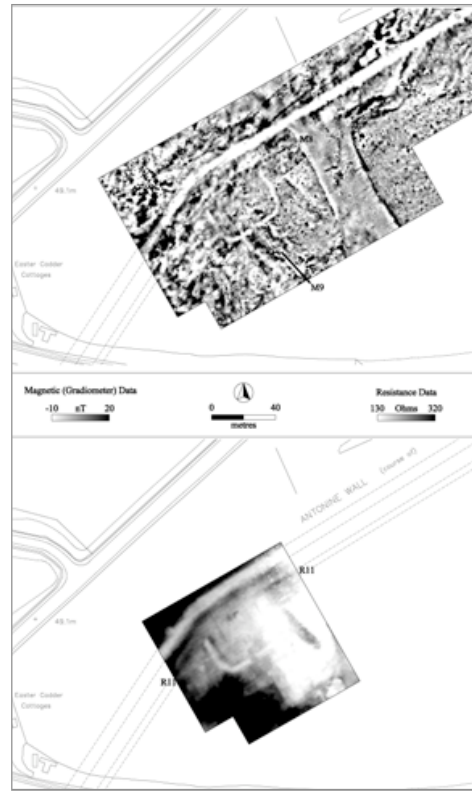


Fig. 15 Glasgow Bridge: Resistance and Magnetic results (Photo: GSB)

Mumrills (Fig. 14) (NGR: NS 919 794)

Survey was carried out by GSB across several fields east of Mumrills fort with the aim of identifying the Wall, Military Way and any ancillary settlement immediately outside the fort some of which are believed to form part of a civil settlement (Breeze 2006, 131). The land was undulating, steeply sloping in places and under rough pasture. Towards the eastern end of the investigation area, some parts of the fields were overgrown, precluding successful data collection.

The geology has had a particularly severe impact on the resistance results from this site, with values recorded in the range of 100 to over 600 Ohms. By contrast some of the archaeologically significant responses are only 10–20 Ohms different from the surrounding “background” values, making them appear very weak in the raw data. Within the zones of higher resistance, such small scale changes are very difficult to identify and analyse (even with filtering).

Unlike most of the other surveys, the Wall ditch is not well represented in either data-set. By contrast, well defined magnetic and high resistance linears M5 and R8 represent the Rampart, the most coherent evidence for this element in the surveys to date. M5 comprises a band of noisy responses which would indicate that the cobbles forming the rampart base are strongly magnetic. The anomalies become slightly less coherent towards the north-eastern corner of the field which ties in well with Macdonald’s observations regarding the preservation of this feature (Macdonald, 1915, 134).

Potential evidence for the Military Way is limited to a band of slightly higher resistance R9 which has the correct position and alignment. The response is somewhat ill-defined and could indicate the road is badly denuded. The lack of any corresponding magnetic anomaly makes the interpretation cautious but, if correct indicates an absence of metallurgy or magnetic cobbles. The absence of any potential road anomalies immediately adjacent to the fort is perhaps unsurprising, since, during excavation the road out of the east gate was found to be wholly destroyed (Macdonald & Curle 1929, 498–499).

The fort ditches appear in both data-sets, as negative magnetic and lower resistance linears, with the mag-

netic responses being more coherent. Within the fort, both techniques have recorded anomalies associated with former buildings. The magnetic responses are primarily positive in nature and correspond to low resistance anomalies, both forms normally associated with ditches; but the patterns clearly suggest wall lines. The building was excavated in the early 20th century (Macdonald & Curle 1929) and it is uncertain whether the geophysics is detecting the remains of excavated features or intact foundations.

Outside of the fort, negative anomaly M6 and low resistance R10 represent a cropmark feature, probably a ditch that forms a small enclosure at the north-eastern corner of the fort. No clear evidence for building foundations is present either within or outside this enclosure and its function remains uncertain. A small cropmark enclosure approximately at (A), partially excavated and found to be Roman in date (Steer 1961) has not been identified in either data-set; with large scale anomalies attributed to natural factors recorded at this location.

Glasgow Bridge (Fig. 15) [NGR: NS 637 731]

Gradiometer survey was carried out by GSB between the fortlet at Glasgow Bridge and Westermain (on the western outskirts of Kirkintilloch), a distance of some 800 m. Resistance data were collected at selected locations along this stretch. The land is undulating and was under a young crop at the time of survey.

The ditch appears consistently in the magnetic results as a broad discrete negative anomaly. By contrast, this feature has produced differing resistance anomalies at the various locations. On the lower lying ground over the fortlet, it appears as a coherent low resistance linear; on the higher ground to the east it is represented by a slightly less well defined high resistance band. It is possible that, at the former location, the ditch has been partially denuded; less of it survives below ground and the near-surface fill has therefore been able to retain greater amounts of moisture. Alternatively it could be that the soils on the lower lying ground are less well drained in general.

The rampart has been detected only intermittently in the gradiometer data, appearing as noisy positive linears M7 and weaker trends M8. It is thought that these responses have been produced by magnetic cobbles of the rampart base and their incomplete nature suggests the feature is somewhat denuded. Within the trends M8, some discrete "pit-type" anomalies are present which could represent post-holes. However, they have a linear alignment, rather than a square formation that might be expected from four corners of a tower, so any interpretation is inconclusive. As with the ditch, the rampart too has produced variable results in the resistance data. At the fortlet end, a few short "weak" high resistance linears R11 seem likely to reflect sections of rampart base, but there are no discrete low resistance anomalies that can be related to the magnetic "pit-type" responses. On the higher ground to the east, a broader, less well defined band of high resistance R12 is attributed to a spread of material from the rampart, but it is difficult to identify any more discrete responses which can be specifically linked with the stone base.

The fortlet ditches have been detected by both techniques, as negative magnetic and low resistance anomalies. The ditches terminate at the line of the rampart and there is a break midway along the southern ditch suggesting an entrance. Although the pattern of responses M9 in the magnetic results could hint at a track or road exiting southwards, they are somewhat ill-defined; no corresponding anomalies appear in the resistance data, making an archaeological interpretation tentative. Neither data-set has produced clear evidence for internal features.

Discussion and conclusions

As an exercise in geophysical prospection, the geophysical surveys along the Antonine Wall have been challenging as they have been enlightening. The locations have for the most part been well suited to the practical side of survey, the terrain being open, usually flat with relatively few obstacles. Yet it is interpretation of the data that has been demanding; in retrospect, this should have come as no surprise in view of the way the Antonine Wall traverses some of the most built up and intensively used land in Scotland. As a result, most if not all the survey areas have been compromised to varying extents by modern developments such as utility pipe lines, and post-medieval to modern agricultural and industrial activities. Placing the surveys within this perspective, the present writers believe that the results, although often difficult to interpret, have been informative.

To start with the main linear elements, the work to date has shown that only the ditch is consistently and conclusively identifiable by both primary techniques (magnetic and resistance survey). Large scale magnetic survey has proved more successful in identifying the rampart; although this element is apparent in the resistance data, it has often been difficult to isolate discrete anomalies that can be related to the rampart base. Most of the anomalies attributed to the rampart are linear; the identification and interpretation of postulated tower post-holes within the rampart remains problematic due to the general elevated levels of background magnetic response. Although in some instances, both techniques have yielded anomalies that might relate to the Military Way, the results are far from conclusive and no "definitive" responses have been identified.

GPR survey was useful in the initial stage of the investigation in providing a definitive interpretation for the ditch. Where it was subsequently employed it did not particularly aid in the interpretation of the results. Of greater benefit has been the adoption of a large area survey strategy; this has made it easier to identify patterns in the magnetic and resistance data that might be archaeologically significant.

Both techniques have been successful in identifying forts and fortlets along the Wall; the level of internal detail varies, dependent on natural factors and the nature and state of preservation of any internal features. Good detail was resolved of the interior of the forts at Balmuildy, Auchendavy and to a lesser extent Westerwood. But, the recording of some intrusive features, Roman drains, but not the post-holes planned during earlier excavations within the fort at Balmuildy, leaves open the question of whether they have been subsequently removed by ploughing or whether the construction technique – the placing of timbers in individual holes rather than constructions trenches – renders their recording through geophysical survey difficult. Certainly absence of evidence should not be taken as evidence for absence.

The work has also been informative in the context of the thrust of Glasgow University's surveys which lay in establishing the existence and nature of civilian settlement in the environs of the forts. The first point to make is that the issue of the civil settlements along the Antonine Wall bears no relation to the comparable situation on Hadrian's Wall; the surveys and the considerable negative evidence from excavation along the former Wall give no support for the existence in its environs of substantial, stone-built structures for civilian settlement. Instead what survey has demonstrated is that at a few sites – Auchendavy, Castlecary and Carriden – there are small areas (called 'Roman enclosed area' at Carriden above) immediately adjacent to the fort's ramparts which are bounded by an enclosure wall and/or ditch running parallel to the fort's ramparts. The character and size of these areas, which are separate from any adjacent annexe, seem to vary from site to site. For instance, during at least one phase at Auchendavy, this area encompassed the probable bath-house, while at Castlecary and Carriden building features are absent. Given that the sampling interval in the survey at Carriden was sufficiently small to be able in principle to detect at least some features such as post-holes belonging to timber buildings, the lack of such features in the area immediately east of the fort at Carriden must be significant: either there were no timber structures in that area, or they have been very fully eradicated by the (modern) ploughing in that field. Of these two options, the former seems more plausible in which case any putative settlement outside the fort had a distinctly temporary nature about it. What the picture at Castlecary is perhaps suggesting is that at different times during the lifetime of the fort the broader area east of the fort saw different functions. That broader area encompassed the space just referred to (i. e. from the fort's ramparts up to 4 in Fig. 11) and the space occupied by the annexe beyond – in other words, there is some Roman activity spread across the full extent of the field east of the fort. This same model could well apply to other Roman forts.

At the other forts investigated, Balmuildy yielded largely negative results to the south and west of the fort. If there had been civilian settlement in those directions, the effects of agriculture will have been largely responsible for their destruction. At Bar Hill, survey to the south and west of the fort proved practicable yet yielded disappointing results. Ironically, the most promising location may lie to the east of the fort where the combination of tree cultivation and recent logging proved detrimental to the survey of areas of any meaningful size.

It is instructive to look at the performance of the respective techniques of survey. As has been the case at Roman sites elsewhere in Britain, magnetic survey with the fluxgate gradiometer has been the approach of choice in terms of relative speed of use and adequate response to the main targets. Furthermore, the

use in most of Glasgow University's surveys of a Bartington 601 gradiometer allowing readings to be taken small intervals (12.5 cm) has been very important. As expected, resistivity proved effective over stone-built structures, as for example within the fort at Balmuldy, but elsewhere was less informative than magnetometry. That said, resistance, in the absence of effective magnetometry at Castlecary owing to the igneous geology, proved to be reasonably effective in detecting a good range of features. The happiest surprise has come from GPR which produced excellent results in an area to the immediate west of the fort at Auchendavy that had been problematic for both resistivity and especially magnetometry. This seems to be an area with significant stratigraphy, and so, whereas GPR was able to resolve individual features appearing at different depths, electrical and magnetic surveys were detecting a confused composite picture. Although the natural/geology has had an impact on both techniques, the effects have been more variable and problematic to the interpretation of resistance data.

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Fig. 1 The archaeological area of Zeiselmauer presented on the Austrian *Limes* website: www.limes-oesterreich.at (Copyright: FRE project)



Fig. 2 The site of Traismauer on the Austrian *Limes* website www.limes-oesterreich.at (Copyright: FRE project)

PRESENTING ARCHAEOLOGICAL SITES OF CULTURAL HERITAGE ON WEBSITES – GUIDELINES FOR SITE-ORIENTED DATABASES

Eva Kuttner, Linz

'The future lies in the field of regional and national databases of sites. And the future will be more than organize archaeological data, the main task will be presenting monuments of cultural heritage' – these hopeful thoughts were made by K. L. Kvamme in 1995. Many websites have been installed since then as an open access to archaeological information. The goal of this paper is to offer practical guidelines on the contents of *Limes* websites based on the experience of working with the databases of two site-oriented websites¹ and as a result of many discussions with colleagues at the *'Frontiers of the Roman Empire'* (FRE) project workshop in Pécs in November 2007.

Careful and thoughtful planning is the key to a successful presentation of monuments and sites on the web. What is a "site"? Even the meaning of "site" has widely different interpretations and each operator has to make the decision as to which will be the minimum archaeological feature to be included in the list of monuments, and whether only visible sites should be included or invisible remains as well. The quantity of sites must be limited temporal and spatial. The team of the Austrian website faced the problem of how far away from the fluvial borderline of the Danube should we go to search for sites? We made the decision to list all the sites featuring military context within a distance of 30 to 35 km measured from the fluvial border. The selection was also made according to the *'Koblenz declaration'* of 2004 (see Jilek in this vol. 201–3). This essential definition of the sites beside a fluvial border was established for the UNESCO FRE World Heritage Site:

- forts: legionary fortresses, auxiliary forts, fortlets;
- further military sites: watch-towers, signal-stations, temporary camps, harbour installations, bridge-heads;
- military roads;
- domestic settlements adjoining the forts: towns, vici, canabae, funerary sites;
- industrial installations like brick kilns, quarries and mines.

Beside deciding on a defined selection of archaeological sites, the availability of data has to be considered: a very practical question. How easy is the access to archives and to literature? Where can illustrations be found? Is there enough time to visit the monuments and all the museums? And finally the most important question: what will be the major benefit for the user of your web-site? As part of the process, it is important to seek the advice of external colleagues.

Basic concept: description of the content, ER-scheme

At the first stage of the project the contents of the database and of the website application have to be described very clearly. The definition of the project should accompany the whole proceedings and sometimes a correction will be necessary. To make the relations between the groups of data visible and comprehensible it is useful to create a graphic scheme (for instance by using an entity-relationship-scheme, ER-scheme) as a visualisation of the structure and architecture of the database. It is necessary to regard both the technical possibilities as well as the quality requirements of the content. The hierarcgical structure should be as simple and efficient as possible. Of course there might be more data included in the database than presented in the public website. Some data can be restrained only for experts or legal use while others are available for everybody. It is possible to offer access to more or less complete levels of information via user authentication but in that case controlling the access may cause a need for personal supervision.

Working out a timetable corresponding with the available resources and the costs should ensure that the proceedings are carried out within the agreed time limitation. Consequently the design of the structure is followed by development and implementation of the database system, filling in data, implementation, validation

¹<http://archaeologie-ooe.info/>, <http://www.limes-oesterreich.at>
<http://www.romanfrontiers.org/thesaurus/>
<http://www.wien.gv.at/kultur/kulturgut/>

and adoption. The problem of later alternations can be minimized by a careful and accurate proceeding and an intensive period of planning and designing an appropriate basic concept.

“Area” – “Site” – “Activity”

The site or monument is the central entity of an archaeological cultural heritage website. Many of the archaeological areas contain only one site, like a single watch-tower, others like Mautern (*Favianis*) contain many monuments or sites. By working out an efficient structure for the Austrian *Limes* website it was necessary to create two levels. The first level is termed “archaeological area” (Fig. 1) as a unit of different sites (e.g. *vici*, domestic settlement, roads) provides data concerning topography, geology, ancient environment, location of the sites and of the visible monuments, together with tourist information. It was useful to add a modern map on the web application where the user is able to find the locations. As the first approach to following archaeological information it is essential to give orientation and an overview.

The second level is the site and/or the monument itself (Fig. 2). According to the stage of research on each monument, it is possible to expand on temporal and/or spatial correlation. So the sites may be called “Valentinian tower” or “funerary site Wildacker” as these are common terms and names. The second level provides data like the description of the site with exact measures and a listing of the archaeological features. The classification of the site was done by using the Thesaurus established at the FRE Project. The multilingual tool offers accuracy and the possibility of adding secondary features following the tree. An overview about the history of research may be a special attribute for the more interested amateur archaeologist as well as for students and scholars. The presence of military units is listed with the advice for references. Additional data are chronology with references and converse interpretations.

The content of the next level includes all the archaeological activities in relation to a site. For the Austrian *Limes* website data were filled in the database by extracting literature. Documentations, excavations, survey, aerial prospecting and conservations/preservations are listed with additional information. These are the description of finds, the classification and the storage of finds, storage of documents and site plans, and of course the organisation as the actor of the archaeological activity. Working up archaeological activities of more than 150 years of research is a huge part of the time investment. It is necessary and rewarding on sites with poor research work. It is essential on sites with converse interpretation. In the case of existing web based archaeological information systems like ‘*Wien Kulturgut*’ it is sufficient enough for the link to the query and map application to have the access to about 5,000 find spots in Vienna (*Vindobona*). Fortunately the user is able to make a choice of sites – legionary fortress, canabae, funerary sites and civil town – and to run a query searching for the street names of the find spots and excavations.

A *Limes* instrument for archaeologists as well as for interested amateurs can be established by working up and offering the archaeological activities. When planning a website for archaeological sites it is necessary to consider the resources available and the quality sought to achieve within the limitation of time. It might be better achieving a high standard with a simple access for the user covering just a few areas than working up all the sites with poor information. It might be useful choosing a restricted number of sites where a profound explanation of the excavations has been made. On the other hand, a minimum of information has to be provided for all the existing *Limes* sites including location, topography, description and classification of the site, condition of the monument, chronology and references.

Georeferenced information

First of all, geographical coordinates of the location of the sites are needed for mapping as well as for evaluating the archaeological cultural heritage. An essential first step is to determine the exactness of the data. By searching for exact geographic information the researcher will always face the reality of the present stage of information concerning an archaeological area. Sometimes it will be useful to recycle old site plans by digitalization when dealing with excavations published without acceptable data. Collecting data in the field by gaining GPS information is another possibility. The cheapest access will be a GPS mouse in combination with a note-book or a portable GPS receiver. Ideal at open places, problems may occur in narrow spaces/valleys. Normally two-dimensional coordinates will be possible. Sometimes it might be useful to work with three dimensions especially for better understanding for strata and building structures of a site and to create relations between archaeological units. If the spatial dates are transferred to a map decisions will have to be made about incorporating points, lines or polygons. There is even the possibility of

admitting data of prospected areas with “no result” because this might be important for later spatial analysis (see Sommer in this vol. 118–21). For obtaining spatial information of contemporary building structures (e.g. museums, entries to archaeological parks) coordinates can be requested from regional or world wide geographic services provided on the web.

Beside the coordinates it is useful to add the modern administrative structure as community, county, etc. for easier location. The recording of historical names of areas is important because they are unfamiliar today and do not appear in modern maps but they are used in literature. The spatial relation to a Historical Landscape or a Nature Reserve is an additional feature to point out existing forms of preservation.

Completing a web-site for monuments of cultural heritage

Archaeological information systems (AIS) can be used for presentation and evaluation of cultural heritage monuments by adding further information. Beside the archaeological information the web based database can offer many features leading the user of the website to the present. It is a wide rank of possibilities which will become obvious while working out the structure and even later in the proceeding while feeding in the data. A short list of the most effective additions will be compiled.

Ancient environment

Describing the location of the site as it was in Roman times is very important especially for sites on a fluvial borderline. The fact that there are vast differences between past and present environment has to be faced. Geological information on the site location and the distance to the ancient riverbank are interesting for both scientist and amateur. A description of the topographic situation and of climatic changes in former times will aid understanding of the monument. Mentioning the distances to ancient military roads and to the next military installations will make the borderline imaginable. Various multi-disciplinary studies of ancient environment have been made in the last decade and a link to web based information is widening the user’s point of view.

Preservation and presentation of the monuments

Despite the rich body of information that will be revealed as a result of intensive research work, the fact that many of the sites are destroyed or in bad condition has to be accepted. Visiting the sites by the team is a needful action. A description of the present condition will be filled in the database. Photos showing the existent monument can be compared with elder documentations on the website. It makes sense to represent examples of successful preservation (Fig. 3-4). Problems of the modern environment must be pointed out to increase the user’s sensibility for preservation and conservation. Signposts and information panels should to be listed to help the visitor find the monument and gain information on site.



Fig. 3 The north-eastern fan-shaped tower, fort Zeiselmauer in 1986 (Photo: S. Jilek)



Fig. 4 The north-eastern fan-shaped tower, fort Zeiselmauer after conservation in 2007 (Photo: E. Kuttner)

Tourist information

Information for tourists on the website should provide an accelerated access to the visible monuments. What will I see there? How will I get there? The implementation of a Google-map as a common and easy-working tool can be very effective. Tourists visiting a town or a landscape are often interested in other cultural and natural features. So links to hiking-trails, biking-routes, museums and nature reserves enhance the value of a region and make a region more worth-while to visit.

Communities

Beside the information for visitors there is often a lack of knowledge in the communities themselves. The people living beside a monument sometimes have poor knowledge about the cultural heritage in their vicinity. Often suitable access to professional information is missing. Adding a file with a mixture of the each community's historical and cultural characteristics to the website will provide better understanding for the cultural heritage in the user's vicinity. It might be also necessary because the area of the ancient settlement sometimes differs from the modern administrative district. Offering a link to the communities on their website is a simple and efficient approach to better appreciation, not least because the communities often carry an essential element of responsibility for the historic preservation of their monuments.

Research

The database is regarded as a *Limes* instrument offering primary information about sites. The references – literature, site plans, and documents in archives – will open up further resources. A simple and clear structure might accelerate the process of finding answers. Providing a simple query interface on the website offers an access to more complex data sources.

Platform for museums

Museums with Roman finds and archaeological parks can be listed and related to the communities or towns (see Flügel in this vol. 174–78). Short and specified information ought to be added. The problems faced in preparing the Austrian *Limes* website were that some small local museums had not yet installed an official website and on the other side the websites of large museums were missing a sufficient description of their Roman collection. The text describing the museums should inform about the characteristics and pick up a special feature. It is useful to mention extraordinary exhibits, exhibitions, events and conducted tours. Primary information for the visitor like opening hours should be provided. Special events and activities may be listed on an additional interface. All of these features should offer specified information and links in order to invite the interested user of the website to visit museums, parks and events.

Conclusion

A web based site-database is a vivid thing with the option of further specifications and additions. That makes working exciting but also requires the need of careful planning and adoption. Specified additions to a basic AIS (Archaeological Information System) will enlarge the content to become an adequate website for Monuments of cultural heritage. Beside the user's benefits, *Limes* websites have to be regarded as an instrument of documentation offering actuality and will work as a helpful tool for the appreciation and evaluation of the monuments (see Devine in this vol. 181–85).

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GUIDELINES FOR THE MAPPING OF ARCHAEOLOGICAL MONUMENTS ALONG THE FRONTIERS OF THE ROMAN EMPIRE IN PREPARATION FOR THEIR NOMINATION AS A WORLD HERITAGE SITE

Rebecca Jones, Edinburgh and Andreas Thiel, Saalburg

Hadrian's Wall in the United Kingdom and the Upper German-Raetian (Obergermanisch-Raetischer) *Limes* in Germany form the first two parts of a serial, phased, trans-national '*Frontiers of the Roman Empire World Heritage Site*' (FRE WHS). This new trans-national designation was agreed by all parties involved and formally created in 2005 when the German stretch of the frontier was inscribed on the list (Hadrian's Wall was originally inscribed in 1987). In 2007, the UK government submitted an application for a further stretch of Roman frontier, the Antonine Wall in Scotland, to be considered as part of this multi-national site by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) WHS committee.

Preservation and promotion of WHS requires accurate documentation and understanding of the features that make up the Site in its entirety. In the case of complex linear structures, such as Roman frontiers, accurate mapping is a key tool for the heritage bodies involved in site protection and management.

With respect to the nature and scope of this huge archaeological monument, stretches of which reside in three continents, Europe, Asia and Africa, the World Heritage applications for both the Upper German-Raetian *Limes* and the Antonine Wall were based on a sophisticated mapping programme. The ways in which the mapping of Roman frontiers can be enhanced and developed were considered in advance of both nominations, in consultation with colleagues from across the European Union (Fig. 1). These discussions were, in part, facilitated through the three-year '*Frontiers of the Roman Empire*' project, with the support of the Culture 2000 programme of the European Union. This approach was chosen with the intention of developing a concept for the entire frontiers of the Roman empire, which will be uniform in content and cartography. This has also been agreed with the UNESCO World Heritage Centre.

Cartographic form and content for nomination mapping

The extent and content of the potential whole '*Frontiers of the Roman Empire World Heritage Site*' consists of different types of archaeology in differing states of preservation. Some sites are visible; other areas have been excavated; some are known but not visible; some are conjectured on academic and scientific grounds; others have been built over, although excavations in urban landscapes frequently reveal the remains of Roman military archaeology beneath or between current buildings. Therefore, the intention for the WHS is to include, as far as possible, all areas of the frontiers where archaeological remains have survived. Excluded from the World Heritage Site are the parts that have been completely destroyed, although these can also be included in the buffer zones, as was the case along the Antonine Wall and the Upper German-Raetian *Limes*.

Different national standards in surveying and base cartography prevent an identical mapping of all the frontiers of the Roman empire, although the increasing availability of global mapping data may facilitate greater harmony in the future. At present, such mapping is at too small a scale to be suitable for such archaeological requirements. Nevertheless, the following basic mapping conventions were agreed after discussions within our international specialist community.

Due to the extent of the monument various map scales must be used to show the position and course of the Roman frontier and its sites:

- small-scale maps should give an overview of all frontiers of the Roman empire as well as of the course the frontier line inside a specific country. With this in mind, a new, accurate map of the frontiers of the Roman empire was produced through the Culture 2000 project and used as the first map in the Antonine Wall nomination (Fig. 2);

- topographic maps should show the course of the frontier and the locations of any forts, fortlets, watch-towers and other structures. Distinctions must be made between those elements that are visible and invisible (i.e. now longer discernable as topographic features on the ground), and between the visible, invisible, presumed and destroyed sections. The representation of each fort and fortlet should be true to scale. They should also show the extent of the area proposed as the WHS as well as the necessary buffer zone (Figs. 3–4);
- at the scale of cadastral plans or something similar, a consistent representation of the precise course of the frontier and the positions of its constituent elements, with visible, invisible, presumed and destroyed parts clearly distinguished. These must be depicted alongside the extent of the WHS area chosen for inscription and the surrounding buffer zone (Figs. 5–6);
- areas where the monument is protected by the legal system of the individual countries (for example, through scheduling) should be depicted on the maps, and the proposed WHS line should acknowledge these protected areas.



Fig. 1 The authors discuss issues of mapping during a visit to the fortlet of Kinneil on the Antonine Wall in June 2006 (Photo: Anna Adamczyk)



Fig. 2 Map 1 from the Antonine Wall nomination, this map was prepared by Andrea Faber, Heinz-Jürgen Köhler and Kurt Schaller (Copyright: FRE project)

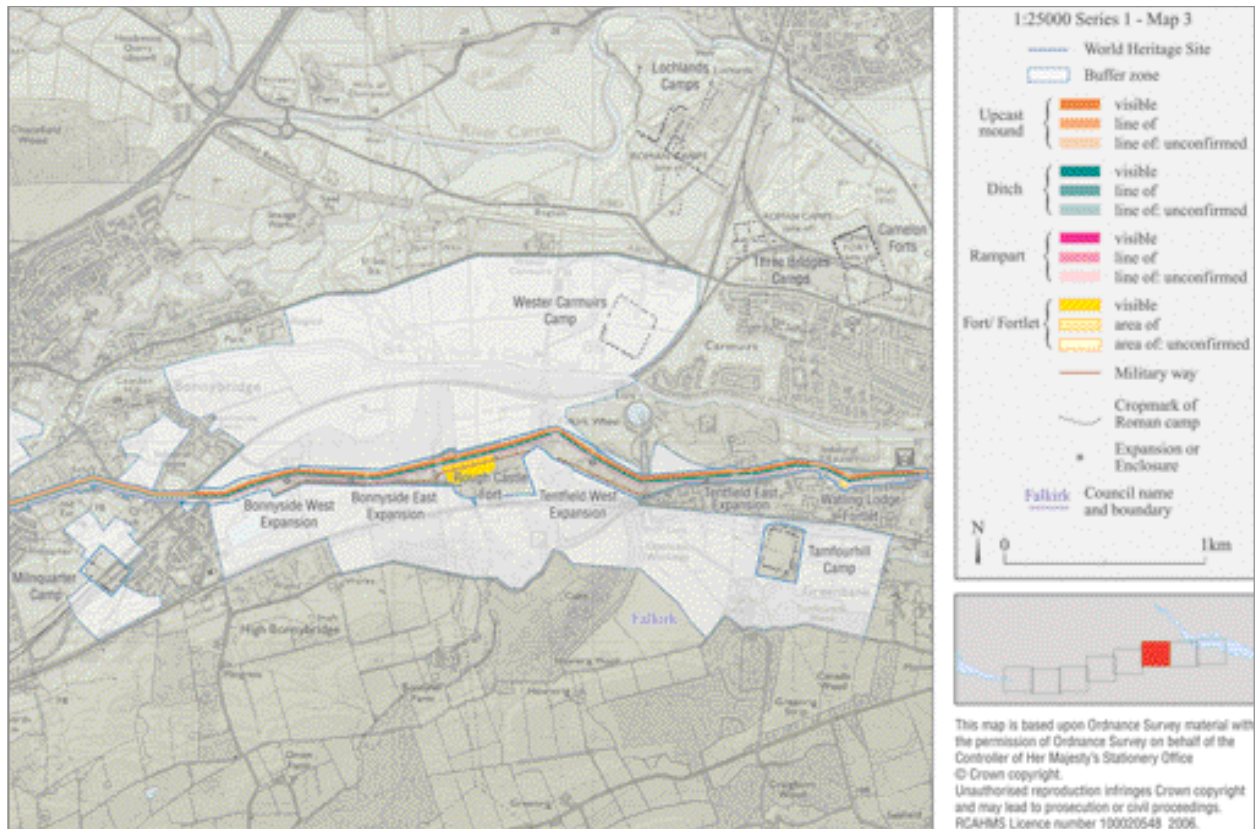


Fig. 3 An example of one of the 1:25,000 maps from the Antonine Wall nomination (IV series 1) showing the area around the fort at Rough Castle, prepared by Georgina Brown, RCAHMS

Unique elements of the World Heritage application

Part of the very essence of a linear frontier or border is for it to be seamlessly depicted in the form of a continuous line. It is accepted that all three stretches of the frontier currently inscribed or proposed for inscription represent artificially constructed barriers, whereas elsewhere rivers and desert were used. Nevertheless, these rivers and deserts also formed linear obstacles. Reducing the depiction of a frontier to individual sections would lose authenticity and break up the unique feature of the monument: the continuous frontier. A fragmentation into areas with differing standards of monument preservation and management could result in less well-protected areas suffering long-term damage. The aim, therefore, should be to have all the surviving remains of the ancient frontier installations accorded World Heritage status, if possible.

In order to fully protect all the elements of the monument in the WHS, the mapping should be as inclusive as possible. This includes those areas where the monument has been built over with modern buildings and installations. The reason for this is to provide a transparent and comprehensible demarcation of the WHS, as well as recognising that archaeological remains frequently survive beneath such installations which are worthy of preservation.

Archaeology in towns

Excavations in urban centres and beneath other buildings frequently reveal Roman features and artefacts thereby demonstrating the archaeological potential of such areas (see Breeze in this vol. 109–11; Sommer 70–3). It is for this reason that the WHS should include the frontier in towns and under other developments, except when it has been clearly demonstrated that all underlying archaeology has been destroyed (for example, through earlier quarrying). In these instances, where part of the monument has been lost, it can be protected through the buffer zone. However, where recent buildings are situated cartographically within the proposed WHS, they are themselves not an intrinsic part of the application. This also includes reproductions of Roman architecture such as watch-towers (Fig. 7), and (parts of) fort installations.

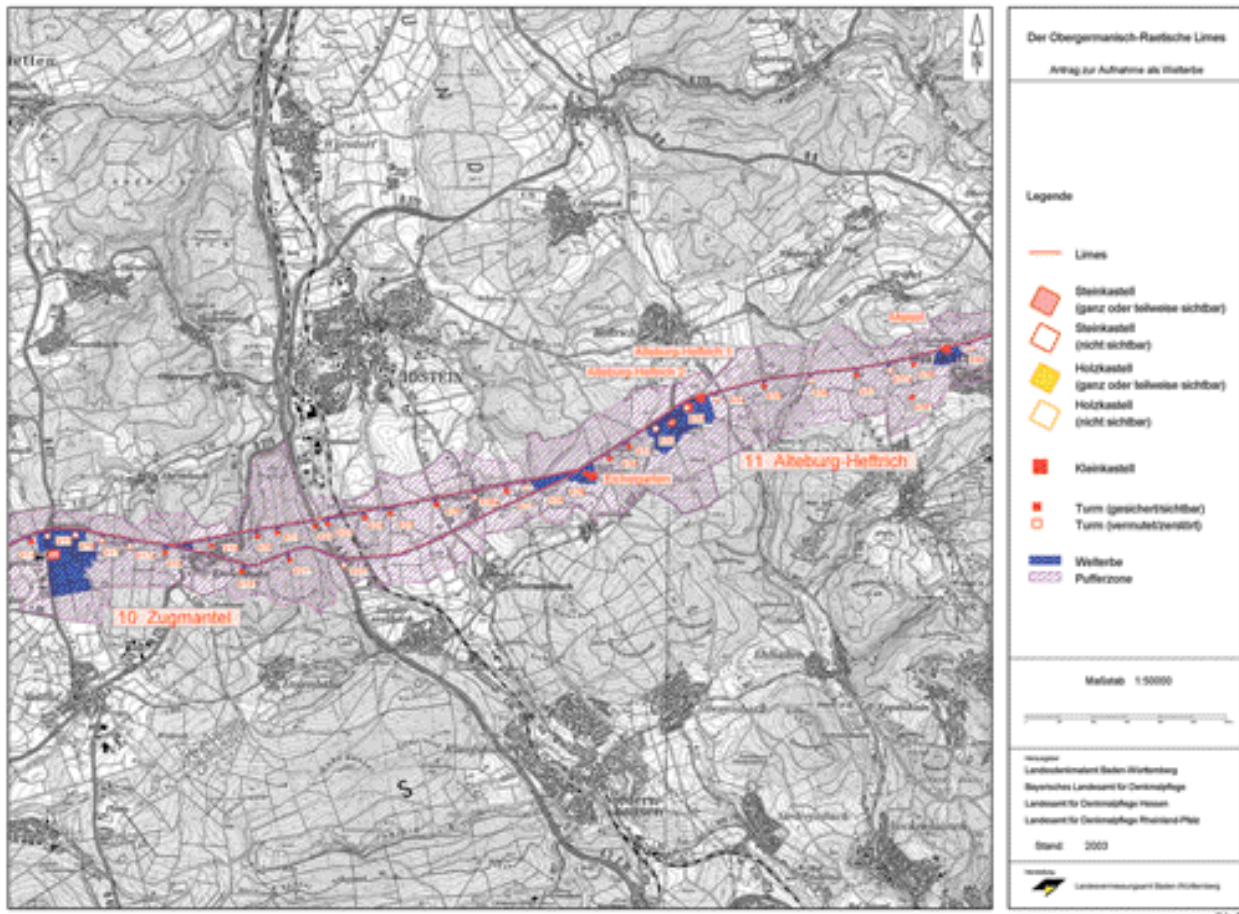


Fig. 4 An example of one of the 1:50,000 maps from the Upper German-Raetian *Limes* nomination showing the area between the forts of Zugmantel and Alteburg-Heftrich (Copyright: Deutsche Limeskommission)

Any reconstructions built on ancient foundations should be seen as parts of the buffer zone (see Sommer in this vol. 128–39). Buildings and installations of this nature are clearly distinguished by didactic means on each site as modern reproductions of Roman originals (e.g. through signposting). It is also the case that some of these reproductions stand on the original Roman foundations and are therefore part of the monument. Many of these reproductions bear witness to the interest of large parts of the population with the monuments and with the Roman history of individual sites.

Underlying research and monument management

In order to manage and promote the WHS once it has been inscribed, management regimes should require the maintenance of the dataset providing information about the monument including its geographic location. In many cases this will be through databases and Geographic Information Systems (GIS).

Additional funding through the ‘*Frontiers of the Roman Empire*’ Culture 2000 project enabled a sophisticated mapping programme to be undertaken along the Antonine Wall in Scotland. This involved the detailed digitisation of all archaeological interventions (events) along the line of the monument, to supplement the digital line of the Wall, created from a detailed topographic field survey undertaken by the Ordnance Survey in 1980. In addition to recording all investigative events, all recorded cropmarks along the line of the Wall were rectified (geo-referenced) and transcribed using aerial photographic software. This programme of work updated the existing baseline survey and brought all the available documentation for the Wall up to date. Evidence was gathered from a variety of sources including published and unpublished reports and collections of material deposited in the archives of the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS). Site location plans were digitised and geo-references to local mapped

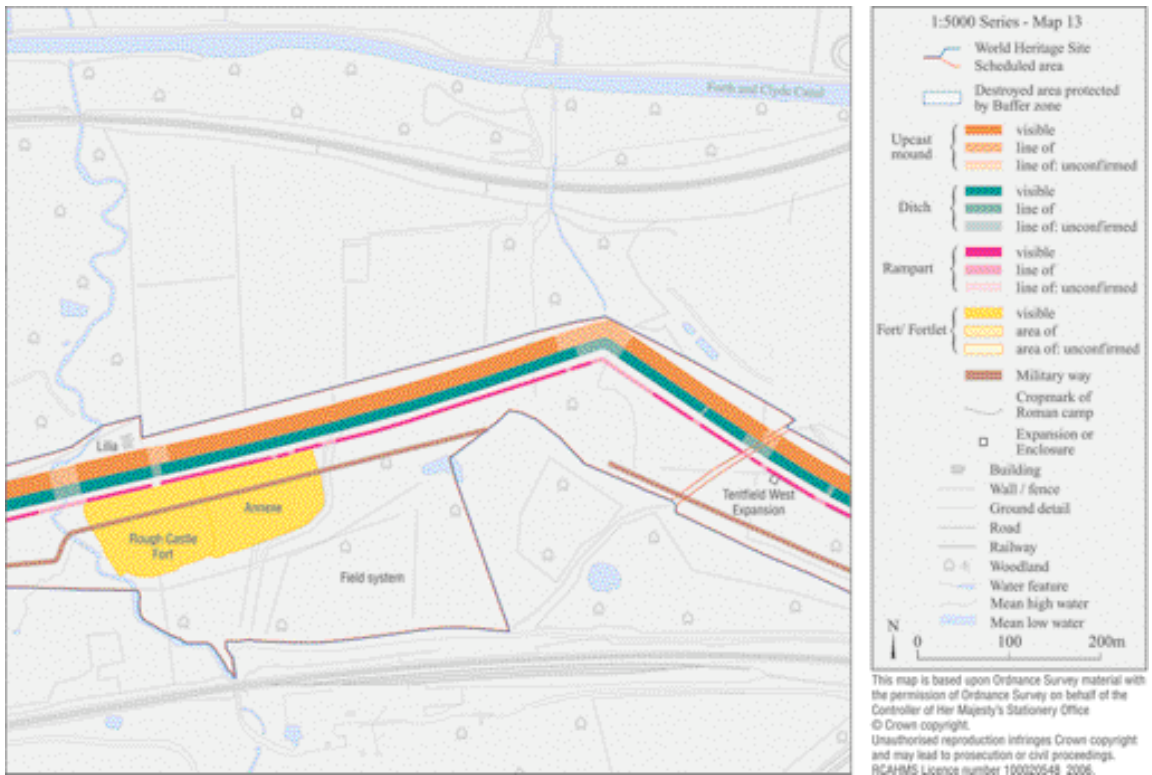


Fig. 5 An example of one of the 1:5,000 maps from the Antonine Wall nomination (V) showing the fort at Rough Castle, prepared by Georgina Brown, RCAHMS

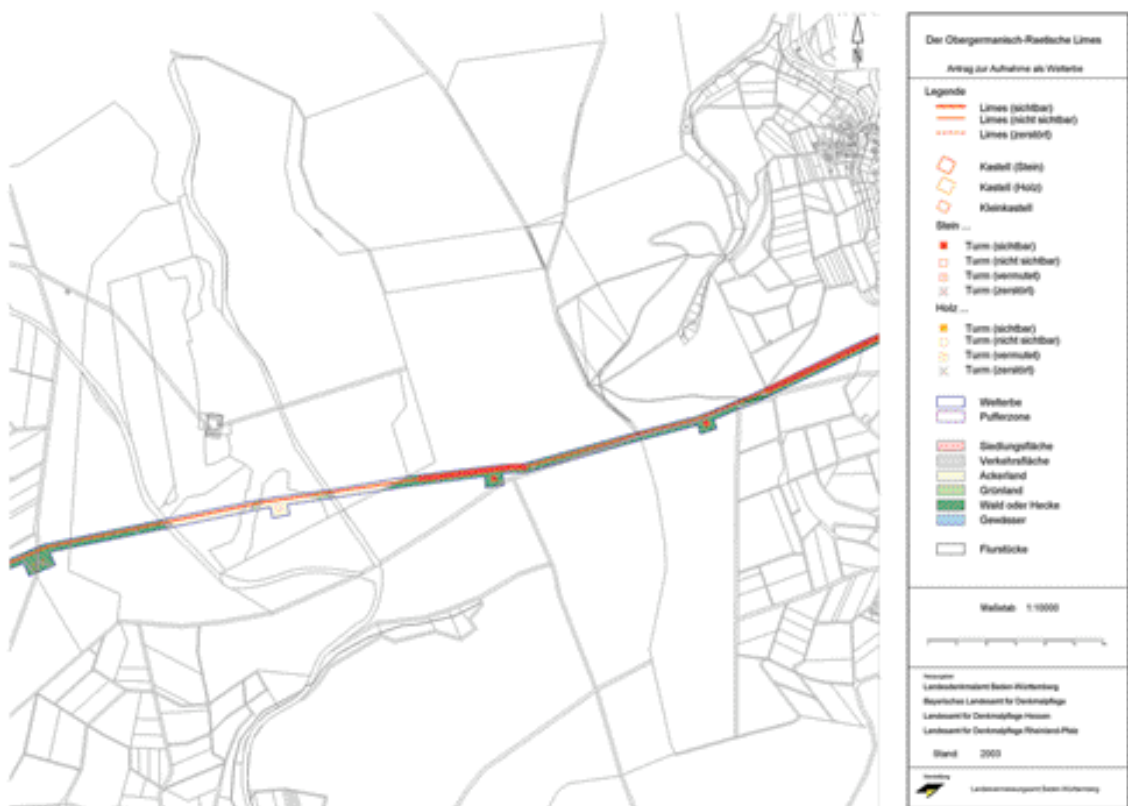


Fig. 6 An example of one of the maps from the Upper German-Raetian *Limes* nomination showing a section of the frontier (Copyright: Deutsche Limeskommission)



Fig. 8 An extract from the digital map for Balmuildy Roman fort incorporating the raster geophysical survey (Glasgow University 2005), the vector digitised excavation plan (Miller's excavations 1912-14) and the RCAHMS vector digitisation of the OS 1980 Survey. (Geophysical Survey produced with the permission of Glasgow University (Mapping: Crown Copyright. All rights reserved. RCAHMS Licence no. 100020548 2008.)



Fig. 7 The reconstructed watch-tower of Erkertshofen on the Upper-German Raetian *Limes* (Photo: A. Thiel)



Fig. 9 RCAHMS surveyor Ms Georgina Brown undertaking GPS survey at Seabegs Wood on the Antonine Wall (Photo: RCAHMS)

detail. Attribute (metadata) tables were created, both at a high level, containing data such as the type, date and director of the intervention, as well as more detailed data recording the individual features found. The project digitised information from excavations, watching brief and geophysical surveys, recording individual trenches and features, identified by type. By capturing the data in this way, the user is able to cross-search different events to identify similar features across, for example, separate excavation projects (Fig. 8).

In addition to this data collection, further selected field survey data to enhance this resource was gathered in 2006, using a differential Global Positioning System (GPS) with a connection to SmartNet (Fig. 9). This methodology enables the user to get a position, accurate to a few centimetres at any point in the UK where there is mobile phone coverage and a clear view of the sky, while using only one GPS receiver. It was particularly suitable for rapid field survey of this long linear monument.

All the data gathered through this project is available as a series of layers in the GIS. Once in this digital environment, the data can be viewed and cross interrogated with other datasets. This includes raster datasets such as earlier maps of the monument and 'intelligent' vector data such as the WHS line and buffer zones, Historic Scotland's Scheduled Ancient Monuments, Historic Land-use Assessment information, national and local sites and monuments record data, and other datasets gathered for land-management purposes.

This dataset, delivered to the bodies involved in the heritage management of the Antonine Wall, provides a powerful tool for the management, protection, conservation and interpretation of the monument. Although the digitisation project has been completed, it is, of course, recognised that work on the Roman frontier is not static. All the parties involved in data collection and heritage management are working together with commercial and research archaeologists on ways to streamline the process of integrating digital information into the dataset in future.



Fig. 1 The fortifications of the Republican camp at Numancia (Photo: S. Jilek)



Fig. 2 Participants of the XXth *Limes* Congress in León, Spain in 2006 (Photo: Á. Morillo)

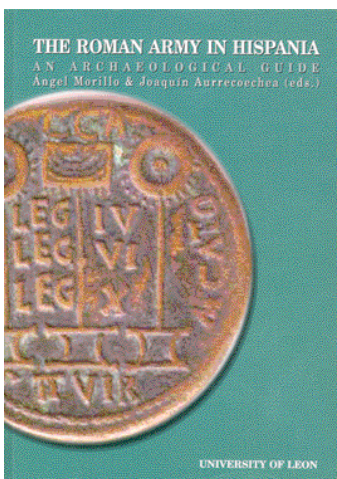


Fig. 3 Guidebook on the remains of the Roman army in Spain (Photo: Á. Morillo)

DOCUMENTING THE ROMAN ARMY IN SPAIN

Ángel Morillo, León

Traditionally, research on Roman military archaeology in Spain has progressed slowly compared to other European countries. Until a few decades ago, only a few military sites had been excavated and the results were rarely published. The reason was the indifference to the Roman military strategy applied in *Hispania*, and not the shortage of military testimonies to the Iberian Peninsula, as it has sometime been argued. Until very recently there have been few reflections about the nature of the conquest process and Romanization in the military field. We do not doubt that this indifference was based on certain ideological concepts. The Roman army was considered an imperialistic element, a necessary instrument to maintain the “rebellious people” of the north of *Hispania* inside the orbit of the empire. This northern, supposedly barbaric and militarized *Hispania*, contrasted with the rich and romanized regions of the East and the Mediterranean sea. The progress of archaeology has confirmed that these ideological premises cannot be sustained nowadays. Furthermore, spectacular progress in Roman military archaeology can be recognized during the last two decades, although the standard of publication is not the same as in other European countries. There has been a significant advance in our knowledge of the camps and forts of the early Roman empire, particularly for the Augustan and Julio-Claudian period, though there is not such qualitative advance for the Republican sites.

The long duration of the Roman conquest of *Hispania*, which took two centuries (218–19 BC), and the significance of certain historical episodes such as the Celt-Iberian and Sertorian Wars have traditionally attracted the attention of researchers to the camps and forts of the Republican period. Spain preserves the best collection of Republican Roman military settlements as A. Schulten’s surveys and excavations revealed at sites such as Numancia (Fig. 1), Renieblas, Cáceres el Viejo and Aguilar de Anguita. His work on Republican forts, which he conducted in the first decades of the 20th century, has not been continued. His extensive monographs concerning the camps at Numancia have remained largely unexamined by the Spanish research and not subjected to interpretation.

Following the tendency started by García y Bellido in 1961, J. M. Roldán published his monograph about the Roman army in Spain in 1974. New forts and military camps of the first century AD were discovered by surveys and aerial photography in the 1960s: Lugo, León, Astorga, Herrera de Pisuerga and Rosinos I. Because most of these sites lay under modern cities it turned out to be difficult to document and excavate the internal buildings. In archaeological respects we have a better knowledge of the auxiliary forts of the earlier Roman times. During the last years many new sites were found in the whole Peninsula. The results opened new perspectives on the disposition of the military units and the main objectives of the army in the Iberian Peninsula. In the intervening period, a complete renovation of the methodological approaches and qualitative advances in the knowledge of the military bases have been made. The results are collected and published in two congress volumes about Roman military archaeology (Segovia: Morillo 2002 and León: Morillo 2006).

During the XIXth *Limes* Congress in Pécs in Hungary, it was decided to hold the next meeting in Spain in the city of León in 2006. The Congress was organised by the University of León between the 4th to the 11th September 2007 (Fig. 2) under the Honoured chairmanship of His Majesty the King of Spain. The *Limes* Congress received financial and institutional support from the European Culture 2000 project “*Frontier of the Roman Empire*” (see Breeze and Jilek in this vol. 7–14). More than 300 archaeologists from 32 different countries attended the meeting and were shown the latest results of Spanish military archaeology. The proceedings of the conference will include about 200 papers, which will be soon published within *Gladius*’ series, from the Consejo Superior de Investigación Científicas of Spain (CSIC). The European Union Culture 2000 project mainly supported the production of a guide-book on Roman remains in Spain by A. Morillo and J. Aurrecochea, *The Roman Army in Hispania* (Fig. 3), which was presented to all the participants. The book offers a most welcome overview on the Roman army in Spain, containing many papers written by Spanish authors as well as colleagues from Portugal, Germany, France and the United Kingdom. It

includes articles about the historiography, the state of archaeological research in Spain, the conquest of the territory, military equipment and military productions, the role of the army in the exploitation of the gold, as well as the research on late Roman sites. An annexe deals with military epigraphy. The chapters are organised in chronological periods from Republican, through the early Roman empire to the Late Roman times.

The archaeological evidence demonstrates that the Roman army did not repress the indigenous people in the north of the Iberian Peninsula but brought Roman civilization to the edge of the empire. After the conclusion of the conquest and the total occupation of the Spanish territory during the reign of the Emperor Augustus, the army carried out technical missions and controlled the resources, mainly the exploitations of gold mines. The army also acted as an administrative and executive body in the Roman settlements of the territory. The main military base was León, which flourished from the 1st to the 4th centuries AD.

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THE PROTECTION OF ROMAN FRONTIERS

David J. Breeze, Edinburgh

There tends to be a fundamental difference in the cultural attitudes relating to the protection of archaeological sites (often called ancient monuments) that are no longer in any use related to their original purpose, and historic buildings that continue in some form of use. The former are valued because of the archaeological and historical information they embody, because they are frequently an integral part of a wider cultural landscape, and they may also have become visitor attractions (Fig. 1). But in each case, the monument no longer serves the purpose for which it was built, whether it be a prehistoric stone circle, a Roman frontier or a medieval abbey. A historic building, on the other hand, retains a function, whether it be a structure for living, working, worshipping or burial. In the latter case the aim of preservation is to retain the building, in extreme cases perhaps even allowing destruction of the interior in order to preserve the façade if that is the more important element. That would not be contemplated for an archaeological site, where destruction of any part would represent an unacceptable loss of scientific data (see Sommer et al. in this vol. 128–39); similarly the creation of an *in situ* replica must be an unacceptable tool in the preservation, conservation or presentation of an archaeological site because of the loss of authenticity entailed (Fig. 2) (see Lengkeek in this vol. 36–51).

The main aims of all legislation protecting archaeological sites are therefore their preservation *in situ* and, should destruction or damage become unavoidable, their excavation and publication to the highest possible standards, bearing in mind that this is a unique exercise. Once destroyed, even through excavation, an archaeological site can no longer be re-created; this is a fundamental difference between archaeological preservation and natural conservation. While excavation must continue today, for a variety of reasons, there is no doubt that techniques will improve and that is a good reason for preserving sites if there is no compelling reason to do otherwise, though, paradoxically, techniques will only improve if we continue to practice existing – and develop new – techniques.

Roman frontiers run through many different modern landscapes: rural, urban, and even maritime. On the whole, it is more straightforward to protect archaeological sites which survive in the countryside. Roman remains in urban contexts often underlie later buildings erected through the centuries following the fall of the Roman empire, and those later buildings may have a value of their own (see Jilek in this vol. 64–9). In some cases, damage in the medieval and modern periods has been so great that much of the Roman remains has been destroyed – though, as every archaeologist knows, it is difficult to destroy a ditch, and Roman frontier works contain many ditches, and an important element of work on Roman frontiers today is to plot those parts of the frontiers which have – or appear to have – been destroyed.

Despite these caveats, one of the most significant discoveries of later years has been the realisation that archaeological remains survive well in towns (Fig. 3). This is partly because, during the great age of urban expansion in the nineteenth century, many buildings were erected with minimal foundations which were so shallow that they hardly cut into the underlying Roman levels. On Hadrian's Wall (UK), an entirely new element of the frontier, pits between the wall and the ditch, were first located – and indeed have only been located – in towns during the process of urban renewal. On the Antonine Wall (UK) recent excavations have shown that the Wall base can survive well in towns, and long-lost forts have been identified and excavated in Bearsden and Falkirk (Bidwell 2005; Breeze 2006).

The presumption must always be that archaeological remains will survive in urban environments, unless it can be proved otherwise (see Sommer in this vol. 118–21). Yet towns cannot be fossilised, they need to develop. How can this potential clash between the preservation of archaeological remains and the need to develop be resolved?

As a starting point, it is possible for all to accept that archaeological remains will survive and to design any

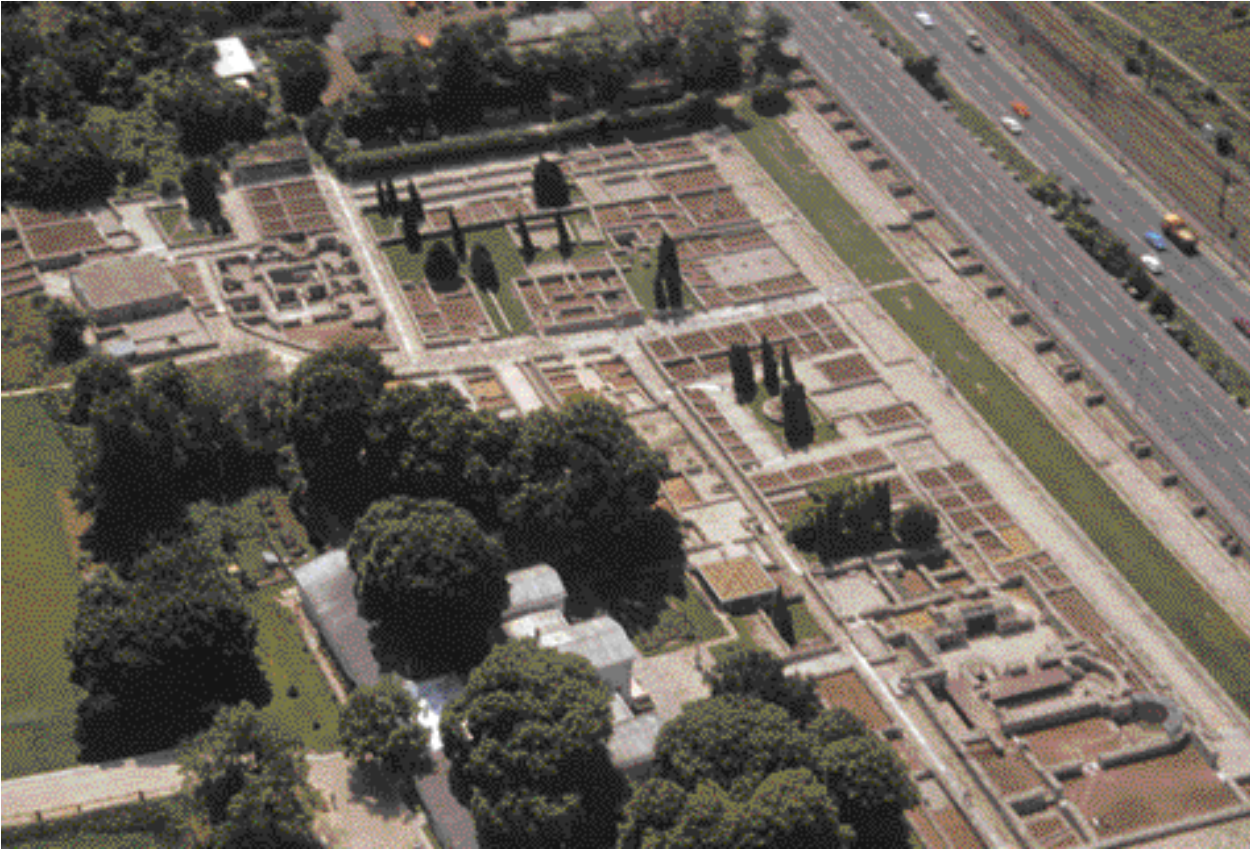


Fig. 1 The remains of the Roman civil town in *Aquincum* (Budapest), Hungary (Photo: Zs. Visy)



Fig. 2 The newly reconstructed house(s) in the Roman civil town in Carnuntum, Austria (Photo: S. Jilek)



Fig. 3 The remains of the *Porta Praetoria* of the legionary fortress in the very centre of Regensburg, Bavaria (Photo: BLfD, München)



Fig. 4 The Bearsden bath house lays in the middle of a modern housing estate (Copyright: Historic Scotland)

new development on the basis of that presumption. The line of the Antonine Wall survives as no more than public open space in several towns along the frontier. Where there is some doubt about the extent of what remains, evaluation of the archaeology may be justified. In such cases, however, the specific intention must be evaluation rather than excavation. Investigation should be restricted to the important task of determining if there are indeed archaeological remains, and it should not proceed to examine those remains. The clarification of the extent of survival will allow mitigatory measures to be undertaken, which might include protecting the remains below new buildings. It might also include selective excavation and display, as, for example, was the case with the bath-house in Bearsden (Fig. 4) (Breeze 1984).

There is no doubt that people are interested in the history of their towns, as observation of the numbers of visitors at any urban excavation or at the sale of volumes of the Scottish Burgh Surveys demonstrates. Public pressure can lead to the retention of archaeological site, as was the case with the Walbrook Mithraeum and the Rose Theatre in London. People do welcome the retention of these links with their past.

Roman frontiers offer a particular form of link with the past. The line of linear barriers such as the German *Limes*, Hadrian's Wall and the Antonine Wall have long been respected, as is seen in the way that many roads follow the course of the Scottish frontier or that many road names commemorate its route. It is not only essential that we maintain these particular forms of links to the past, but also seek to extend them through acknowledgement of the Roman lines in modern developments.

The protection of both ancient monuments and historic buildings tends to be site specific. In the face of the growth of landscape studies, cultural resource managers have sought ways to move from this approach and embrace the challenge of protecting the wider historic landscape, and, in particular, to ensure that the time depth in today's landscape is acknowledged. Understanding the wider landscape, both spatially and chronologically, is important to a fuller understanding of Roman frontiers, as I have argued elsewhere in this volume (see Breeze in this vol. 60–3). Within a narrow framework, the environs of Roman frontiers can be protected through the formulation of amenity or buffer zones, so that some elements of the relationship of the frontier to the landforms within which it sits remains and its location can be understood. Yet, it is clear that for wider understanding, engagement of Roman landscape studies with the debate on the best means of protecting the historic environment and ensuring recognition of the time depth in the landscape is essential.

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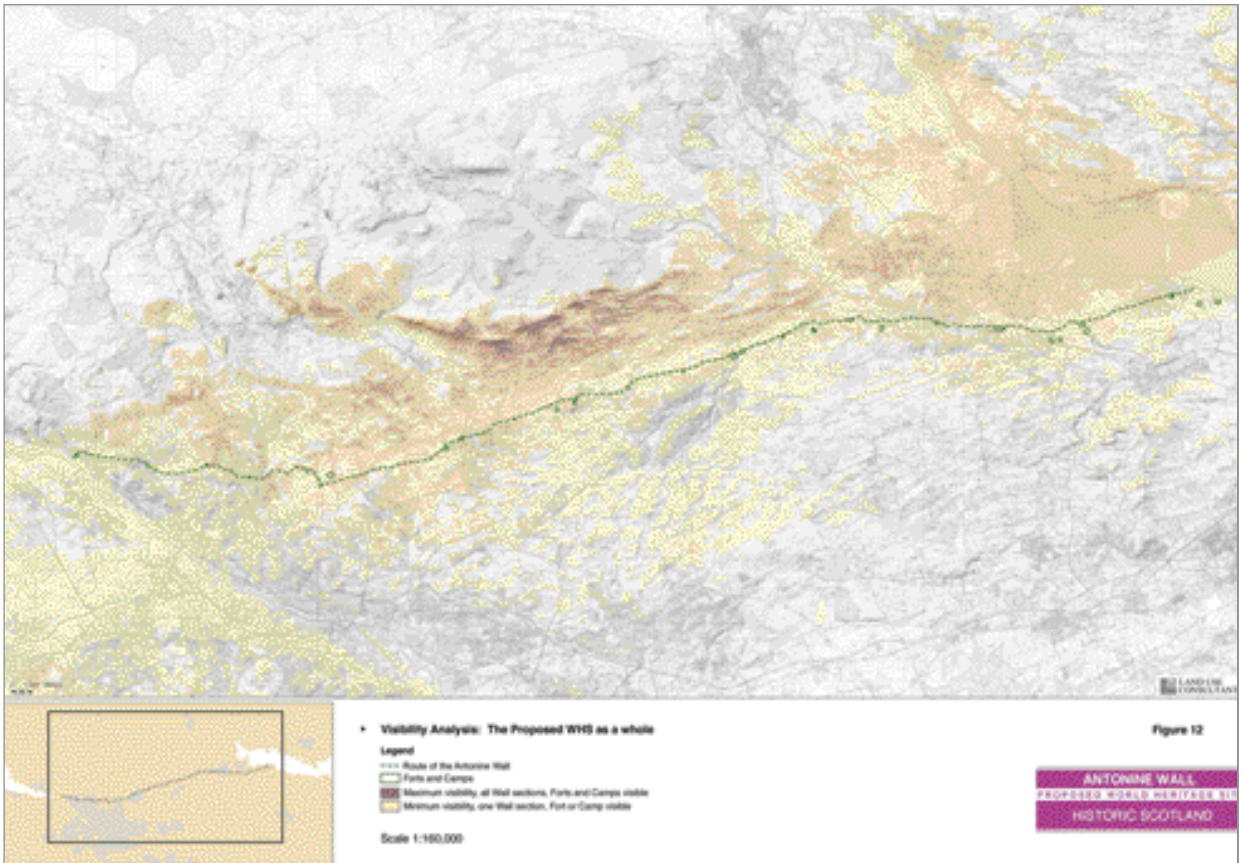


Fig. 1 Section of the digital terrain model (Copyright: Historic Scotland)



Fig. 2 Map showing the buffer zone areas along the Antonine Wall (Crown Copyright: RCAHMS)

THE ANTONINE WALL: THE DEFINITION OF BUFFER ZONES

Beatrice Dower, Land Use Consultants, Glasgow

Land Use Consultants (LUC) was commissioned in January 2006 to carry out a study to define the extent of the Buffer Zone to protect the proposed Antonine Wall World Heritage Site (WHS). The purpose of such buffer zones is to protect the landscape setting of a WHS. A buffer zone may also be used more proactively to define where landscape management schemes might be introduced, to improve the setting of a WHS and to facilitate appreciation and understanding by the public.

There is no single established methodology for the definition of buffer zones for WHS, particularly as the setting, circumstances and extent of Sites is very variable. The proposed Antonine Wall WHS, for example, is a long linear site, and in a lowland largely built up setting. Buffer zones have been identified as *'the physical extent of the landscape that is visually and perceptibly linked to the perception of the WHS and that can still be practically protected or managed'*. Definition of the buffer zone has therefore been based on visibility to and from the proposed WHS, and analysis of the land use setting, including urbanised areas and current development policies set out in Local Plans. This was carried out using available data relating to the proposed WHS and its surroundings, GIS inter-visibility analysis with the surrounding landscape and site survey work.

The definition of the buffer zone for the proposed Antonine Wall WHS was undertaken within the following framework:

- identification of the physical extent of the proposed Antonine Wall WHS (including associated forts, camps, etc.) and its state of preservation;
- GIS based inter-visibility analysis;
- analysis of Historic Landuse Assessment (HLA) to analyse the time-depth of the immediate context;
- field verification;
- comparison with existing planning policy areas, including Amenity Zones and Greenbelt areas;
- definition of the finalised buffer zone;
- preparation of planning and management guidelines for the buffer zone.

Identification of the monument

The GIS data base on the Antonine Wall held by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) provided the essential tool in identifying the monument. This data base recorded the rampart, ditch, upcast mound and Military Way, forts, fortlets, camps, etc, and provided some information regarding the state of preservation of the individual elements.

Inter-visibility analysis

This stage consisted of a GIS based inter-visibility analysis to identify those areas visually connected with the potential WHS, including recording of key views to and from the line of the Wall and features which might help define the boundary of the buffer zones. A digital terrain model was generated of the corridor along the Antonine Wall, extending to 15 km to the north and south of the linear Wall route (Fig. 1). This area included the Kelvin Valley, the Campsie Fells and Kilsyth Hills to the north and more gently rising land to the south.

For the purposes of modelling the length of the Antonine Wall was split into sections based on the current land use context. Particularly long sections were further split at road or canal crossings to make all sections of comparable length. In total, 59 sections were identified of 0.2 to 2.3 km long. These sections of the Wall were modelled in the visibility analysis as a series of points 200 m apart. Forts and camps were modelled with points at each corner, and a point in the centre of each site. Additional points were used for larger forts and camps.

Evaluation of the theoretical extent to which the modelled WHS will be visible across the study area consisted of establishing a 'zone of theoretical visibility', using specific computer software designed to calculate the (theoretical) inter-visibility between the monument and its surroundings. Arcview computer software was used to generate the visibility maps. This programme calculates areas from which the modelling points are (potentially) visible. This is performed on a 'bare ground' computer terrain model using a 10 x 10 m grid, which means that the computer calculates the number of points visible from the centre point of each 10 x 10 m square across the surrounding area. It should be noted that the programme uses point height data, rather than continuous data, and assumes straight line topography between data points, and cannot therefore account for small scale topographic features. Because it uses a 'bare ground' model it is considered to overemphasise the extent of visibility of the features and therefore represents a maximum theoretical visibility.

Because the proposed WHS was modelled as points, rather than as continuous linear features, it was possible for the analysis to calculate how many points would be visible from each part of the study area. This allowed a distinction to be made between locations where only a very short section of the Antonine Wall is visible (few points) and those where longer or multiple sections are visible (many points). This was used to highlight any areas that are particularly sensitive in terms of their visual relationship with the Wall corridor, in particular locations where visibility of long sections of the Wall would best allow the appreciation of the Wall as a linear feature running through the landscape.

It is, however, important to recognise that the visibility analysis is carried out on the basis of 'bare ground topography' which does not take account of the screening that can be provided by woodland, buildings or other features such as railway embankments or hedges. It is also subject to a margin of error associated with OS data. However, the results of the visibility analysis provide a good basis for:

- defining an area of search to be tested in the field;
- distinguishing between different parts of the buffer area, in particular areas where visibility of multiple points or sections of the Wall or multiple forts or camps may be possible;
- identifying landscape features which restrict the visibility to and from the proposed WHS and form visual horizons;
- key viewpoints for viewing the Wall, particularly those at some distance and outside the area likely to be included within the buffer zone;
- informing future management.

Field verification

Following the production of visibility maps for the Wall sections, forts and camps, an area of search was identified up by rationalising the theoretical visibility extent to the nearest (outwards) physical boundary shown by roads, railways or field boundaries on the OS 1:25,000 scale maps, excluding those areas beyond urban areas except where strong visual relationships with the monument exist.

This area of search was tested on the ground during field survey, carried out in order to:

- check the actual visibility extent of the proposed WHS;
- check the extent of the proposed buffer zone;
- confirm the land uses and within or adjacent to the buffer zone;
- confirm the boundary features suitable for the buffer zone;
- identify where recent development has taken place, and is not marked on the OS map data;
- identify key views extending beyond the proposed buffer zone;
- identify key issues that may inform landscape planning and management recommendations.

The conclusion of the inter-visibility analysis was that short distance continuous visibility extends to approximately one km to the north and south of the monument, beyond which the local landform breaks up the visibility. Longer distance views tend to be northwards, as the Wall and the forts and camps tend to be located on the southern sides of valleys or the north facing slopes of hills. The exception to this is the westernmost section, along the foot of the Kilpatrick Braes, where visibility is more extensive southwards than northwards.

The pattern of shorter distance visibility can be used as a basis for the maximum extent of the buffer zone, the longer distance visibility can be used to identify more where the visual relationship with the proposed

WHS extends beyond the buffer zone.

Historic Landuse Context

The Historic Landuse Assessment GIS dataset provided information about the past and present land uses along the Wall. This was used to identify the existing context of the monument (urban or rural, for example) and also to identify the time-depth of this context, i.e. whether settlements have existed along the Wall for a long or short time. This dataset, supplemented with aerial photographs was used to confirm where the Wall runs through developed and undeveloped areas and to analyse how the patterns of development/settlement along the Wall have changed with time distant view areas, HLA demonstrates that much of the landscape that we see today dates back to the 18th, 19th and 20th centuries comprising a combination of farmland, woodland, settlements, mineral sites and recreational areas such as golf courses. This general over-view was supported by analysis of each section of the frontier.

Comparison with Planning Policy Areas

The area of search identified during desk and field work was then compared with local authority Local Plan maps to identify areas where policies relating to the archaeology or landscape are in force. The area benefits from a relatively high level of protection through existing development plans as a result of Greenbelt, Areas of Great Landscape Value, heritage and nature conservation policies, though the extent to which the Antonine Wall is explicitly referred to in plan policies, supporting text and proposals maps varies.

Definition of the buffer zone

The visual relationship of the landscape with the proposed WHS varies according to the land use, topography and also with distance; Figure 1 reflects this pattern of inter-visibility. For the purposes of identifying a buffer zone for the proposed Antonine Wall WHS, three types of visual relationship between the Wall and surrounding areas have been identified. Firstly, the area of almost continuous inter-visibility, identified as being generally up to 1 km from the monument but of differing extents to the north and south depending upon the local topography; secondly, a zone of discontinuous inter-visibility reflecting the fragmenting of views caused by intervening topography; and thirdly, longer distance views to and from key hill areas which are visible from large sections of the Wall or from which extensive sections of the Wall are, in theory at least, visible. The first and second categories have been used as a basis for defining the buffer zone immediately adjacent to the WHS, but the third of these categories has also been considered, as these locations aid the understanding of the context of the WHS as an extensive linear feature across the wider landscape, and allow for greater interpretation of the route chosen by the Romans.

The landscape along the proposed WHS changes along its length. The relationship of the Wall, forts and camps with the surrounding topography affects the extent and characteristics of the buffer zone. Four different landscape setting types have been identified from east to west, including along a scarp slope, along the south side of a broad valley, over drumlin hills, and across south facing slopes.

The final definition of the buffer zone was drawn up on the basis of the multiple layers of information gained through the preceding tasks. As a result of the detailed analysis, seventeen buffer zone areas were identified, generally existing between urban areas, or surrounding forts and camps that are isolated from the Antonine Wall itself by urban areas, and justified by detailed descriptions (Fig. 2). The buffer zones are designed to include those areas which are close to the Wall and which have the strongest visual relationship with it. They extend typically 1 or 2 km to the north and a shorter distance to the south, reflecting the way that the builders of the Wall made good use of local topography to create a defensive boundary with areas to the north. Although the Campsie Fells and Kilsyth Hills to the north have the strongest and most extensive pattern of inter-visibility with the line of the Antonine Wall it is considered impractical and inappropriate to extend the buffer zone to include these areas. The buffer zone areas have been drawn up with the aid of Local Plan maps showing the areas subject to development policies such as proposals for development and boundaries for policies such as Greenbelt, nature conservation sites and open space.

Preparation of guidelines

The final stage of the analysis was to set out a series of recommendations for the future planning and management of the area within the proposed WHS buffer zone. This included the following:



Fig. 3 The Kelvin Valley looking north-west from the Antonine Wall with the Campsie Fells in the background (Copyright: Historic Scotland)

- land uses (including actions which might be allowed within the buffer zone);
- potential reflection of the buffer zone within local authority plans and sibling strategies (e.g. greenspace or access and recreation);
- the potential need for additional safeguarding policies relating to landmarks or viewpoints in prominent locations adjacent to and outside the defined buffer zone.

Preparation of guidelines and future management recommendations was based on information gained from the planning review as well as field observations. Recommendations related to how different parts of the buffer zone could be used and managed, and how its conservation and management might be reflected in development plans and other sibling strategies (e.g. greenspace strategies). These were drawn up to reflect the different characteristics of the proposed WHS and its immediate setting, through management responses that would be appropriate to each contextual setting.

It is evident that much of the buffer zone is already provided with a high level of protection as a result of its Greenbelt status. It is important that the buffer zone is reflected as an additional layer of development constraint within this zone. The following recommendations are designed to inform local plan policies across the area, reinforcing existing levels of protection and providing a consistent approach throughout the buffer zone. More detailed recommendations are set out in relation to each local area of the buffer zone.

- there should be a presumption against new development within the buffer zone;
- minor development will only be acceptable where it relates to existing development and where the location, scale, design and materials would not affect the setting of the proposed WHS, views of it or access to it;
- there are a number of mineral, landfill and water infrastructure sites within or immediately adjacent to the buffer zone. Redevelopment of these sites could provide important opportunities to enhance the character and quality of the buffer zone. The priority should be to restore these sites' previous landscape character and quality, or where this is impractical, to establish 'soft' after uses such as nature reserves or areas for quiet recreation. Where sites come forward for redevelopment, Supplementary Planning Guidance (for example in the form of planning briefs or design guides) should be used to ensure that schemes protect the setting of the Antonine Wall in terms of scale, design and materials. Developments should not affect views of the Antonine Wall nor access to it;
- definition of the buffer zone has been informed by an analysis of those areas with views to or from the proposed WHS. However, the fragmented nature of the zone of visual influence means there are some isolated areas outside the defined buffer zone which have a visual relationship with the Antonine Wall. While increasing distance means that this relationship is weakened, there are areas closer to the buffer zone boundary where major development could have an impact on the setting of

the proposed WHS. Local plans should therefore ensure that major development proposals within 5 km of the buffer zone boundary are assessed in terms of their potential effects on the setting of the proposed WHS.

- there are also a number of areas of higher ground which have a strong visual relationship with significant sections of the Antonine Wall. It shows that the Campsie Fells have the strongest visual relationship with the Wall (Fig. 3), but that there are also a series of secondary areas where there is also a relatively strong relationship. It is considered inappropriate and impractical to extend the buffer zone to include these areas. However, development plan policies should require major developments in these locations to be assessed in terms of their potential effects on the setting of the proposed WHS.
- encourage management of the landscape that contributes to the environmental quality of the buffer zone. Management should therefore aim to reinforce, and where appropriate restore, the structure and quality of the landscape, for example by enhancing field boundaries, improving woodland management and tackling areas of damaged or under-used land. Mechanisms may include agri-environment funding (for example via Land Management Contracts and, in the future, Land Management Plans), targeted use of the Scottish Forestry Grant Scheme or the actions of public land owners and managers such as local authorities, Central Scotland Forest, Transport Scotland, British Waterways and Network Rail. Land management should avoid operations that might damage known or potential historic sites. Where appropriate, management of the buffer zone should be integrated with that for other conservation interests such as the Forth and Clyde Canal and nature conservation sites.
- opportunities to increase managed access throughout the buffer zone should be realised where this is compatible with preservation of the potential WHS and with the existing land use. This should be allied to improved signage, information and interpretation. Access networks should be integrated with long distance routes (including the Forth and Clyde Canal), key public transport nodes, neighbouring settlements, other key recreation sites and tourist attractions and car parks. Local Authority Outdoor Access Strategies and Core Path Plans should reflect these opportunities. Organisations such as Visit Scotland and British Waterways should be involved in managing public access, recreation and tourism within the WHS buffer zone.
- within and adjacent to urban areas, those parts of the buffer zone comprising publicly accessible greenspace should be managed to realise greater awareness and interpretation of the WHS. Local Authority Greenspace or Open Space strategies should reflect the presence of the Antonine Wall in these locations.



Fig. 1 Aerial photograph of the Roman part of Straubing with the eastern fort in the middle ground under the green fields (Copyright: BLfD 7140/012-4457-12, 13.7.1986; O. Braasch)

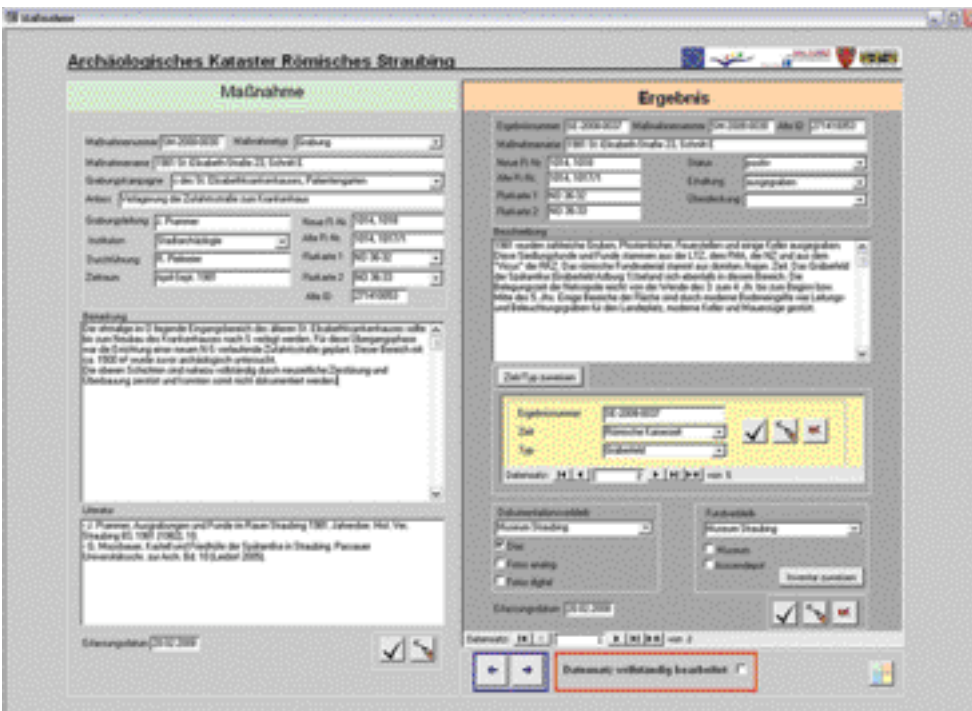


Fig. 2 Cadastre Straubing: masks for measures ("Maßnahme") and archaeological results ("Ergebnis") (Copyright: BLfD; J. Valenta)

THE CADASTRE PROJECT IN STRAUBING (BAVARIA)

C. Sebastian Sommer, Munich

Whereas the distinction between “existing” and “destroyed” in relation to ancient monuments is fairly easy to accept in the open countryside this causes major problems in urban surroundings. In towns, villages and industrial settlements the collection of information on archaeological monuments is much more difficult as most methods of prospecting fail due to small parcels, covered surfaces, disturbances and pollution.

Independent of the visual appearance, however, it is not uncommon that between and under intensive constructions ancient monuments are very well preserved (see Breeze in this vol. 109–11). Often conditions here are even better than in the open countryside due to their protection by later layers of debris and remains of demolition, sometimes ancient monuments in themselves. However, the intensive use of these areas for cellars, cess-pits, wells, and lines of infrastructure often led to a punctuation of the evidence by small-scale destruction. Accordingly, conditions of ancient monuments under these circumstances and changes of preservation occur on a very small scale and may vary metre by metre.

Hadrian’s Wall and the Upper German-Raetian *Limes* within the World Heritage Site ‘*Frontiers of the Roman Empire*’ (FRE WHS) include a number of forts and their military *vici* underneath medieval and modern settlements. In many of the proposed future elements of the WHS along the rivers Rhine and Danube even the majority of sites were used continuously since the Roman times (see Jilek in this vol. 64–9). As UNESCO accepted for the Upper German-Raetian *Limes* the distinction of underground levels with WHS-qualifications overlain by medieval and modern construction without WHS-status the extent and quality of areas underground have to be specified, described and mapped.

Cadastres – that is, the mapping of different layers of a town’s history and development – are instruments for documentation as well as for management. Archaeological cadastres in particular offer knowledge on comparable levels and guidance towards dealing with archaeological heritage in difficult terrain, in particular built-up areas, on the basis of a sound evaluation (for the principles see Virton 1992; Bericht 2002/03; Bräuning et al. 2000; Haberstroh 2004; for examples Ade-Rademacher et al. 2005; Behrer 2001; Schneider 2001, and the list at www.landesdenkmalamt-bw.de/publikation/stadtkataster.php). In particular, the following elements are important for an archaeological cadastre:

1. mapping of archaeological evidence. This leads to a detailed knowledge of the whereabouts, depth and quality of existing parts of the archaeological heritage (positive results). To be precise, knowledge of excavated and destroyed parts is transferred to parts not destroyed in the direct vicinity;
2. mapping of all disturbances of the archaeological heritage. Cellars, underground garages, infrastructure, but also excavations and medieval as well as pre-modern constructions in depth (which sometimes in themselves may be protected monuments) show the extent of previous destruction (negative evidence) and by contrast areas of preservation;
3. overlay of existing older maps and plans. Hereby changes in the layout of a settlement and the range in which to expect ancient constructions even at presently undeveloped areas may be indicated;
4. plotting of the evidence of written sources. The effect may be a higher level of understanding of what to expect (small scale historical geography).

The overlay of the results not only leads to a thorough knowledge of the existence of the archaeological heritage, but it allows the value of the remains to be assessed, even though this process is very unpopular among conservators. Such assessment, however, is an unconditional requirement and not only for WHS-applications. When GIS-based, the results can be combined with other strands of information which makes



Fig. 3 Cadastre Straubing: Sample area (construction site in fig.1) with positive (various colours; excavations) and negative results (yellow and grey; buildings, cellars (Copyright: Stadt Straubing, BLfD, J. Valenta)

an archaeological cadastre a valuable planning instrument for (local) authorities as well as investors and developers.

The purpose of the cadastre project within the Culture 2000 project is the creation of an exemplary documentation to aid the application at a possibly future WHS within the *'Frontiers of the Roman Empire'*. Straubing on the Bavarian Danube-*Limes*, the ancient *Sorviodurum*, was selected for its dynamic development and not least due to the fact that the local authority and the local historic society agreed to balance the EU-investment by an equal amount of money (Fig. 1; Prammer 1998; Prammer 2007; Sommer 2008). A major goal was the modification of pre-existing independent concepts to fit with or to be included into present day large-scale GIS-databases for heritage management, here in particular the "Fachinformationssystem" (FIS) within the "BayernViewer-denkmal", the web-based GIS of the Bavarian State Conservation Office (Schlicksbier and Wanninger 2006; Sommer 2007; www.blfd.bayern.de). For the "Archäologischer Kataster Straubing" principals were developed (Fig. 2-3) and are applied within a sample area within the Roman part of Straubing. The contents will be evaluated by civic planners, the town archaeologist, as well as state heritage managers, and subsequently transferred into the "BayernViewer-denkmal" once the project is completed. This will offer public access to that part of the information which is not subject to legal data protection as is already the case with approximately 55.000 registered archaeological monuments of Bavaria. The advantage is the combination of the cadastre with up-to-date topographical maps provided by the Bavarian ordnance survey. It is hoped that the "Archäologischer Kataster Straubing" will provide useful information to civic planners, land owners and possible investors, direct the future development towards an archaeology-friendly approach and therefore support the attempts to preserve the archaeological heritage. Additionally, it may serve as the spring-board for a possible WHS-application and as an example to collect and present archaeological data at other sites.

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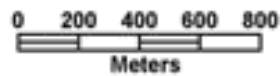


Fig. 1 Schematic overview of the various and most important Roman settlements at Nijmegen during the 1st – 5th century A.D. Roads are reproduced in dotted lines. The Roman cemeteries are mostly situated along these roads. In blue the excavated areas since 1946. A *Ulpia Noviomagus*, B *Oppidum Batavorum*, C Late-Roman fortification, D Legionary fortress of the 10th Legion, E Fortress on the Kops Plateau (Drawing: Huub Beckers, BAMN)



Fig. 2 Excavation in de Gerard Noodtstraat in the centre of Nijmegen (Photo: Afra Koopman, BAMN)



Fig. 3 Foundation trenches of a building in the fortress of the 10th Legion in a backyard in Nijmegen-Oost (Photo: Rob Mols, BAMN)

SAVING THE REST – ROMAN NIJMEGEN BENEATH THE PAVEMENT

Harry van Enckevort, Nijmegen

Around 19 BC the first Roman troops descended on the outwash plain and ice pushed ridge in the east of Nijmegen and started to build a series of fortresses, 15 km south of the later Roman frontier. In the immediate vicinity of these, some years later, they established *Oppidum Batavorum*, the capital of the Batavians. The foundation of this urban settlement has given the town of Nijmegen in 2005 the occasion to celebrate – albeit a few years late – its 2000th birthday. In the meantime, the Roman and medieval past of the town, particularly after 1870, when the town expanded beyond its fortifications, have completely disappeared below new constructions. In this strongly urbanised landscape, only a few streets still remind us of the spatial layout of 2000 years ago.

The area with settlements and cemeteries from the Roman period, but also from prehistoric times and the Middle Ages, is mainly concentrated in an area of 500 hectare on the south bank of the river Waal (Fig. 1). But also in numerous other places within the municipal border (over 5760 hectare), sites with tangible remains from the over five centuries' occupational history of the Roman urban territory may be found. Until the mid-nineties, we thought Nijmegen's past had been fairly accurately charted; however, new sites are still being discovered. An illustration of this fact is the new, low-lying area to the north of the river which was assigned to Nijmegen as an urban development area in 1997. Prior to the large-scale new construction, more than 80 new sites, mostly from the Iron Age or the Roman times, were discovered in this 1345 hectare area. Since it is very difficult to detect, for instance, cemeteries in the course of prospective research, we are certain even more sites will be revealed in time.

Threats to the archaeological remains

Some of the sites north of the river can be fitted into the new urban landscape that is being developed; others must necessarily be excavated. An almost 8 hectare large Batavian settlement and several small middle Iron Age cemeteries can be mentioned as examples here. Almost 8% of the 330 hectares of archaeologically valuable sites in this development area has been excavated in the past 12 years. Almost 5% of the area is protected by the government as *rijksmonument*. Whether the rest will have to be excavated in the next 10 to 15 years depends on construction plans yet to be developed. A remarkable detail deserves notice in this respect. In the early nineties, the government designated this area as a development area for house-construction, but in the years prior to its addition to the town of Nijmegen, the former State Service for Archaeological Investigation (ROB, now the National Service for Archaeology, Cultural Landscape and Built Heritage, RACM) hardly stirred to chart its archaeological values. As a result of this reluctance, accommodation of significant archaeological sites in the planning of the new urban landscape was insufficiently taken into account.

The Roman and medieval centres, cemeteries and graveyards south of the river have been almost completely built over. In addition to these remains, this 500 hectare area also contains a number of prehistoric settlements and cemeteries. Only 3,1% is protected by the government as *rijksmonument*. In 1994, in a study into the degradation of archaeological sites in the Netherlands, it was ascertained that since 1950, one third of these have disappeared mainly as a result of agriculture, building activities and infrastructural construction. I venture to doubt whether this also applies to Nijmegen. It is true that new construction projects, particularly those that took place in the centre of Nijmegen after the American bombardment in February 1944 and furious fights between Allied and German forces in September of the same year, have resulted in a number of large-scale building schemes (*Wederopbouw*) in which the archaeology has not, or only insufficiently, been taken into account. However, the greatest damage to the Nijmegen sub surface was done by archaeological research.

From 1946 onwards, over 10% of the mentioned 500 hectares have been excavated (Fig. 1). For a long time, archaeological research consisted of rescue excavations on the one hand, and of what the Germans call '*Lustgrabungen*' on the other: excavations undertaken merely to satisfy archaeological curiosity. Ironically,

none of these excavations carried out by the ROB were sufficiently analysed and published. In the past 20 years, excavations in Nijmegen were only carried out if the archaeological resources on site were threatened by house-construction, sewer renovation, reconstruction, environmental clean-up, etc. Wherever and to the extent possible, the archaeological resources left *in situ*.

The nature of the Roman remains in the Nijmegen soil has its own problems for archaeological heritage management. In this densely built-over area, it is impossible to halt economic and social development merely because the soil contains, prehistoric and medieval features, the remains of the earliest urban settlement and the most important Roman town in the Netherlands, the only fortresses on Dutch territory, a late-Roman fortification (*castellum*) and over 10,000-15,000 graves from the Roman and Early Medieval period. Nijmegen archaeologists do not consider this only as a hindrance, but also as a challenge, and they try to take their opportunities within the various projects. Doing this, they are faced with multifarious problems. To illustrate these, I will briefly take you through a number of projects.

Modern problems and opportunities

Sewer renovation is daily business in the town of Nijmegen. The old sewers lie in mainly hand-dug, narrow ditches. Nowadays, when sewers are renovated the entire width of the street is disturbed by machines. In some cases, intensive monitoring suffices to chart and recover any archaeological remains. Especially in areas where streets can only be left open for a brief period, for reasons of economy, a lot of useful information can still be gathered in this way. The only 4th century lead sarcophagus from the Netherlands was rescued in 2001 using this strategy.

Wherever it is deemed necessary as well as possible, the street is excavated prior to the construction of a sewer. In this way, in 1998–2000, a cross-section through the fortress (*castra*) of the 10th Legion was made which yielded surprising results. As it happened, the archaeological important layers of the soil had remained unharmed under the modern road surface in exactly this location (see Breeze in this vol. 109–11, Sommer 118–21). Similar street excavations, yielding traces of *Oppidum Batavorum* and the late-Roman cemetery, took place in the centre of Nijmegen in 2005–2006 (Fig. 2). One of the main problems of this kind of excavation is the cost of proper archaeological research. In some cases it is more than half the budget that is available for the construction of the sewer, leaving aside the cost of the study and publishing of the results.

The next example has to do with construction permits. Particularly in Nijmegen-Oost which contains mainly houses with spacious gardens from the twenties and thirties of the 20th century, these present a problem. Large areas of the successive fortresses still remain relatively undamaged. Since construction permits in the Netherlands have to be granted within 6 weeks of application, one has to act very quickly where archaeological values are at stake. Every year, the municipality has a special budget for such cases, but this may quickly turn out to be insufficient if many permits are requested for parcels whose soil definitely contains Roman remains. In the winter of 2004–2005 such a case occurred: people wanted a pool in their back yard. Thanks to the construction permit they applied for we got there in time to study the area they wanted to build on (Fig. 3). Subsequently, the owner decided he wanted the rest of his garden to become 1 meter lower, as a result of which that part of the garden had to be excavated as well. The entire cost of the project came for the account of the municipality. On top of that, the owner tried to recover the costs of the removal of the soil and a new layer of garden soil from the municipality – he failed.

The third example is formed by the large urban renovation projects. The old working-class areas from the first decades of the last century are being replaced by modern districts with council housing. In the past 20 years there were three such projects, two inside the municipal borders of *Ulpia Noviomagus* and one in the eastern part of the fortress of the 10th Legion and the adjacent *canabae legionis*. Affordable housing for society's financially weak is higher on the political agenda than archaeology. Consequently, it is an illusion to think that the archaeological resources in these locations will be allowed to remain in the soil undisturbed, the more so since, particularly in these places, these Roman remains do not lie deeply buried. It is for the town a difficult, but provoking challenge to excavate as less as necessary and use the archaeological information for a preliminary design of the new quarter and for visualizing the results in the street.

In a new project (2008) only the streets and sidewalks (sewer, distribution pipes for gas and water) need to

be excavated. The building society listened to the archaeologists: the foundations of the new houses lie at least 0.20–0.30 m above the Roman remains of *Ulpia Noviomagus*. In the near future, a number of other such areas will be developed in the southern part of the Roman town. Attempts will be made to spare the very rich archaeological resources wherever this is possible.

During the next years, the Waalfront plan will constitute the potentially greatest threat, but at the same time the greatest challenge, for the archaeological resources of Nijmegen. These plans for the development of the western riverfront threaten at first sight more than half of the 30 hectare Roman town. The archaeology was taken into account in these plans from a very early stage, so the urban developers are taking Nijmegen's Roman past seriously. Because of this, plans can be developed to spare its remains, while at the same time the Roman past of this area is a source of inspiration for the layout of one of the new districts (Quartier Romain) that is going to be developed here in the next 15 years. However, it is an erroneous idea to think that the entire Roman past of this planning area can be protected. Out of necessity, excavations will need to be carried out, for instance in the new streets. In view of the nature and quality of the Roman remains in question, this research will be relatively costly.

A fourth example is the larger construction projects that fill in the old and new gaps in the Nijmegen street scene, to achieve the necessary quota of housing for the coming years. In 2005–2006 we carried out a large excavation on a former parking place, the St. Josephhof, where apartment buildings with underground parking are to be built. The location is near the centre of the earliest urban settlement of the Netherlands, *Oppidum Batavorum*. This settlement was founded in the same period as Waldgirmes, Cologne, Xanten in Germany and Tongeren in Belgium. The history of the area had already made us aware that the best-kept and nearly undamaged remains of *Oppidum Batavorum* were to be found here. The remainder of the settlement was damaged to some extent by construction activities from the Middle Ages onwards. After having decontaminated the soil in an archaeologically responsible manner, we documented in an area of almost 7000 m² several thousands of features belonging to *Oppidum Batavorum*, late-Roman ditches and graves, a seventeenth century garden wall, houses burned down during World War II and a school, founded in the late 19th century.

The examples given here show problems and opportunities with which the Nijmegen Bureau for Archaeology and Built Heritage (*Bureau Archeologie en Monumenten*, BAMN) is faced. Sewer construction, the great demand for cheap housing, private building activities and illegal digging form direct threats to Nijmegen's archaeological heritage. In a dynamic urban living- and working environment, in many cases the protection of such remains is difficult, if not impossible. In other cases, attempts are made to spare the archaeological resources as much as possible. An added problem is that the municipality of Nijmegen is well above the national average where the number of known archaeological remains in the soil is concerned. The multiple interferences in the Nijmegen soil bring about a continuous process of erosion of the urban archaeological resources.



Fig. 4 Modern interpretation of a Roman column exhibited at the Het Valkhof Museum, in front of the same museum (Photo: H. van Enckevort)

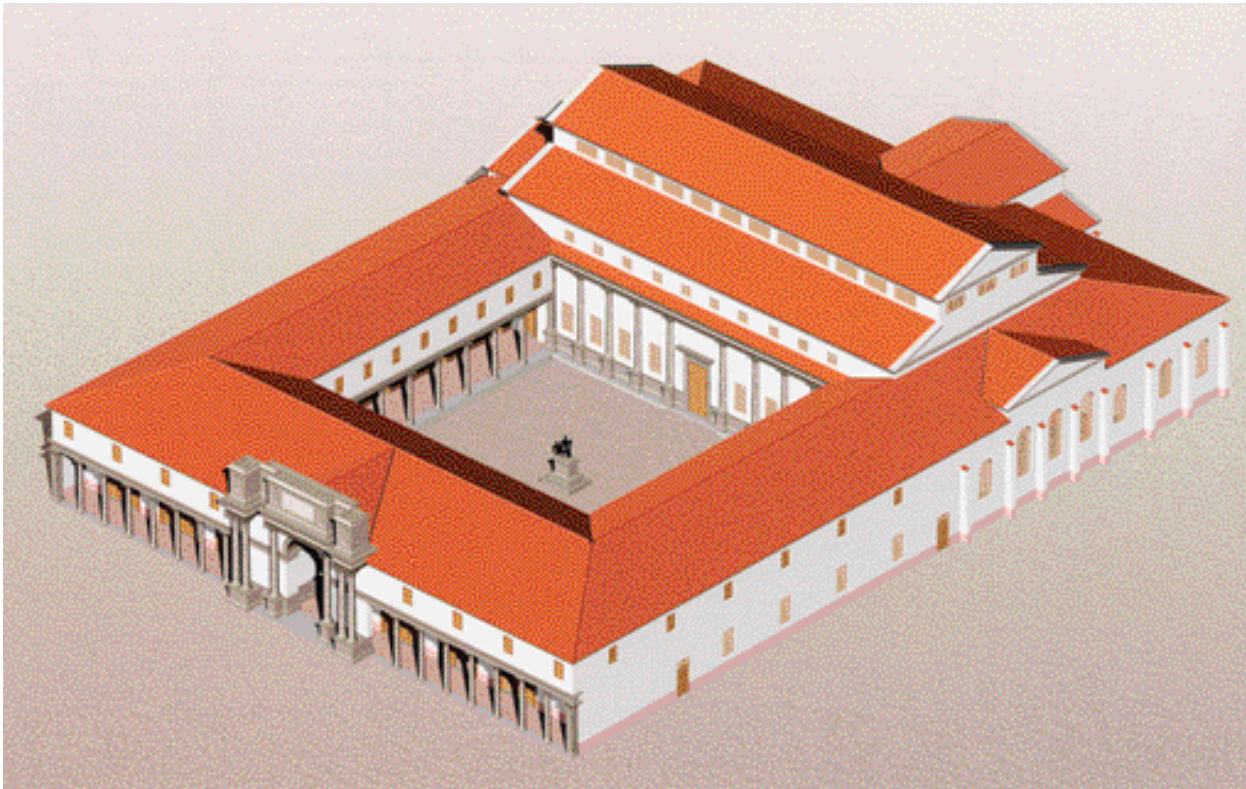


Fig. 5 Bird's eye view of the *principia* of the fortress of the 10th Legion (Design: Kees Peterse, PANSA BV/Nijmegen; Computer still: Jonker & Wu/Rotterdam)

The future

The town of Nijmegen took the responsibility for their archaeological heritage in 1988 and invested during the past 20 years in Bureau for Archaeology and Built Heritage, which developed up to now in an organisation of about 80 employees for excavations, publishing, archaeological policy and visualizing Nijmegen's past. With the new '*Wet op de Archeologische Monumentenzorg*' (Archaeological Heritage Act, 1 September 2007), 15 years after the European Convention on the protection of Archaeological Heritage in Valletta (Malta), integration of archaeological values in the environmental planning process on the municipal level is necessary. The legislator has designated the zoning plan as the core instrument for the archaeological preservation of monuments and historic buildings. On the basis of this zoning plan, the mayor and aldermen of Nijmegen can attach archaeological conditions to activities for construction or demolition, and set rules for exemptions. This much is clear: more than ever before, the archaeology of Nijmegen will play a significant role in future planning.

An adequate zoning plan, a system of archaeological construction and a good enforcement policy, as well as a positive approach, will compel private persons, project developers and the municipality itself to be more careful with archaeological resources. After all, they may be forced to pay not only for the excavations, but also for the study and publishing. At the same time, the zoning plans and the cost of archaeological research constitute a warning: be careful with the archaeological resources of Nijmegen. On top of this, the cost may serve as an impetus to seek alternative means of foundation, as a result of which the constructions of cellars and car parks under new buildings may sometimes be decided against. The lack of zoning plans that contain solid paragraphs about archaeology currently hampers archaeological heritage management in Nijmegen. However, work is being done to adapt zoning plans to the archaeological reality in the near future (2009).

Good policy also needs a good archaeological policy map. A predecessor, an archaeological values map, has all the interesting and important locations on it. The policy chart will be finished in 2008 or 2009. Broadly speaking, we are aware of what is located where beneath the surface, but correct interpretation still remains largely impossible, the more so since in the past, the largest part of the university-, government- and the municipal excavations until 2005 were not analysed and published. Despite the huge investments of the municipality in saving the archaeological heritage since 1988, the lack of money hinders to open an 'archaeological gold mine' in the archaeological depots. Thus, they continue to constitute hindrances to the implementation of the municipal policy. The results of the Nijmegen excavations from 2005 onwards are now being published in reports in a new series.

In the past years, the town of Nijmegen has also invested in the actual use and usefulness of its archaeological heritage. The birthday party in 2005 enhances Nijmegen's reputation as the earliest Dutch town. In a modest way, the return on investment is also being reflected in the Nijmegen street scene. Wherever possible, the Roman past is used as a source of inspiration, works of art making this past visual for passers-by. Contours of buildings, a modern interpretation of a Roman column with depictions of the gods (Fig. 4), or other monumental objects: these remind the public of the discoveries made at these locations.

Also digitally, attempts are being made to bring Roman Nijmegen to the surface once again. In cooperation, Museum Het Valkhof, PANSa BV and the municipal Bureau for Archaeology and Built Heritage produce three-dimensional scientific reconstructions of Roman buildings, which show the monumental grandeur of the rich Roman past of what was an important fortress 2000 years ago (Fig. 5), and subsequently became a small provincial town and a military point of support. In these Roman remains lie the roots of the modern town of Nijmegen.

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www.nijmegen.nl/archeologie



Fig. 1 Weißenburg i. Bay., Germany. Consolidation of the walls of the *principia* of the fort and protecting roofs around 1900, in the background the station (Photo: Archive of the Reich-Limeskommission, Römisch-Germanische Kommission of the Deutsche Archaeological Institute)

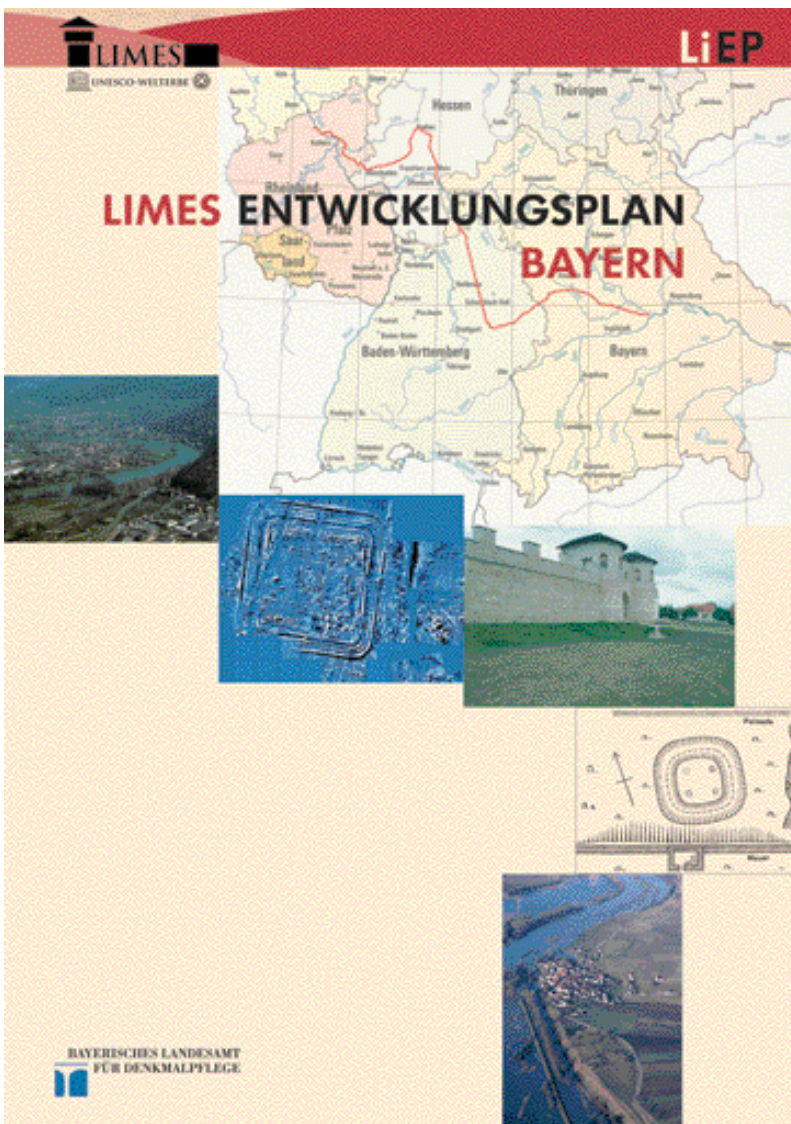


Fig. 2 The "Limesentwicklungsplan" (LiEP; Limes development plan) created with the help of the FRE project was presented in May 2007 (Photo: BLfD)

CONSERVATION, MANAGEMENT AND DISPLAY OF SITES

C. Sebastian Sommer, Munich with contribution from Jarka Schmidtova, Bratislava,
Jan Rajtár, Nitra, Zsolt Visy, Pécs and Piotr Dyczek, Warsaw

Conservation, management and display of the archaeological heritage, in particular of remains along the *'Frontiers of the Roman Empire'*, were major topics of the FRE Culture 2000 programme according to the application. They were discussed at several meetings of the partners of the project (workshops). The meeting at Bad Gögging/Neustadt (D), 25.–27. February 2008, was centred on this topic as the main theme. Starting point were presentations of recent plans for the restoration of the fort of Eining as part of the World Heritage Site (WHS) *'Upper German-Raetian Limes'* and discussions about the possible approaches.

Background

There is a large range of demands in the public for the development of ancient monuments in general and WHS in particular ranging from “we want it all” to “change nothing at all”. With the question of “how can we use/exploit/get value from a WHS” heritage managers are often faced with expectations which seem to contradict the request of the UNESCO-WHS statutes for authenticity and unspoiled preservation for the future (see Breeze in this vol. 140–7). This is a particular challenge for archaeological sites, especially those where there is little or nothing to see for the untrained eye as is the case with large parts of the WHS *'Hadrian's Wall'* and *'Upper German-Raetian Limes'* as parts of the *'Frontiers of the Roman Empire World Heritage Site'* or the future WHS part *'Antonine's Wall'*.

Originally, the participants of the FRE project had the idea that common standards should be created. However, it turned out that ideas and traditions were too disparate from country to country (compare Sommer 2007). Nevertheless, it was felt that some kind of framework should be formalised. Within the FRE project the partners agreed for their approach at their meeting at Esslingen in March 2006 on:

- the idea of simplicity;
- acceptance of individual traditions and strategies;
- working within processes of consultation with local and/or regional authorities;
- respecting the essentials of existing management plans.

As many countries have long established though different concepts of conservation and presentation the project therefore centred on presenting and discussing various approaches and possibilities in order to create a general sensitivity to the problems involved.

Principles

Ideas concerning the conservation or restoration of the archaeological heritage and ways to execute them for future presentation of sites cannot be seen in “isolation” of particular places. Not only at WHS general questions have to be taken into consideration and national as well as international dimensions have to be respected. To name a few:

- international charters and agreements, like those of Venice 1964/1965; Burra 1999 (www.international.icomos.org/charters/venice_e.htm; www.icomos.org/australia/burracharter.html)
- guidelines for restoration and reconstruction, as were included into the German WHS application (see appendix; compare also *'English Heritage Policy Statement on Restoration, Reconstruction, and speculative Recreation of Archaeological sites including Ruins'* (2001), www.helm.org.uk/server/show/nav.005004001003)
- guidelines for restoration and reconstruction, as were included into the German WHS application (see appendix);
- sustainability of the heritage resource.

On the other side, quite a number of practical aspects have to be considered:

- the particular history of conservation of a particular site;
- costs;
- maintenance;
- public acceptance;
- long term development (how much sacrifice [“Bauernopfer”] has to be accepted in order to achieve for example “indefinite” preservation for a site as such).

From early times of excavation not only in the Classical world exposed ruins were kept open to show the remains of the past to a wider public and tourists, to raise interest and to educate. Usually, various steps to preserve walls were taken, ranging from consolidation with new bonding substances in the joints and newly set upper courses to additional courses of masonry with old or new material, often distinguished from the antique parts by painted lines, layers of slate or tiles, sometimes protected by turf, to partial reconstructions on top of the original. Occasionally, particular sensitive parts were protected from the influences of the weather by roofs of even special buildings in the sense of an oversized showcase (Fig. 1). However, what usually has not been taken into account, were maintenance and long-term costs. At present, we are concerned at many places, WHS and beyond, with the problems of how to restore and preserve conservation and restoration measures of the past.

When dealing with a particular site a number of questions have to be asked and answered:

- do guidelines/standards exist in the country/the organisation about consolidation/conservation work, to which one can refer?
- are there generally understood/accepted definitions of “preservation”, “consolidation”, “restoration”, “reconstruction”, “rebuilding”, “reproduction” etc.?
- is there a proper relation between the achievements one has in mind and the price to be paid for (taking into account not only the actual financial costs, but the loss in authenticity, visual constraints due to modern safety regulations, possible damage through intensive visiting etc.)?
- who takes responsibility for the future development (maintenance, periodical refurbishment)?
- are there records of the original monument?
- are there records of previous work at sites already exposed?
- is there a separation of old and new constructions?

The action considered has to be carefully planned. It has to be taken into account that many previous presentations have led to an (almost) complete destruction of the original over the decades (see below). Therefore, not only in respect to the legal request of most heritage conservation laws of undisturbed preservation of the archaeological heritage one has to seek alternatives which do not consume the original evidence. And in any case, for evaluation purposes and more important for future work it should be standard that all steps taken are recorded and archived.

Management plans

Management plans propose the goal of and set the framework for the development of the cultural resource. Generally, they have to refer to the legal background as provided by the various national or state laws, take into consideration the requirements of the local and regional stakeholders and, in the case of WHS, the relevant UN charters (see Jeschke in this vol. 186–95).

As part of the Culture 2000 project, the compilation of the “Limesentwicklungsplan” (LiEP; Limes development plan) as a detailed site by site management plan for the Upper German-Raetian *Limes* in Bavaria was started in December 2005. It is based on the general management plan of the application for the WHS, which contained already a museum development plan (see Flügel in this vol. 196–99) and guidelines for reconstruction (appendix). In a first phase, till May 2006, the outline was developed and the contents collected. In a second phase, graphical material was added (Faber and Schmidt 2006). After a phase of harmonisation with the authorities concerned, the plan was presented to the public by the responsible minister of Bavaria, Dr. Thomas Goppel MdL, at Gunzenhausen on the *Limes* on May 23rd 2007 and distributed

to all stakeholders (Fig. 2) (Wiesner 2007). Since then the newly employed “Limes-coordinator for Bavaria” is concerned with the implementation together with owners and authorities.

The first part of the LiEP deals with the requirements of the heritage zone and the buffer zone in general. In the second part, four main objectives are considered in detail: protection and conservation, accessibility, information and display as well as scientific research. In geographical order – county, community, political subunit and piece by piece – the present knowledge on the remains of the *Limes* is presented, threats and the lines of future development discussed. Aspects of tourism and local interests possibly conflicting are part of the consideration. For on-site information and educational display the LiEP relies on directives laid down by the Deutsche Limeskommission (DLK), in particular for the layout of information tableaux (Deutsche Limeskommission 2006).

Culture in bloom

Under the auspices of preservation, the most “conservative” approach towards presentation of the archaeological heritage is leaving archaeological remains undisturbed underground by maintaining a protective layer of soil. In order to serve the public and to help interpretation and the understanding of sites the concept of “culture in bloom” offers an advanced and sophisticated strategy. It was initiated and developed by landscape gardeners and artists in a private organisation named “Kultur in Blüte e.V.” (“Culture in bloom”) (see Flügel in this vol. 174–8). The primary objectives are to visualize temporarily or permanently archaeological remains through plantation which are otherwise not, or only hardly, visible on the ground. The concept can be understood as a kind of re-enactment of the historic landscape (Fig. 3; compare on a larger scale the Dutch Belvedere programme; Bloemers 2002).

Usually, the underlying remains have been detected and plotted through non-destructive methods such as aerial photography or geophysical survey without exposing and partially destroying them by excavations. The outlines of linear as well as spatial features are outlined on the ground. Depending on the intended duration of the project, flowers of various colours, shrubs, bushes and trees are planted. In order to preserve the underground remains one of the considerations should be to use plants which do not need deep preparation of the ground or which roots do not penetrate too deeply. An alternative or additional approach is to create different mowing patterns, i.e. to cut the growth on ancient paths or streets more often than their surroundings (Fig. 4).

As a result, either colourful artistic “images” of past structures, possibly combined with a “deeper meaning” of the plants (e.g. wheat to mark a barn, the blue of cornflowers to mark baths; Fig. 3) and “walkable” sites in the layout and size of e.g. a Roman fort can be achieved (Fig. 4).



Fig. 3 Regensburg-Burgweinting, Germany. Outlines and buildings of a Roman villa rustica marked by various plants (Culture in bloom; Photo: BLfD 7138/312 8315-4, 09.09.2000; K. Leidorf)



Fig. 4 Ruffenhofen, Germany. Roman Fort with its buildings and surroundings marked by planting and through mowing patterns (Photo: Römerpark Ruffenhofen 2007; J. Mang)



Fig. 5 Eining, Germany. Presentation of the baths around 1915 (Photo: BLfD).



Fig. 7 Eining, Germany. Aerial view over fort and baths and military vicus as cropmarks (Photo: BLfD 7136/074b 2251-30, 03.06.1982; O. Braasch)



Fig. 6 Eining, Germany. Visible walls and their dates of erection or latest restoration (Photo: Schiwall 2008)



Fig. 8 Eining, Germany. Concept for the presentation of the fort and its surroundings (Copyright: Historia Romana e. V.; 2006)

Presentation and conservation of exposed ruins

Eining, the Roman *Abusina*, on the south bank of the Danube between the Raetian *Limes* and the Danube *Limes* in Bavaria, is a good example to show the complicated and complex post-Roman story of a WHS. Preliminary to the “renovation” of exposed walls the history of the visible structures was studied (Schiwall 2008): Large scale excavations from the 1870s onwards, their subsequent exposure, consolidation and partial covering by roofs (Fig. 5) led after many years of interest to phases of neglect and decay, due to increasing maintenance costs. A first large scale renovation in the 1950s attempted to solve this problem in a long-term way with modern wall, partially on top of Roman foundations but in other parts in their replacement, and a lot of concrete. As no continuous care followed further consolidation work had to be done in the 1970s leading to even more loss of the original (Fig. 6). After the initiative of a local interest group (“Historia Romana e. V.”) plans to “develop” and to display the fort somehow as it was laid out originally are now competing with the present state as a landscape park with ancient and artificial ruins as well as a nature reserve (Fig. 7 and 8).

Not dissimilar, at Weißenburg, *Biriciana*, on the Raetian *Limes* in Bavaria, the city as owner of the grounds of the fort developed plans to enhance the overall situation there contemporary to the Culture 2000 project. After early excavations around 1900 exposed walls had been kept open. As means of conservation loose parts were taken away and one or two new courses were added with concrete as binding. The top was formed concave to keep a certain amount of moisture and covered with turf. After long phases of neglect it was decided in 1965 to tear down the rotting walls and to mark their lines with concrete slabs on a concrete foundation. To make the site more attractive the northern front of the fort was excavated in the 1980s and subsequently reconstructed in a 1:1 scale (Fig. 9; Grönke 1997). In respect to the decision of the UNESCO WHS board, following the recommendations of ICOMOS that reconstructions done since 1965 should not be part of the WHS ‘*Upper German-Raetian Limes*’, this reconstruction became only part of the buffer zone (see Jones and Thiel in this vol. 99–105).

With the intention to make the fort even more attractive it was decided to replace the old concrete slabs marking the walls by several courses of newly built masonry. As the old foundations were reused no excavations and further destruction of the original were necessary. Therefore, we believe that these measures do not affect the state of the WHS as such and are in accordance with the WHS decision that ‘... *development above the Roman remains, be considered as a buffer zone for the inscribed site*’. The results are quite positive, as for the first time it is possible to imagine the limits of the fort from most places within it and to get a feeling of its size of 3.1 ha (Fig. 9). At present it is obvious at least to the interested visitor that the visible walls are only an image of the past in contrast to original remains e.g. of the baths presented since their excavation in a protective building as some kind of “giant showcase” (Fig. 10).

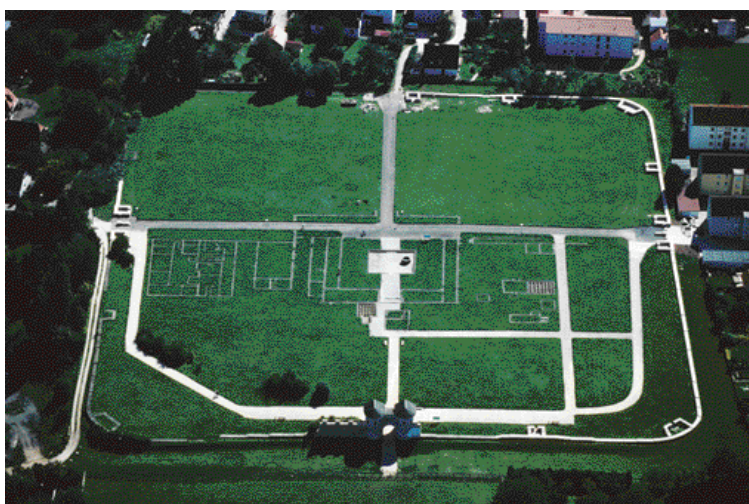


Fig. 9 Weißenburg i. Bay., Germany. Aerial view of the Roman fort with reconstruction of the northern gate, partially rebuilt perimeter walls and central buildings laid out with in concrete (Photo: BLFD 6930/009 8988-11, 22.09.2006; K. Leidorf)

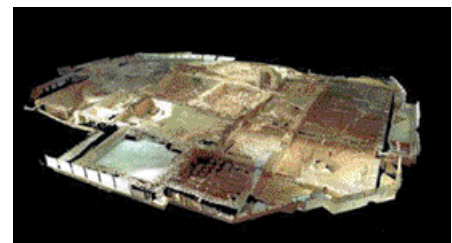


Fig. 10 Weißenburg i. Bay., Germany. 3D-scan of the Roman baths within its protective building (Copyright: E. Christofori)

At the Roman fort of Rusovce (*Gerulata*, SK) excavations, geophysical studies as well as restoration of some of the exposed parts were undertaken within the project (Fig. 11) (see Dyczek et al. in this vol. 74–8). At the site of Devín (SK) within the “Roman Days” new ways of presenting Roman remains were explored. At the Roman fort of Iľa (SK) excavations in the framework of an international summer school were carried out (see Breeze and Jilek in this vol. 7–14; Dyczek et al. 74–8).

From the Polish side excavated and previously exposed parts of the *valetudinarium* (hospital) of the legionary base of *Novae* (BG) were conserved and restored for presentation to the public (Fig. 12). Conservation works at *Novae* were focussed on two objects: the legionary hospital latrine and the ceramic tile floor in the *frigidarium* belonging to the Flavian bath building. At first, the necessary documentation was prepared, which in turn was preceded by a geological analysis of the stones used for building as well as the antique mortar. The aim was only to secure the preserved structures. If necessary, the floor was reconstructed using original materials/tiles. The intention of the reconstruction was that it appears quite genuine to visitors; yet in the future the original and reconstructed elements can be clearly distinguished. The walls were built up of similar stones as the original ones. Their inner structure however is made of contemporary building material. The roof was constructed according to archaeologically verified parameters for ancient roofs. The wooden beams match the antique ones, the roof tiles are modern.



Fig. 11 The conservation work in the fort of Rusovce (*Gerulata*), Slovakia (Photo: J. Schmidtova, Town Museum Bratislava)



Fig. 12 The conservation work in the legionary base at *Novae*, Bulgaria (Photo: CAR Novae; P. Dyczek)

To conclude: The excavation and subsequent exposure of original substance causes major problems and continuous costs. From generation to generation more and more restoration work has to be done as neither Roman nor modern walls with “open” tops can be prepared in such a way to resist rain and shine permanently. Thus, the replacement of original parts (and evidence) piece by piece is inevitable resulting in all modern structures at some point.

The consequence should be that

- either excavations are covered up completely after they are finished when the site is not threatened;
- or – if evidence has to be presented due to public pressure – new weather resistant walls are built on top of the original to be replaced from time to time without worries, preferably without contact to the covered original;
- or – if it is desirable that original structures should be shown – protective buildings have to be erected (not just a roof) as some kind of giant showcase.

If the related costs cannot be covered responsibility towards our unique archaeological heritage requests not to excavate at all in unthreatened circumstances.



Fig. 13 The Roman fort of *Lussonium*, Hungary (Photo: Zs. Visy)



Fig. 14 The Roman amphitheatre in the fort of *Porolissum* in Romania (Photo: Boundary Productions)

Drawbacks

However, sometimes all attempts towards sustainability fail even with best intentions, elaborated legal background and minimal conflict with owners and planners. This became evident at *Lussonium* (H) (Fig. 13). The Roman fort, situated on a high loess-cliff on top of the Danube, fulfils most likely all stipulations as a WHS within the '*Frontiers of the Roman Empire*'. Nevertheless, as explained by Prof Dr Zsolt Visy and some specialists on-site during the project workshop in Pécs in November 2007, the geological situation and the erosive activity of the river at the bottom of the cliff had already resulted in the collapse of major parts and will eventually lead to the complete loss of the fort. Foot wide fissures through large parts of the cliff indicate imminent danger which means that the parts concerned cannot even be "rescued" and "preserved" by excavation and research for safety reasons.

During a conference outside the Culture 2000 project at Cluj (RO) the author had the opportunity to visit *Porolissum* (RO) (Fig. 14) which originally was named as focus of the national Romanian co-project within the Culture 2000 project. Goals as well as administrative problems were discussed with Dr Alexandru Matei from the responsible museum at Zalau as well as with Dr Mircea Victor Angelescu and other members of the Ministry of Culture and Cultural Affairs at Bucarest (RO). It turned out, that A. Matei's ideas of large scale reconstructions on top of the original heritage were quite far reaching. Therefore they were discussed controversial. Additionally, the plans were not agreed upon with local and national authorities. Therefore, the project had to be dropped within the Culture 2000 project.

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Procedure for the reconstruction, reproduction and rebuilding of archaeological monuments of the Upper German-Raetian *Limes*

(Upper German-Raetian Limes - Managementplan attachment 1, May 2002)

Bavarian State Office for Monument Conservation
State Office for Monument Conservation Hesse
State Office for Monument Conservation Rhineland-Palatinate
State Office for Monument Conservation Baden-Württemberg

1. Preamble

The Upper German-Raetian *Limes*, with its towers, forts and other constructions, is a singular cultural monument and an irreplaceable historical record. For adherence to national as well as international standards, highest priority is given to the preservation of the existing monument stock. This must be taken into account in general with the planning and realisation of all projects concerning the cultural monument and in its environment. Reconstruction, reproduction and rebuilding must be subordinate to the maintenance of the original substance of the *Limes*.

Future measures of reconstruction, reproduction and rebuilding must therefore be integrated into the management and development plan for the Upper German-Raetian *Limes* and in addition require the approval and control of the specialist conservation authorities. With regard to protection of the substance, its ability to be experienced or its scientific value, the greater the quality of a site or a monument area, the more restrictive the treatment of possible changes. Measures of this kind are ruled out completely at defined high-grade sections of the *Limes*.

2. Definitions

This text contains the following definitions:

Restoration: restoring existing structures to a known earlier state by removing additions or by putting together existing components once again without the addition of new materials except to secure the work. Restoration includes anastylosis and conservation.

Reconstruction: bringing existing structures to a known earlier state in which, in contrast to restoration, new materials are used. They serve for repairs and should be carried out as far as possible with comparable materials and with the same craft techniques as the original

Rebuilding: the creation of an assumed earlier state on the original findings with extensive use of new materials. The basis is formed by preserved evidence from this location or from other sites and conclusions that were drawn from this evidence.

Reproduction: rebuilding at a different location or near the original findings.

Reversible: measures that do not cause any damage to the original substance of the monument and can be removed without impairment, if this should be necessary for the conservation of the original.

3. Basic conditions

Because of the conservation, the limited state of knowledge and the character of archaeological monuments, changes to the existing monuments in the Upper German-Raetian *Limes* have been limited to measures of restoration and reconstruction. The course or individual components of the *Limes* are to be made visible again through measures of landscape conservation.

In certain exceptional cases there are arguments in favour of rebuilding or reproducing forts, towers or sections of the *Limes*. These arguments concern the development of individual locations for education or tourism, or to guarantee their preservation. Reproduction and rebuilding can also extend the basis of knowledge in terms of experimental archaeology as to how an ancient building was built or used. It is

known that model buildings can also represent important tools for interpretation. However, this must not lead to damage to original conserved monument substance, its cultural value or the historical importance of a site.

Reconstruction, rebuilding and reproduction

- must take place in conformity with national and international guidelines;
- may only be carried out after a complete archaeological examination of the monument areas in question;
- must preserve the historical significance of the site and its environment;
- must be carried out using the original technology and with comparable materials, as far as this is technically possible. Financial reasons do not justify the use of different types of materials;
- must be based on scientifically substantiated evidence and be the products of an experimental reproduction of the antique procedures;
- must improve understanding. Hypotheses must be clearly marked as such and at the same time require that the knowledge gained from them or the findings of the actual realisation are portrayed, archived and published;
- must be designed in such a way that both their erection and their upkeep and the needs of a site are guaranteed in the long term;
- should take second place if they do not serve a clarifying protection of the existing monument, or if the capacity for visitors to experience them can be improved by other means;
- impart knowledge in a model form. For this reason, an accumulation of adjacent structures of a similar type is not practical.

The basis of all measures is the complete comprehension of a monument. This includes not only the areas above and below the ground but also the environment. Any evaluation should also include the archaeological potential and its historical and contemporary importance, as well as aesthetic, scenic, nature conservation technical, public, spiritual and other values. This list is not exhaustive.

The plans for a project must show clearly just how the implementation would affect the value of the monument. Realisation must fulfil all of the basic conditions discussed here and have a positive influence on the significance of the *Limes*.

4. Guidelines for future representations

The plans for future measures for restoration, reconstruction, rebuilding or reproduction in the area of the *Limes* archaeological monument must conform to national and international quality standards. The contents of all measures should ideally be suitable for expressing the contemporary-historical dimension and not merely for reproducing an ideal condition. At the same time, the aim should be for uniformity in the portrayal so that the Upper German-Raetian *Limes* is presented as an integrated whole.

The same care that is taken with the new plans for a project should be applied to its sustainability. Repairs and upkeep must be carried out by trained personnel or under expert supervision. There must be sufficient resources available for the both the maintenance of existing installations and for remedying unforeseen damage.

4.1. Course of the *Limes*

There must be no reconstruction, rebuilding or reproduction of any kind along the stretches of the *Limes* which give the environment its overall image, for example, in the Taunus forests or in the Swabian or Franconian Jura.

At those sections in which the ramparts/ditch or wall are preserved above ground:

- attention should be given to measures to preserve the substance;
- there must be no excavations or reconstruction, reproduction or rebuilding;
- paths must be laid out next to the monument and not on top of it;
- plants must not cause damage to the substance;

- the aim should be integration into specialist concepts for nature conservancy.

In those areas in which the ramparts/ditch or wall have disappeared above ground:

- an intensified search should be made for possibilities of showing the *Limes* route again;
- presentations should be used to show the original course of the *Limes* route;
- reconstruction or rebuilding should be such that it can be reversed;
- paths or plants must not cause damage to the substance.

4.2. Towers, small forts and other constructions

There must be no reconstruction, rebuilding or reproduction of towers, small forts or other constructions along the stretches of the *Limes* which give the environment its overall image. There must also be no reconstruction or rebuilding of those towers, small forts and other constructions which are preserved above ground. In general, the following measures apply:

- rebuilding is to be avoided. Exceptions can only be made for those installations which have already been completely excavated and/or whose findings are practically completely destroyed;
- reconstruction and rebuilding must be designed to be reversible;
- the location of the rebuilding should be selected directly along the route of the *Limes*;
- in the sense of experimental research and interpretation the simple copying of already existing rebuilding or reproductions is to be rejected.

4.3. Fort installations

Because the reconstruction or rebuilding of fort installations takes place on the original foundations, the most stringent requirements must be applied to every measure within the meaning of the above criteria. At a very early stage projects of this kind must be discussed on the broadest possible basis and evaluated by independent experts; a decision in accordance with the regulations governing the conservation of monuments can only be taken after this.

In general, the following measures apply:

- there should be no reconstruction, rebuilding or reproduction of any kind at or in the neighbourhood of the few totally preserved places that are largely unspoiled in the landscape, for example, Holzhausen, Kapersburg, Halheim and Pförring;
- rebuilding is in general only conceivable for those installations which have already been completely excavated and/or whose findings have been destroyed to a great extent and of which it is extremely difficult to experience because of the present use of the environment;
- a measure must be linked at the same time to the protection of the untouched monument substance. This can be done, for example, through the visualisation of a lost fort area, if this means that other areas of the monument can be preserved as reservation areas;
- it is essential that all reconstruction and rebuilding work be designed to be reversible;
- even more definitely with towers, small forts and other constructions, for the purposes of experimental research and interpretation, priority must be given to copying ancient processes, and copies of already existing structures must be rejected.

These procedures must also be applied analogously to the restoration, anastylosis and conservation, and to the repair of existing fort installations.

All measures must also be carried out to international standards as stipulated in:

- | | |
|-------------|--|
| Enclosure 1 | Charter of Venice 1964:
International charter on the conservation and restoration of monuments and ensembles. |
| Enclosure 2 | Charter of Lausanne 1990:
Charter for the protection and care of the archaeological heritage. |
| Enclosure 3 | Convention of Malta 1992:
European convention for the protection of the archaeological heritage. |
| Enclosure 4 | The Nara document on authenticity 1994. |

Enclosure 5 Charter of Riga on authenticity and historical reconstruction
in relation to the cultural heritage 2000.

The present procedures are the result of talks in Stuttgart in October 2001 and of numerous subsequent discussions which took place in the framework of the Upper German-Raetian *Limes* being accepted into the UNESCO world heritage list.

Those taking part were: Dietwulf Baatz (Darmstadt); Thomas Becker (Freiburg); Jörg Biel (Stuttgart); Stephan Bender (Wiesbaden); Wolfgang Czyns (Thierhaupten); Reinhard Dietrich (Wiesbaden); Volkmar Eidloth (Stuttgart); Meinrad N. Filgis (Stuttgart); Alex Furger (Augst); Joachim Glatz (Mainz); Fritz-Rudolf Herrmann (Bockenu); Werner Jobst (Bad Deutsch Altenburg); Cliff A. Jost (Koblenz); Susanne Kaufmann (Aalen); Dieter Planck (Stuttgart); Rudolf Pfuhler (Eichstätt); G. Precht (Xanten); Egon Schallmayer (Wiesbaden); Wolfgang Schmidt (Bad Homburg v.d.H.); Wolfgang Schmidt (Königsbrunn); Hartwig Schmidt (Aachen); Reinhard Schwirzer (Weißenburg i. Bayern); C. Sebastian Sommer (Munich); Gerhard Weber (Kempten i. Allgäu); Hans-Helmut Wegner (Koblenz); Antony Wilmott (Portsmouth).
The minutes were kept by Andreas Thiel (Stuttgart).



Fig. 1 The reconstructed Saalburg fort, Germany
(Copyright: Saalburg museum)



Fig. 2 Chesters Roman fort from the air
(Photo: D.J. Woolliscroft)

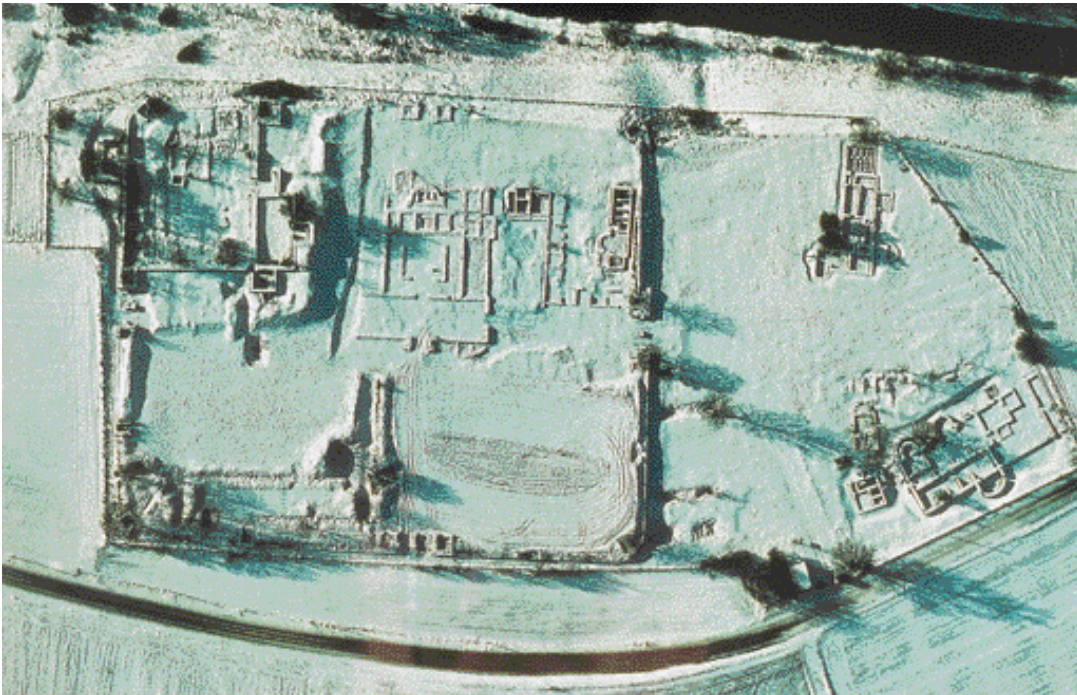


Fig. 3 The fort of Eining in Bavaria (Photo: O. Braasch)



Fig. 4 The late Roman fort at *Dinogetia* on the Lower Danube, Romania
(Copyright: Boundary Productions)



Fig. 5 Reconstructions of town houses in the civil settlement beside the legionary fortress in Carnuntum, Austria (Photo: S. Jilek)

PRESENTING ROMAN MILITARY SITES TO THE PUBLIC

David J. Breeze, Edinburgh

It is now over 100 years since the Saalburg was built. Today it still stands as the archetypal Roman fort (Fig. 1). It looks solid and permanent, as indeed it is. And therein lies the challenge. Visitors depart with a very clear view of what a Roman fort looked like. Those who do not depart but live with the fort on a daily basis – that is, the curators – have to live with a structure that is not quite correct according to modern understanding and is very difficult and costly to change.

While those who erected the fort used all the evidence available to them to ensure accuracy within the knowledge of the time, we have learnt more since and our views have changed. There is one lesson that we still find hard to learn, however. This is that no matter how accurate we think our reconstruction is, future generations will prove us wrong. It is an immutable rule which we all must acknowledge. This is not to decry the Saalburg in any way or to suggest that it should change. It is now a monument in its own right, indeed a research topic in its own right as the displays at the Saalburg museum demonstrate and as such joins an important and select group of sites.

The museum at Chesters fort on Hadrian's Wall is another such site (Fig. 2). It contains the collections gathered over a period of 50 years by John Clayton, owner of the Chesters estate in the second half of the 19th century. He bought up large sections of Hadrian's Wall, eventually owning several forts as well as long stretches of the Wall. He funded excavations at many of those sites. After his death, his heirs created the present museum, which is also now a monument to a bygone era of museum display. Should we change this according to our modern formulae, or leave it as a period-piece in its own right?

These two cases, a site and a museum, are good examples for us to start a discussion on presentation and interpretation. They encapsulate all our problems. What do we seek to display? Should we erect full-scale replicas, especially if these replicas obscure the very evidence that they seek to elucidate? Do we seek to modernise every 5, 10 or 20 years? How do we deal with changing fashions if not fads? Can we be too purist in our approach? How do we view the integrity of the monument? What price authenticity? How far should archaeologists trim their sails in order to accommodate their position – or rather positions – in relation to other agendas which might be more powerful and more financially driven (see Sommer in this vol. 128–39).

Before we consider these problems – and others – let us review the nature of the resource. The range of Roman military remains in Europe is amazingly broad, from whole frontiers, through legionary fortresses and temporary camps to towers and roads. In terms of physical remains they encompass sites only visible as crop marks as well as the fourth-century towers of Austria still standing to full height, though with new roofs. There are three artificial frontiers in Europe. The German *Limes* is the longest at 550 km. Hadrian's Wall is 130 km long and the Antonine Wall in Scotland 60 km. Elsewhere the frontiers lie along a river (see Jilek in this vol. 64–9) or a range of mountains. Along these frontiers are some of the iconic sites of the Roman world: Housesteads on Hadrian's Wall, the Saalburg in the Taunus forest, Eining on the Danube (Fig. 3), *Porolissum* in the Carpathians, *Capidava* on the Lower Danube (Fig. 4). These forts are supplemented by the small forts (Kleinkastelle) of the German frontier, by the milecastles and fortlets of Hadrian's Wall and the Antonine Wall, by gates such as Dalkingen, and by towers everywhere: towers are surely the most ubiquitous Roman military structure. Outside the fortresses and forts along the frontiers sprang up civil settlements: one of the most famous is Carnuntum in Austria (Fig. 5).

So far we have been concentrating on a single line, but Roman military remains are spread widely across the landscape. 150 km behind Hadrian's Wall are legionary fortresses at York and Chester. Behind the German *Limes* are Mainz and Windisch. Frontier lines ebbed and flowed and in the process some forts were abandoned behind the new line – or in front of it. The sweep of country encompassed by Roman military activity is vast. Furthermore, each frontier forms sat within its own landscape. Forts were placed to control potential access points or routes, to observe groups of people either outside or within the empire,



Fig. 6 One of the Distance Slabs from the Antonine Wall, Scotland, UK, which tells us who built what, when and how much (Copyright: Hunterian Museum, Glasgow).



Fig. 7 The analysis of the turfs from sections cut through the Antonine Wall has provided valuable evidence for the land cover at the time of the Romans (Crown copyright: Historic Scotland)

or to support each other. In short, Roman forts did not sit in isolation. Understanding that wider landscape is a challenge to us today, but it is a problem we must address if we are to interpret our sites accurately.

So far we have only been considering the sites themselves. Yet, Roman military sites are particularly rich in artefactual material, as any visitor to a museum from Rome to Copenhagen can testify. These artefacts illustrate the detail of life on the frontier – they provide some of the flesh to cover the bare bones of the physical remains in the field. Sometimes they do more than that. Parchments, papyri and writing tablets are particularly informative, about day-to-day life in the Roman army. Sculpture and inscriptions illustrate the process of conquest which preceded the construction of the frontier (Fig. 6). They name the frontier, tell us when it was built, how it was built and who built it. Very rarely they inform us why it was built.

The traditional range of material – pottery, small finds, sculpture – have now been joined by eco-artefacts (see Flügel in this vol. 174–8. It is difficult to underestimate the importance of all these material remains of Roman culture (Fig. 7). The artefacts help us date native sites – they often form the only dating evidence for such sites. The environmental evidence from Roman sites is certainly more closely dated than that from most prehistoric and early medieval sites and forms a dated horizon of inestimable value. Our Roman military sites form the key for helping understand the landscape within which they and their contemporary civilian sites sat as well as providing the dating evidence for these settlements. For a wider audience, on the firm basis of the wide range of evidence, we can now not only prepare reconstruction drawings of, say, a fort, but offer a landscape for it to sit in. And we can offer reasons for its location at that particular point, relating it to its wider contemporary settlement pattern.

Nor is that the whole picture. Survey, excavation, research and writing have produced an enormous body of literature about Roman frontiers. We cannot understand Roman frontiers, or attempt to interpret them afresh, without comprehending that literature. The thoughts and ideas of our forebears shape and condition the thoughts and ideas of today.

As we have seen, the protection of archaeological sites and the presentation to the public of information of all kinds about Roman sites has a long history. Although some countries had taken measures to protect their monuments in the previous century, it was not until the 19th century that this became universal throughout Europe. The Grand Tour introduced members of the aristocracy to the buildings of ancient Rome in the 18th century. Improved communications of all kinds in the 19th century aided discussions between scholars working in different countries, collaborative ventures such as the *Corpus Inscriptionum Latinarum*, and visits to archaeological sites in other countries. Professor Hulsebos travelled from Utrecht to take part in the second Pilgrimage of Hadrian's Wall in 1886: he was the lone foreign representative. That single visit soon became a flood, in both directions and tourism had become a factor in the protection of sites.

The opening of sites to the public, the creation of museums, the building of replicas, the writing of guide-books, all have a long history. It was in 1849 that John Collingwood Bruce, schoolmaster and minister of religion in Newcastle upon Tyne led the first Pilgrimage along Hadrian's Wall. Three years later he produced his first book on the Wall and 12 years on his first guide-book. The 14th edition of that guide-book, *'The Handbook to the Roman Wall'*, was published recently. Bruce's local archaeological society, the Society of Antiquaries of Newcastle upon Tyne, had long been collecting material from the Wall and today its successor, the Museum of Antiquities, is a major repository of artefacts from Hadrian's Wall and one of the centres for interpreting the frontier.

Over the 150 years since John Collingwood Bruce first showed an interest in Hadrian's Wall, much has changed. Bruce led a mere 24 people along Hadrian's Wall in 1849. 400,000 are estimated to have visited it last year. Bruce assumed a classically educated audience which knew its sources. Such an audience did not require spoon feeding. This was reflected in the level of writing. It assumed too that the visitor could discover and explore the site for him or herself – and wanted to. Site notices were not required. This attitude was to prevail until 20 or 30 years ago. When I joined the state archaeology service in 1969, the level of interpretation at most sites consisted of a blue guide written by an authority with lots of letters after his or her name and containing a large plan, supplemented by a metal plate offering a 60-word description of the site and, perhaps, some discreet notices round the monument. A series of regional and thematic books placed the sites in their wider setting. The audience was presumed to be the equivalent of adult-education students.

In Britain, practically all of the more important ancient monuments were looked after by the state, which saw that as an important role. A portfolio had been built up over the previous 100 years and it encompassed a wide range of Roman military sites – parts of Hadrian's Wall and the Antonine Wall, several forts on the Saxon Shore, parts of the legionary fortresses and so on. The nature of the presentation of these monuments to the public related closely to the state's views on their conservation. This was "conserve as found". This philosophy underpinned the Venice Charter promulgated in 1966 which stated that "*restoration....must stop at the point where conjecture begins*" (article 9).

The basic premise was and is straightforward: that the archaeological remains should be left to speak for themselves; to remain accessible for re-examination and re-interpretation; that any form of restoration must involve a significant element of guesswork and therefore that it is better not to undertake any restoration *in situ* at all.

The world of on-site presentation has changed, and quite suddenly. Our guidebooks are now very different to look at: still authoritative but making full use of modern technology to produce well designed products, often in full colour (Fig. 8). No site is complete without at least one interpretative panel. Whereas full-scale *in situ* replicas were rare, now they are springing up all along the northern frontier of the Roman empire (see Becker in this vol. 153–62). And there are far more players in the game: the state, local authorities and even private institutions all look after archaeological sites and visitor centres.



Fig. 8 Guidebooks to Roman frontiers
(Photo: Historic Scotland)

This must be a good thing. We are all challenged by the new styles of presentation and interpretation (see Sommer et al. in this vol. 128–39). Hopefully, all sites will improve as a result. Yet, it is still worth returning to basic principles every now and then and considering the underlying premises behind our actions.

There is still much to be said for the principles of “conserve as found”. Those familiar with complex sites can readily appreciate the value of returning to re-examine and re-evaluate even the best known sites quite simply because there is no better alternative to studying the fabric of the monument itself: the monument is as much an historic document as a written charter, an artefact or a painting. Placing reconstructed walls on these archaeological remains not only obscures the genuine remains but creates a falsehood quite simply because we cannot know with any certainty what happened above the surviving remains. The fashion of rebuilding of walls sometimes up to a height of about a metre in order to form a more attractive monument is almost equally misleading, even when the modern stones are separated from the originals by a clearly marked membrane such as a slate course or line of plaster.

Nevertheless, we must acknowledge that intervention is necessary to preserve a monument. Mortar decays, as do stones, and sometimes both have to be at least partly replaced for the greater good of the monument: its long-term preservation. Sometimes, this intervention can be substantial. The clay-bonded walls of the Roman bath-house at Bearsden on the Antonine Wall stand up to eight courses high, resting on clay and cobble foundations. There is no way that this monument could have survived the weather and the attention of visitors without the clay core being replaced by mortar. This necessitated recording all the walls on a stone-by-stone basis, taking them down, cleaning the stones, and replacing them with a mortar bond according to the plans and photographs, all under professional supervision. No new stones were added, except to the upper level of the core in order to create a surface which would shed water. This we would all regard as an acceptable action to safe-guard the monument. In cases where such actions would be seen as too intrusive, the general advice of my office would be to re-bury the site, rather than resort to methods that might entail excessive contamination of the evidence.

In considering the conservation of the monument, it seems to me that there are some verities, which are perhaps even eternal verities. The most important is the primacy of the archaeological data-base, be it a Roman fort or a weapon from it. This is acknowledged by UNESCO in considering potential WHS when it stresses the necessity for authenticity and integrity (see Lengkeek in this vol. 36–51). If this view is accepted, then the rebuilding of ruined structures *in situ* is not a sensible approach. This is not to say that we should not offer our interested public reconstructed Roman buildings, but a theme park such as Archaeon (NL) or Beaune (F) is the place for them. And it must be stressed that those reconstructions can be no more than the best we can offer on the basis of the information available at the time they are made.

I would strongly argue that we do need sites like Archaeon. There is a far larger and socially wider group of people interested in visiting archaeological sites than in the days of John Collingwood Bruce. They are better educated, used to all the devices of our electronic age, and expect to see them in action. Such devices offer us unparalleled opportunities. I have already stressed that I believe that many reconstructions offer a misleading impression of certainty. More than that they can close the mind. They imply, by their very solidity, that this building is the truth. Yet we know it is not. It is only our current version of the truth.

Our computer age can do wonderful things. It is now possible to create virtual reconstructions of buildings. This is particularly valuable for delicate structures such as the tombs of Egypt. The original is ensured a longer life and we can explore at our leisure parts of the building normally difficult of access. We can even put the finds back into the building (see Devine in this vol. 181–85). What we have not yet done, to the best of my knowledge, is to offer a computer game in which the player constructs his or her own monument. We can provide the visitors – either real or virtual – with the primary evidence, which is generally not extensive (and certainly far from complete), and invite them to build their own Roman tower, fortlet or fort. We can open minds to our own special problems, not least that there is usually no one correct interpretation. And, as new knowledge becomes available and electronic technology improves, we can change the information we feed into the computer relatively cheaply, certainly a lot cheaper than rebuilding a Roman fort with stone, mortar, timber and earth.

This approach could also have a direct affect on the monuments themselves. The current fashion is

strongly in favour of on-site presentation, so that visitors can more readily inter-relate the physical remains of the monument and its interpretation. The Lausanne Charter states the *“the presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies.... Presentation and information should be conceived as a popular interpretation of the current state of knowledge, and it must therefore be revised frequently. It should take account of the multi-facetted approaches to an understanding of the past”* (article 7). It is, unfortunately, possible to come close to destroying the *genius loci* of a monument through over-intrusive interpretation and the provision of information elsewhere may help to prevent such over-kindness.

Moreover, the visiting of archaeological theme parks might take visitors away from the real monuments, to the benefit of the archaeological remains. In these days of mass tourism we are facing the very destruction of the sites which people travel great distances to see, what John Julius Norwich has called “tourist pollution”. Fifteen years ago, the administrator of Notre Dame in Paris expressed his concern at the effects of over 10 million people visiting his cathedral every year. In Britain, the recent establishment of a National Trail along Hadrian’s Wall has been accompanied by wearing away of the grass sward on many miles of the footpath after only two seasons (Fig. 9). For long lengths of Hadrian’s Wall there is an even more serious concern as the path lies on top of sensitive earthworks. However, the excellent recording arrangements put in place by English Heritage and the Countryside Agency have ensured that wear can be monitored and remedial action directed to the sensitive areas: it is encouraging that the grass sward is recovering quickly as a result of prompt and positive interventions.

One way of looking at the wear on the Hadrian’s Wall footpath is to consider it a sign of the success of this initiative. Yet, instant communication can be a terrible curse. Witness the success of *‘The Da Vinci Code’*. It is excellent that people want to visit the important sites described in the book; horrific that they want to take a piece home with them. Excellent that they are interested in history; appalling that they appear to believe anything that is written down despite the absence of corroborative evidence.

The approach of television can be no less inimical to research. It often presents all research as relatively easy, encompassed within a short time scale, almost a doddle. In Britain, it has been argued that the Time Team is excellent television, but poor archaeology. It has certainly helped to explain archaeology to a wide audience, and had great success at that. But it has also been suggested that the nature of the programme implies that an archaeological site can be examined in three days and all, or at least many, of its secrets revealed, which we know is generally not true in itself. The programme also can obscure the fact that it so often piggy-backs on years of research by local scholars whose work is generally not sufficiently acknowledged within the framework of the programme. If television continues to portray research in the way that is has become used to doing, I fear that in the future the public may be unwilling to give as much money to research as in the past because they have come to believe the simplistic portrayal of our work. It would appear to me that we have a challenge in explaining more clearly how we undertake our work.



Fig. 9 Wear on the footpath along Hadrian’s Wall. Owing to the monitoring regime introduced by English Heritage and the Countryside Agency, the effect of tramping boots can be measured and remedial action quickly undertaken



Fig. 10 Life with the Roman remains in Alphen aan den Rijn, Netherlands (Photo: Dutch Limesbureau)

Challenges! In two words, our greatest challenges today are “education” and “integration”. We need – and we have a duty – to maintain public interest in our archaeological heritage. Our challenge is to find ways of protecting the archaeological resource and maintaining public interest in it. And that public interest is very strong and growing. As a Briton, I am always struck by the strong sense of place which is present in so many towns and villages along the frontier in the Netherlands and Germany (Fig. 10). Every Roman fort in the Netherlands seems to be marked by a notice board, nearly every village on a Roman site in Germany appears to have excavated and put its bath-house on display.

We have also been very successful in encouraging people on holiday to visit archaeological and historical sites. But perhaps we have not paid sufficient attention to the long term effect of mass tourism. Our acknowledgement of the necessity for a sustainable approach to the protection of our heritage is an important first step in that direction and “green tourism” is now on the public agenda. But we still need to engage with the public more effectively to explain our concerns. How many guide-books contain any comment about the conservation history and needs of the monument, for example?

The people we need to educate not only include the general public but archaeologists who work with the resource. Perhaps it is the result of the fragmentation of the archaeological profession that few archaeologists beyond cultural resource managers seem to be aware or concerned about the potential threat to the archaeological data-base which could arise, for example, from its erosion through over-visiting. Yet the archaeological data-base is the very resource which fuels their research.

Thus my second word is “integration”. “Integration” at all levels. Better connections between sites and museums, for example, so that we better encourage visitors to appreciate the links between the site itself and the artefacts that have been removed from it for their own wellbeing (see Flügel in this vol. 174–78). For WHS, there is a special problem. We can propose a Roman frontier as a WHS, but we are not able to include within it the inscriptions which tell us when, why, how and by whom it was built when they are no longer attached to the monument but sit in a museum. Such stone documents are placed in museums for their protection as much as for display (see Venice Charter, article 8). If left on the site, they would certainly be *in situ* but they would also be exposed to the weather and to vandalism. There is an irony here, but also a lack of integration – holistic thinking – in relation to our archaeological heritage which needs further consideration.

As archaeologists we are fond of preparing research agendas. I do consider that these are important actions for archaeologists to undertake. They emphasise the importance of the archaeological resource, they clarify the archaeological research requirements. In practice, however, they have to relate to the realities of life, and not least that much archaeology is now funded through the tourism agenda. There is no inherent problem with that so long as the archaeological dimensions of a research programme driven by another concern are acknowledged and respected. The archaeologist would argue that it is archaeology in its widest sense which underpins knowledge of the monument and which those presenting it to the public are seeking to interpret, be it through on site notices, computer-based projects and full-scale replicas. For the archaeologist, integration does not stop at the provision of information, but he or she should be equally interested in ensuring that the right feel is created through the correct emphasis within the material interpreted as well as the best and most relevant books and souvenirs being sold in the site shop.

We also need integration at the international level: no problems are unique to one country. In return the opportunities are enormous. Our research interests are very relevant to a world which is obsessed with illegal immigrants and frontiers: why are we not capitalising on this? Archaeology, in this aspect as others, can help us understand our past and so aid our progress into the future. Through modern technology we have an opportunity to present and interpret our monuments in a variety of ways which will both stimulate the visitor whether real or virtual. Indeed we can help the visitor in one country understand the frontier in another without moving from his or her own house. We now have an enormous range of information to aid our interpretations. We can paint a virtual landscape for our visitors and place our frontier installations within a setting which encompasses contemporary civilians as well as soldiers. For other archaeologists we offer a datable horizon and a wealth of artefactual evidence against which they can test their theories and models. Vitaly, too, we can appeal to the sense of place – *the genius loci* – which is so close to the soul of even the latest generation of the human race.

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Further Reading

The following Charters provide the framework for conservation, presentation and interpretation:

The Venice Charter (*International Charter for the Conservation and Restoration of Monuments and Sites*) 1966

The Lausanne Charter (*International Charter for Archaeological Heritage Management*), 1990

The Nara Document on Authenticity, 1994

The Riga Charter on Authenticity and Historical Reconstruction in Relation to Cultural Heritage, 2000

The following books set current practice within its wider framework:

Fowler, P. J. and Boniface, P. (1995), *Managing Quality Cultural Tourism*. London.

Jokilehto, J., (1999), *A History of Architectural Conservation*. Oxford.

Thompson, M. W. (1981), *Ruins: Their Preservation and Display*. London.



Fig. 1 Replica of the cavalry barrack in Aalen, Baden-Württemberg (Photo: A. Thiel)



Fig. 3 The reconstructed gate in Weissenburg, Bavaria (Photo: BLfD)



Fig. 2 Site of the open-air museum in Aalen, Baden-Württemberg (Photo: S. Jilek)



Fig. 4 Wooden watch-tower at the end of the Raetian *Limes* close to Hienheim (Photo: S. Jilek)



Fig. 5 Rampart and ditch of the Taunus *Limes* (Photo: A. Thiel)

THE CHALLENGE OF AN APPROPRIATE PRESENTATION OF ARCHAEOLOGICAL MONUMENTS ALONG THE UPPER GERMAN-RAETIAN LIMES

Andreas Thiel, Saalburg

Mid September 2005 in the city of Aalen, Baden-Württemberg, on the site of a former *Limes* fort, the (partial) replica of a Roman cavalry barrack was ceremonially opened. The ground plan of the building is based upon archaeological research and its structure mainly follows ancient designs. At the same time however, through the clearly visible incorporation of modern ingredients, an attempt has been made to counter the impression that the observer is viewing a "historic" building (Fig. 1). It is definitely too early to judge whether they will merely be irritated. However I would like to link this example with a general observation of the problems and potentials of presenting archaeological monuments on the *Limes* in Germany, because the situation in Aalen is representative of the typical and important features which occur at other locations.

The locations and dimensions of the six-hectare fort Aalen have been known since the 1890s at least. The fort, designed for 1000 horse-men, 2 km behind the Raetian *Limes*, was established between 160 and 260 AD, and was one of the largest stone forts on the *Limes*. At the time of its discovery the fort lay outside the city limits in open meadows terrain. Only the southern part was occupied by a graveyard, which enclosed a church that had been there since Carolingian times. In post-Roman-times, the fort's walls were robbed for the construction of the church, and also to build the medieval town of Aalen, although the Roman ruins remained visible until into the 16th century. During the scientific investigations by the Reichs-Limeskommission (1892-1937), however, the remains of the fort were fully levelled off. In the years thereafter the northern section of the Roman fort was covered by detached houses, a fate suffered in the same period by many civil settlements (*vicus*) near expanding urban centres. Only in 1976 did it prove possible to transfer at least the central fort area to public ownership and save it from further development. The starting point for this was the "discovery" of the headquarters building, the *principia*, on the former meadow area through aerial archaeological photography. To make the large open area attractive to visitors, subsequently the fort's left gate, the *porta principalis sinistra*, was excavated, as well as the *principia*. Their preserved foundations are today the only visible original elements of the fort (Fig. 2); the Roman structures remain, as an archaeological reserve, underground.

As early as 1964 a museum was built in the original fort area. The Limesmuseum Aalen has since been expanded four times and, with 40,000 visitors annually, is one of the most important visitor centres for Roman military history. Moreover the newly erected replica cavalry barrack serves as an essential educational resource, in particular for school classes. Although the outside of the building, at least at first glance, may appear as a "reconstruction" of an actual ancient predecessor, it is actually more a type of museum display case, though on an enormous scale. The aim here is to give an idea of the third dimension, the volume and the height that constituted this impressive Roman type of building. The massive half-timbered construction certainly fulfils these aims and thus represents a useful addition to the preserved walls of the remaining fort structures. The effect of the tangible size of the replica, impressive even to the specialist, definitely exceeds that of other attempts, such as computer-based animation, at conveying the scale of the building. Naturally, this development is based on the latest research by archaeologists on the appearance of this fascinating type of structure.

Why then is the Aalen cavalry barrack not a genuine replica, but rather a type of open-air museum? Firstly the replica is based on the example of another fort site, specifically a fort recently found 30 km away in Heidenheim; it is probable that the cavalry barrack in Aalen may once have looked exactly like this, but this has not been proven archaeologically. Secondly, the barrack-block is not in its correct location within the camp plan, but is rotated through 90°, in the vicinity of the original defensive wall. This relocation can first be attributed to the requirements of its current functioning as a museum, but at the same time intrusion

into the area of the Archaeological Park has been minimised. And, despite the great care taken with the detail, finally the modern surroundings which have been deliberately retained, could awake in an observer the possible impression of standing before a genuine monument. However the question remains whether the visitor recognises these “academic” differences and whether he does not involuntarily associate the new barrack in Aalen with the known replicas of other ancient buildings, such as exist in many areas of the *Limes*?

At practically every large fort location along the Upper German-Raetian *Limes* in Germany, wall segments of Roman buildings have been preserved, very often the baths or parts of the defensive walls (Fig. 3). Aside from a very few exceptions, these are always genuine wall segments *in situ*, which, throughout Europe and beyond, assist us in the presentation of the remains of ancient buildings. A specific feature of the presentation in Germany, however, is found in the current replicas of Roman architecture, rendered as complete “models” on a 1:1 scale. The Saalburg fort in Hesse, which was nearly completely rebuilt under Kaiser Wilhelm II from 1897 onwards, is only the best known and most thorough, but not the earliest example of this. Along the Upper German-Raetian *Limes* between the Rhine and the Danube over thirty replicas have been built since the 19th century. Alongside sections of Roman enclosure facilities, such as the palisades, the rampart and ditch system or the *Limes* wall, there are also fort gates, towers and walls and above all watch-towers. Watch-towers are easily the most frequently replicated elements of the *Limes* in Germany (see Becker in this vol. 153–62). Thus, for example, a dozen stone buildings alone have been built that claim to copy Roman *Limes* towers, although none of them are the same in design or execution! The oldest of these towers has stood since 1874 near the spa town of Bad Ems in the Rhineland Palatinate. Here, as elsewhere, replicas are often built directly on the remaining foundations, which are thereby destroyed or rendered unrecognisable (see Breeze in this vol. 140–47). The watch-towers have been built at different times by different persons and institutions and above all with quite different levels of scientific knowledge. Thus the group of those responsible for the planning and design of the structures ranges from Ernst Fabricius, one of the fathers of *Limes* research in Germany and editor of the standard work *The Upper German-Raetian Limes of the Roman Empire* in 14 volumes (Berlin/Leipzig, 1894–1939) all the way to private individuals and sport clubs, that mostly had little or no knowledge of the archaeological background to their actions. Indeed, in the past these were very often local groups, without any permission from the local authorities or any scientific instruction, which were involved in these projects, driven by enthusiasm and interest in the subject.

Interestingly the lack of specialist instruction had a greater effect on the complete replicas, as on preserved authentic monuments, since with the latter aspects of monument preservation, the law always had to be taken into consideration. However, this means that such complete replicas, that often leave the greatest impression on visitors, such as the historical structures along the Roman border, are often built with the least understanding of the matter. This is particularly striking in the case of the numerous wooden *Limes* towers built using a wholly unhistorical block system (Fig. 4).

Without fully examining the background to individual projects, in my opinion there are three main reasons why such replicas were built. And it appears that these motives were not always equally justified at the same time but were subject to historical development. Above all there was definitely at the start the intent to make a piece of the past physical again, to make history “tangible”. Often no expense was spared, but also little attention was paid to the original monument. Then there were and are replicas built as a kind of compensation: as compensation for the fact that tax money was used on archaeological investigations, a replica – the evidence of the scientific success – remained on the site. At the same time replicas formed a type of “added value”, be this as tourist attractions or as monuments, presented to the people living at the site as (re-)visible documents of their own heritage. Here too the preservation of the original site in most cases played no (further) part; however in almost every case the cost factor was important, so that often, only the excavated find, at most, was preserved, or a partial reconstruction built. But more recently replicas have increasingly become an important element in an active management concept. This function of replicas, i.e. the spirit of preservation that can be connected with such presentation measures, is to be a focal point of the second part of this contribution.

Why should monument preservers not leave the archaeological sites entrusted to them in the state they were passed down to us? The definitely banal answer is firstly because the world does not only consist of

monument preservers – other people are also interested in these sites – and secondly because it is necessary to actually accompany every situation. This is an exceptionally important point and should not be underestimated, especially in the field of archaeological monument preservation! On the Upper German-Raetian *Limes* we are dealing with a monument of 250 km² in total, which is partly heavily under threat. The situation cannot be compared to that of an expert in the restoration of paintings, who does not have to worry about the continued existence of his object and who can take his time to wait until he has the resources to implement the best technical or most authentic solution.

Solutions relating to monument preservation must generally be realised in direct and stern conflict with interested parties that in general have interests that conflict with the interests of monument preservation.

What has that got to do with the presentation of the Upper German-Raetian *Limes*? Let us first look at the *Limes* monument in its best state of preservation. Nearly half of the 550 km *Limes* runs through woodland, which, over centuries has helped to preserve the monuments along the *Limes*, frequently in such an impressive manner that they could speak for themselves. Along the barrier, at the watch-towers and also at various fort sites, the visitor can very often experience these archaeological statements without special presentation measures. Any support work here, for example, can be limited to clearing bushes and undergrowth so as to improve the visibility of the monument. In an ideal case scenario this also shows clearly how the *Limes* is embedded in the surrounding landscape, which clearly played an important role in the construction of the ancient border structure. But also in places where the *Limes* still exists as a striking, indeed perhaps even the most significant landscape element, it may be necessary to help indicate its location and the lines along which it extended, with, for instance, signposting. Not every woodland visitor is a cultural tourist on the trail of the Roman past, but the wood is also a workplace and increasingly the location for a number of leisure activities that are not compatible with monument preservation. The identification of the often invisible but delicate monuments of the *Limes* would be of particular benefit here to help protect these monuments against unintentional destruction.

Along the Upper German-Raetian *Limes* there are at the same time projects for presenting the archaeological monuments through targeted cultivation measures. At various fort sites, for example, the trajectory of the defensive walls is made clear by hedges and the position of towers by trees. For the monument preserver it is important here for the original construction substance to continue to remain protected by the earth, for such findings that can only be visualised in a manner such as, for example, that which can be provided by geophysics. Comparable measures are currently being designed for the course of the *Limes* wherever the naked eye can no longer see any traces above ground level. In addition to a better presentation for the visitor, these projects also serve the goal of better protection through identification of the monument. The archetype for such cultivation measures is also the historical condition of individual *Limes* sections. Thus on the Raetian border section, over the course of centuries, on the rubble rampart section of the *Limes* wall, a linear woody vegetation has grown up on the rubble rampart section of the *Limes* wall, creating over the centuries a "*Limes hedge*", one element of the cultural landscape (Fig. 5). The collaboration with nature preservation bodies has simultaneously provided most welcome synergies (see Höchtl in this vol. 166–73).

With the same ultimate goals as these measures for identification of a monument by the retention of its protection in the soil, there are also the types of measures that can be seen realised with the fort baths of Jagsthausen and Schwäbisch-Gmünd in Baden-Württemberg. Their partly excavated foundation walls were subsequently completely re-covered with soil. Separated by a dividing layer, modern masonry exactly replicates the ancient structures and Roman design of the authentic ruins – apparently often enough so well that the normal visitor does not even notice! However, in this way the scientist loses the object of his study (see Breeze in this vol. 140–47). But alongside the protection of the original, such measures are also supported by the greatly reduced costs for maintenance of the "artificial monument".

The effects of the weather, in particular frost, generally make a protective covering of the excavated wall section necessary (see Sommer in this vol. 128–37). The simplest form of preservation has already been chosen for the walls of the Saalburg *vicus*. Here, for around 100 years, grass turfs on the wall tops have been successfully protecting the original walls. By contrast with the widespread wall raised by further layers, this measure can be easily reversed, does not falsify the original find and moreover supports the impression of a "romantic ruin".

With buildings wholly or partly built of organic materials, we must often resort to replicas for visualisation. Where, thanks to a favourable location, for example wooden architecture remains preserved, we often have the best potential for recognition. Thus the method of construction of the *Limes* palisade has been verified by numerous excavations. We even now have examples where individual beams or members can be re-jointed, exactly in the style of a genuine anastylis. One of the best known examples on the Upper German-Raetian *Limes* is the beneficiarier shrine in Osterburken in Baden-Württemberg, where nearly the entire structural body of a small wooden temple could be reconstructed (see Flügel in this vol. 196–99). But in any event it would be technically tricky and, from a preservation aspect, even criminal, to use the original material for replicas thus expose it to the weather or visitors. Replicas here offer a practical and scientifically justifiable alternative.

To conclude, it must be said that replicas also serve to disseminate scientific findings. Trivial as this may sound, it can frequently be seen that archaeology first has to provide the proof that structures have been preserved in the earth – and are thus invisible to the naked eye. The key idea here is: “one only believes what one sees”. The mere results of investigations are not always convincing for the layman. Every archaeologist in the field knows of examples where even the most hard-hearted property developer agreed to put aside part of the development site when clear archaeological discoveries came to light, or even suggested, after the partly destruction of the site, to excavate or to present another part of the monument. The first option was and is occasionally realised, the second option of solely excavating monuments for the purpose of excavation is not possible from the perspective of the monument preserver himself. The question remains to what extent replicas can help to preserve the original monument? Can all those developers, architects and planners be convinced more easily through targeted presentation of archaeological sites that their project will lead to the irretrievable loss of authentic sources of history? To what extent, for example, has the Saalburg replica, known to every schoolchild in the region, contributed to the better protection of adjacent sections of the *Limes*? To what extent have the funds from admission fees helped the better presentation of the *Limes* in the region? To what extent can the historically incorrect and speculative replica of a wooden *Limes* watch-tower help to prevent the authentic but invisible watch-tower lying a few metres aside, from unintentional destruction during forestry work? To go back to the Aalen example cited at the beginning, one should ask what contribution the replica of the cavalry barrack could bring to the preservation of the other archaeological areas, what benefits neighbouring authentic monuments derive from it and what long-term consciousness-formation is created by such a dissemination of the Roman past. These questions naturally cannot be answered definitely, but they should be posed if one wishes to deal properly with the matter of such presentations and “replicas”.

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NATURE AND FUNCTION OF RECONSTRUCTIONS ON THE UPPER GERMAN-RAETIAN LIMES USING THE EXAMPLE OF WOODEN WATCH-TOWERS

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Archaeologists in north-west Europe are faced with the challenge of bringing their understanding of the records they make of the traces they observe in the soil to the wider public. Who does not find it difficult to reconstruct in their mind the remains of the triple-layered foundations for a building several metres high? We experience even more difficulty with wooden structures, whose remnants are reduced to inconspicuous, unspectacular discolorations in the soil. The archaeologist paints a picture from the observed details to reconstruct a virtual building. These mental reconstructions are then occasionally translated into reality for the interested lay person.

This can be done in various ways. The first that comes to mind is the reconstruction of the archaeological find in a drawing, an often-used method. Model reconstructions are another option, as demonstrated by numerous models of different excavations. The final possibility is an original restoration of the find in the form of a reconstruction, which certainly provides the most impressive picture of the historical situation. This form of presentation is chosen extremely rarely, of course, as the work and costs involved are very high compared with the other methods. All these options are employed in German archaeology for the periods up to the High Middle Ages.

Reconstructions on the Upper German-Raetian *Limes*

The Upper German-Raetian *Limes* World Heritage Site is no exception when it comes to deploying reconstructions as a tool for transporting information (see Thiel in this vol. 148–52). Reproductions of the original situation as envisaged by archaeological researchers exist at a variety of locations along the frontier line. These reconstructions range from recreations of border fortifications (palisades, ramparts/ditches, walls) and timber or stone watch-towers to individual buildings or sections of the defences surrounding the forts along the *Limes*. Especially with forts, the reconstructed sections are often part of an open archaeological park surrounding the entire fort area and thus fulfil both a presentation and a protective function. Reconstructions of the above-ground stonework can be found at five of the 61 forts on the WHS (Welzheim, Aalen, Ellingen, Weissenburg, Pfünz). The highlight, and singular model, is unquestionably the major reconstruction of the Saalburg fort near Bad Homburg, which was almost totally rebuilt from 1897 to 1907 at the behest of Kaiser Wilhelm II.

The most popular reconstructions on the German *Limes* are without doubt the watch-towers. Along the 550 km section of the frontier, 20 of the approximately 900 watch-towers proven or assumed to have existed were rebuilt between 1874 and 2004 (Fig. 1). If we include three more towers that were built away from the *Limes* (Neuss/North-Rhine Westphalia, Bad Nauheim `Johannisberg´/Hesse, Dill/Rhineland-Palatinate), we have a total of 23 watch-towers. Also worth mentioning are two examples of partially reconstructed towers, i.e. restorations of the lower storey (tower 9/96 near Murrhardt; tower 13/2 near Mönchsroth). The fully reconstructed towers on the German *Limes* are spread among the federal states of Rhineland-Palatinate, Hesse, Baden-Württemberg and Bavaria at a ratio of seven to five to four to four. They are not spread evenly along the frontier line, however (Fig. 2). It can be seen that the density of the reconstructions often increases the closer one gets to the relevant state capital, while no towers are to be observed near to borders with adjacent states.

The method of construction for all tower reconstructions can be divided roughly into two groups: timber and stone. This subdivision results from the Roman tradition of tower construction along the Upper German-Raetian *Limes*. The Romans built the first wooden towers on the frontier at the beginning of the second century, possibly in parallel with the erection of the palisade along the frontier around AD 120. In the thirties and forties of the second century the border fortifications were extended and the number of

so soldiers on the frontier was increased. The Saalburg fort was enlarged from 0.7 to 3.2 ha when the Raetian cohort was redeployed there. Around AD 145/146 construction units then replaced the timber towers with stone ones. In some sections of the frontier the number of towers doubled. Most of them stood until the border was abandoned – in some cases the construction of completely new towers alongside the former sites can be observed, which can usually be put down to building necessity rather than destruction as a result of border attacks.

tower	timber/stone	build	by
1/1	stone *	1973	Privatinitiative
1/9	timber	2004	Förderverein Freunde des Limes e.V. Rheinbrohl und Ortsgemeinde Rheinbrohl, mit Unterstützung des Naturpark Rhein-Westerwald, aus Mitteln zur Förderung der Dorferneuerung örtlicher Verschönerungsverein
1/37	stone	1970	?
1/54	stone	1912	?
1/68	stone	1994	Verbandsgemeinde Höhr-Grenzhausen
1/84	stone *	1953/4	Verkehrsverein Arzbach
2/1	stone	1874	Bürger der Stadt Ems zu Ehren Kaiser Wilhelms I.
3/15	stone	1972	Privatinitiative
3/26	stone	2002	Freundeskreis Römerturm Idstein
4/16	stone	1922-1926	durchgeführt durch P. Helmke, maßgeblich vom deutschamerikanischen Tuchfabrikanten G. Oberländer finanziert
4/33	timber	1899	Privatinitiative Direktor Jäger (Begründer Butzbacher Geschichtsverein)
	timber	1957	Stadt Butzbach
4/49	stone	1967	Ortsverein Watzenborn-Steinberg, mit finanzieller Unterstützung durch das Land Hessen und die Gemeinde Naturpark „Schwäbisch-Fränkischer Wald“
9/64	timber	1971	Forstdirektion Stuttgart, Rems-Murr-Kreis, Gemeinde Großerlach
9/83	stone	1981/82	Stadt Lorch
12/14	timber	1969	Kreisarchivar B. Hildebrand (Initiator), durch private Stiftung
12/77	timber	1971	Gemeinde Burgsalach auf Anregung des damaligen Landrats Hofmann.
14/48	timber	1971	Teilnehmergemeinschaft Flurbereinigung Erkertshofen, Landkreis Eichstätt, Markt Titting
14/63	stone	1989-1991	Fremdenverkehrsverein Kipfenberg, durch Spende finanziert
14/78	timber	1997	Landkreis Kehlheim
15/45	timber	1975	

* The marked towers exhibit a combined method of construction, with the upper stories made of timber or timber-framed

Fig. 1 Reconstructed watch-towers on the Upper German-Raetian *Limes*

Fundamentals of wooden tower reconstruction

Using the example of the wooden towers along the Upper German-Raetian *Limes*, the text below highlights the fundamental principles behind these reconstructions and the forms of authenticity. Authenticity is subjective to a certain extent (see Lengkeek in this vol. 36–51), as it is always based upon the latest research results, while older research, of course, is at a disadvantage faced with advances in knowledge. Here, the aim should be less the presentation of a generally valid proposal in line with the latest research, for there can be no such thing, as will be demonstrated later. Instead, the problems associated with such constructions and their information value against the background of science should form the focus.

Eight of the 20 reconstructed watch-towers on the *Limes* are of timber construction (Fig. 2), which roughly corresponds to the ratio of timber to stone towers in reconstruction drawings in the archaeological literature. The smaller number clearly indicates that these towers are more difficult to reconstruct than their stone counterparts.

The reconstructions are primarily based upon the findings of archaeological excavations at wooden towers, in particular the investigations conducted by the Reichs-Limeskommission between 1892 and 1937,

although the section commissars largely restricted themselves to localising the towers and recording their dimensions. This meant that usually only small cuts were made in the mound, without a full excavation taking place. Fully excavated towers from this research period are an absolute exception. On completion of the work and publication of the results, some wooden towers had to be fully excavated for historic preservation reasons, which significantly increased our understanding of the construction details. In 2004, for example, the entire area around a wooden tower at tower Site 5/4 in Hesse was investigated, as it was threatened with destruction by a new housing development (Schallmayer 2007).

Without wishing to go into too much detail here, significant differences in the method of construction of the wooden towers can be observed. They vary in size from tower to tower, ranging from 3.0 m to 5.5 m. All towers are demonstrably surrounded by ditches, some circular, some rectangular; some are double-ditched. At one tower site in the Odenwald region we even know of a stockade that cordons off a large area around the site.

While the observed details provide a good basis for assertions about the tower layout, the information available for reconstructing the height is rather scanty. The first question to be answered concerns the building technique by which the towers were erected. They may have been completely of wood or timber-framed – both methods of construction have been documented for the Roman era in central Europe and were used by the Roman army in the Germanic provinces. As only the corner posts of the towers have been identified and there is no evidence of their being connected by buried crosspieces, no clues are available as to the above-ground architecture. The smaller quantity of wood required and the occasional finds of pieces of fired daub seem more likely to indicate a timber-framed construction. Some towers, especially in the Taunus and Odenwald regions, clearly have a solid ground floor made up of a dry masonry block with wooden beams as crossmembers. This construction technique appears only at certain locations on the *Limes*, however, and may be attributable to the particular building style of the constructing units. The ground floor of most towers seems to have been designed for access on foot. Isolated finds such as storage pits or fire places discovered inside the towers during excavation work would appear to attest to this.



Fig. 2 Reconstructed wooden watch-towers on the Upper German-Raetian Limes: 1/9 Rheinbrohl; 4/44 Butzbach; 9/64 Mainhardt; 12/14 Lorch; 12/77 Rainau; 14/48 Burgsalach; 14/78 Kipfenberg; 15/45 Neustadt (Photo: 1/9: Th. Becker, Bonn; 4/44: W. Schunk, Butzbach; 9/64, 12/77, 14/48, 14/78, 15/45: J. Obmann, München; 12/14: A. Thiel, Friedberg)

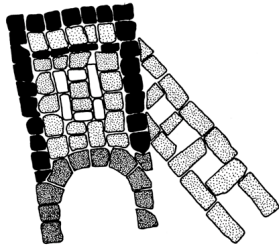


Fig. 3 Depiction of a Roman watch-tower on a 4th century mosaic from Madaba, Jordan (Photo: Th. Becker, Bonn)



Fig. 5 A private view of antiquity. These watch-tower reconstructions were built on private land away from the *Limes* (Aalen-Wasseralfingen, Bürgstadt) (Photo: J. Obmann, München)

When reconstructing the upper storeys, however, archaeologists primarily make comparisons with ancient representations that depict corresponding towers or provide clues with regard to construction details. For the watch-towers on the *Limes*, particular reference is made to depictions on two victory columns in Rome: Trajan's Column, which was raised in honour of the Emperor Trajan (98–117 AD) to mark his victory in the Dacian Wars, and the Column of Marcus Aurelius, built following the Marcomannic Wars under the Emperor Marcus Aurelius (161–180 AD). Built to secure the frontier on the Danube, the watch-towers on the relief are depicted with a gallery running around the second storey, which was adapted for most of the reconstructions on the Upper German-Raetian *Limes*. The narrow drainage channels in corresponding distance from the tower occasionally identified during excavations point to a wide roof overhang and thus the existence of such a gallery. Other towers exhibit drainage channels in immediate proximity to the tower wall, however, which would appear to rule out reconstructions with a gallery.

Additional construction details such as shingle roofs were based upon the depictions on these two columns. Other depictions also provide clues to tower reconstruction, however. The construction on stilts employed at watch-tower 1/9 near Rheinbrohl, for example, can also be observed on a depiction (Fig. 3) on the Madaba Map, a mosaic found in Jordan dating to the 4th century AD. Going by the arch on the ground floor of the depicted tower, it must have been built in stone. The proximity to the river Jordan would explain the use of stilts, as buildings in this position would no doubt have to be afforded protection against flooding. Sentries accessed the tower by way of a ladder leant against the exterior, as is assumed for the towers on the Upper German-Raetian *Limes*. To what extent this form of architecture can also be transposed to towers in the north-western provinces is a matter of debate, as it is not clear whether such unprotected posts could have survived the climatic conditions in the northern section of the *Limes* or whether the wood would weather more quickly due to being installed without protection. Here, the tower can certainly be seen as a contribution to an archaeological experiment that will demonstrate the applicability of this form of construction in practice.

Detailed information on the tower architecture can in turn be derived from archaeological finds. There is no reason to assume that any of the watch-towers, timber or stone ones, were covered by tiles. This is suggested not only by the ancient depictions. Excavations at tower sites on the Upper German-Raetian *Limes* have revealed no corresponding finds of tiles whatsoever. The stone towers on the Johannisberg, a hill near Bad Nauheim, and at site 10/37 (Schneidershecke) form two exceptions to this, though here the use of tiles is explained by the special functions of the towers. The Johannisberg tower is situated behind the border line and is generally interpreted as a visual and signal link to the auxiliary fort at Friedberg in the hinterland. At tower 10/37, evidence exists of a change of use to a sanctuary near the end of the border line, or following the relocation of the line to the east. Tiles with the stamps of the manufacturing legions were

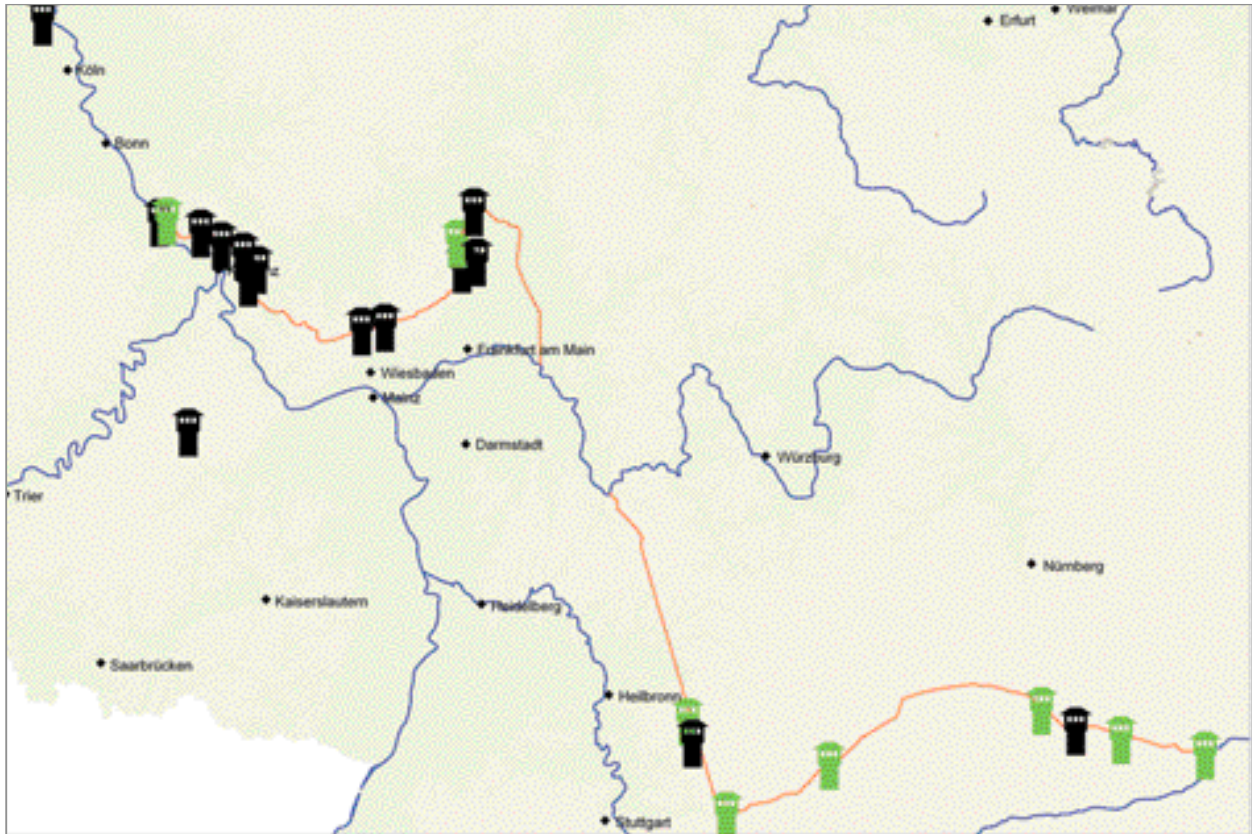


Fig. 4 Distribution of reconstructions of Roman watch-towers in Germany. A differentiation is made between timber (green) and stone (black) reconstructions (Photo: Th. Becker, Bonn)

found at both towers; the form of the stamps suggests that the tiles were made a long time before the towers were erected and it is thus a case of old material being re-used. The tiles used for tower 10/37 could have come from the neighbouring fort at Oberscheidenthal, which was abandoned when the border was moved and thus served as an ideal location for recycling material.

Finds of glass fragments capable of being interpreted as the remains of window panes are very rare at towers along the German *Limes*. Proven finds of window glass include two at wooden towers in the Wetterau region. The low overall number of window glass finds from towers on the *Limes* can be interpreted in different ways. It can be taken to mean that the windows were closed with other material, such as thin pieces of leather or simple wooden shutters. In the wooden architecture of earlier Roman military camps, too, window glass is totally absent in material finds right up until the Claudian era (middle of the 1st century AD). From this we can deduce that other methods were used to close windows, which serve as further evidence for the reconstruction of watch-towers.

Taken together, the archaeological details from over a century of research on the *Limes* prove that some existing tower reconstructions are scientifically obsolete. This applies in particular to the wooden towers of log construction. Though this has become the most popular construction procedure for wooden tower reconstructions on the *Limes* – six of the eight towers were built accordingly – there is no evidence whatsoever of such a building technique being used anywhere on the ancient *Limes*. Log construction plays a subordinate role in the timber architecture of the Romans and the method of reconstruction employed is more resemblant of the method used to build log cabins in North America or of the architecture seen in 1950s and 1960s westerns. The use of log construction in northern Europe dates back to the Bronze Age and manifestly arrived in North America with settlers from this area (Weslager 1969). The depictions on Trajan's Column and the Column of Marcus Aurelius in Rome, where the wooden towers exhibit perpendicular beams, may also evidence a different method of construction.

Relevance of watch-tower reconstructions

The analysis of individual construction details and the fundamentals behind them could be extended to other tower areas. Yet the current overview already demonstrates that the information used to build the towers is either derived from an interpretation of individual archaeological finds or conclusions are drawn from pictorial depictions. Some clues are too difficult to interpret, while others can be understood in different ways. Recourse has to be taken to pictorial depictions for some parts of the structures, since archaeological finds are unable to provide information for use in reconstruction. As the number of pictorial depictions of Roman watch-towers is very small, the few examples that do exist exercise a strong influence on the reconstructions. This manifests itself clearly in the use of a gallery around the upper storey of 21 of the 23 reconstructed towers in Germany. If the depiction of the watch-towers on Trajan's Column and the Column of Marcus Aurelius in Rome did not exist, the reconstructed towers would undoubtedly be different in appearance and could be based only on the archaeological finds.

The submissions on individual construction details also demonstrate, however, that the wooden watch-towers on the *Limes* were not built to a standard procedure. There is evidence of variation both in the tower layout and in the design of some components. This observation can also be applied to the stone towers, which provide even better evidence of variation in design (see Thiel in this vol. 148–52). For various sections a basic pattern exists that probably reflects external specifications such as a fixed minimum size. Such specifications can be deduced from the basic measurements of the towers, for example (Becker 2004). The individual design itself was subject to local conditions and the ideas of the constructing unit.

Hence there can be no 'right' or 'wrong' or 'generally valid' way of reconstructing a *Limes* watch-tower. Tower reconstructions always reflect the views of the constructing institution or the academic in charge of the project. The time of construction and associated tastes and fashions can also be said to exert a certain influence (see Breeze in this vol. 140–47). The prevailing 'zeitgeist' and possibilities on offer during construction also play a role. The bandwidth of reconstructed towers indicates the way in which the research view of the ancient frontier has developed. This circumstance is also taken into account in the management plan for the Upper German-Raetian *Limes* WHS by the call for new buildings to reflect the latest research rather than being copies of existing tower reconstructions (Management Plan 2007).

From the idea to the reconstruction: the executing organisations

If we look at the various watch-tower reconstructions on the Upper German-Raetian *Limes*, their uneven distribution will catch the eye (Fig. 4). First there is the uneven split between the federal states involved, as already mentioned, of seven to five to four to four. If we then set this in the context of the individual states' share of the frontier, we find that Rhineland-Palatinate has the greatest density of reconstructions, with seven towers over 75 km, while Baden-Württemberg exhibits just four over a distance of 164 km.

There are large differences in distribution within the individual states, too. No concentrations are to be observed in Baden-Württemberg or Bavaria on account of their large sections while in Rhineland-Palatinate we see an accumulation in the centre of the state. A certain proximity to the city of Koblenz, today capital of the eponymous administrative region and the former seat of government in the Prussian province of Rhineland, while certainly not intentional, would appear to have had a positive effect on the building of reconstructions. In Hesse, the towers are concentrated on the western part of the state and thus the western section of the *Limes* – it would be tempting to draw a correlation with the distance to the state capital, Wiesbaden, but other factors, such as fort Saalburg's standing as an archaeological institution and archetype, would appear to have played a role. What is noticeable for all states is that tower reconstructions in the local or immediate vicinity of the state border appear to have been unwanted. Possible exceptions to this are two tower reconstructions at either end of the *Limes* frontier, one by the Rhine in the cadastral district of Rheinbrohl (watch-tower 1/1 and 1/9) and one near the Danube in the municipality of Hienheim (watch-tower 15/45).

The observations on distribution clearly point to the lack of an overall concept and thus management control over the reconstructions, be it on a trans-state level for the entire *Limes* frontier or an individual state level (see Jeschke in this vol. 186–95). The formulation of an overall management policy for the frontier has proved difficult due to the cultural sovereignty of the individual states. A certain degree of control may ensue following the formation of the *German Limes Commission* in 2005 by the four states bordering the



Fig. 6 The reconstructed tower as a destination for walkers. The many trails leading to tower 1/84 near Arzbach are clearly apparent (Photo from: Topographische Freizeitkarte 1:25.000 "Der Limes von Rheinbrohl bis Holzhausen" (ed), Landesamt für Vermessung und Geobasisinformation Rheinland-Pfalz/Generaldirektion Kulturelles Erbe, Direktion Archäologie, Amt Koblenz)

World Heritage property, especially as the management plan for the Upper German-Raetian Limes WHS provides for a joint approach with regard to reconstruction applications (Management Plan 2007) (see Sommer in this vol. 128–39).

The lack of management is more down to the genesis of the individual towers than any lack of will. This shall be explained by the example of the wooden tower reconstructions and examined and expanded upon with a view to their stone counterparts.

Where the circumstances surrounding the construction of the various wooden towers can be determined (Schmidt 2000, 98–109, Fig. 1), four categories of initiator can be identified: private groups and individuals, clubs and societies, local authorities and tourism organisations. This pattern is also in evidence for the stone towers on the *Limes*. Here, the motives of the various groups differ greatly. The prime interest of private groups or individuals and clubs and societies, for example, is classical antiquity and its real-life recreation. Hugely impressive examples of this are the early reconstructions in western Wetterau (tower 4/16 and tower 4/33), which were erected by history enthusiasts at their own expense. This type of patronage, as exemplified by the building of the Saalburg fort with funds provided by Kaiser Wilhelm II, has not been imitated in recent history. In most cases, interest groups come together to organise the construction by staging activities, holding collections or doing the work themselves. One exception is the stone tower at the beginning of Section 2 near Bad Ems, which was built by the town's citizens in honour of Kaiser Wilhelm I. This tower served more as a symbol of the Kaiser's war achievements – the Franco-Prussian War of 1870/71 had ended just four years previously – in comparison with the Roman army.



Fig. 7 Rheinbrohl (Rhineland-Palatinate). The reconstructed tower as a crowd puller, as here at watch-tower 1/9 on the *Limes* hiking day organised by the radio station SWR 4 (Photo: Th. Becker, Bonn)



Fig. 8 Rheinbrohl (Rhineland-Palatinate). This half reconstructed tower is placed at the city centre at a house wall. It copies the reconstruction of the watch-tower 1/1 exactly (Photo: Th. Becker, Bonn)

The motivation of municipal and tourism-industry initiators is undoubtedly to be found in raising the attractiveness of a place, a municipality or a region. Accordingly, some initiators choose the site of the reconstruction themselves. More often than not, municipally backed tower reconstructions are located close to the municipality (e.g. Lorch tower 12/14 or Titting-Erkerthofen tower 14/63) or in a business park (Höhr-Grenzhausen – Hillscheid tower 1/68), while tourism-based initiators usually take scenic factors into account. Good examples of this are the towers in two natural parks, Schwäbisch-Fränkischer Wald (tower 9/64 and 9/83) and Altmühltal (tower 14/48, 14/78 and 15/45).

The list of initiators clearly shows that no government preservation agencies or other state or federal cultural institutions were involved in the launch or implementation of any of the tower reconstructions. Advice was sought from historic preservation experts during some of the more recent reconstructions, in particular. But their influence on the actual tower construction process is limited to the submission of expert opinions on the location should the *Limes*, as a historic monument, be affected in substance and appearance. Since the granting of WHS status, the management plan and the *Limes* development plans of the individual federal states have offered additional opportunities for intervention. The examples of two privately initiated reconstructions of wooden towers away from the *Limes*, however, clearly highlight the limitations of this influence (Abb. 5). In both cases the towers were erected on private property and came to the attention of the historic preservation authorities only by chance, though they are based upon the archetypes on the *Limes* itself.

Benefits

In this era of history marketing and social responsibility, the question must be raised as to the point and the benefits of reconstructing ancient legacies (see Breeze in this vol. 140–47). A problem associated with *Limes* watch-towers, in particular, is that people visit the reconstruction only once, as the knowledge gain on viewing the structure, reading the information panels and perhaps observing the surrounding scenery appears to be complete. Incentives for further visits, as created in the museum sector by changing exhibition themes (see Flügel in this vol. 196–99), for example, cannot be replicated for watch-tower reconstructions. First, there is a lack of space for corresponding presentations; second, their invariably isolated location constitutes a security problem for the exhibits. Some towers have been closed temporarily due to the threat of arson and vandalism (Richter 2006, 17). Even if these problems were to be resolved, the lack of resources available for the continuous renewal of such incentives would often present a difficulty.

Watch-tower reconstructions, therefore, derive their attraction from the ability to ‘experience’ classical antiquity and the surrounding scenery. Most of them can therefore be accessed and climbed, thus combining the goal of feeling like a sentry on the gallery or upper storey of the tower with a view of the scenery. Some towers are expressly marked as observation towers. Evidence exists of many towers being incorporated in the local system of hiking trails where the *Limes* Walking Path is not the only one to lead past the

tower (Fig. 6). Many of the towers are included in the *Limes* tourism route. All the local and regional tourism institutions promote the reconstructed towers as places of interest worth visiting.

Some towers now form part of the local events structure with a variety of activities. Walks along the *Limes* to the watch-towers are held (Fig. 7) and special Roman festivals organised on the reconstruction sites. These activities are usually closely tied to the interests and opportunities available to the organisations that support them. Depending on the size of the event and the publicity in the regional and national press, they attract new or repeat visitors to the watch-towers, though it is clear that most of these visitors are primarily interested in the event rather than the reconstruction itself. The latter also applies, of course, to towers where other visitor attractions have been created in the surrounding area. Though they draw more visitors, barbecue sites near towers, for example, also increase the risk of damage.

One factor that should not be underestimated when considering the benefits of tower reconstructions is their identity-forming character. This is demonstrated by the fact that eleven of the 20 structures were initiated by private individuals or clubs and societies and most are maintained and run by them. In addition, they are usually considered part of the local scenery and often incorporated in the municipality's visual identity through in-depth emotional communications (see Lengkeek in this vol. 36–51). This is reflected by the depiction of the Roman town of Lorch (Baden-Württemberg) in the local monastery museum, for example, with its focus on the reconstructed watch-tower rather than the local fort, which from an archaeological and military-history point of view is undoubtedly more important (Fig. 8). In an art competition staged in Lorch, school pupils painted the Roman watch-tower as an illustration of their home town. A look at the location of the watch-tower in Lorch reveals that it is on equal standing with the neighbouring Hohenstaufen monastery, both in real and conceptual terms (Fig. 9). There could hardly be a clearer indication of the esteem in which this tower is held than the choice of such a location.

Returning finally to the benefits of tower reconstructions as sites of archaeological knowledge transfer, they do, of course, paint a picture of the ancient world in the eye of the beholder. In addition, they are readily chosen as models for replicas of varying description – mention has already been made of private reconstructions as one possible example (Fig. 5). They also provide the inspiration for cutout card sheets and models and find their way into school or children's books on Roman history. A reconstructed tower not only paints a picture on the ground, therefore, it also serves as a knowledge multiplier in media form. It should be noted that the reconstructions are usually translated into models or images in an uncritical fashion, as



Fig. 9 Set alongside the Hohenstaufen monastery in Lorch (Baden-Württemberg), *Limes* tower 12/14 dominates the landscape (Copyright: Landesamt für Denkmalpflege Esslingen; O. Braasch)

they are thought to be faithful representations of the antique situation. Consequently, towers of log construction, for example, have been imitated in various model kits without the erroneous construction method – mention has already been made of the lack of log construction in Roman architecture – being examined academically. The aim of future tower reconstructions on the *Limes* must therefore be to replicate the original situation as faithfully as possible in accordance with the latest research in order to avoid the adaptation, and thus the reinforcement, of an unnecessarily false picture of the frontier. Finally, a reconstruction always remains an approximation of the ancient situation – there can be no such thing as a “this is how it was”!

Summary

An examination of the watch-tower reconstructions on the *Limes* can be performed under a variety of aspects. Twenty such rebuilds, along with partial reconstructions of forts or short sections of the border line, provide a three-dimensional experience of the ancient frontier. They are distributed very differently along the 550 km *Limes* frontier and were built as early as 1874 as examples of ancient border fortifications.

Authenticity can never be achieved, however, as the information base for the reconstructions (archaeological finds, ancient depictions) leaves a host of questions unanswered. In addition, the archaeological finds indicate that there was probably no ‘standard method of construction’ for the watch-towers on the *Limes*. Despite some factual errors, the existing reconstructions are primarily to be considered under aspects of historical research and the attempt at an approach.

The reconstructed towers were initiated and built by four different types of interest groups: private individuals, clubs and societies, local authorities and tourism institutions. No initiatives can be identified at state or federal level, be it during the construction of individual towers or for the purpose of managing the overall picture along the *Limes*. Here, the management plan for the Upper German-Raetian *Limes* WHS and the individual *Limes* development plans of the four federal states appear to aspire to a management function to deliver an overall picture and thus achieve an ordered increase in new reconstructions and avoid an unacceptable change in the appearance of the WHS property.

The benefits offered by reconstructions of Roman watch-towers are to be found in the areas of education and tourism and in local identity building. Various examples are good testimony to this, though they also highlight the limitations of such tower reconstructions. With regard to the effect of the reconstructions on the public perception of the ancient frontier, it is especially important for the design to incorporate the latest research findings on the appearance of the towers and for archaeologists to have an influence. But archaeologists are also called upon to bring their specialist knowledge to a wider public in order to achieve the necessary level of acceptance and thus involvement in corresponding projects. The towers demonstrably serve to paint pictures of life as it was, thus reinforcing a corresponding image among the public – be it right or wrong.

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FROM SCOTLAND TO THE BLACK SEA – MAKING THE DVD 'FRONTIERS OF THE ROMAN EMPIRE'

Sandra Walkshofer and Erik Dobat (Boundary Productions), Bleiberg

The Roman frontiers ran for 5000 km through different landscapes, enclosing a territory which is situated on three continents. For us – being historians, archaeologists and filmmakers – it is a fascinating idea to present these frontiers and the regions in which they are located to a wider public. In 1998 we started video projects concerning the Roman frontiers in Britain and Germany. Our aim was to raise interest in Roman frontiers and the history of the Roman empire and its provinces. During that time we still were students at university, so we could not effort too much time developing film and multimedia projects but still, two films about Roman frontiers were published.

In 2002 we came to Britain to work on our first DVD project called '*Roman Frontiers – Hadrian's Wall, The Antonine Wall*'. During that time Erik Dobat, the producer, was finishing his studies of Roman archaeology at the University of Glasgow, writing his thesis about a presumed early Roman frontier along the Gask Ridge in Scotland. In 2004 the DVD about the Roman frontiers in Britain was released by the Konrad Theiss Verlag in Germany and by Northern Heritage in Great Britain. In 2005 we published a DVD on the Upper German-Raetian *Limes* which at that time became an UNESCO WHS.

Since we are not only filmmakers but also archaeologists and historians, we are always working very closely with other archaeologists, historians and related institutions when undertaking film productions. In 2006 the FRE project office approached us with the intention to produce a DVD about the Roman frontiers (see Breeze and Jilek in this vol. 7–14). This DVD should include short films and should be given out to schools, museums and related institutions for free.

Because we already had quite some footage of Roman frontiers, it seemed to us to be an achievable task to produce such a DVD within the project time of the Culture 2000 project. For this production we had to focus on the eastern European Roman provinces along the Danube and in Romania.

We started production in August 2006 on the Danube in Austria, filming in the region of Carnuntum (Fig. 1). We kept on filming in Slovakia and in Hungary, travelling down the Danube. Archaeologists in the individual countries helped us on site and we like to mention all the effort to tidy up the sites undertaken by local archaeologists and councils at the sites of Visegrád and Tokod in order to get the best shots of the Roman remains. After filming at *Aquincum* in Budapest, we headed back to Carnuntum where we filmed the reconstruction of a Roman boat, which was at that time travelling down the Danube (Fig. 2). The boat had been built by the Department of Ancient History of the University of Regensburg (Germany). For us, it was a good opportunity to get footage of a boat which the Roman fleet used in the late Roman period for patrolling along the Danube.

After that, we decided to do more filming in autumn. In October we travelled up and down the Danube in Austria. The weather was fine and we were able to gain a lot of footage of the Danube and the Roman remains. In November we were back in Carnuntum filming at the museum. In January 2007 we were filming on the Danube in Germany, at Regensburg, and then going down the Danube to Austria until the town of Linz, not only filming landscape but also museums.

It was intended that the DVD '*Frontiers of the Roman Empire*' (Fig. 3) would have contain a main film on it. This main film should be a general introduction of the Roman frontiers and future plans connected with them. Since many countries in Europe are preparing to nominate their parts of Roman frontiers to become an UNESCO WHS, it was important for the FRE project partners to include an interview with UNESCO in the main film. In February 2007 we travelled to Paris to interview Dr Mechtild Rössler at the UNESCO centre. After that we flew to Glasgow in order to get an interview with Prof David Breeze at the Hunterian Museum.



Fig. 4 The film team with Andreas Thiel relaxed in the ruins of Nicopolis ad Istrum in Bulgaria (Photo: J. Rectaw)



Fig. 2 Filming the Roman galley in Carnuntum, Austria (Photo: P. Tontur)



Fig. 1 Filming on the frontier in Romania (Photo: Boundary Productions)

In Britain we were also able to gain additional footage of the Antonine Wall and Hadrian's Wall.

For May 2007 we were about to film the Roman frontiers in the south of Hungary, in Romania, Bulgaria and again in Slovakia (Fig. 4). Quite some research and planning had to be undertaken for such a long production journey. The filming went well. In Bulgaria Polish archaeologists from the University of Warsaw which were excavating at the legionary base Svištov (*Novae*) helped us in finding the right locations. In Romania, the assistance of local archaeologists made production very easy for us. After five days in Romania we drove back into Hungary to take a shot of the National Museum in Budapest and then we were heading for Slovakia. The next day, Slovakian archaeologists were waiting for us in order to do some aerial photography of the Roman frontier along the Danube in Slovakia. After that, we went filming at the National Museum of Slovakia and to some interesting archaeological sites in the region of Bratislava. The end of this production journey marked filming in Carnuntum where we met Dr Sonja Jilek at Carnuntum for an interview.

Carnuntum saw us again in summer 2007 when we were presenting a first version of the FRE DVD and filming the amphitheatre. After that, preparations were made in order to go on a ship travel along the Danube. By the end of September we were ready to go on a ship travel along the Danube as far as the Danube delta. With the MS Swiss Tiara, a newly built, very modern tourist ship, we left from Passau (Germany) and sailed down the Danube. The weather was beautiful and so was the landscape along the river. It took us about 6 days until we reached the Danube delta. Then we turned to travel upstream. The captain of the ship, Mr Michael Székely, navigated the ship near to all the Roman sites along the Roman Danube frontier. So thanks to him we were able to get good footage of the several Roman remains.

After our ship journey we were able to finish seven short films for the FRE DVD in two languages: English and German. In February 2008 last filming was done on the Roman frontier along the Danube in Germany. Since it was decided to have five languages on the DVD, the project partners helped us with translation, narration and sound editing. Now, everything was prepared to add one more film on the DVD to have a wider dimension of Roman frontiers: a film about the Roman frontier in the Middle East. While preparing production for this, we were working with a Slovenian film production company in order to create a Slovenian version of the main film of the FRE DVD. The main film will be shown in an exhibition about Roman frontiers in the National Museum of Slovenia in Ljubljana in spring 2008.

With undertaking the production in Jordan, editing the new film about the Roman frontier in the Middle East and put Arabic as additional language on the FRE DVD, the project will be finished by May 2008. It was a fascinating experience for us to be able to work in so many different countries with so many different people. We are very thankful for the help of everybody who has been a part of this film project and we have to say that all of them undertook great efforts and assisted us in whatever way they could to bring this project to a successful end. I hope that when people are watching the films of the FRE DVD that they will be able to obtain the same fascination we gained about Roman frontiers and Roman history during this project. And we hope that the films will help to raise interest in the history and the protection of the Roman frontier monuments.

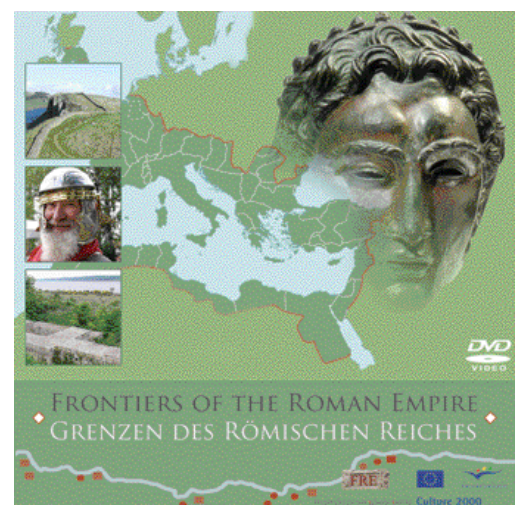


Fig. 3 The cover of the DVD '*Frontiers of the Roman Empire*' (Copyright: Boundary Productions)

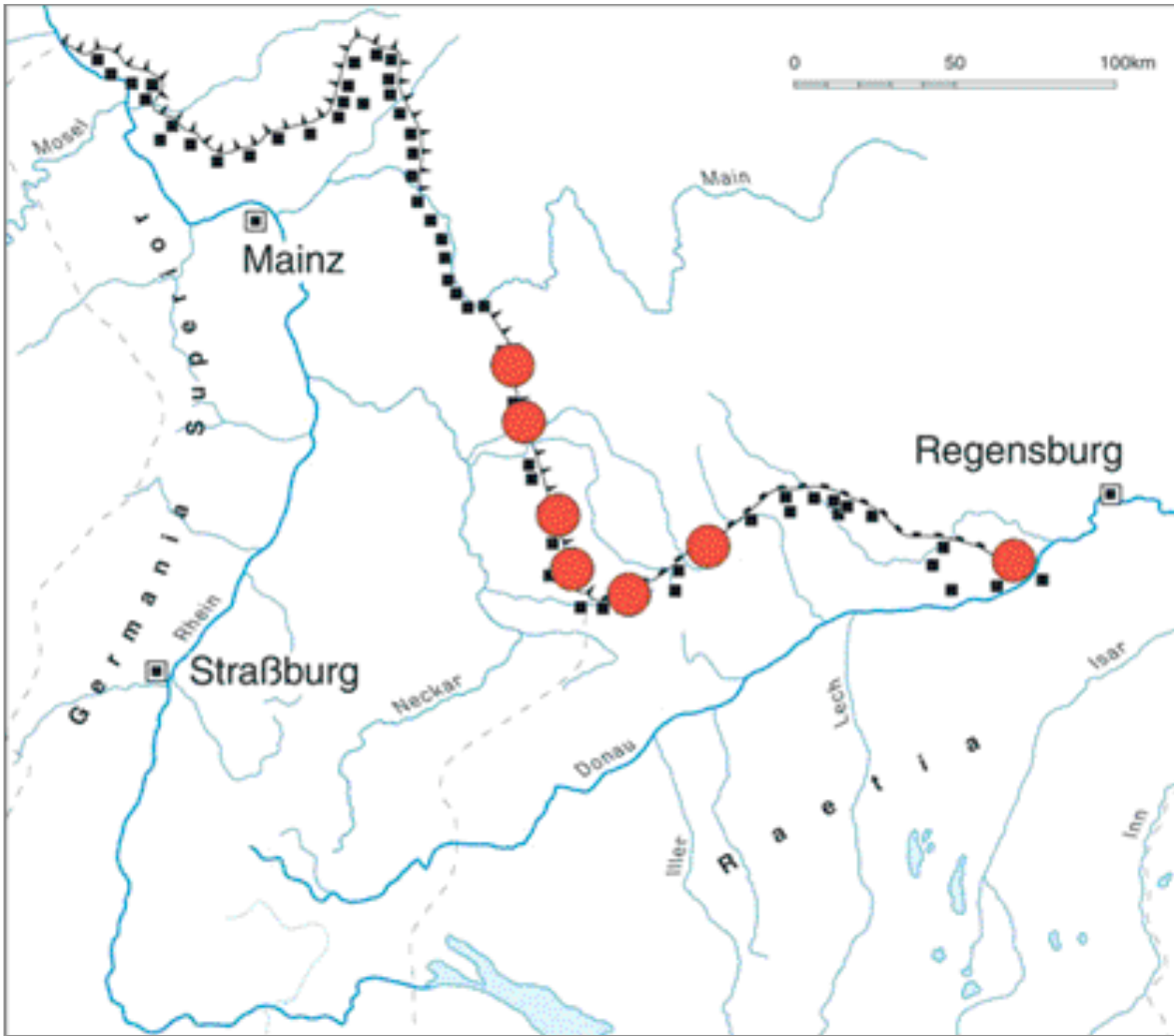


Fig. 2 Locations of the project areas (based on a template prepared by the Deutsche Limeskommission)



Fig. 1 Damage caused to the *Limes* Wall by timber harvesting operations near Hopfengarten in Baden-Württemberg (Photo: F. Höchtl)



Fig. 3 Flowering blackthorn bushes (*Prunus spinosa*) along a forest edge in early spring (Photo: F. Höchtl)

QUOT CAPITA, TOT SENSUS: PARTICIPATIVE LANDSCAPE AND HERITAGE CONSERVATION ALONG THE UPPER GERMAN-RAETIAN LIMES

Franz Höchtel, Martin Ebrahimzadeh and Patrick Pauli, Freiburg

The Upper German-Raetian *Limes* is Germany's largest archaeological monument. The artificial, in places wholly straight, demarcation lines separated the Roman empire from the Barbarian world between the 1st and the 3rd centuries AD. Together with its forts, watch-towers, fortlets, settlements, watch and transport routes, the *Limes* is the symbol of Europe's Roman epoch. The inscription of the Upper German-Raetian *Limes* on UNESCO's list of World Heritage Sites (WHS), as the 31st German monument of cultural heritage, and its inclusion in the transnational '*Frontiers of the Roman Empire World Heritage Site*', are tributes to its singularity and outstanding universal significance.

Its present day appearance is multi-faceted. Only 27 % of the German *Limes* is visible, with 64 % below ground and not directly identifiable, and another 9 % irrevocably destroyed (ICOMOS 2007). The monument is also incorporated into various land use regimes. At 92 %, the greater part of the *Limes* is situated on forest and agricultural sites, with the remaining 8 % in settled areas (ICOMOS 2007). As a consequence, the *Limes* is exposed to a high degree of threat. Damage results, for example, through simple ignorance, from inappropriate forestry operations (Fig. 1) and from intensive agriculture practices, construction measures, soil erosion and badly thought out attempts at the reconstruction of the monument. The principal objective of its designation as a cultural heritage site is to anchor the values of the Upper German-Raetian *Limes* in the public consciousness. The experts from the International Council on Monuments and Sites (ICOMOS), which is largely responsible for the designation of the Site, therefore demand that:

- the present condition of the monument be safeguarded;
- it be protected from destruction and ill-considered attempts at reconstruction;
- the values that it represents be conveyed to the highest degree possible;
- its visibility be increased (ICOMOS 2007).

In order to fulfil these postulates the federal states Rhineland-Palatinate, Hesse, Baden-Württemberg and Bavaria are, as the abutting jurisdictions, responsible for the drafting of management and development plans for the monument. In the '*Limes development plans*' drawn up by the states Baden-Württemberg and Bavaria particular emphasis has been placed on the monument in the context of the landscape (Faber and Schmidt 2006) [see Sommer in this vol. 128–39]. It was for this reason that the Institute of Landscape Management of the University of Freiburg was awarded the task of developing practicable suggestions for the design and enhancement of the landscape value of the monument.

Objectives

The purpose of the 'Enhancing the landscape value of the Upper German-Raetian Limes UNESCO World Heritage Site' project is to increase perception of the *Limes* by means of appropriate design measures, so as to help make the wider public aware of its extraordinary cultural worth. Additionally, on the basis of the proposed design and management measures, synergies between heritage conservation, nature protection, as well as agriculture and forestry concerns are to be identified. A further objective is to develop a guideline for the permanent fostering of the elements designed. The hub of the design measures are the invisible and barely visible, and poorly accessible segments of the *Limes*, as these are the areas in particular need of either enhancement or management. The main focus of the study is on areas in Baden-Württemberg and Bavaria (Fig. 2). Work on the *Limes* project began in 2006 and will finish in September 2008.

Methods

The interdisciplinary project is based on four methodical pillars, the building stones of which derive from the following scientific disciplines:

- historical geography: evaluation of primary sources (historic maps, archival documents) and secondary literature (e.g., pertaining to Roman history, paleobotany and ethnobotany), mapping of historical landscape elements on the ground;
- remote sensing and aerial photo interpretation: analysis of aerial photos and digital orthophotos, landscape analysis using the ArcGIS geographic information systems software;
- ecology: identification of areas of nature conservation value in the immediate vicinity of the *Limes*, assessment of the nature conservation value of the object;
- empirical social science: interviews and workshops with various stakeholders to increase their willingness to participate in the project, and to increase acceptance of design measures and garner supplementary design ideas.

The design proposals for the enhancement of the Upper German-Raetian *Limes* will be developed on the basis of the results derived from the application of these approaches.

Basic design concepts

In the following the beginnings of a greater design concept made within the overall framework of the landscape context are presented. This concept will potentially contribute to increasing the visibility and perception of the Upper German-Raetian *Limes*.

Plants as a means to increase visibility and perception

Planting and vegetation are a good way to improve visibility and perception as they create contrasts and, through design and special planting arrangements, can be employed to emphasise archaeological monuments (see Sommer et al. in this vol. 128–39). This may include newly planted material or the tending and design of the vegetation already present. Depending on the state of preservation of the monument, it may be necessary when planting new material to ascertain whether it is necessary to maintain a certain distance from the monument. The following general planting options exist in most cases:

- planting of tree rows parallel to the monument;
- localised planting of solitary trees at noteworthy sites;
- the opening up of forest canopies in order to create park- or grove-like structures;
- the planting/tending of hedges and the planting of flower beds or shrubs;
- the implementation of historical forms of forest use (e.g., coppice, coppice-with-standards);
- attractive forest edge design where the monument coincides with forest margins (Fig. 3); the sowing and management of oligotrophic grasslands rich in flowering species.

Creation of vantage point interactions

The watch-towers made of wood and stone allowed the Romans to guard their borders and to peer into the 'Barbarian land'. Their arrangement also allowed for the rapid passing on of news by means of signals (Schallmayer 2006). This renders the creation of vantage point interactions along the *Limes* particularly apt. Existing sights and vantage point interactions are identified and possibilities for new locations are sought, and the means to best create a visual connection considered (see Dower in this vol. 112–17). From this the following questions arise:

- are openings in the forest a suitable means for the creation of sight and vantage point interactions between watch-towers?
- at which locations is there the potential to install viewpoint axes incorporating multiple watch-towers?

Stones and earthworks as a means to increase visibility and perception

Stones and earthworks can serve to enhance optically the remains of the wall lying on the ground. They also protect those parts of the monument buried beneath the surface. Possible measures include:

- the marking of wall contours using fine gravel;
- the mounding of coarse gravel, quarystone or soil directly over (only at watch-tower sites) or parallel to the monument.

Possibilities to incorporate the symbolism of the *Limes* in the overall context of the landscape. The *Limes* is an imposing symbol. Some of that which is associated with the *Limes* is echoed in the surrounding landscape (e.g., transience, isolation, the creation of boundaries) and can be emphasised by design measures (e.g., multiculturalism, cultural exchange, communication).

Incorporation of relicts of historical land use

Traces of historical land use and layers of later history, such as estate boundaries, charcoal burning sites, giant trees, stone bolts, dry walls, relicts of coppice and coppice-with-standards, ridge and furrow, and hollow ways, as revealing witnesses to culture documented along segments of the *Limes* and incorporated in the design. Central to this aspect are the questions: What traces of use in later centuries are apparent in the immediate vicinity of the *Limes*, can be readily identified at the *Limes*, and may even have impacted upon it?

Development of 'landscape screens'

This relates to the creation of 'picture frames' in the landscape, in which the first glance reveals a picture of today's landscape. Gradually 'slides' showing conceivable properties of the ancient landscape may be added to these frames, providing the observer with an idea of the previous forms assumed by the landscape.

An event culture based on the monument's symbolism

The one time border was also a focal point in times past, a place of communication. Goods and information were exchanged at various points along the *Limes*. Possible events might include fire and laser events, or Roman markets.

Management and design of the archaeological monument in the forest

Whereas the development of approaches for the design of the *Limes* in the open landscape was still ongoing at the time of writing (March 2008), concrete results of the considerations made in relation to the preservation of the monument in afforested areas are available. The suggestions were developed over the course of numerous discussions with representatives of archaeological heritage conservation and forestry, primarily taking place directly on site. The catalogue of measures proposed was considerable, so that in the following only the main points and examples can be presented. Although the following categorisation suggests a strict separation between tending and design measures, in reality they frequently go hand in hand.

Tending measures

Basic principles applying to forest management

The forests traversed by the *Limes* must be converted to stable, widely spaced continuous cover forests with sparse undergrowth along a 50 m strip on either side of the monument. This process of conversion should occur as part of the regular tending and thinning of the stands, in adherence to the principles of close-to-nature forestry. Trees growing directly on top of the monument represent a threat. Most trees within the 5–7 m wide zone occupied by the embankment and the ditch must be carefully removed in the course of thinning operations. No woody plants may be permitted to grow on the stone remains; for example, those of fortlets, watch-towers or of the Raetian Wall itself. Operations to reduce the numbers of trees and shrubs should be of a low intensity and implemented over a protracted period of time so that the gaps created in the canopy can close quickly (to reduce the emergence of young trees and to prevent rain erosion). Naturally regenerated trees should be thinned early and pruned from the time they attain a diameter at breast height of between 10–20 cm. Trees with low branches blocking off the view of the *Limes* are pruned to a height of at least 5 m, where this can be reconciled with silviculture and labour considerations. The location and the course of the monument, and all design and tending measures, must be incorporated in the relevant forest management plans – so as to promote the recognition by the forestry concerns of the existence of the *Limes*, and to ensure the continuity of its management.

Timber harvesting and weather damage

Where trees are to be harvested the following principles apply. Trees should only be harvested singly along the *Limes*. They are to be felled away from the monument, although safety regulations take precedence and must be observed at all times. Harvested trees may not be forwarded over the *Limes*, irrespective of



Fig. 4 Where great oaks mark the course of the *Limes* its majesty becomes tangible (Photo: F. Höchtl)

whether the monument is visible or not at any given location. Machines may only drive on designated routes and along extraction trails in the stand. New routes are only to be established parallel to the monument and at an appropriate remove. Operations should only take place during the winter months, and when there is ground frost. Forest workers and contractors must be made aware of the location and the significance of the *Limes*, and the necessity for careful timber harvesting.

Harvesting residues (tree crowns, branches) are to be deposited to the side of the monument. Only in exceptional circumstances may debris remain on the monument or be placed there intentionally; for example, to prevent a path running along the wall from being used. Naturally regenerated trees are preferred to be planted as a means to close gaps in the canopy over the monument created by harvesting, storm or as a result of an insect calamity. For the subsequent establishment of the stand, the principles described previously apply. The choice of tree species is determined by the local conditions. Holes created in the ground by the unearthing of root plates as trees are wind thrown should be covered. However, these should not be filled with foreign matter.

Design measures

Special measures are focused on segments of the *Limes* where signs of the past military infrastructure are no longer visible. Unlike those locations where traces of the past are readily apparent, these areas require particular attention.

Design through management

Parallel to the embankment and ditch, at a remove of at least 5 m, individual well formed trees positioned along an imaginary line can be selected and managed as a row of standards (Fig. 4). These trees are successively released over the course of thinning operations so that they may develop large crowns and take on a majestic appearance. The rotation of these 'marking' trees is prolonged to 150 years or more, depending on the species. Trees remote from trails can even be excluded from production entirely. Like the monument, they too can be allowed to age and gradually fall to ruin. Species fitting this purpose are oak, beech, ash, sycamore, fir and pine.

Gateways are an effective design element that can be achieved in the existing stand solely by means of tending (but also through planting), this can be particularly effective in areas where the monument is located at a transition between forest and openland (Fig. 5). At a distance of 4 m from the foot of the embankment, and 6 m from the remains of the Raetian Wall, the more striking trees near the forest edge are gradually released until they become solitary trees. Elsewhere trees contrasting with the species dominating the adjacent forest stand may be planted; for example, broadleaf species (such as cherry or birch) planted against the dark backdrop created by a conifer forest.

Planting alongside the monument

To mark the course of the monument through the forest by means of planting, the species selected will primarily need to be (semi-) shade tolerant native perennials and woody species. Planting may be linear along sections of the *Limes*; or in isolation, to represent points symbolising the watch-towers and fortlets; or

alternatively over wider areas. When using woody species it is necessary to take into consideration the depth and intensity of rooting of the selected species, and to select the distance from the monument at which planting should take place accordingly. Planting should be concentrated on the inner, 'Roman side' of the *Limes*. Should this not be possible, for topographical reasons, planting can upon consultation with the heritage authorities take place on the 'Barbarian side' of the Wall. Planting should be at a distance of 4–6 m from the original base of the embankment and 5 m from the Raetian Wall. The distance from the monument should not be too great, so as to prevent creating a false impression of the original location of the embankment and the ditch.

Yew (*Taxus baccata*) is a shade tolerant, flat rooting and visually striking tree species that can be used to 'visualise' the *Limes* where the soils are base-rich and the winter climate is mild. Under shade yew grows slowly, but a lightening of the canopy can accelerate this growth somewhat. There is a close association between yew and the Roman empire. The tough, hard yet elastic timber produced by yew was used in furniture making, for household utensils and for bows. In mythology, the way to the underworld was said to be lined with yews. Roman poets referred to it as the tree of death. Caesar believed that his Germanic foes dipped their arrows in the sap produced by yew trees in order to poison him. In ancient times healers warned that sleeping under a yew or drinking from cups made of its wood would result in death [Landesnaturschutzverwaltung NRW 2007].

An interesting means of bringing to life the *Limes*, especially in the vicinity of the sites of old forts, would be the establishment of a Roman *arboretum*. The *Limes* was a meeting place for a variety of peoples and tribes – Germans, Romans, soldiers from different provinces of the empire. It exudes multiculturalism. It seems fitting, therefore, to bring together plants from various parts of the Roman empire at one location. Pannonian (Lombardy) pine (*Pinus nigra*), British yew (*Taxus baccata*), Pontic walnut (*Juglans regia*), chestnut from the Balkans (*Castanea sativa*), cedar from Lebanon and the High Atlas (*Cedrus libani*, *Cedrus atlantica*) and oak (*Quercus robur*) and ash (*Fraxinus excelsior*) from Germania to represent the past cultures, and to symbolise the origins of the people that once came together at the farthest reaches of the Roman empire. The symbolism of the *Limes* is placed in direct interaction with the surrounding landscape.

Marking with stone and earthworks

This manner of design is generally less well suited as a means to represent visually the monument as it might create a false impression of the location and earlier condition of the *Limes*, and render the continued study of the monument more difficult. However, at certain locations, for example, where the sites of past watch-towers lie buried out of sight or where the protection of exposed parts of the original wall-work is required, this method can be used to create especially attractive effects. These spots can, with due consideration of the local site conditions, be raised using earth and planted with attractive native perennials and grasses (e.g., *Aruncus dioicus*, *Digitalis purpurea*, *Aquilegia vulgaris*, *Asarum europaeum*, *Vinca minor*, *Carex pendula*, *Carex sylvatica*, *Carex umbrosa*) (Fig. 6). The non-invasive deposition of gravel on small sites once occupied by fortlets, and the delineation of trails or property walls with gravel, is an option that may also be employed. In each case it is necessary, however, to consider whether or not this is the most suitable option to adopt.

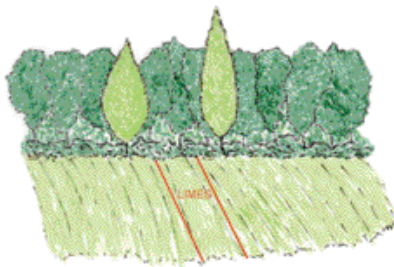


Fig. 5 Gateway situations at the transition between forest and openland (Image: P. Pauli)

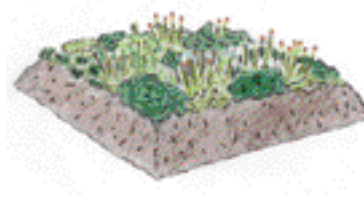


Fig. 6 Possible design of a site that once hosted a watch-tower (Image: P. Pauli)

Creation of sight and vantage point interactions

The cutting of a straight glade through the forest as a means of radically freeing up the monument should only occur in exceptional circumstances, and following careful consideration. The dense, closed forest canopy above the monument generally protects it from erosion and the negative effects of copious tree regeneration. Once the monument is exposed precipitation and light reach the ground, promoting plant growth. This leads to the need for increased tending of the site, and means additional costs are incurred. However, where there is an abundance of financial and human resources, and expert knowledge, forest glades can be a design highlight in terms of conveying the monument and its history.

Sight interactions in the open landscape can often be achieved when, from forested rises in the landscape, individual trees aligned along a particular axis are removed, so that a window into the surrounding landscape is created. When heritage conservationists, forestry authorities and communities work in unison it is also possible to construct simple wooden watch-towers at various locations, all within sight of each other.

Synergies between landscape management and heritage conservation and the concerns of other stakeholders

To ensure the greatest possible acceptance for the planned design measures, it is helpful to develop and avail of synergies with and between other relevant stakeholders – agriculture, forestry, nature conservation and tourism.

Agriculture

Many segments of the *Limes* are adjacent to, or cross, agricultural land, often intensively used areas. The planned design measures should not mean a loss of revenues from agriculture. In order to avoid conflict, a concentration of efforts on fallow and non-intensively used land is advisable. It is also conceivable that land be purchased and transferred to public ownership – as incorporated in the Bavarian part of the '*Limes development plan*' (see Sommer in this vol. 128–39) – so as to take these areas out of production (Faber and Schmidt 2006). The incorporation of agricultural extensivisation and contractual nature conservation schemes would also be worthwhile (e.g., field margin and set-aside programmes) so as to facilitate the envisaged design concepts, such as the sowing of colourful meadow plants (corn poppy, cornflower and camomile) or the implementation of oligotrophic grassland management. The highlighting of alternative forms of land use might also lead to synergies between various stakeholders (e.g., nature conservation, tourism). With an appropriate measure of public relations work, these approaches could potentially also serve to enhance the image of interested agricultural concerns. It is, therefore, worth identifying the willingness of the farmers in the immediate vicinity of the *Limes* to participate in the cultivation of certain historical crops grown in Roman times (as contemplated by Körber-Grohne 1987) or to rear old races of domestic animals similar to those kept at the time (refer to the experiences from the Roman town *Augusta Raurica* (Augusta Raurica 2007). Finally, it is worth determining the extent to which farmers can be won over to land art programmes (cf. Goldsworthy 1990).

Forestry

Where *Limes* design measures are to be implemented in forest situations it is necessary to minimise or avoid entirely financial losses, with especial consideration given to the costs potentially arising during expensive tending operations. By resorting to alternative or historical forms of management, silviculture is



Fig. 7 Stone bolt heaped for nature conservation purposes (Photo: F. Höchtl)

in a position to enhance the aesthetic value of the forest, and in so doing create synergies with nature and landscape conservation interests and tourism. This might be achieved by converting conifer monocultures to site-appropriate mixed forests or by means of attractive design of the forest edge, including the incorporation of broadleaf species. The resultant widening of the product range also provides greater security, particularly in these times of climate change. Furthermore, it is conceivable that ecological certification programmes might be established, awarded for forest management taking into consideration heritage conservation concerns (keywords: enrichment with coarse woody debris, site- and soil-adapted forestry, establishment of mixed stands), consequently improving the image and marketing options open to local forestry enterprises.

Nature conservation

Due to its particular aura, the *Limes* WHS represents an especial opportunity for the simultaneous conveyance of heritage and nature conservation concerns, as is demonstrated by the following examples.

Piles of stone and stone bolts that present themselves to us along the *Limes* as ruined walls or clearance mounds can be purpose-built so as to parallel to the *Limes*, to delineate its course (Fig. 7). This is also beneficial from an ecological perspective, as these stones represent valuable habitats for rare animal and plant species the focal point of whose distribution lies in the Mediterranean and sub-Mediterranean region. Snakes and lizards hide and hibernate between the stones, butterflies warm themselves on them and, almost devoid of competition from other species, xerophytic plants use them as a substrate upon which to grow. As soon as trees, hedges or flowers are planted alongside the monument the structural diversity increases, particularly in cleared agricultural landscapes. The plants provide nutrition, refuge and nesting sites. The same occurs when old trees are left standing to mark the monument.

From a nature conservation perspective, design measures should be implemented in such a way that species diversity is safeguarded, and indeed enhanced. Another focus of nature and landscape conservation is safeguarding the aesthetic values of the landscape and to develop the uniqueness of the monument within the overall context of the landscape. The design proposals should also contribute to the promotion of education and the experiencing of nature.

Recreation and tourism

A particular focus of the considerations regarding the recreational use of the monument is public accessibility. Special emphasis is placed on the continuity and consistency of the design measures so as to cater for a whole-landscape conveyance of the WHS. However, excessive opening up of the *Limes* to recreational use is to be avoided. It may be assumed that, in principle, all measures promoting the aesthetics, structural diversity and biodiversity of the landscape, and so providing a fill of attractions, shapes, colours, sounds and smells, will also enhance the tourism value.

Acknowledgements

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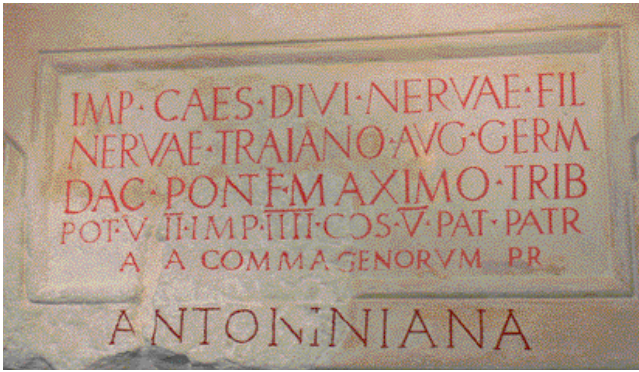


Fig.1 Trajanic building inscription from the Roman cavalry fort at Tulln, Austria (Photo: Boundary Productions)



Fig.2 Würth am Main, Miltenberg county (Bavaria). Aerial photo with fort area (Photo: Aerial photography archive BLfD Munich 6120-046-02)



Fig.3 Würth am Main, Miltenberg county (Bavaria). Virtual reconstruction of the *Porta Praetoria* from within the fort (Copyright: Archimedix Ober-Ramstadt und R. Frank, Ansbach).



Fig. 4 Virtual reconstruction of the military hospital (*valetudinarium*) at the legionary base of *Novae*, Bulgaria (Copyright: CAR Novae, Warszawa)

THE WORLD HERITAGE SITE “FRONTIERS OF THE ROMAN EMPIRE” IN MUSEUMS: REVEALING THE INVISIBLE

Christof Flügel, Munich¹

As a central address on the *Limes*, the museums offer visitors detailed information about this frontier. An important task of the smaller museums is to convey a compact impression of the local *Limes* sections, highlighting specific items of interest. Many fort locations along the Upper German-Raetian *Limes* already have museums with Roman collections. Original finds are central to the exhibits and provide direct evidence of human life at the *Limes*. It is these archaeological objects, which are not themselves classified as items of World Heritage that enable the public to understand the linear *Limes* frontier in its entire context. This is particularly the case with finds that refer to the construction of the *Limes*, such as the inscription at the fort in Ellingen, Weißenburg-Gunzenhausen county and Obernburg am Main, Miltenberg county, the famous “distance slabs” from the Antonius Wall or the building inscription of the Trajanic fort of Tulln in Lower Austria (Fig.1). As these finds often consist of fragments, a clear museum presentation is critical for the public to understand the ancient functions of the objects. The finds are thus an integral – and inseparable – part of the protected monument. They illustrate how much historical heritage can be lost when a monument is destroyed.

The presentation of the *Limes*, a linear archaeological monument, is a great challenge for museums. At the beginning of the 20th century, impressive segments of the original structure still existed, as historic glass plate photos and excavation reports show. The tapping of these historical sources for archaeological research on the *Limes* is a common task of the museums, the state offices for the protection of historical monuments, and the Deutsche Limeskommission. A systematic compilation and analysis of the material are also a basis for the restoration of the original structure. A detailed analysis of the photo material can often reveal undocumented, earlier restorative measures and their affect on the Roman structure. A comparison of these historical pictures with photographs of the current situation and virtual reconstructions in museums illustrate the deterioration of an archaeological monument. This process sensitizes the public to issues regarding the preservation of ancient monuments. The same effect can also be achieved through virtual reconstructions of forts: at first, the layman may only see a field, or a modern settlement (Fig.2). For this reason, many local information centres such as Würth am Main, Miltenberg county (Bavaria) and Ruffenhofen, Ansbach county (Bavaria) show virtual reconstructions of the local fort. Both presentations are based on the results of magnetometer prospection (Fig.3). Another form of display used by museums is a depiction of modern research methods applied to the *Limes*, such as LIDAR-Airborne-Laser Scanning, or geophysical prospection (see Sommer in this volume xxx and Stephens, Jones and Gater xxx).

A major task of the museums is to integrate a display of the latest *Limes* research findings in their permanent exhibitions. These findings are presented regularly at colloquia of the Deutsche Limeskommission and the international *Limes* Conference. Examples are the new picture of the Upper German *Limes*' last expansion phase, with only a bank and ditch and without a palisade at the front, or the latest thoughts concerning the functions of fortlets. Further, the *Limes* was not an Iron Curtain between the Romans and the Germanic hordes who were waiting to destroy them. These examples show that museums can often convey information long before they are printed in school books. The initiative “Archaeology and School”, of the Society for Archaeology in Bavaria is also concerned with developing a closer cooperation between the state's archaeology department, museums and schools. The results can be seen in the “Weißenburger Erklärung” (www.gesellschaft-fuer-archaeologie.de/mat/schule.htm).

Virtual reconstructions of archaeological construction findings are increasingly being incorporated into modern displays (Fig. 4). There are many reasons for developing a digital reconstruction, beginning with the main goal of presenting archaeological information – and also information gaps – to the general public. The danger involved with these virtual displays is that they are often understood to be perfect replications of the past. Digital imagery must therefore be based on a detailed, scientific and analytic examination

¹Translation by Mary Sommer-Wong.



Fig. 5 The presentation of finds in the new Nijmegen museum, The Netherlands (Photo: S. Jilek)



Fig. 6 'Roman Games' in Rusovce (*Gerulata*), Slovakia (Photo: Town Museum Bratislava)

of the object. This can often be a tedious and protracted process. Since the recognition of the transnational '*Frontiers of the Roman Empire*' as a WHS, several digital reconstructions have been made.

The potential of the museums to convey the importance of the *Limes* to the general public can be seen clearly at *Limes* sections without a linear border construction: except for the local information signposts, the museums are the only place where the public can learn about the *Limes* (Fig. 5).

Museums and Tourism

Public interest in the *Limes* and in provincial Roman culture is generally localized. Local museums, especially at the level of the "regional information centres" (see above) are usually the first point of contact. They supplement the original remains, preserved excavation findings, or reconstructed *Limes* watch-towers with more detailed information on the history and development of the *Limes* as well as on the life at the northern border of the empire.

Occasional reenactments of Roman life, for example in the museums in Aalen, on the Saalburg, both Germany and in Gerulata (SK) (Fig.6) and projects such as "The *Limes* in Flames" (Fig. 7) (see Sommer et al. in this vol. 128–39) are short-lived public attractions that can awaken the general interest in the *Limes*. They direct immediate attention to the *Limes* and can also reach a group that does not usually visit museums. The efforts of the *Limes* museums should not, however, be limited to such one-off events. Both the quality of the content and display methodology as well as the ability to convey information to different types of visitors are key to the success of the museums.



Fig. 7 Ruffenhofen, Lkr. Ansbach (Bayern). Visualisation of the fort through planting in September 2004 (Photo: Günter Pomp, Dinkelsbühl)

The supraregional central museums described in the *'museum development plan'* have initiated a variety of projects to optimize their recreational value: The *Limes* museum in Aalen developed the area behind the museum into an archaeological park with a partial reconstruction of a Roman cavalry barack and educational activity areas. The *Limes* museum itself has new multi-media display equipment. Virtual archaeological worlds are often very effective in awakening the curiosity of younger visitors and can be used to bring them closer to original finds, which can only be seen in museums. In Osterburken (Baden-Württemberg), a museum was built next to the protective construction over the fort's bath. On the Saalburg (Hesse), the commander's house (*praetorium*) was enlarged, making more room for administrative offices. The archaeological park within the partially-reconstructed fort is also being expanded with civilian strip houses. Additionally, the reconstruction of the *fabrica* will provide space for further displays and educational activities.

Museums are increasingly serving as the starting point of cultural or touristic experiences. The Infopoint *Limes* in Kipfenberg, Eichstätt county, concentrates on information about the *Limes* within the area "Naturpark Altmühltal". The connection between a Roman cultural and a nature experience is at the centre of many initiatives to increase cultural tourism along the *Limes*. Examples here are the Deutsche Limesstraße (German *Limes* Road), the Deutsche *Limes* Radweg (bicycle path), and the *Limes*-Wanderweg (hiking route), for which official maps are being prepared. A long-term development of the *Limes* as a touristic goal is important. The cooperation of all involved parties and clear planning are the only way to achieve the enduring protection of the *Limes*, a fragile archaeological monument, and public understanding for the goals of archaeology.

Further reading

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SENHOUSE

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Frontiers of the Roman Empire
- Maryport and Hadrian's Wall
- Senhouse Museum
- Ruffenhofen and the
German Limes
- The Limes in the Hesselberg
region
- The Roman fort at Ruffenhofen

The Roman fort at Ruffenhofen

The cavalry fort at Ruffenhofen was established around 110 AD and existed until about 260 AD. It lies on a flat rise where one would have had a view of a large local section of the Limes and its watch towers. Five hundred horsemen were stationed within the 3.7 hectares (1 ha = 10 000 square metres) of the fort. The names of the fort and of the original military contingent are still unknown.

Ruffenhofen is one of the few Limes forts with adjoining civilian settlements that has never been built over since Roman times. Only minor excavations were carried out in 1892 and 2005, so that major areas still remain undisturbed. Nevertheless, many details of the fort structures are known through aerial photography and extensive geophysical surveys.

Since 2003, 36 hectares have been taken out of agricultural use and designated as an archaeological reserve. This area includes the fort and part of the civilian settlement. The "Roman Park Ruffenhofen" is now open to the public. The Roman structures are marked by hedge rows and other temporary features. The small museum, which opened in 2004, exhibits a large-scale model and a complete virtual reconstruction of the fort. In the coming years, this interim museum will be moved into a larger new building located directly in the Roman Park.

Ruffenhofen, aerial view (2006)



Ruffenhofen, Magnetometry Survey



Civilian settlement Geophysics survey, images etc, references, all can be taken from existing sources.

The fort Panoramic image of fort with pop-up labels showing location of key features (ie gates, roads etc), references. This will need some expert input and will go here. Using which picture?

Future Developments at the site.

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Telephone: (+44) 01900 815 100 - Email: romans@senhouse-freeserve.co.uk

Fig. 1 Screen shot from the first draft of the Maryport & Ruffenhofen section of the new Senhouse Museum Website. <http://www.senhousemuseum.co.uk/redesign/redesign.htm>

MUSEUMS ON THE FRONTIER: AN EXPERIMENT IN TWINNING THE SENHOUSE ROMAN MUSEUM ON HADRIAN'S WALL AND THE MUSEUM RUFFENHOFEN IN BAVARIA

Christof Flügel, Munich and Ian Francis, Maryport

Background

The soldiers and labourers who built the defences along the Roman frontier must surely – if they thought about the matter at all – have found it hard to grasp the geographical extent of the enterprise in which they were engaged. The fort at *Alauna* (Maryport) was in a particularly isolated position, in what was virtually the north westernmost corner of the European section of the frontier. It would have taken many days to travel there by land and sea from the nearest section of the *Limes* which formed the borders of the provinces of Upper Germany and Raetia.

Modern visitors to the Senhouse Museum, and the various other museums along the European frontiers, may find it equally difficult to imagine the vastness and complexity of the system of fortifications of which these sites were once part.

The essential object of the museum twinning initiative is to demonstrate to non-specialist visitors to the two museums concerned – Maryport and Ruffenhofen – how these sites fit into this larger picture. Both have a comparable archaeological basis, with large parts of each site explored by geophysical surveys.

The collaboration comes at a particularly opportune moment, with the inclusion of the Upper German-Raetian *Limes* with the existing Hadrian's Wall UNESCO WHS to form a new trans-national '*Frontiers of the Roman Empire*' WHS (see Breeze and Jilek in this vol. 24–8).

The first practical measure we have taken to effect closer ties between the two museums and to demonstrate to the wider public how the forts concerned once formed part of the same defensive system, is to develop a new website for the Senhouse Museum which contains a section specifically devoted to the *Limes* and to the place of these two forts within it (and will link to the official '*Frontiers of the Roman Empire web portal*'). This section will give an overview of the importance of Hadrian's Wall and the German *Limes*, then provide more detailed descriptions of each fort (Fig. 1-2).

Objectives

The website – which will go live in April 2008 – is the first step in what we hope will develop into a longer-term collaboration. The basic aims of this collaboration are as follows:

- as noted above, to provide visitors to each museum with a more thorough appreciation of the place of each fort within the Roman frontier of the second century;
- to illustrate, initially by means of the website, and perhaps later by shared interpretative material, the similarities and differences in the construction and operation of each fort;
- to share best interpretative and curatorial practice between each institution. For example the museum at Ruffenhofen has developed innovative computer-aided images of reconstructions of the fort, as the non-excavated site is the main "exhibit" in the museum, whilst at Maryport the Senhouse Museum has published books synthesising archaeological data and interpretation of the fort and its local setting;
- to share new and existing archaeological data with the aim of improving our understanding of each site;
- to open up new funding opportunities for each institution, in the context of the '*Frontiers of the Roman Empire*' initiative.

Future perspectives

The experience in creating the Ruffenhofen museums partnership is very promising in the context of a

possible future enlargement of this trans-national project. Senhouse and Ruffenhofen are both museums belonging to category 3 in the development plan of museum of the Upper German-Raetian WHS application.

As a next step, the inclusion of another museum along the Antonine Wall might be contemplated, as well as one along the river Main frontier in Germany. In this way there will be one representative “minor museum” in all parts of the existing or future WHS in Scotland and Germany.

The German museum development plan also defines the highest category of supra-regional museums in places like Weißenburg, Obernburg (Bavaria) or Aalen (Baden-Württemberg) (see Flügel in this vol. 196–99). These museums have as their main task the provision of general information on the ‘*Frontiers of The Roman Empire Site*’ project, and they also serve to redirect visitors to the smaller museums mentioned above. In the future museums at this level, like the Hunterian Museum Glasgow, could join the museums twinning project (see Devine in this vol. 181–85).

In the near future a web2-based application for archaeological museums in Bavaria with a user friendly interactive map-interface will be developed. This could serve as a model for bringing together visitors and museums experts in different parts of the WHS.

Another promising idea is that important finds from each site could be re-grouped in virtual exhibitions, according to the individual visitor’s interest, as proposed in a former EU-project MU.S.EU.M on the European roots from the Palaeolithic to the Bronze Age (www.europeanvirtualmuseum.it).

A very important question is how to bring together information on both locations and finds, as many museums are also responsible for preserved artefacts along the *Limes*. Examples are the Antonine Wall distance slabs, building inscriptions in museums along the Roman frontier in Germany (e.g. Obernburg am Main, Eichstätt) or dated dedications on stone altars like in Senhouse or Obernburg am Main (see Flügel in this vol. 196–99). Whilst these tell us about historical events along the WHS they cannot be part of the Site itself. This academic differentiation is very difficult to explain to non-archaeologists. A solution could be to install webcams, helping to bring the site into the permanent exhibition of a museum.

Initiatives like the Senhouse – Ruffenhofen museum twinning and the possible future developments outlined above provide exciting opportunities to broaden our view of the frontiers of the Roman empire.

OPEN FRONTIERS: ACCESSING THE ANTONINE WALL THROUGH MULTIMEDIA TECHNOLOGIES

Jim Devine, Glasgow

A brave new world (wide web)

The coming of age of interactive digital information and communication technologies has provided cultural heritage organisations with a range of tantalising opportunities to utilise these ever more flexible computer technologies to provide access to their cultural resources in new and increasingly innovative ways. At the University of Glasgow, the Multimedia unit of the Hunterian Museum and Art Gallery, in collaboration with partners from within the University and further afield, have embraced this exciting challenge since the earliest arrival of web technology into the cultural heritage sector back in the early 1990's, and have established a firm bridgehead as pioneers at the leading edge of computer-based cultural heritage information delivery.

The World Wide Web presented museums and art galleries with a unique opportunity to provide access to their collections to a global audience. Resources which hitherto were only available to those fortunate enough to live within travelling distance of museum collections were suddenly available for access via the then new medium of web technology. Moreover, many museums saw the potential to turn the world wide web into additional "virtual display space" to reveal many artefacts which had been languishing in storage or reserve collections. The earliest cultural heritage web sites, whilst being brave first steps into what was for most museum staff very new territory, tended to be little more than web versions of printed information leaflets and brochures. It was not long however before many museums caught on to the potential of this new medium to revolutionise the way that we presented our collections to our new "virtual visitors".

The Romans in Scotland web debut

The Roman collections from the Antonine Wall, and in particular the distance slabs, held in the Hunterian Museum have long been regarded as one of the most important and unique parts of the Hunterian's fine collections (see Flügel in this vol. 174-78). The popularity of the Roman displays with visitors of all ages from primary schoolchildren to academic researchers prompted the decision by the author to focus the first web experiment at the Hunterian Museum on telling the story of the Romans in Scotland. The first version of the Hunterian Museum and Art Gallery web site went live in the summer of 1995. The site contained a sampling of the Hunterian's main collection areas and a more in-depth feature on the Romans in Scotland (Fig. 1).

Romans on film

An early experiment at the Hunterian Museum to implement interactive multimedia into the Romans in Scotland web site involved digitising and editing VHS video footage from a filmed sequence produced by Scottish Television's "Skoosh" children's magazine programme. This was filmed for broadcast using a professional film crew and presenter, assisted by the author and a party of volunteer schoolchildren from a local school (Cumbernauld Primary School) (Fig. 2). This experiment underlined various pros and cons of using moving images on the then still fledgling networks. It was clear that any attempt to deliver the content at broadcast quality would be impossible due to the very large file sizes that this would generate and the restricted capacity of the available networks, and the desktop computers connected to them, to handle such large downloads of data. The workaround that we developed for this was to reduce the film to several much shorter clips of only a few minutes each, illustrating points of interest on the Romans, and reducing the physical picture size on screen and the frame rate of the film to get the content to a size manageable for web download. The resulting movie clips were placed in a set of web pages which encouraged users to answer questions set in the web pages by watching and listening to the film clips. This was a steep learning curve from the multimedia development perspective and provided some excellent experience in the nuances of developing and adapting filmed content for web delivery. The lessons learned here were to



Fig. 1 The Romans in Scotland section of the Hunterian web site in an early design build (Copyright: Hunterian Museum and Art Gallery, University of Glasgow)

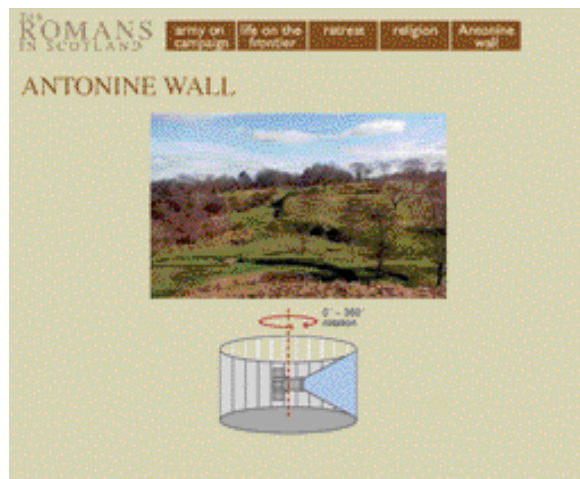


Fig. 3 Web page illustrating 360 degree QTVR panorama of Rough Castle on the Antonine Wall (Copyright: Hunterian Museum, University of Glasgow)



Fig. 2 Discovering the Romans on film (Copyright: Hunterian Museum and Art Gallery, University of Glasgow)



Fig. 4 Web page illustrating 360 degree QTVR rotational object movie of the Head of Fortuna from the Roman Bathhouse at Bearsden on the Antonine Wall (Copyright: Hunterian Museum, University of Glasgow)

lead to the creation of web-specific, digitally-filmed material and “streaming video”, and to a greater understanding of user-oriented content creation and delivery (Dobat and Walkshofer in this vol. 163–5).

Romans in QTVR

The development in 1996 by Apple Computer of QuickTime Virtual Reality (QTVR) software heralded a new era in the presentation of cultural heritage sites and the related artefacts from them. The ability of this new software technique to take still photographs of locations and objects and “stitch” them together to create 360 degree panoramic views and link these together as “scenes” which allows the user to take a “virtual tour” of a site, and combine these with 360 degree rotational “object movies” of related artefacts held in museum collections, provided a ground-breaking solution to that old archaeological and museological adage of trying to encourage the museum visitor to try to view the artefact in its original context. This technique was employed by the Hunterian Museum on a field expedition to Knossos, Crete in 1998 where, in partnership with the Department of Computing Science at the University of Glasgow, and the British School at Athens, the entire archaeological site and related nearby locations were digitally photographed and processed in QuickTime Virtual Reality to create a ‘virtual tour’ of the palace of the legendary King Minos. The experience gained in that project has since been put to use in developing QTVR panoramic scenes for

all of the Antonine Wall sites and a selection of 360 degree rotational QTVR object movies of Roman artefacts from the Antonine Wall in the Hunterian's collections (Fig. 3-4).

Antonine Wall web site

The Hunterian Museum and Art Gallery, in partnership with Historic Scotland and the Royal Commission on Ancient and Historic Monuments of Scotland are currently developing a dedicated web site for the Antonine Wall, which will also serve as a portal to other Roman sites in Scotland, and will link to the 'Frontiers of the Roman Empire web portal' (see Borgulya, Jilek and Schaller in this vol. 15-17), which is currently in development under the aegis of the European Culture 2000 initiative. The Antonine Wall web site project brings together the multimedia development skills of the Hunterian Multimedia team, with the mapping and archival expertise of the Royal Commission on Ancient and Historic Monuments of Scotland, and the historic environment access and management knowledge and authority of Historic Scotland. The web site is to be launched at the Culture 2000 meeting in Scotland in May 2008 (Fig. 5).

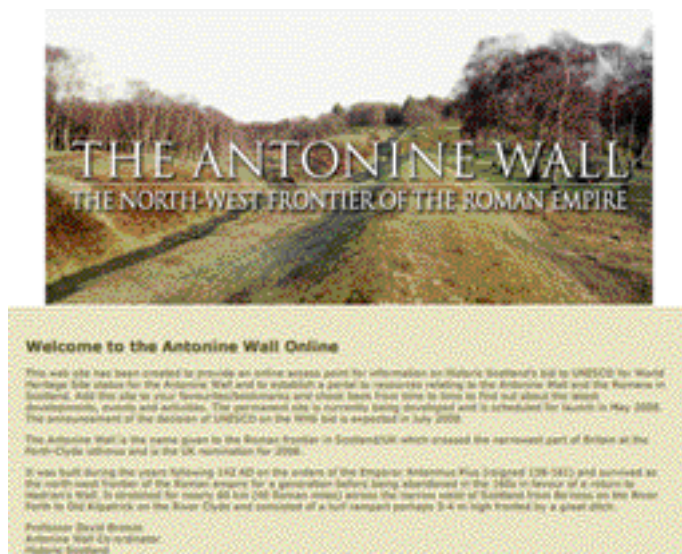


Fig. 5 The Antonine Wall web site <http://www.antoninewall.org/> (Copyright: Hunterian Museum, University of Glasgow and Art Gallery, Historic Scotland, RCAHMS)



Fig. 7 Gravestone of *Verecunda* in the Hunterian Museum and Art Gallery (Photo: Hunterian Museum, University of Glasgow)

The Romans in Scotland CD ROM

The Hunterian Museum has developed a new CD ROM in partnership with Historic Scotland and the Royal Commission on Historic and Ancient Monuments of Scotland, with support from the Culture 2000 project, focussing on the Romans in Scotland and incorporating an interactive map illustrating the sites along the Antonine Wall in QTVR and linking them with artefacts from the Roman collections of the Hunterian Museum. The CD ROM platform is a useful medium for those users who prefer to have large collections of data available for use in an offline mode. Schoolteachers for example may not always want to be connected to a live internet connection during a classroom lesson. Whilst there are numerous CD ROM's available for the study of the Romans, very few focus on the Romans in Scotland. This CD ROM therefore provides a useful vehicle for that aspect of Roman studies (Fig. 6).

Reconstructing Roman lives

The Hunterian Multimedia team have been developing audio tours linking the Roman displays of the Hunterian with the localities from which the artefacts came. The Roman stones in the collections of the Hunterian and other museums in Scotland carry information which can be quite detailed or very basic. At the Hunterian, we have been keen to develop stories based around the artefacts, to help the visitor to gain some insight into the lives of the people who made, used, or are commemorated on these artefacts and monuments. We have written a narrative based around a young girl, *Verecunda*, who is commemorated on a gravestone in the Hunterian Museum (Fig. 7). The absence of anything other than "Dis Manibus" and her first name on the gravestone suggests that she was a slave. Beyond that we know nothing of her or her life



Fig. 6 Interactive map page of the Romans in Scotland CD ROM (Copyright: Hunterian Museum and Art Gallery, University of Glasgow)

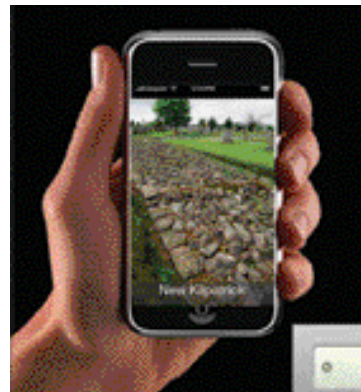


Fig. 8 Mobile information to hand on an iPhone (Copyright: Hunterian Museum and Art Gallery, University of Glasgow)

in Roman Scotland. However we have chosen to create a life for her, based largely on educated guesswork, to bring her to life in audio format to act as a guide and interpreter for our younger visitors. This work is being undertaken entirely in-house using our own staff and students engaged on Hunterian vacation scholarships. The software is developed at the Hunterian Museum with assistance in the form of recording facilities from the Glasgow Caledonian University. The hardware is based upon commercially available audio devices.

Roamin' Romans

We have been experimenting with the transfer and adaptation of multimedia content for delivery via mobile devices such as iPods, MP3 players and mobile phones. The thinking around this approach is to provide information on the sites of the Antonine Wall in terms of how to get there, what to see when you are there, and what related information can you access to improve the appreciation of the site when you are there? We are experimenting with podcasts and information to be downloaded to the prospective visitor's computer and uploaded to their mobile device to be taken along on the trip (Fig. 8). It is hoped that this early stage experimental work will lead to mobile content being readily available on demand for members of the public planning visits to the Antonine Wall WHS.

Reconstructing the Romans in 3-D

The Hunterian Museum is currently developing a 3-D reconstruction of the Roman Fort at Bar Hill in association with the Glasgow Caledonian University (Fig. 9). This is being undertaken by a Masters student project with support from a Hunterian Multimedia Scholarship. The 3-D model will be used as part of the interpretative multimedia materials which will be housed in the proposed Antonine Wall Centre, which will be a new permanent home for the Hunterian's Roman collections located on the main University of Glasgow campus. This is the subject of a Heritage Lottery bid, and if successful, will be scheduled for opening in the autumn of 2009.

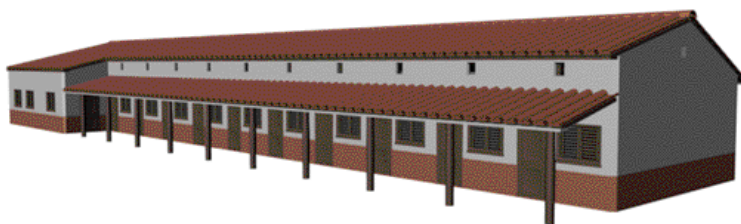


Fig. 9 Early stage view of 3D reconstruction of barrack block from Bar Hill Fort (Photo: Hunterian Museum and Art Gallery, University of Glasgow)

Archiving the Romans in Scotland

The Roman Scotland Archive, formally established in the early 1980s, holds records assembled over a period of 60 years by two long-serving curators, Professor Anne S Robertson (in post 1939–1975) and Professor Lawrence Keppie (in post 1973–2003). Housed in a room in the Hunterian's "Attic Corridor", currently accessible by appointment only, and not at all accessible to any physically-disabled would-be user, and comprising folders on every Roman site in Scotland, on the many locations along the Antonine Wall frontier from Forth to Clyde, isolated finds of pottery, coins etc not linked to any known site, and entries for the Scotland fascicule of the Corpus of Roman Sculpture.

In addition the Archive holds the unpublished archive of excavations conducted in SW Scotland by John Clarke (1940s and 1950s) and in Renfrewshire by Frank Newall (1950s–1980s). There are many unpublished drawings of pottery from sites on the Antonine Wall and elsewhere, prepared in the 1960s and 1970s. The Archive holds the original site-notebooks, excavation plans from the many excavations undertaken by Anne Robertson in the 1950s to the 1970s, and by Lawrence Keppie in the 1970s, 1980s and 1990. There are some 450 folders in all containing correspondence, records of excavations and new discoveries, many never subsequently published to a wider audience.

There are some 3600 35 mm slides of excavations and artefacts and of the surface appearance of the sites as they looked in the period 1950–2000 (Fig. 10). Other slides (c.1000), glass-mounted and larger format, in the fashion of the times, date to the 1950s and 1960s. In addition there are some 2000 photographic prints. There are also a number of videos and cine-films containing many hours of material, themselves an important historical record of excavations in the 1950s–1970s, which could be transferred to digital format for wider distribution.

The longer term aim for this material therefore is to digitise this resource and create a digital archive for scholars that will be made available online and ultimately be available as part of the Roman Scotland Archive in the proposed new Antonine Wall Centre. Early discussions are underway with the Royal Commission on Ancient and Historic Monuments of Scotland to explore avenues for a joint project which would bring together electronically, the resources of the Roman Scotland Archive at the Hunterian Museum, and the J.K. St. Joseph archive resource held by the Royal Commission on Ancient and Historic Monuments of Scotland, in partnership with Historic Scotland, who have supported an initial inventory of the Roman Scotland Archive. The provision of this resource electronically would have an immediate effect of enabling access to all users, including those with physical disabilities. The next stage would be to digitise the entire Roman Scotland Archive to make it fully accessible through online searching, and linking database resources with RCAHMS (see Jones and Thiel in this vol. 99-105). This could be undertaken on a longer term basis, with funds being sought from external sources, in the run-up to the opening of the new Antonine Wall Centre in 2009.



Fig. 10 Digitised 35mm slide of excavations at Bar Hill from the Roman Scotland Archive (Copyright: Hunterian Museum and Art Gallery, University of Glasgow)



Fig.1 Section (Gilsland, Map 9) of the WHS Hadrian's Wall (Austin and Young 2002; Management plan 2002-2007 English Heritage)



Fig.2 Section (Fort Duntocher, Map V37) of the Antonine Wall, proposed WHS, in an urban setting (Crown Copyright: RCHMAS)

A CULTURAL LANDSCAPE MAINTENANCE SYSTEM (‘KULTURLANDSCHAFTSPFLEGEWERK’©) FOR THE HISTORIC CULTURAL LANDSCAPE ZONE OF THE ‘FRONTIERS OF THE ROMAN EMPIRE’ AN INTERDISCIPLINARY GOVERNMENTAL SYSTEM OF PROTECTION, MAINTENANCE AND DEVELOPMENT BASED ON A HISTORIC CULTURAL LANDSCAPE APPROACH

Hans Peter Jeschke, Linz

Introduction

Inspired by the extensive preparations for the *Limes* UNESCO-nomination in Germany 2003/2004, the author formed and led an Austrian working group with national and state representatives to prepare the Austrian application for the *Limes* from 2002–2005. The first working paper, a “Letter of Intent” (Jeschke and Ubl 2003) also supported the German application. Participation in the meetings of the ‘Bratislava Group’ in Bratislava and London (see Jilek in this vol. 200–03) have inspired the creation of an interdisciplinary concept (framework) for the historic landscape zone of the ‘*Frontiers of the Roman Empire*’ (FRE). The concept incorporates the new status of the *Limes* as a World Heritage Site (WHS) (Jeschke 2008).

Starting point

The recognition of Hadrian’s Wall as a WHS in 1987 and the efforts to nominate the Upper German-Raetian *Limes* in Germany brought up new issues that span a range of disciplines and countries. These have, in turn, created a completely new profile for the FRE as an archaeological WHS. This change of paradigm can be followed over the years: In 1987, the World Heritage Centre’s (WHC) assessment determined, ‘*The Hadrian’s Wall Military Zone (is) an extensive and diversified ensemble (with) some 100 monuments and sites*’ (ICOMOS 1987). In another WHC document (ICOMOS 2004) regarding the extension of the intercontinental project FRE (!) the Upper German-Raetian *Limes* in Germany bears the following classification: ‘*Together the remains form a relict landscape*’. Furthermore, the ‘*Summary Nomination Statement FRE WHS*’ (see Breeze and Young in this vol. 29–35) resulted in one of the most important methodological and structural bases for further research, maintenance and development: the UNESCO classification of the site as ‘*serial property*’ (UNESCO 2008 GL Art. 137 and 138). With this classification, the transcontinental dimension of this border of the Roman empire can be far better documented and protected. It also brings an aspect of cultural landscape to perceptions of the frontier.

Today, remains of the former border system lead us through a wide variety of landscape types: pure relict (archaeological) landscapes, more or less-cultivated agricultural landscapes, and – in terms of regional planning – urban agglomerations, or thickly-settled regions where which significant archaeological potential lies under several historical layers. Here, at the latest, it becomes clear that the categorization of the FRE as a relict landscape, with the protective and maintenance measures related to this category, does not suffice.

As shown in Fig. 1–4, the current zone contains relict landscapes as well as continuing agricultural, or urban landscapes including buffer zones of differing widths (with further protected areas). In this article the categories ‘*continuous agricultural landscapes*’ and ‘*relict landscapes*’ are used as descriptions and not as the official protective categories of the UNESCO Guidelines 2008. ‘*Continuous landscapes*’ are especially interesting because – unlike relict landscapes – their function and nature are influenced by socio-economic change. For this reason, the protection of this WHS requires not only action from the sectors of monument and landscape protection, but from all historical spatial sciences. The FRE consist of a transcontinental, historic cultural landscape of a nature that includes areal, linear, and single-point elements of great universal importance.

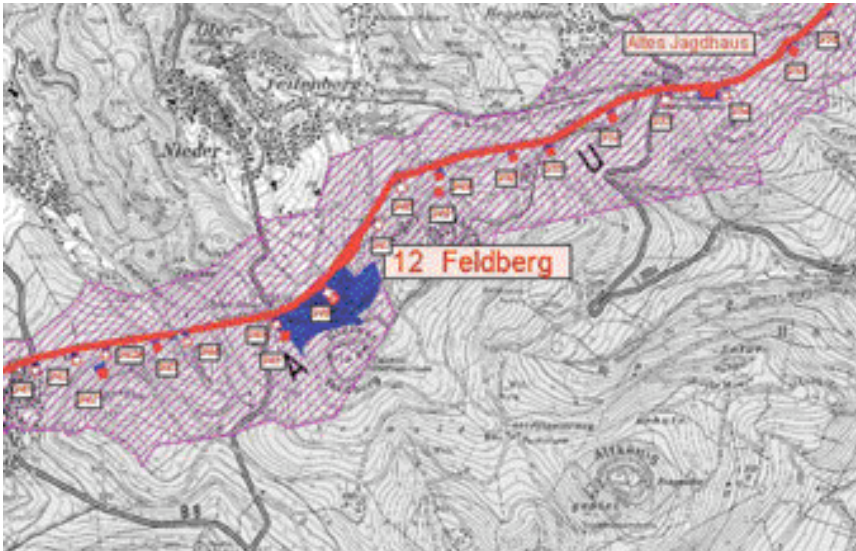


Fig.3 Section (TK 50 Feldberg) of the WHS Upper German-Raetian *Limes* in a rural setting (Copyright: Deutsche Limeskommission)

The management plan for the Upper German-Raetian *Limes* contains material that clearly documents the status of the current usage of the area, or rather the extent to which the *Limes* is potentially endangered by these (Fig. 4). Only 27% of its substance is visible, 64% is underground and cannot be detected by the human eye and 9% has been irrevocably destroyed. Furthermore, the *Limes* runs through areas of differing usage: 46% of its substance is in wooded and agricultural areas each and 8% is in development or settlement areas. The *Limes* thus faces different kinds of dangers and constraints (e.g. forestry or agricultural measures, the assignation of new development areas and the resulting encroachment caused by building, traffic infrastructure, erosion, unprofessional reconstructions of ancient monuments, or waste deposit).

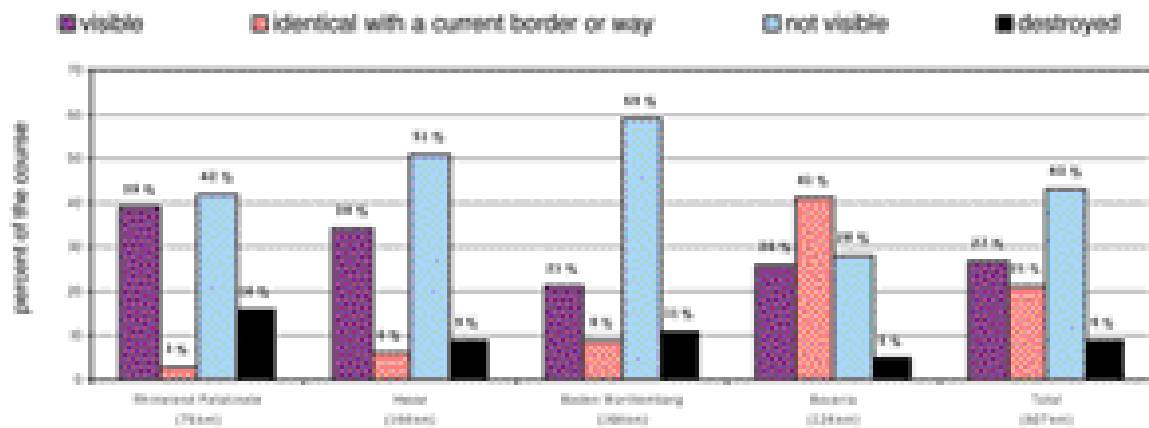
Today, the FRE can be found not just in one country, but in several countries in Europe, the Middle East and North Africa, each of which has its own national regulations and administrative traditions. The establishment of a WHS Site that stretches from the North Sea to the Black Sea and beyond requires intensive cooperation and consensus-building among those parties that are responsible for the protection and administration of ancient monuments. It is only through the harmonization of these methods that one common WHS can be created.

The legal basis for the protection of a WHS can be found in the World Heritage Convention, a binding international legal document, and in the European Community law as well as in the laws of the respective member states. The UNESCO Guidelines (2008) substantiate the terms of the Convention and define the framework within which World Heritage property is to be handled.

The UNESCO categorisation of the FRE '*serial property*' provides for further structures which are described in the '*Summary Nomination Statement FRE WHS*'. These were binding for the development of the cultural landscape maintenance system ('*Kulturlandschaftspflegewerk*©') presented here. The document follows the suggestions of the 'Bratislava Group' and defines the FRE as a complex linear system which forms an 'extensive historic landscape' (see Breeze and Young in this vol. 29–35). It also paraphrases in Section 2 the importance of the frontiers as world heritage and the UNESCO categories (ii), (iii) and (iv). Following a short description, a review of the history and development of the frontiers is presented, focusing on the management of the property and the necessity of creating a general framework for this purpose (cp. among others point 2.7.5: '*International goals over the next five years:...the development of common standards for identification recording, conservation management and display*'). References to management and monitoring are oriented to the terms contained in the UNESCO Guidelines (2008). The installation of the Bratislava Group, founded in 2003, as an advising body of experts is a significant new development (see Jilek in this vol. 200–03).

Course of the border line (without the section along the Main)

Bundesland	visible	not visible	identical with a current border or way	destroyed	total
Rhineland-Palatinate	39 %	42 %	3 %	16 %	75 km
Hesse	34 %	51 %	8 %	9 %	144 km
Baden-Württemberg	21 %	59 %	9 %	11 %	164 km
Bavaria	28 %	28 %	41 %	5 %	124 km
Total	27 %	43 %	21 %	9 %	507 km



Course of the border line and land utilisation (without the section along the Main)

Bundesland	wood or hedges	arable or grassland	built up areas	total
Rhineland-Palatinate	61 %	29 %	10 %	75 km
Hesse	50 %	41 %	9 %	144 km
Baden-Württemberg	30 %	61 %	9 %	164 km
Bavaria	44 %	51 %	5 %	124 km
Total	46 %	46 %	8 %	507 km

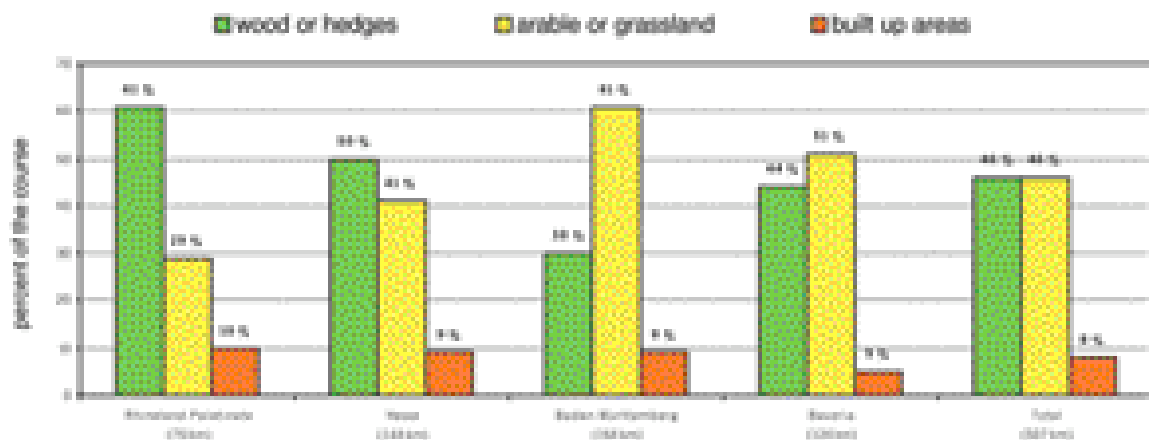


Fig.4 Upper German-Raetian *Limes* nomination

As an instrument to safeguard cultural heritage, European environmental protection laws provide an important additional legal basis for implementing the concept of world heritage. The states that ratified the World Heritage Convention committed themselves to ensuring that the following be carried out in their respective countries: the identification, protection and conservation-- in terms of substance and quality -- of world heritage property as well as their transmission to future generations. In order to accomplish this, models and systems geared towards protection, maintenance and development must be created within the framework of the legal system, scientific instruments, institutions and administrative structures of the respective states.

The cultural landscape maintenance system for the historic cultural landscape FRE thus provides structural support for the respective national and regional implementation of state management systems (protection, maintenance and development).

For a long time, archaeological research was concerned with the retrieval of material relicts such as jewellery, weapons, and every-day items. Burial sites and the building forms of earlier cultures were also successfully reconstructed. As Shate diagnosed for Germany in 2005, the concept of going beyond the examination of a single building and single settlements to reviewing areal ensembles within entire landscape regions and of differing functions, or of examining man's effect on his natural and cultural environment, as is now the case with landscape archaeology, was still in an early phase. Benesch (2001) examined the possibility of implementing elements of landscape archaeology in Austria and titled his report of the situation, *'Archäotopmanagement – Eine utopische Diskussionsgrundlage für Österreich'* (A utopian basis for discussion in Austria).

According to the UNESCO concept, the actual property to be protected should be enclosed within a buffer zone that includes a cultural – and not just natural – landscape aspect. This zone can be characterized as an area of archaeological potential, as it recognizes the likelihood that more ancient constructions are buried there and that not nearly all constructions have been investigated. Furthermore, a buffer zone takes into account the fact that the frontier system had a lasting effect on the landscape. The border was to a significant extent dependent on the topography of the region. This kind of historic cultural landscape zone thus helps observers to experience the ancient monuments in their surroundings. Important aspects here are not only the views and the environment, but also the protection of the integrity of the cultural heritage. The relicts of the historical frontier system are also in more or less intensely developed agricultural areas or settlements on the one hand, and densely-populated urban centres on the other hand. This completely new positioning of a transcontinental, archaeological serial property requires new scientific models, which are outlined in the following pages.

The concept of a historic cultural landscape as the basis for the protection, maintenance and development of the cultural landscape FRE

The previous sections of this chapter lead directly to a methodological basis for the maintenance system – the concept of a historic cultural landscape. This representational study is based on the suggested definition for the term of historic cultural landscape (Ministry of Education *Conference 2003, 1*), which is, in turn, based partially on the document *'Denkmalpflege und Historische Kulturlandschaft'*, June 2001 of the *'Deutsche Vereinigung der Landesdenkmalpflege'* (Landesdenkmalpfleger 2001). The term 'historic cultural landscape' includes the following aspects: *'Cultural landscape is the result of the interaction of natural elements and human exertion in the course of history'*. Dynamic change is thus a feature of cultural landscape. The term can be used for both a type and for a regionally-limited segment of landscape.

The historic cultural landscape is a segment of the current cultural landscape that has been moulded by historic, archaeological, art-historical, or cultural-historical elements and structures. Historic cultural landscapes can include elements, structures and areas of differing time periods that co-exist and interact. Elements and structures of a cultural landscape are considered to be historic when, for economic, social, political, or aesthetic reasons, they no longer occur, or are no longer produced or maintained in that form today. In other words, when they stem from a past epoch. The historic cultural landscape contains material evidence of historic traditions and can in certain cases be of value itself as an ancient monument. The key here is the existence of clearly-identifiable and substantial elements and structures in the landscape that are of historical importance. Each item as such does not have to be considered an ancient monument.

The historic cultural landscape is an environment consisting of individual, historic cultural landscape elements or ancient monuments. *'The conservation of a historic cultural landscape, or parts of the landscape, is in the public interest'* (Kultusministerkonferenz 2003, 1).

The cultural landscape maintenance system ('Kulturlandschaftspflegewerk'©) for the historic cultural landscape FRE

The UNESCO classification makes protection of a property possible with a spatial, cultural-landscape component that is completely new for the state parties. The UNESCO World Heritage Convention protects not only the individual, linear and areal archaeological and structural objects; it also extends protection to the immediate surroundings and a further surrounding zone so that a comprehensive – in terms of cultural, and not just natural landscape – system of protection can be established.

In view of the great uncertainty and implementation deficits as well as a paucity of models (frameworks) regarding the protection, maintenance and development of WHS, a national concept, or framework, the cultural landscape maintenance system ('Kulturlandschaftspflegewerk') is presented for the historic cultural landscapes of the Roman empire. The concept supports the principles of the EU co-financed FRE project.

The development of the model incorporates the UNESCO's buffer-zone model and the methodical expansion of archaeological research and protection strategies with a view towards historical, spatial and landscape-related connections (Archäotopmanagement: Behm 1998 and 2000). In addition, the historical spatial sciences are fully integrated in the basic model of a cultural landscape maintenance system (Jeschke 2004 and 2008). In the following sections, the essence and structure of this instrument will be outlined. With its basic elements, the instrument is presented as an integral system.

The name – motives for a conceptual harmonization of the cultural landscape management system as a specific instrument to protect all cultural heritage landscape categories of the UNESCO guidelines and historic cultural landscape zones

In the World Heritage Convention, or its Operational Guidelines (UNESCO 2008), three major categories are listed in the capital 'Cultural Landscape': gardens and designed landscapes, organically evolving landscapes, and associative landscapes. As large as the differences between these categories may be, it is clear that they also have structural elements in common with regard to basic research, maintenance, protection and development.

For one part of the UNESCO categories, 'landscape designed and created intentionally by man', for example gardens and parkland landscapes, the 'maintenance system' of C. Bauer (DGGL 1987, 94; Sallmann 1961, 207 and Thimm 2008) has established itself in the German-speaking world as an effective instrument for preservation, protection and development. Garden maintenance systems are according to their nature expert reports (Meyer 2000, 55). Their realization occurs within a single legal system of national heritage protection. In contrast, the cultural landscape maintenance system is, due to the differing legal bases, decision-making bodies, etc., more a steering system. The term 'cultural landscape maintenance' includes a specific geographic aspect and its planning-oriented way of dealing with cultural landscapes is defined as an analytical, interdisciplinary task. The term attempts to include landscape structures and single elements as they have evolved through human spatial activity within their spatial complexity and thus to combine together the protection, preservation and careful further development of a cultural landscape (Schenk, 1997, 7).

Cultural landscape maintenance as a system

The conception of the maintenance document for outstanding cultural heritage landscape zones drew on aspects from the World Heritage Convention, the guidelines and reports of the convention (periodic monitoring) and the relevant literature. These were combined into a holistic system (consisting of interacting elements) and incorporated in a European cultural landscape concept. Systems science describes a system as a holistic 'whole'. According to systems theory and cybernetics, a system consists of a number of interacting elements that try to achieve a common goal through exertion and steering. Structure refers to the way in which the elements, the functions and amount of relationships are combined. The structure thus provides information about the internal formation of a whole and the organization of a system.

Using a management mechanism, the maintenance system now interlinks the formal elements and the structural 'pillars' described below to form an interdisciplinary system. This mechanism ensures the interaction of the individual components. The results of the most important field systems research, planning science, administration/management, law and communications science formed the basis. The system must be oriented to the three basic pillars of a comprehensive cultural landscape policy (• safeguarding through inventory and fundamental research; • safeguarding through protection; • safeguarding through subsidies) and includes the ten fundamental elements which will be outlined below. Further details can be found in published works of the author (Jeschke 2000; 2004 and 2008).

The basic elements of the cultural landscape maintenance system for the FRE – a compendium of key words on the components

The cultural landscape maintenance system can be presented in a variety of ways: through a structural or block diagram and through a description of the individual elements. This article includes a short list of key words and descriptions which illustrate that the whole is more than the sum of its parts. As this publication does not have enough space to present the concept in detail, the following summaries provide a first impression.

(1) National bearer of the primary responsibility for the FRE / Regional government(s) with a governmental member bearing the primary responsibility

According to the UNESCO Convention, the identification, protection and conservation in terms of substance and value are the primary task of each member state. The protection and maintenance of the historic cultural landscapes, cultural landscape zones and their prominent elements involve a cross-section of specialties, is interdisciplinary and often involves many decision-making levels. In federally-organized nations, the administration of the landscape is usually at the state level. Here, the respective state government with its relevant government representative bears primary responsibility for protection. In other types of government the responsible government member is located at the national level. The task of the responsible official representative is to create a complete concept within the framework of the respective national legal system that is officially recognized (cp points 6 and 8). A prerequisite is the formal appointment of an office with this task (the government 's list of responsibilities).

(2) Regional concept / regional spatial development

As the cultural landscape maintenance system with its goals and elements (as a part of its spatial characteristic) can be viewed as a program in the language of the spatial sciences, a cross-linking with the total planning –i.e. the institutionalized integration (regulations, etc.) – in the following is absolutely necessary: • the formal total planning of spatial order and regional planning, • regional development concepts (which connect formal and informal instruments, or use the latter for the implementation of regional goals).

Basic safeguarding of the historic cultural landscape zone FRE in its spatial character on a regional level
For the WHS, this means that the historic cultural landscape zone with an extended buffer zone is officially declared – within the framework of regional cultural landscape protection planning (regional development program on the state level, or with an official regulation at the level of the member states) – to be a self-contained area of priority, with related protective concepts and with legal standing.

Integration in spatial planning

The integrative connections formed by a cultural landscape maintenance system between the procedural and implementation-oriented instruments of the "new" type of regional development and the cultural objects- and landscapes-orientation, or an ecological orientation result in a primary integration as a program based on the respective regional planning laws.

Cross-reference to the management mechanism and central management office

With the passing of an ordinance in conjunction with the enactment of a program to protect the historic cultural landscape FRE, the management and coordination function of the cultural landscape maintenance system (cp. management mechanism, point 6) is to be secured at the level of regional and communal development concepts and programs.

(3) Central office of expertise with a scientific advisory board for coordination, conception, protection and

development (UNESCO site management office)

Protection, coordination and conception as outlined by the UNESCO protection goals can only be structurally ensured by the establishment of a management office with specially-trained specialists and sufficient finances (World Heritage Convention Art 5(b)). The importance of the WHS and the necessity to perform further research on the area require a scientific advisory board that supports the responsible office and the political decision-makers in all basic decisions and project evaluations with additional research, advice, etc.

(4) World Heritage Forum

The communication of all participants at all levels and between all (interconnected) individual components is crucial for a cultural landscape maintenance system. The special communications concept ranks as a core element of the system (point (10)) due to its extreme importance and integral effect on all elements. National and non-state organisations play a definitive role in this interactive process. Therefore, a special element has been created for the communication of these participants: the World Heritage Forum.

This body performs a variety of functions. Its primary function is to act as regional advisory body for the responsible member(s) of government. The advisory body can be consulted regarding the implementation of the cultural landscape maintenance system as a whole, or in parts, and single projects. It is also the first forum for the approval and presentation of projects initiated by the communities, various planning bodies and non-state institutions.

(5) National and worldwide monitoring

The implementation of the UNESCO world heritage model with national, practice-oriented, basic research must be supported by national and international monitoring. Strict adherence to the principle of subsidiarity and the 'best practice method' must be supplemented by a (frame) model. The large spaces of time that elapse between the international reviews and the 'coarse' screening system require a second, 'finer', filter. This can reveal at a fairly early stage flaws within the law, specialized instruments, etc. at national or regional levels. International monitoring will therefore have to go beyond the method of questionnaires (more transparent, same questionnaire for all World Heritage objects and properties (?)).

(6) Management mechanism

According to its definition, a mechanism is a technical complex of elements in which the movement of one element necessarily causes the movement of the other elements. Mechanisms of varying complexity are found in basically all engineering sciences and technical disciplines. Every system is composed of elements (components, sub-systems) with relationships to one another. Usually, these relationships involve an interactive influence based on the nature of their connection.

The sixth element of the cultural landscape maintenance system is thus a central steering element for protection, conservation and development. Supported by the management mechanism, the steering must be effected through the individual planning bodies and at different levels. Cooperation is a prerequisite for success here. The mechanism should be officially anchored in the legal system and have at its disposal all appropriate legal instruments and methods and be connected with all elements of the cultural landscape maintenance system. It can be (legally) effective in five ways:

- an immediately-effective instrument of protection;
- an administrative evaluation benchmark;
- the fixation of a 'cultural landscape inventory';
- a framework for the elaboration, extension and further development of the management plan;
- a framework for (success) control, monitoring and effectiveness analysis.

With the management mechanism described above, the elaboration of an action-oriented concept is presented. Thus instrumentalises the theoretical concepts of 'cultural heritage landscape' and historic cultural landscape as a relevant planning tool. This model of a management mechanism reflects the interconnecting relationships between the contents that this theoretical concept explains on the one hand, and the goal-oriented programs on the other hand. The structure of the management mechanism includes:

- legal instruments of mutual involution and connections;

- integral models of the relevant fields;
- national and international guidelines and regulations.

The UNESCO goals are secured through three basic strategies which are connected by the management mechanism together with basic elements (organizational, legal, methodological and specialist instruments) through an administrative regulation:

- safeguarding through inventory, protection and subsidies;
- ten elements of the cultural landscape maintenance system as fields of action.

The action occurs in the form of a formalized concept which is given legal status and integrated on all planning levels through planning instruments and which makes it possible to achieve cultural landscape development that is goal-oriented and based on a comprehensive concept.

(7) Protection and conservational development through subsidiaries and tax instruments

Effective protection and maintenance of cultural assets depend to a large degree on the availability of sufficient public funds to cover the additional costs that arise, for example, from preservation concerns. Direct subsidies on the one hand, and the help of tax reliefs on the other hand, are core elements of world heritage protection.

At the same time, as already mentioned, it should be noted that within the framework of cultural landscape maintenance certain elements of the landscape and their use (e.g. agriculturally-used areas) can only be maintained within a system of agricultural or forestry subsidies. Therefore, subsidies are an essential part of a society's land-use planning system. The public interest, represented as a part of this system in the laws and guidelines, plays a big role in the determination of subsidies. The goal-oriented use of this kind of aid, tied to cultural assets and the cultural landscape inventory on the regional level can provide sustained support of the interests of protection and conservation. Protection and conservational development thus follow the conception of implementation strategies and criteria for subsidies on an object level as well as the binding of the subsidies to the *Limes* database, or the cultural landscape cadastre (register) (see Sommer in this vol. 118–21) (cp. projects of cultural- and natural tourism, etc. and protection through subsidies, e.g. agricultural and forestry usages that are especially significant for the protected area).

(8) Safeguarding with protective instruments.

In addition to protective mechanisms for the archaeological heritage itself, the cultural landscape management system for the FRE includes legally-binding, two-tiered cultural landscape management plans (at national and local levels) within the framework of regional planning (together with visual landscape protection). Regulations (planning elements) are specifically connected in the text of the ordinances with other elements of the cultural landscape maintenance system (e.g. cultural landscape inventory, linkage to relevant fields and their support, preservation competence of the coordinating office, etc.). The implementation of the cultural landscape dimension with planning instruments at all planning levels makes it possible to create a 'formalized concept' of cultural landscape development that is goal-oriented and based on a clear model. This concept supplements and helps to safeguard the protective components at the object level.

(9) Protection through basic research and inventory

The information system FRE is a basic instrument to realize the goals to protect the archaeological heritage and the historical zone. This system is integrated in a cultural assets and cultural landscape cadastre (register) for the cultural landscape zone and identifies the historic relevance of all the elements, sites and areas. Combined with comprehensive basic research, the inventory supports the activities of the coordinating office and all other elements of the maintenance system.

(10) Public relations, civic participation and communication

Four strategies are of great importance:

- a communications concept;
- acceptance;

- cooperation;
- the development of an understanding for, and appreciation of, planning.

This includes:

- cooperation, joint problem-solving, benefiting from individual activities and synergy effects; dedicated participation, motivation, the mobilization of endogenous potential, democratization;
- informing the general public, explanations, optimizing planning and the implementation, legitimization and democratization of the planning process;
- informing and listening to all parties involved, legal protection of the process. (Selle 1996,69).

References

Due to the necessary brevity of this article, reference is made to the extensive list of literature in the basic study, Jeschke 2008. This can be requested through the e-mail address found in the list of authors.

Jeschke, H.-P. (2008), *Das Kulturlandschaftspflegewerk © für die Historische Kulturlandschaftszone der Grenzen des Römischen Reiches. Ein transdisziplinäres staatliches Schutz-, Pflege- und Entwicklungssystem auf der Basis des Ansatzes der Historischen Kulturlandschaft*. ICOMOS Austria AG. „Kulturlandschaft, Städtebau und Raumordnung“ Linz/Wien.



Fig. 1 Aalen, *Limes* museum. *Principia* with museum buildings and a partially reconstructed cavalry barack (Photo: Limesmuseum Aalen)



Fig. 2 Obernburg am Main, dedications of the *beneficiarii*: previous display in the Römermuseum Obernburg (Photo: Manfred Eberlein, Bavarian State Archaeological Collection, Munich)



Fig. 3 Weißenburg in Bavaria, Limes-informationszentrum (Photo: City of Weißenburg)

A MUSEUM DEVELOPMENT PLAN FOR THE WORLD HERITAGE SITE OF THE UPPER GERMAN-RAETIAN LIMES

Christof Flügel, Munich¹

The application for the *Limes* as a WHS was primarily concerned with protecting the archaeological monument and documenting the status quo. With the registration of the Upper German-Raetian *Limes* as the German module of the transnational WHS 'Frontiers of the Roman Empire', the museums at the Upper German-Raetian *Limes* have assumed a central role in the communication of information on this monument – at a length of 550 km, the longest interconnected archaeological monument in Europe.

Museums at the *Limes* – tasks and goals

The heritage application includes a management plan that should be regularly reviewed and further developed. A major component of the management plan is a museum development plan for the German states ("Länder") through which the *Limes* runs: Bavaria, Baden-Württemberg, Hesse and the Rhineland-Palatinate. The plan was developed by representatives of the states, the museums, relevant state associations, the state museums, the "Deutsche Limesstraße" association and the working group "Welterbe Limes". This development plan for the museums at the Upper German-Raetian *Limes* has the character of a suggestion and not of an official directive such as the 'Bavarian Museum Development Program' of 1979. It defines various categories and levels of museums as well as their communications strategies.

Supraregional Central Museums

These museums, placed strategically at individual sections of the *Limes*, present a comprehensive view of the *Limes* in one state. An example is the *Limes* museum Aalen (Fig.1). As "beacons" in the museum environment, they provide a wide range of information on the history, function and preservation of the *Limes* as well as on related, general themes. Topics include the description of historical backgrounds, current research trends and measures taken to protect the *Limes*. Reference to the regional museums along the *Limes* is also an important function. The supraregional central museums at the *Limes'* Bavarian sections of Raetia and Upper Germany are the Römermuseum in Weißenburg, Bavaria (a branch of the Bavarian State Archaeological Collection, "Archäologische Staatssammlung München") and the Römermuseum in Obernburg am Main, in the county of Miltenberg. The example of Obernburg am Main illustrates the new orientation of the supraregional museums: In the near future, a new "Main *Limes* Museum" is intended to replace the existing Roman museum which concentrates primarily on local Roman history. The features and finds of the *beneficiarius* station in Obernburg am Main (Fig.2), which are of a unique character, will be incorporated in the new museum, both architecturally and conceptually. Knowledge gained from the *beneficiarius* station will be presented *in situ*. As the name "Main *Limes* Museum" indicates, a second theme will be the entire Bavarian-Hessian section of the *Limes* between Miltenberg and Großkrotzenburg. In the new Obernburg museum, each *Limes* settlement along the Main will be thematically represented with a local focus. As the entrance gate to the "Geopark Odenwald", the new Main *Limes* museum will also highlight the Odenwald *Limes*. In neighbouring Baden-Württemberg, the Roman museum in Osterburken has been expanded to a second supraregional museum, in addition to Aalen. In Hesse, the Saalburg Museum, seat of the Deutsche Limeskommission, has taken over the role of the supraregional museum. This museum category does not exist in the Rhineland-Palatinate.

Regional museums

These museums should concentrate on noteworthy archaeological features in the relevant topographical and regional surroundings.

Regional information centres

These museums deal thematically with individual fort sites or sections of the *Limes*. They bridge regional information gaps along the *Limes*. The existing non-state museums (generally locally sponsored) already concentrate on local issues and are intended to convey an impression of the *Limes* in their area to the population.

¹Translation by Mary Sommer Wong



Fig. 4 Würth am Main, Roman Department of the 'Schiffahrtsmuseum' (Photo: Ch. Flügel)

Local information sites

Fort sites or typical objects along the *Limes* are signposted and clearly indicated in the terrain. Signboards are to be designed according to the "Information system for the signposting of archaeological sites on the Roman frontier", prepared by the Deutsche Limeskommission. The goal here is to use a common "Limes design" throughout the states in order to emphasize the fact that the defensive system consists of a single interconnected, archaeological monument.

Since the creation of the development plan for the Limes museums in 2004, experience gathered in Bavaria has led to new ideas regarding a simplification of the museum categories. At the same time, new categories have evolved of touristically-motivated *Limes* information points, such as in Kipfenberg. A critical review of the museum development plan should occur together with the regular monitoring of the WHS.

As the most important element, the level of the supraregional museums remains intact. The planned second level of regional museums could be dropped, as this can easily be integrated into the next level of the many non-state museums. Further, in the case of Bavaria, at least, this second category of museum cannot be realized at present. In the other *Limes* states, no concrete suggestions have been made to date regarding this type of museum. The next museum level could then be the regional information centres which focus on the local *Limes* sections. As in Hesse, existing museums in the counties along the *Limes* could largely be integrated into this scheme. In general, this would call for a coordinated effort to differentiate the themes handled by the various regional centres and a clearer, *Limes*-specific profile for each location.

Somewhat apart from these two museum types is the third category, the local information sites, which are concerned with the signposting of archaeological sites in the design created by the Deutsche Limeskommission, and with the organization of expanded "Limes pavilions", as in Hesse. The strategy here focuses on the display of texts and pictures directly at the site of the archaeological monument. The *Limes* information points round off the system, serving as a springboard to the network of more specialized museums and departments. For this reason, they are primarily integrated in existing museums, for example in Aalen (Limesinformationszentrum), Weißenburg (Limesinformationszentrum), and Kipfenberg (Infopoint *Limes*). In Weißenburg, the *Limes* information centre is located on the ground floor of the Roman museum and offers visitors an introduction to the *Limes* as a WHS in general as well as providing information on the *Limes* in the region (Fig.3). In Aalen, the *Limes* information centre coordinates not only its own *Limes*-related touristic offers, but also the services provided by local communities and counties regarding the *Limes* in Baden-Württemberg. In the Rhineland-Palatinate, an information centre is planned at the beginning of the *Limes* between Bad Hönningen and Rheinbrohl. It will combine both museum and touristic aspects (*Caput Limitis* as the start of tourist routes and bicycle/hiking paths).

The working group “Roman Museums along the *Limes*”

The museums with Roman collections at the Upper German-Raetian *Limes* have joined together in an interstate working group. The group's goals are the advancement, improvement and coordination of the museums' public communications efforts.

Only a few museums at the *Limes* were conceived as purely Roman exhibitions. The majority display a variety of themes and the size of their Roman departments differ. The original concepts were developed for the most part in the 1980's and 1990's. Many museums are now planning to up-date their permanent Roman exhibits in order to include the latest results of *Limes* research. A new documentation of the *Limes* in its relevant regional surroundings based on the UNESCO application is a further theme. In addition to presenting general information on the military and on civilian life, the highlighting of local aspects and the development of themes and other museum characteristics with unique public appeal are important tasks. For example, the museum in Großkrotzenburg, Hesse, focuses on the theme “Roman brick production in Upper Germany”. The Roman department of the shipping museum in Würth am Main, of Miltenberg county in Bavaria concentrates on “The acquisition of wood and shipping on the River Main” (Fig.4).

The museums' task is to increase public awareness of the *Limes* as part of a common world heritage and, by using significant finds, to convey to the general public the history of an archaeological monument that cannot be seen and is difficult to detect.

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Fig. 1 The first meeting of the Bratislava Group in the Archaeological Museum in Bratislava. Participants from l. to r. V. Varsik, S. Jilek, H.-P. Jeschke, A. Szentgáli, J. Rajtár, D. J. Breeze, A. Thiel (Photo: Zs. Visy)



Fig. 2 Participants of the third meeting of the Bratislava Group at Koblenz, Germany in June 2004 (Photo. Zs. Visy)

THE ROLE OF THE BRATISLAVA GROUP

Sonja Jilek, Vienna

In March 2003 the co-ordinators for the various actual or proposed sections of the new World Heritage Site, 'Frontiers of the Roman Empire' (WHS), met at Bratislava to discuss items of mutual interest (Fig. 1). The success of the meeting led to an agreement to meet regularly and, as the first meeting was held in Bratislava, the group was named after that city. Subsequently, the existence of the Group was enshrined within the Summary Nomination Statement for the 'Frontiers of the Roman Empire World Heritage Site' (see Breeze and Jilek in this vol. 24–8) and its role accepted by the World Heritage Committee meeting in Durban in July 2005.

The nature, purpose and membership of the Bratislava Group are defined as:

'The group, so called because it first met in Bratislava in March 2003, was established to provide professional and technical advice in relation to the proposed 'Frontiers of the Roman Empire World Heritage Site', 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 focus of the advice is UNESCO and the state parties containing part of the World Heritage Site or intending to propose their own sections of the frontier as part of the Site'.

'The group consists of representatives of those state parties which are already part of the WHS, have nominated their section of the frontier, or have officially stated that they intend to nominate their section of the frontier within the offered definition of the WHS, together with co-opted members'.

The members of the Bratislava Group are: Mr Paul Austen (UK) representing Hadrian's Wall, Professor David J. Breeze (UK) representing the Antonine Wall, Dr Andreas Thiel (Germany), Prof Zsolt Visy (Hungary), Dr Jan Rajtár (Slovakia), Dr Mirjana Sanader (Croatia) and Dr Sonja Jilek (Austria). Professor Breeze serves as the chairman and Dr Jilek as the secretary.

At the 3rd meeting at Koblenz, Germany, on 23 June 2004 (Fig. 2), the Group considered a definition of the proposed WHS. The following was suggested:

Koblenz Declaration

'The Frontiers of the Roman Empire World Heritage Site (FRE WHS) 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'.

The Bratislava Group has now met in Bratislava (SK), London (UK), Koblenz (D), Győr (H), Amersfoort (NL), Paris (F) and León (ES). Whenever possible, the meeting has been accompanied by a workshop at which particular issues of a local significance were discussed.

The aim of the first meeting at the Archaeological Museum in Bratislava was to gather the co-ordinators of the future WHS to acquire, through presentations and discussions, a better knowledge and understanding of the multiple meanings, uses and challenges of the *Limes* heritage in the individual countries today. During the debate it was quickly realised that all of us share a similar nature and type of monuments but

located in different regional, cultural, political, economic, and scientific protection conditions and contexts. The outcome of the meeting was that we decided to create a professional network to help to harmonize and optimize further WHS nominations.

The main focus of our second meeting at the British Academy, the national academy of arts and the humanities of the UK and the Commonwealth in London, was dictated by the necessity to find a general definition for the new WHS in respect of the establishment of the FRE WHS by UNESCO. The decision to create a single WHS which could encompass all the frontiers in Europe and beyond implied that UNESCO required an overall description of the new property up to some detail. After intense discussions we achieved a general agreement about the identification of the property, the justification for inscription and the description and management principles of the WHS leading to the formulation of the *'Summary Nomination Statement'* by David Breeze and Chris Young, which was included in the German nomination document (Annex 1) accepted by UNESCO (see Breeze and Young in this vol. 29–35).

The third meeting in the Landesdenkmalamt Rheinland-Pfalz at the Festung Ehrenbreitstein close to Koblenz led to the declaration about the specific nature, purpose and membership of the *'Bratislava Group'*. The Bratislava Group is mentioned in the *'Introduction'* (n7, n12) and in the section *'Management'* (n4.4, n4.6, n4.7) of the German UNESCO application. The Group had been asked to define the frontiers of the Roman empire. To a large extent, the creation of a multi-national WHS is a new task for UNESCO. The existing transboundary WHSs were either a single monument or a natural area which happens to be divided between 2 modern countries or a chronologically or theoretically coherent monument such as the mission stations in Argentina and Brazil. Nor is the FRE WHS merely a large site such as the Wachau in Austria because there is often no physical linking between the different parts of the Roman frontier. A specific problem with Roman frontiers is that they moved over time. A definition of the *'Frontiers of the Roman Empire WHS'* therefore had to embrace several different aspects – chronologically development and movement to and fro across the landscape as well as differentiating between different types of structures and frontiers. Our solution sought to deal with all aspects and brought us to the passing of the *'Koblenz Declaration'*, a short description of the first stage of the new FRE WHS. This declaration – a preliminary draft was proposed during the European Archaeological Association's Annual Conference in Esslingen in 2001 – was discussed, amended and approved. The declaration was included in the German nomination document and accepted by UNESCO.

In Hungary the fourth meeting took place in the Xántus János Múzeum in Győr. The main subject of debate was about the boundaries of the *Limes* monument across Europe and the various possibilities and challenges for the protection of the invisible remains along the frontiers. It was agreed that a special emphasis must be made to raise more consciousness for these remains on a professional as well as a general level. In future all invisible parts of the frontier in the countryside as well as in urban areas should be included in the nomination, except those which are already destroyed. Also museums, which look after the most important finds from individual frontier sections, should be included into further discussions (see Flügel in this vol. 174–78). Furthermore the Group decided to encourage more countries like the Netherlands, Croatia, Romania and Bulgaria to declare their intention to place the Roman *Limes* on their Tentative Lists.

The Bratislava Group was invited to gather for their fifth meeting at the ROB in Amersfort in the Netherlands. One element of the discussion was the first attempt to come to a definition for river frontiers (see Jilek in this vol. 64–8), which present us with different challenges than artificial frontiers like Hadrian's Wall, the Antonine Wall or the Upper German-Raetian *Limes*. The workshop about the protection of remains in urban areas was joined by many colleagues from the Netherlands. The protection of the Limes WHS in urban areas cause particular problems when cultural resource managers are faced with threats such as the building of new houses, factories, even petrol stations, pipe-lines, roads etc. (see Breeze et al. in this vol. 109–11, Sommer 128–39). These discoveries require a flexible approach to extending the boundary of the WHS as knowledge continues to grow; further statements were postponed to the UNESCO meeting in Paris.

The sixth meeting took place at the UNESCO centre in Paris, where the Group met Dr Mechthild Rössler, Chief officer for Europe and Peter Stott, Chief Retrospective Inventory Project (Fig. 3). Subject of the dis-

cussion was the listing of the individual sections within the new WHS, the protection of frontier installations in urban contexts, the UNESCO position on reconstructions and the future progress of the WHS. There have been implications for UNESCO too in the creation of the FRE WHS. Because the aim of the proposal is to embrace separate elements of the frontier in different countries, the term 'trans-national' would no longer do. The term 'trans-boundary' was therefore created to reflect the changed circumstances. Further, previously trans-boundary Sites had only been listed under the first country in alphabetical order. In the face of the possibility of several countries managing parts of a single WHS, the order of listing WHSs was changed, with a single list recording trans-boundary Sites and different type face differentiating between the different types of Sites in the main list. It was stated that 2 or more nomination could go forward at the same time either together or separately (the latter depends on the number of nominations in the pipeline of each country of course). Reconstructions above Roman remains should be included as part of the buffer zone and not as part of the WHS in future nominations. In effect a vertical buffer zone could be created in relation to both reconstructions and urban development.

At the XXth *Limes* Congress in Léon in Spain the Group drew up a summary of the results achieved during the third years of its existence. All members reported about their stage of nomination and possibilities for further involvement of colleagues from countries in the Middle East and North Africa were discussed. The Group decided to look again at the definition of the frontier in order to amplify and clarify the definition. More reference in future should be made to the visibility and invisibility of the archaeological remains.

The mapping of military remains has been a theme running through several meetings (see Jones and Thiel in this vol. 99–105). The local workshops have proved valuable in both networking and learning about new work on frontiers.



Fig. 3 The sixth meeting at the UNESCO centre in Paris (Photo: Zs. Visy)

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