TOWARDS A NATIONAL COLLECTION

UKRI Arts and Humanities Research Council

FINAL REPORT
FOUNDATION PROJECTS

Locating a National Collection (LaNC)

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The British Library | University of Exeter
The National Trust | Historic Royal Palaces
Historic England | English Heritage
Historic Environment Scotland
Portable Antiquities Scheme

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Executive Summary

Locating a National Collection (LaNC) helps cultural heritage organisations to use geographical information — such as where objects were made and used or the locations they depict and describe — to connect collections and engage the public. Through workshops, audience research and software development the project has developed a set of recommendations for using location to enhance discovery of digital records from across diverse collections.

Research approach

The Locating a National Collection (LaNC) project took the Towards a National Collection programme's key objectives as the foundation of its research approach. First, geography offers powerful connections between the public and collections. LaNC has sought to explore how these connections can facilitate broader engagement. Second, geographical information provides an effective method for dissolving barriers between collections and providing innovative access through web maps. Finally, geography lies at the heart of research questions asked across diverse disciplines; LaNC has examined how digital geographical information can help researchers use cultural heritage to answer those questions. LaNC's partners were composed of two types of cultural heritage organisation:

- Historic Environment Organisations: Digital records represent sites and thus location is fundamental to their structure. Partners: Historic Environment Scotland, Historic England, English Heritage, National Trust, Historic Royal Palaces.
- Galleries, Libraries, Archives, Museums (GLAMs): Collections encompass objects and therefore digital records place locations alongside other entities like person or time. Partners: British Library, Portable Antiquities Scheme.

Our project's hypothesis was that geographical information provides a particularly effective method of connecting digital records held by these two types of organisation. Our engagement work package consisted of public audience research to understand the motivations of potential users of the national collection. The infrastructure work package undertook exploratory technical work in dataset creation and front-end web development. Our research approach was user-focused, a core principle being that audience research should inform technical development.

Research results

Engagement work package

Interviews with cultural heritage professionals in strategic roles from across the sector provided insights into audience motivations and desired features for web interfaces. A public survey with a representative sample of the UK's population demonstrated a confidence with web maps and an enthusiasm for their application to heritage and other exploratory uses. Location motivated the public to engage with heritage although the intersection of motivations with values like local identity was complex. Detailed results can be found in Research Bods quantitative findings summary. Focus groups including participants with varying interest in

heritage and confidence with technologies explored motivations further. Opening discussions examined how participants use heritage, the appeal of heritage connected to location and where participants discover digital resources. Interest in local heritage extended beyond 'where I live now' to encompass residence, genealogy and memory. Stimulus took the form of Powerpoint slides, with simple sketches of existing and future interfaces to prompt discussion. These included existing interfaces, namely Historypin and A Street Near You, alongside three 'pretotypes' or ideas for web-map interfaces that LaNC might create. Focus group feedback on Heritage for All and Visit Plus, two pretotypes that connected the digital records of GLAMs and historic environment organisations, led LaNC to develop them as web applications. More detail can be found in Research Bods qualitative findings summary.

A survey of history teachers and their pupils from a cross-section of schools followed by a series of interviews with teachers was undertaken in conjunction with the History Association. Results offered insights into the attitudes of teachers and pupils towards heritage and location, technology use for historical school teaching and the curriculum relevance and educational value of GLAM collections and heritage sites.

Infrastructure work package

Interviews with cultural heritage professionals working in technical roles provided insights into geographical information held by historic environment organisations and GLAMs. Historic environment organisations' records, representing visitor sites or protected monuments for example, contain WGS84 coordinates or Ordnance Survey national grid references. On the other hand, geographical information in GLAM digital records occurs as toponyms that represent current location, location of origin/publication or location of discovery. Geographical information might occur in GLAM catalogue metadata or could be derived from the content of digital objects such as text or images. LaNC developed two applications with the aim of understanding what is required to visualise this geographical information and implement audience-research findings:

Locolligo bridged the gap between raw data and visualisation tools by allowing users to convert spreadsheets to the JSON-LD Linked Places Format (LPF) that supports visualisation and to create connections between collections' data. The tool is freely available for use.

The Peripleo web-map interface enables users to explore and discover locations that represent the organisational web pages of collection items. Peripleo was designed to visualise four project datasets that bring together GLAM and historic environment organisation digital records: Visit Plus, Hollar 1660, Heritage for All and Early Egyptian coins in Northern Europe. The interface is available, reusable, documented and can be easily deployed for other datasets that comply to LPF structure. The interface's front-end only design supports free hosting on Github pages.

Recommendations for the programme

- The national collection should connect the collections of GLAMs and historic environment organisations.
- The infrastructure for a national collection should be designed according to actionable audience motivations.
- Presenting heritage of local significance offers opportunities to broaden the public audience for the national collection.

- Geographical information can help school pupils engage with the history curriculum through local heritage, visits or use of maps, thus broadening the audience of the national collection.
- Coordinates offer a straightforward method of connecting digital heritage records. The resulting connections can be unexpected and might not surface using other methods.
- Realising the geographical potential of GLAM collections requires the systematic derivation of coordinates.
- The heritage included in the national collection should be representative of the entire geography of the UK.
- Web maps offer an effective interface for accessing the national collection in certain use cases.
- The national collection cannot rely on a single interface but rather requires a set of interfaces designed using user motivations.

Abstract

Locating a National Collection helps cultural heritage organisations to use geographical information — such as where objects were made and used or the locations they depict and describe — to connect collections and engage the public. Through workshops, audience research and software development the project has developed a set of recommendations for using location to enhance the discovery of digital records across diverse collections. A set of thematic and technological case studies have connected site records from historic environment organisations with objects from galleries, libraries, archives and museums virtually. The Pelagios Network of researchers, scientists and curators has developed a methodology that uses geographical information to connect research data with considerable success. LaNC built on their methodology by exploring methods of accessible and meaningful presentation to the public in collaboration with the National Trust and Historic Royal Palaces. The engagement work package encompassed survey and focus groups to understand the attitudes, behaviour and motivations of audiences such as community groups, heritage visitors and schools towards cultural heritage and location-based technologies. Our infrastructure work package created two web apps: a curation tool, Locolligo, and a web-map interface that can be embedded in organisational websites, Peripleo. LaNC encourages cultural heritage organisations to take up a common approach to creating and presenting geographical information with the ultimate aim of spear-heading a movement beyond text-based searches in cultural heritage.

Aims and Objectives

The overarching aim of this project was to help cultural heritage organisations to use location data to connect their diverse collections and engage research and public audiences in new ways. This was pursued through the following objectives:

- To understand how location is referenced and represented in the digital records of cultural heritage collections. Such digital records might include representations of objects, documents, sites or buildings in the form of metadata or web pages.
- To scope and describe the benefits of connecting collections using location for public audiences such as community groups, heritage visitors and schools as well as for cultural heritage organisations.
- To develop a set of case studies in connecting cultural heritage data from GLAMs and historic environment organisations and evaluate their potential impact on varied audiences and cultural heritage organisations.
- To implement the case studies through technical work including the creation of linked datasets and a web-map interface.
- To make the web-map interface available openly for different cultural heritage organisations to use.
- To scope and describe what is required to connect collections using location in a sustainable way, the available options and to make recommendations.
- To write and disseminate a report that summarises the state of the art in using location to connect collections, using engagement findings to influence technical development.
- To inform and influence the use of location data and map visualisations across the cultural heritage sector and the Towards a National Collection programme.

Partnership structure

LaNC includes partners from across the cultural heritage sector. Partners fed into project research by providing data and expertise. Organisations in which investigators are based also acted as partners.

Partner	Roles
British Library	Data provider, consultation on specific themes for the prototype, expertise from internal steering group, interviewees.
English Heritage	Data provider, advice.
Historic England	Data provider, consultation on specific themes for the prototype, interviewees.
Historic Environment Scotland	Data provider, consultation on specific themes for the prototype, interviewees.
Historic Royal Palaces	Data provider. Provision of expertise and data restricted due to furlough.
National Trust	Data provider, consultation on specific themes for the prototype.
Portable Antiquities Scheme	Data provider, consultation on specific themes for the prototype.

Staffing structure

Principal Investigator: Gethin Rees (British Library).

Lead Curator, Digital Map Collections at the British Library. Coordinated the project, line managed the researcher and managed phases of the engagement and infrastructure work packages.

Researcher: Valeria Vitale (British Library). June 2020 until May 2021.

Research Curator, Geospatial Cultural Heritage. Led research and supported delivery of both work packages including engagement work and organisation of the infrastructure workshop.

Researcher: Stephen Gadd (British Library). November 2021 until May 2022.

Research Curator, Geospatial Cultural Heritage. Led research and supported delivery of the infrastructure work package, including development of Locolligo app, creation of datasets and management of Peripleo interface development.

Co-Investigator: Leif Isaksen (University of Exeter).

Director of Digital Humanities, University of Exeter. Contributed to the infrastructure work package including the creation of the Early Egyptian coins dataset.

Co-Investigator: Alex Hunt (National Trust).

Head of Advocacy and Policy at the National Trust. Contributed to the engagement work package, led scoping phase, focused on heritage visitors.

Co-Investigator: Anthony Musson (Historic Royal Palaces).

Head of Research at Historic Royal Palaces. Contributed to the engagement work package, worked on the scoping, workshop and evaluation phases, focused on schools.

Development partner: Rainer Simon (Austrian Institute of Technology). March 2022 until June 2022.

Developer of Peripleo web-map interface.

Revised overall programme

	2020							2021												2022					
Summary	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Engagement interviews																									
Engagement public survey and focus groups																									
Infrastructure workshop																									
Engagement scoping schools survey																									
Engagement scoping schools interview																									
Infrastructure scoping research																									
Locolligo app development																									
Dataset/simple-site development																									
Peripleo app development																									
Engagement workshops																									
Report writing																									

Events and consultations

Event	Date	Outputs	Attendees
SHED symposium, Historic Environment Scotland	11 Mar 2020		40*
Interviews with cultural heritage professionals	Jul-Sep 2020	Interim report	18
Infrastructure workshop at Linked Pasts conference (Demos of three tools, feedback sessions and roundtable)	7-16 Dec 2020	Linked Pasts infrastructure workshop dataset	213
Research Bods public survey	Dec 2020	Our place audience survey results, quantitative findings summary	992
Research Bods focus groups	20-30 Jan 2021	Qualitative findings summary	26
TaNC discovery webinar interim findings presentation	19 Feb 2021	Interim findings presentation video	110*
Pelagios Visualisation activity presentation	26 Apr 2021		16
British Library internal presentation to Western Heritage department	20 May 2021		40*
Presentation to School of Advanced Study, University of London, Digital Humanities Research Hub seminar	6 May 2021	School of Advanced Study digital hub presentation video	30*
Presentation to Dariah Annual Event 2021: Interfaces. The Interface(s) of a virtual national collection panel	7 Sep 2021	Abstract available at https://dariah-2021.sciencesconf.org/354441	120*
Spatial Humanities conference presentation	16 Sep 2021		30*
LaNC engagement workshop part 1, presentations and feedback from project partners	8 Oct 2021		38
Teacher survey in collaboration with History Association	May-Jul 2021	Schools survey and interview question, schools survey report.	164 pupils 47 teachers

Teacher interviews in collaboration with History Association	Aug-Sep 2021	Schools survey and interview question, schools survey report.	5
User testing of Peripleo web-map interface with British Library staff	Mar-Apr 2022	Videos, notes for internal use	6
LaNC engagement workshop 2, testing of Peripleo web- map interface by partners	26 Apr 2022	Feedback forms and writeup for internal use	25*
British Library 21-century curatorship internal presentation	12 May 2022	Video available to British Library staff on internal wiki	43
End of project webinar	25 May 2022	Video to be made available on TaNC channel	55
TaNC recommendations webinar	8 Jul 2022	Video to be made available on TaNC channel	27
Digital Humanities Conference (DH2022) long presentation	28 Jul 2022	Abstract	18

* Figures are approximate

Research approach

The Locating a National Collection (LaNC) project took the Towards a National Collection programme's key objectives as the foundation of its research approach. First, geography offers powerful connections between the public and collections. LaNC has sought to explore how these connections can facilitate broader engagement. Second, geographical information provides an effective method for dissolving barriers between collections and providing innovative access through web maps. LaNC has scoped and tested digital search interfaces and cataloguing tools that test an approach to realising these opportunities. Finally, geography lies at the heart of research questions asked across diverse disciplines; LaNC has examined how digital geographical information can help researchers use cultural heritage to answer those questions. LaNC's partners were composed of two types of cultural heritage organisation:

- Historic Environment Organisations: Digital records represent sites such as monuments and buildings and thus location is fundamental to their structure. Partners: Historic Environment Scotland, Historic England, English Heritage, National Trust, Historic Royal Palaces. Note that many of these organisations also manage collections of objects which are treated separately here.
- Galleries, Libraries, Archives, Museums (GLAMs): Collections encompass objects and therefore digital records contain locations alongside other entities like person or time. Partners: British Library, Portable Antiquities Scheme.

Our project's hypothesis was that geographical information provides a particularly effective method of connecting digital records held by these two types of organisation. In this report, the term 'geographical information' refers to both toponyms that embody notions of place and coordinates that refer to a position in geographical space. 'Records' refer to digital representations in the form of metadata and web pages that include representations of objects, documents, sites or buildings, to name four examples, and might contain digitised or born-digital content like images or sounds, structured data, text or URLs. LaNC's investigation of this hypothesis has been broken into engagement and infrastructure work packages. Our engagement work package consisted of public audience research to understand the motivations of potential users of the national collection. The infrastructure work package was characterised by practical exercises in dataset creation and front-end web development. Our research approach was user-focused, a core principle being that audience research should inform technical work. To this end, the engagement work package preceded the infrastructure. In order to ensure that project outcomes can be implemented, each work package drew on perspectives from cultural heritage organisations and varied public audiences as structuring principles.

Engagement work package

The engagement work package examined attitudes and behaviour in relation to cultural heritage, digital technology behaviours and the public's values connected to place and geography. The project gathered information from three groups of key stakeholders: cultural heritage professionals, teachers and their pupils and public audiences more widely. Valeria Vitale conducted thirteen structured interview sessions with 18 cultural-heritage professionals, these provided insights into motivations, requirements and capabilities across the sector. In order to ensure our findings can apply beyond LaNC partners we interviewed professionals employed in organisations of different sizes and stages of digital development and in two roles:

- Technical. Expertise in the acquisition, maintenance, sharing and delivery of cultural heritage data including location information.
- Strategic. Expertise in managing and designing the delivery of cultural heritage content to the public on the web or elsewhere.

The main findings are discussed in the interim report.

Public audience research was led by Alex Hunt at the National Trust working with Valeria Vitale alongside John Horgan and Peter Strachan from STRAT7 Research Bods, a market research company who used the 'Our Place' online platform. Research divided into two interlinked phases: a public survey followed by focus group interviews. The survey consisted of 33 questions completed by 992 members of the general public and was answered over the web to gather quantitative insights. Respondents were nationally representative of age, gender and location and included a broad range of ethnicities. Questions and resulting data are available in the Our Place audience survey results and in the Research Bods quantitative findings summary. Complexity in the public's attitudes, values and uses of technology meant gathering qualitative evidence in a second round of focus-group interviews was essential. We organised four two-hour remote sessions in total, each including six-eight members of the public. Participants were selected based on audience profiles constructed from survey results in two areas: interest in heritage and engagement or competence with digital technology. To focus discussion we employed stimulus, simple sketches of interface designs in the form of Powerpoint slides that helped to focus discussion on what might be technically possible. Stimulus helped the project understand how different audiences might derive value from different approaches to the placement of objects within the context of the historic environment.

Research into the role of location in history teaching within schools was conducted by Anthony Musson and took a similar user-focused approach encompassing two surveys, one completed by 164 pupils and the other completed by 47 teachers. This work was supplemented by follow-up consultations based on interviews and emails with five teachers. The research examined the role of location in the history curriculum and resulting technical opportunities.

Infrastructure work package

Our infrastructure work aimed to understand what is required to implement the findings of the engagement work package in technical terms. Building on the Pelagios methodology, LaNC asked how we can use geographical information held in the UK cultural heritage sector to connect collections and engage audiences through map visualisations. Interviews with technical cultural heritage professionals provided initial insights into geographical information in cultural heritage and what might be possible. Exploratory technical work conducted by Stephen Gadd, Rainer Simon, Victoria Morris, Gethin Rees and Leif Isaksen implemented engagement findings through several case studies in dataset creation. These formed the basis of prototype visualisations that could inform the design and development of production-ready products at scale in later TaNC phases. This technical work resulted in the creation of two complementary web apps designed to solve problems that cultural heritage organisations face: Locolligo, a curation tool for geographical information, and Peripleo, a web-map visualisation interface. Both are freely available for use by the public with Peripleo functioning as a production-ready interface that cultural heritage organisations can use to make their data available. Together they demonstrate a technical approach to visualising cultural heritage based on a sustainable and accessible front-end design that enables free hosting based on Open Geospatial Consortium, W3C and Pelagios standards. Furthermore, the provision of a curation tool to support the creation of datasets underlying visualisation is innovative.

Research results

Engagement work package results

Engagement with Cultural Heritage Sector

LaNC's partners are a particular subset of UK cultural heritage organisations. First, they are predominantly Independent Research Organisations (IROs), larger organisations that are eligible to apply for funding from research councils in the same way as universities. GLAMs (galleries, libraries, archives and museums) predominate amongst the UK's IRO consortium for the arts and humanities with a smaller number of historic environment organisations and fewer botanic gardens. Yet historic environment organisations predominate amongst LaNC's partners making the project well positioned to explore connections across this key division in UK cultural heritage. LaNC's GLAM partners, namely the British Library and the Portable Antiquities Scheme, offer useful case studies although they are not representative of the UK's GLAM sector. See Appendix for Figure 1.

Being large organisations for the most part, LaNC's partners are also not representative of the UK's cultural heritage sector more broadly. We therefore interviewed those in strategic roles at organisations of different sizes and stages of their digital journey. This summary focuses on two areas: audiences and web presence. Interviewees had a strong interest and knowledge of both current and potential audiences. However, across the sector there was a lack of structured audience data based on segmentation, analytics or structured feedback. Nevertheless, interviewees developed an effective understanding based on social media and personal experience. This led several common audience motivations to be cited that were connected to geographical information. The first was a sense of local identity that helped the public to relate to specific items and their stories. The second was proximity, heritage connected to where people are currently located or travelling to. Third, memory is strongly connected to location, and an interest in where one has lived or visited motivates searches for heritage. In terms of desired web features, there was an interest in implementing basic functionality before complex. Interviewees outlined a hierarchy for the prioritisation of content, with practical information being the highest, followed by catalogue records and moving on to user-generated content. Simplicity and user-friendliness were key concerns for access interfaces with the consolidation of resources through a simple access method being a high priority. Web maps were a popular addition to such a consolidated resource, and interviewees in strategic roles made knowledgeable suggestions about filtering geographical information and the relationship between records and location.

Engagement with Public

Survey questions covered a broad range of topics, only two are summarised here: using location services for heritage, and attitudes and values around location. 98% of respondents had used online map services before and 65% had used them in the last week, making map services the third most used online service after videos or search (Question S6). Web maps were used for pre-planned and closed-ended tasks, primarily way-finding and searching for a specific location (B4, B6). There was an enthusiasm for web maps that depict heritage locations (B3) and for exploratory uses (C2b) alongside a curiosity towards maps that depict

heritage with a local theme (C2b). However, web maps were not well-used to access heritage. The survey also offered insights into the public's relationships with different types of location. 60% identified strongly with 'the place and local area that they now consider to be their home' whilst 54% agreed that they feel well connected to 'the local community in the place and local area that they now consider to be their home' (C4). Although the majority of people identified with their local area a very significant minority did not, and overall levels of identification could be described as modest. Is there a lack of interest in heritage amongst those who do not identify with their local area or do we have an opportunity to build a sense of local identity through cultural heritage? On the other hand, 75% agreed that they enjoy a visit more if they can find out information about the history of the place, whilst 83% agreed they are always curious to find out more about the places that they visit (C6). Results suggest curiosity around visits such as browsing, exploring or planning trips might be an important motivation. See Appendix Figure 2.

Four focus groups, each including six to eight members of the public, facilitated a deeper exploration of concepts introduced in the survey. Participants were selected based on survey responses in two areas: interest in heritage and engagement with digital technology. Focus groups were structured according to two profiles: the first with a high interest in heritage and high technological engagement and the second with lower interest in heritage and lower technological engagement. Our hypothesis was that the latter might be less likely to engage with heritage on the web and to use our project's outputs. Feedback from this group was useful to ensure interface design decisions help to broaden the audience of a national collection. The differences in responses from the profiles are complex and discussed in detail in the 'methodology and sampling' section of the Research Bods qualitative findings summary. Each focus-group session was divided in two. Following opening discussions of heritage, the web and location, we used stimulus to prompt focus groups to reflect on approaches to presenting heritage using interactive web maps. Opening discussions were wide-ranging and examined questions such as: How do participants use heritage? What is the appeal of location-based heritage? Where do participants discover digital resources? Participants were universally concerned with the credibility or veracity of the heritage sources that they used and engaged in different types of behaviour including close-ended, task-focused activities and open-ended, exploratory browsing. Their interest in local heritage extended beyond 'where I live now' to encompass residence, genealogy and memory. The results of the opening discussions are discussed in detail in the qualitative findings summary.

The second section of each focus group used two types of stimulus presented using Powerpoint slides. The first were existing web-map interfaces, and the second, 'pretotypes': ideas for web-map interfaces that LaNC might create. Participants were not made aware that some existed and others did not:

Historypin – Based on the popular website, Historypin aimed to test attitudes to user-generated content. Participants were reticent to contribute to such a resource and concerned about the veracity of available content. See Annex Figure 3.

A Street Near You – Based on James Morley's inspirational web-map interface, this aimed to understand engagement with local heritage, around where participants live. The First World War theme and archival documents were an advantage for some but a barrier to others. See Annex Figure 4.

Heritage for All – Allows users to explore diverse collections connected to 'where they live now'. Despite concerns about repeat use, participants gave passionate responses to connections between varied collections and familiar locations. See Appendix Figure 5.

Visit Plus – An interactive web map designed to enhance heritage visits by placing GLAM objects alongside visitor-site information. Whilst visitor sites piqued curiosity, the 'Visit Plus' branding implied a particular usage obscuring broader uses and value. See Appendix Figure 6.

Walking Tours – Associates collection items with physical locations, testing reactions to the use of GPS for heritage. Participants were concerned about whether collections could be displayed effectively on mobile phones. See Appendix Figure 7.

Engagement with Schools

Anthony Musson led audience research work to ascertain teacher and pupil attitudes towards heritage and location, discover the extent of technology use for historical school teaching and to establish the curriculum relevance and educational value of GLAM collections and heritage sites. To do this he undertook a survey of history teachers and their pupils from a cross-section of schools in conjunction with the History Association, followed by a series of interviews with teachers. The results are discussed in the Schools survey report.

The research found that levels of technology provision and access to web resources in classrooms vary. 45% of schools do not permit or have the resources to provide electronic devices for classroom use. 62% of pupils use the Internet to discover new information about history/heritage and 69% enjoy finding out about historical films, TV dramas and novels linked to heritage places. Pupils' learning is directed and searching websites of heritage/GLAM organisations is encouraged, but the websites are geared more towards primary than secondary level and should be better tailored to curriculum themes/topics.

Teachers still prepare course materials themselves. Engagement with cultural heritage prior to Covid was strong with two-thirds visiting a heritage site/museum once or twice a year with their family; 7% admitted never going. School visits had very positive pupil feedback and increased pupils' enthusiasm. Understanding physical heritage and location heightened the emotive issues raised by a place and improved connections made. Pupils were positive about feeling part of their local communities and 63% were curious about places outside their local area. Visiting a local site offers practical benefits in enabling costs to be kept down and reducing timetable disruption. Educational value is derived from pupils being able to relate to events occurring in their vicinity and compare local and national perspectives. Using maps and searching for historical/heritage sources are skills embedded in a new curriculum focus on the historical environment at GCSE. This has stimulated engagement in local history for Key Stages 2 and 3.

Cross-curriculum overlaps with geography involve making and using maps of their local area and schools sometimes undertake parallel geography and history field trips to heritage sites. A-level courses are specialised according to periods and themes, very source-based and source-led, encouraging and enabling pupils to make connections between locations and local and national events as well as search GLAM collections to provide sources to assist interpretation. Although the focus of this research has been history there are opportunities to draw on cultural heritage collections in other areas of teaching.

Infrastructure work package

Infrastructure Cultural Heritage

Our interviews with cultural heritage professionals working in technical roles provided insights into geographical information held by historic environment organisations and GLAMs. Historic environment digital records represent sites, meaning location is prioritised. For example, datasets from IROs that represent visitor sites or protected monuments contain large volumes of coordinates in the WGS84 geographic coordinate system or Ordnance Survey national grid references. Geographical information is fundamental to the day-to-day work of historic environment organisations like National Trust, Historic Environment Scotland and Historic England who have strong expertise in Geographical Information Systems (GIS). On the other hand, digital records that represent GLAM objects might contain several locations in their geographical information including current location, location of origin/publication, location of discovery etc. Such geographical information might occur in catalogue metadata or could be derived from the content of digital objects such as text or images. Most of this geographical information occurs as toponyms and is treated alongside other entities like time or person in organisational systems. Certain categories of object have a clear relationship with location, for example Portable Antiquities Scheme finds or photos, maps and sounds in the British Library's collections, with the result that metadata contain coordinates. Organisational systems at both types of organisation allow digital records to hold coordinate data and toponyms. Both toponyms and coordinates have their respective advantages. Coordinates refer to precise locations and facilitate visualisation. Toponyms are intuitively understood by humans without using a map, facilitate text-based search and form the basis of geographical authority files or gazetteers like Geonames, World Historical Gazetteer or Getty Thesaurus of Geographic Names. These authority files attach coordinates to the toponym and contain identifiers, some of which are persistent.

Infrastructure Technical Development

With this firm understanding in hand, the LaNC team undertook technical development work, with the aim of implementing our engagement findings. This work broke down into three areas defined as activities under the TaDIRAH framework: capture, enriching and dissemination.

Capture – discovering and gathering data

The primary method of gathering data was through the transfer of spreadsheets from contacts at project partners. Many are not publicly available. Historic environment organisations made data available through portals, typically in GIS formats such as SHP files, particularly for statutory datasets. API access was less common although the Portable Antiquities Scheme and Historic Environment Scotland made such services available. Few partners made linked open data available for modelling or connecting collections, although the British Library aim to make their catalogue available using schema.org to improve discoverability through search engine optimisation.

Enriching – transforming and connecting data

The overall aim of our technical work was to visualise collections on a map, a process reliant on WGS84 coordinate data. This does not pose significant problems for historic environment collections although regionally-encoded coordinate data such as grid references need to be transformed. Similarly, restrictions on

the precision of Portable Antiquities Scheme data require coordinates to be obfuscated. GLAM digital records do require work, however, to derive coordinates from geographical information that occurs in metadata such as the title and description or from within their content. As the focus has been the British Library's collections, LaNC has worked with text content and strings like toponyms, addresses or postcodes. Extracting this information at scale requires technical skill and is reliant on processes such as Named Entity Recognition and Regular Expressions. Once extracted, it is necessary to define the significance of the geographical information for the record and to assign coordinates or 'geocode'. Geocoding might rely on alignment, referencing or entity linking to an authority file, gazetteer or other dataset, often through a process of string matching. Sincere thanks to Victoria Morris, metadata analyst who has carried out this work for records in the British Library's catalogue of manuscripts. Relevant functionality has been included in the Locolligo app whilst the whole enriching process was the subject of LaNC's infrastructure workshop and indeed other projects funded by the TaNC programme.

Dataset considerations

With our enriched data in hand, we set about creating several datasets, each intended to exemplify an approach in connecting cultural heritage collections. This approach aimed to understand what is required to implement the findings of our audience research and learn through practice. Spreadsheets have the advantages of familiarity and ease-of-use, but become unmanageable when attempts are made to create several connections to other records. Transformation to JSON-LD (JavaScript Object Notation - Linked Data) enables these connections to be made in a machine- and human-legible format. JSON-LD facilitates the discoverability and dissemination of data, which in web terms are dependent on connections to machine-recognisable vocabularies. JSON is also required to visualise data in Javascript web maps components. To take advantage of these benefits, Stephen Gadd developed a version of the JSON-LD Linked Places Format (LPF) originally conceived and developed by the Pelagios Network as a standard for the exchange of gazetteer information. Used to visualise diverse data, LPF is based on the Open Geospatial Consortium's GeoJSON standard for structuring coordinate data.

Stephen saw a need for reliable, intuitive, repeatable and efficient software processes to bridge the gulf between raw data and visualisation tools, and to mitigate any computer programming skills deficit. Locolligo was conceived as a software tool to provide that bridge, and its functionality was extended to encompass tasks identified through the development of the datasets detailed below. In essence, it converts spreadsheets to LPF and then facilitates connections with other data resources. Locolligo remains very much a prototype, but effectively fills an obvious gap in a workflow for GLAMs to visualise their data and is freely available for external use due to its front-end design. The project created four main datasets to explore the functionality of Locolligo and Peripleo:

Visit Plus – Unites over 1,600 heritage visitor sites across the whole of the UK with objects from GLAMs and beyond. Visitor sites included are managed by project partners National Trust, English Heritage and Historic Environment Scotland alongside Cadw, National Trust for Scotland and North Ireland Department of Communities. Each site acts as a nexus and entry point to connections for diverse related cultural heritage, a relationship tested through pretotyping.

Hollar 1660 – Draws connections between locations illustrated on an etching from George III's topographical collection held at the British Library and LaNC partners' collections. The dataset highlights the diversity of connections manifested in the content of a single collection item. Hollar 1660 demonstrates the potential for

integrating Pelagios' Recogito annotation tool with iiif and cultural heritage geographical information. See Appendix Figure 8.

Visit Plus and Hollar 1660 draw connections between records based on the geographical proximity of coordinates attached to digital records. In the case of Visit Plus connections were drawn in an automated process whereas Hollar 1660 used manual curation, both drew on Locolligo functionality. Neither used an external authority file/gazetteer due to a lack of coverage, rather the visitor sites or locations in the etchings played this role. An approach based on geographical proximity uncovered links that wouldn't otherwise be found, for example where there is no toponym in common.

Heritage for All – helps the public to explore the parts of collections connected to familiar locations such as the 'where they live', 'where they remember' or 'where their family are from'. Relatively precise geographical information like addresses, postcodes or coordinates connected collection items to familiar locations like buildings, parks or cemeteries. The overlay of different collections led to serendipitous co-contextualisation and had been explored in a pretotype.

Early Egyptian coins in Northern Europe – presents the locations of archaeological findspots and the associated web pages of ancient base-metal and billon (silver-alloy) coins minted in Egypt, from the Hellenistic to the Byzantine periods. The dataset was created by Leif Isaksen and drew available evidence together from a large number of independent datasets to present geographical patterns in their distribution and generate insights into why these coins are found in northern Europe.

Heritage for All and Early Egyptian Coins adopted a model akin to a Geographical Information System whereby the marker for each location on the map is a visual representation of a single record. This offers the user a visual overview of patterns in the dataset alongside the ability to access specific web pages.

Dissemination – making datasets available through search and visualisation

Rainer Simon at the Austrian Institute of Technology was commissioned to develop a web-map interface to explore issues in visualising cultural heritage data. Peripleo was designed to visualise the four project datasets but also to be reusable so that other datasets that comply with LPF's structure might populate future interface instances. See Appendix Figure 9. The interface was designed to enable users to explore, discover and then access locations that represent pre-existing organisational web pages for collection items. Accommodating other use cases within the same interface was problematic at times. For example, the configuration and filtering functionality was not sufficiently flexible to communicate research insights through visual geographical patterns in the case of Early Egyptian Coins. Rather, dataset structures and a focus on 'click-throughs' to web pages meant the effective presentation of several collection items associated with the same location was paramount. Search, filtering and popup functionality were tailored to support this collections discovery use case. The interface followed a client-side or front-end only design to support hosting on Github pages without the need for a server-side application. This design expedites the reuse of the interface in the cultural heritage sector by providing a low-cost, low-maintenance and simple route to hosting. It conforms to WCAG 2.1AA accessibility standards where possible and can be used with standard assistive technologies for accessibility. A pre-existing Pelagios Network tool, Peripleo, was developed further and although initially conceived as a prototype, the interface is now production ready, documented and can be easily deployed. Development adopted a user-centred approach, the interface was subject to user testing and includes options to include Google analytics codes and social media exports. The project embedded Peripleo to visualise the datasets discussed earlier alongside explanatory text using Simple Site, thanks to Joe Padfield.

Projects outputs

The table contains a list of project outputs.

Output	Description
Interim report	Interim report written by Gethin Rees and Valeria Vitale and disseminated in time to inform TaNC discovery project applications. https://doi.org/10.5281/zenodo.4569777
Interim findings presentation	Presentation run by TaNC to inform discovery project planning. https://youtu.be/jLbK4E_ebMM
Schools survey and interview questions	Survey devised by Anthony Musson at Historic Royal Palaces. Questions posed as part of a survey of schools (teachers and pupils). The survey consisted of a series of questions to be completed anonymously online via Google Forms by teachers and pupils in response to an invitation on the Historical Association website. Teachers were invited to participate in a follow-up interview posing more in-depth questions about engagement with heritage in teaching, use of sources, use of technology and ways of improving accessibility for schools and their understanding of history. https://doi.org/10.5281/zenodo.6346868
Schools survey report	Report written by Anthony Musson summarising findings from the schools survey and teachers interviews. https://doi.org/10.5281/zenodo.6792357
Our Place audience survey results	Results of a public audience survey. The research was led by Alex Hunt at National Trust in collaboration with Research Bods, a market research company who have delivered results using the National Trust's 'Our Place' online audience research platform. The survey consisted of a series of questions to be completed over the web by 992 members of the public in around 15 minutes. https://bl.iro.bl.uk/concern/datasets/82174333-db07-4108-a069-b6648185f8a7 https://doi.org/10.5281/zenodo.4582250
Research Bods quantitative findings summary	This is a summary of the first phase of Research Bods' two-stage audience research programme compiled by Peter Strachan. The slides summarise key findings from the public audience survey. https://bl.iro.bl.uk/concern/reports/19c1ca6a-29bc-4d28-8a75-832daf60cda1 https://doi.org/10.23636/94st-ah87

Research Bods qualitative findings summary	This is a summary of the second phase of Research Bods' two-stage audience research programme written by John Horgan. The report summarises key findings from focus groups. https://bl.iro.bl.uk/concern/reports/31e646b4-2e3f-4cb3-a696-34f85083d42d https://doi.org/10.23636/a7tr-9j25
Linked Pasts infrastructure workshop dataset	Data created as part of the 'Linking Geo-Data through Test and Play' workshop held in the Linked Pasts 2020 symposium. The workshop presented symposium attendees with three tools: Heritage Connector, World Historical Gazetteer, and Living with Machines' Deezy Match. Each of which forms a critical step in a workflow for aligning and enriching cultural heritage collections metadata using geographical information. Each tool was showcased at a one hour demo. Participants then went away and used the tool to work with cultural heritage datasets courtesy of British Library, Historic Environment Scotland, and Historic England. Participants came back together at a second session and to ask questions, provide feedback and share back data. https://github.com/LinkedPasts/LaNC-workshop https://doi.org/10.5281/zenodo.4555714
Presentation to School of Advanced Study, Digital Hub Seminar Series.	This interim presentation explored how LaNC used audience research methods including surveys and focus groups to inform geospatial data structures and interface design. https://youtu.be/rO442L0OGz8 https://doi.org/10.23636/pmdd-4p53
Locolligo historical geodata curator tool	Locolligo is a prototype, browser-based javascript application for the formatting, linking, and geolocation of datasets, with a particular focus on cultural heritage. https://github.com/docuracy/Locolligo https://doi.org/10.5281/zenodo.6584103
Peripleo web-map interface	Peripleo is a web-map interface for the discovery and spatial visualisation of collections, originally an initiative of the Pelagios Network and developed in 2022 by Rainer Simon and Stephen Gadd. The main development code can be found here alongside the template for producing your own version. The development code contains several of the project's linked datasets structured in LPF. Development code https://github.com/britishlibrary/peripleo-lanc Template https://github.com/britishlibrary/peripleo https://doi.org/10.23636/sd7c-k310

Linked Datasets	Over ten linked datasets structured in the LPF format and used to populate instances of Peripleo. https://github.com/britishlibrary/peripleo-lanc/tree/main/docs https://doi.org/10.23636/sd7c-k310
Locating a National Collection project website	Project website that houses instances of LaNC's Peripleo maps interface alongside descriptive text. Built using Joe Padfield's Simple Site. https://britishlibrary.github.io/locating-a-national-collection https://doi.org/10.23636/e43s-1v22
Digital Humanities 2022 abstract	1,000-word, peer-reviewed abstract for Digital Humanities 2022 conference. P337 https://dh2022.dhii.asia/dh2022bookofabsts.pdf
LaNC end of project webinar	Final presentations from LaNC project team. https://www.youtube.com/watch?v=QL2kQJ2-O4U
TaNC recommendations presentation	Summary of LaNC recommendations to the TaNC programme. https://www.youtube.com/watch?v=QL2kQJ2-O4U

Recommendations for the programme

Engagement recommendations

Recommendation 1: The national collection should connect the collections of GLAMs and historic environment organisations.

LaNC's public audience research and interviews with cultural heritage professionals have demonstrated considerable value in connecting these collections. There is a lack of existing projects, interfaces and datasets that bridge this key divide in cultural heritage.

Recommendation 2: The infrastructure for a national collection should be designed according to actionable audience motivations.

Audience research is critical to the presentation of collections, otherwise 'how do you know you solved the correct problem?' (Norman, *The Design of Everyday Things*, 2013, 217)[1]. However, it must be possible to put the results into practice. Actionable audience motivations connect specific audiences with implementable technologies. LaNC's use of pretotypes or simple interface ideas in focus groups has provided an opportunity to gather feedback that is specific to interface design.

Recommendation 3: Presenting heritage of local significance offers opportunities to broaden the public audience for the national collection.

Quantitative, qualitative and pretotype findings all point to a deep curiosity towards local heritage encompassing motivations like where I live, where I remember and where my family is from. Only those collections that contain precise geographical information connect records to specific locations and enable engagement at this local scale. Presentation at a local scale helps audiences to engage with the breadth of cultural heritage collections particularly as the UK's geography has been reshaped by Covid.

Recommendation 4: Cooperation with schools and exam boards offer considerable opportunities to broaden the audience of the national collection. Geographical information from cultural heritage collections can foster deeper engagement for pupils with the history curriculum through local heritage, visits or use of maps.

Anthony Musson's research demonstrates that geographical information provides an effective method of aligning collections with topics on the curriculum. Moreover, the presentation of records on maps can help teachers and pupils discover relevant digital records quickly and effectively. Objects held in the collections of a national cultural heritage organisation might otherwise be inaccessible to schools in practical terms.

Infrastructure recommendations

Recommendation 5: Coordinates offer a straightforward method of connecting digital heritage records. The resulting connections can be unexpected and might not surface using other methods.

[1] Norman, D., 2013. The design of everyday things. Cambridge: Massachusetts Institute of Technology Press, p.217.

Geographical proximity draws diverse records together in ways that might not be possible with text. Such unexpected connections help a conceptual understanding of place emerge from disparate collection items.

Recommendation 6: Realising the geographical potential of GLAM collections requires the systematic derivation of coordinates.

Coordinates can be derived from geographical information in the metadata or content of GLAM records in varied ways. LaNC has examined manual and automated methods of deriving coordinates from text and it is possible to store coordinates or geographical persistent identifiers in British Library catalogue records. Further work is required to understand how tools and processes might be embedded in cataloguing processes and the extent to which this can be automated.

Recommendation 7: The heritage included in the national collection should be representative of the entire geography of the UK.

Investment in cultural heritage collections such as digitisation, entity linking or web presentation should encompass records containing geographical information with truly national coverage. Such an effort can help the population living in diverse parts of the UK engage with collections. For example, to what extent are the coordinates derived from digitised collections distributed across the whole of the UK? The extraction of geographical information and systematic derivation of coordinate data is one way to examine this question but analysis could also occur at the collection level.

Recommendation 8: Web maps offer an effective interface for accessing the national collection in certain use cases.

Web maps are cost-effective and highly sustainable by the standard of visualisations, being based on Open Geospatial Consortium standards. They are already well-used by the UK public and were the second-most requested feature after text box search in a recent survey (TaNC-commissioned User Research Report, 20). The project implemented search and filter functionality in Peripleo to help users complete the close-ended task of discovering and clicking through to organisational web pages.

Recommendation 9: The national collection cannot rely on a single interface but rather requires a set of interfaces based on user motivations.

The Peripleo user interface was designed for a specific task: the discovery of organisational web pages. In some cases functionality and configuration was not readily applicable to other tasks such as communicating geographical research insights. Similarly, it is unclear whether web maps are well-suited to visualising complex connections between entities that are not geographical such as people or themes. Different types of visualisations may be necessary to facilitate open-ended browsing and exploratory behaviour. Web map and other interfaces for the national collection should not be generic but rather designed for particular tasks. These might include applications designed to communicate research insights and narratives or to facilitate exploration, gaming and the creation of community-generated content. LaNC's research into the presentation of geographical information using interfaces has defined impact in terms of individuals visiting organisational web pages. Such traffic is of considerable value to cultural heritage organisations. The geographical information discussed in this report can also help organisations to engage in-person community groups and to develop community-generated content. LaNC's research into the geography of cultural heritage therefore provides a pathway to realising community impact amongst the UK public.

Contacts

The primary contact for this research is:

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Appendix

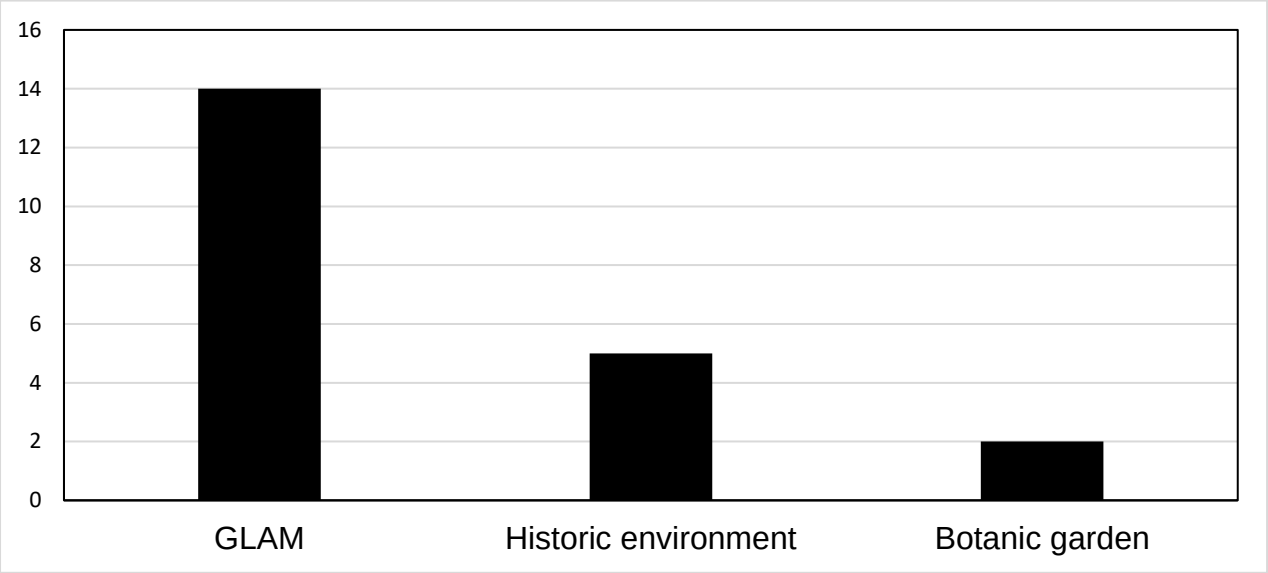


Figure 1. Breakdown of Independent Research Organisations for Arts and Humanities by type. Compiled from ahrc-iroc.org in 2021.

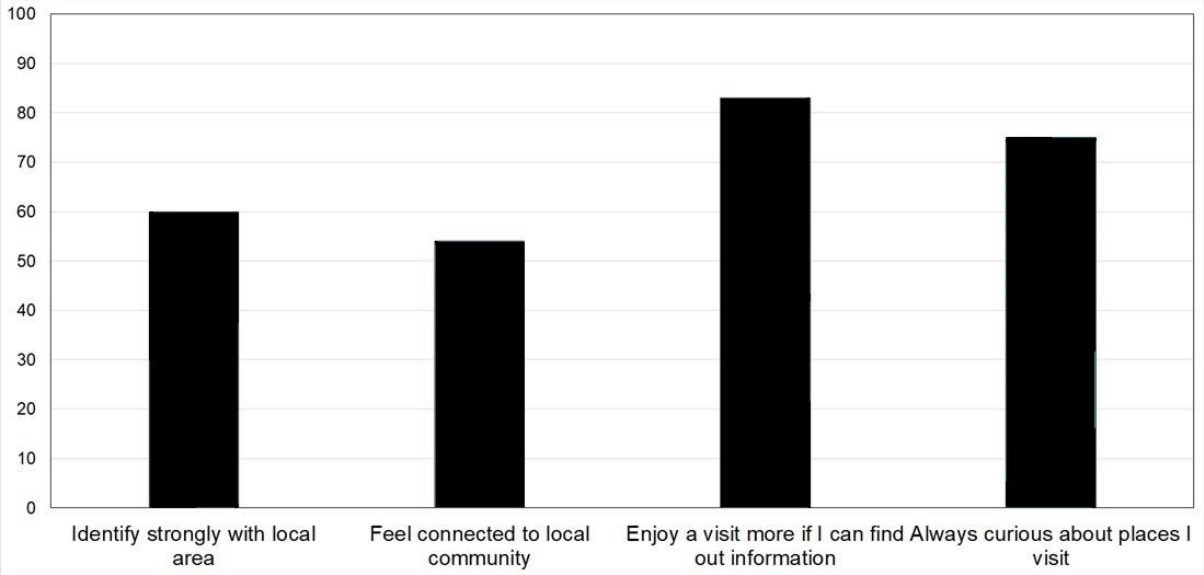


Figure 2. Audience survey results of public attitudes to different types of locations.

Responses to question C4 (two bars on left). *Here are some statements that refer to the place and local area that you now consider to be your home (e.g. County, city, suburb, town or village). Please say how much you agree or disagree with each statement when thinking about this place: (% Agree)*.

Responses to question C6 (two bars on right). *And now we're going to ask you about visiting other parts of the UK. In thinking about travelling to different places, please say how much you agree or disagree with each of the following statements: (% Agree).*

Explore digital resources (like photographs, articles, sketches) that have been "pinned" to a map and grouped in thematic collections such as "Places of the Silver Jubilee Tour" or "Medieval UK"

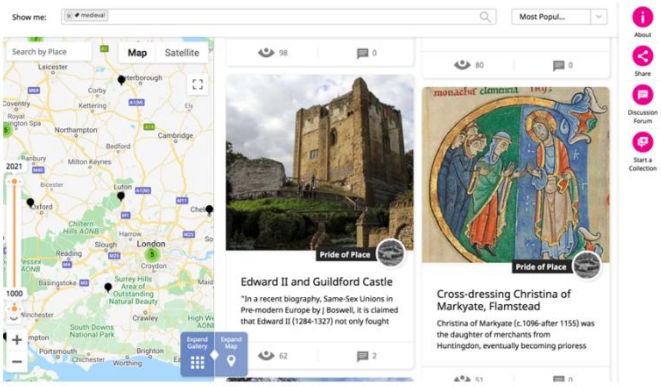
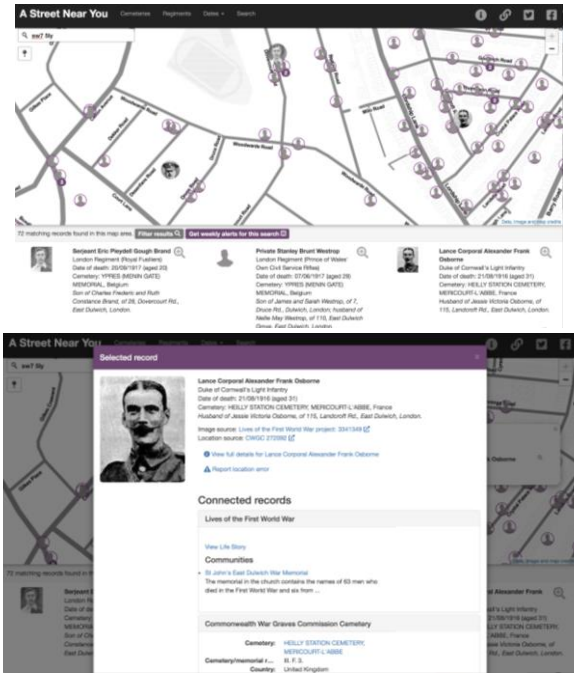


Figure 3. Historypin focus-group stimulus.

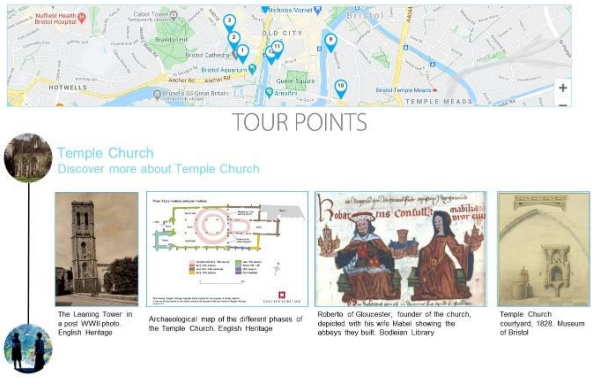


Enter your postcode, and "meet" people from the past who used to live in your area. Click on each record to know more about their lives and stories.

Figure 4. A Street Near You focus-group stimulus.

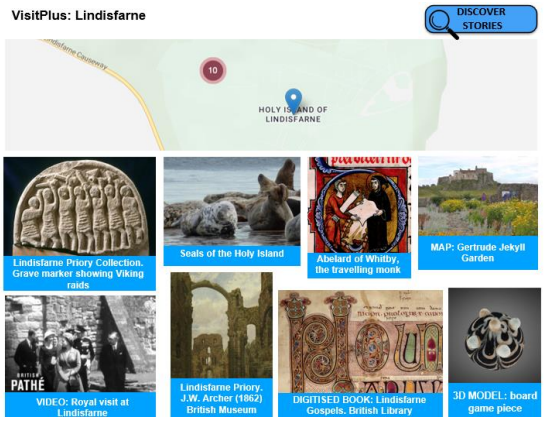
Explore your neighbourhood, and discover the related resources in national collections. Learn more about the history of the place where you live, or find disappeared monuments and buildings.

Figure 5. Heritage for All focus-group pretotype stimulus.



Download the guide on your phone, and explore the city. Discover the urban landmarks, and dive deeper into the history of each monument, accessing photos, videos and paintings from different museums and galleries in Britain and beyond.

Figure 6. Walking Tours focus-group pretotype stimulus.



Dive deeper into the history of a heritage location, like a castle or an archaeological site. You can enrich your visit discovering photographs, paintings and artefacts that are connected with the place.

Figure 7. Visit Plus focus-group pretotype stimulus.

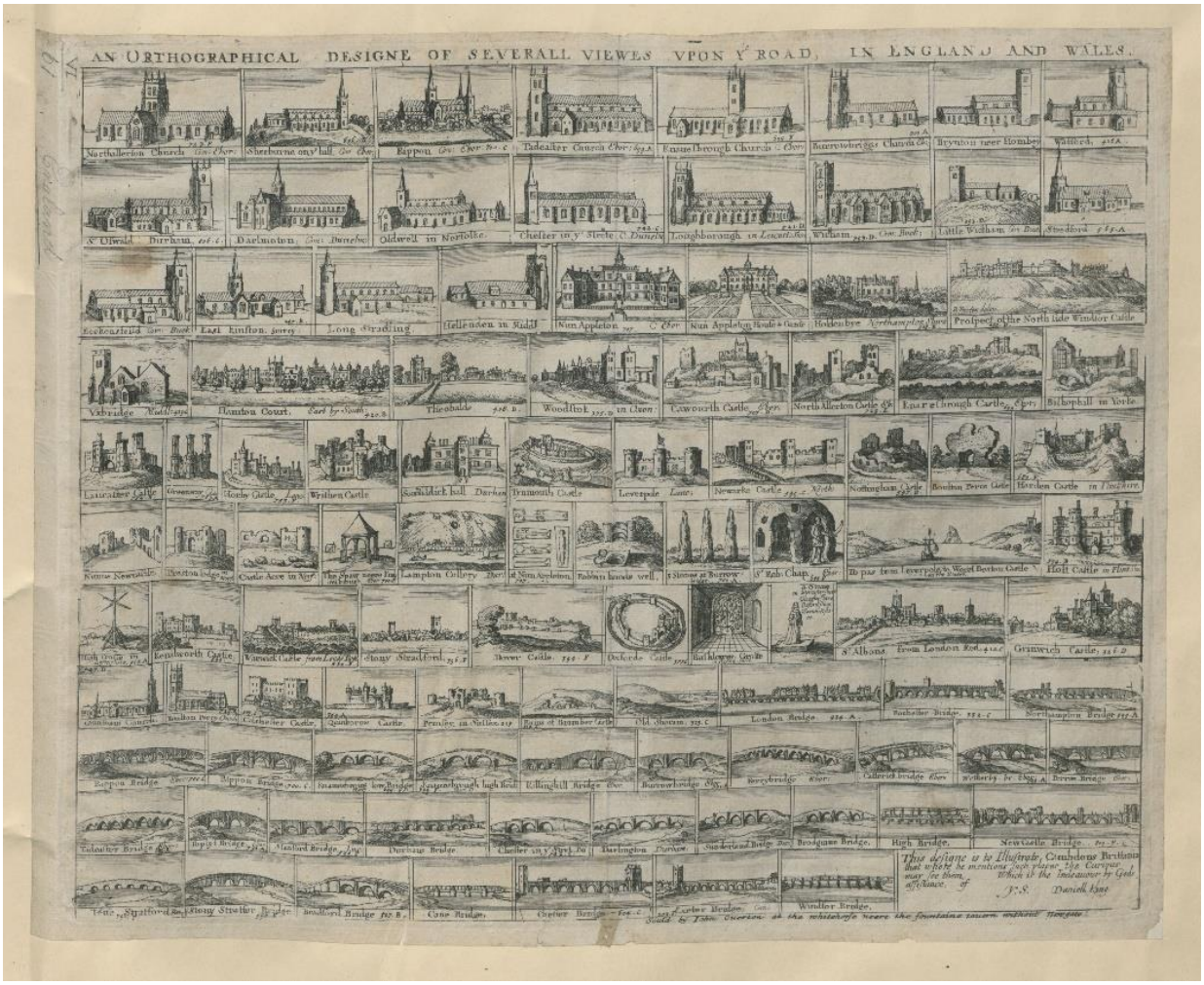


Figure 8. *An Orthographical Designe of Several Views Upon Ye Road, in England and Wales*. Wenceslaus Hollar. Maps K.Top.6.61. https://www.flickr.com/photos/britishlibrary/50263236958

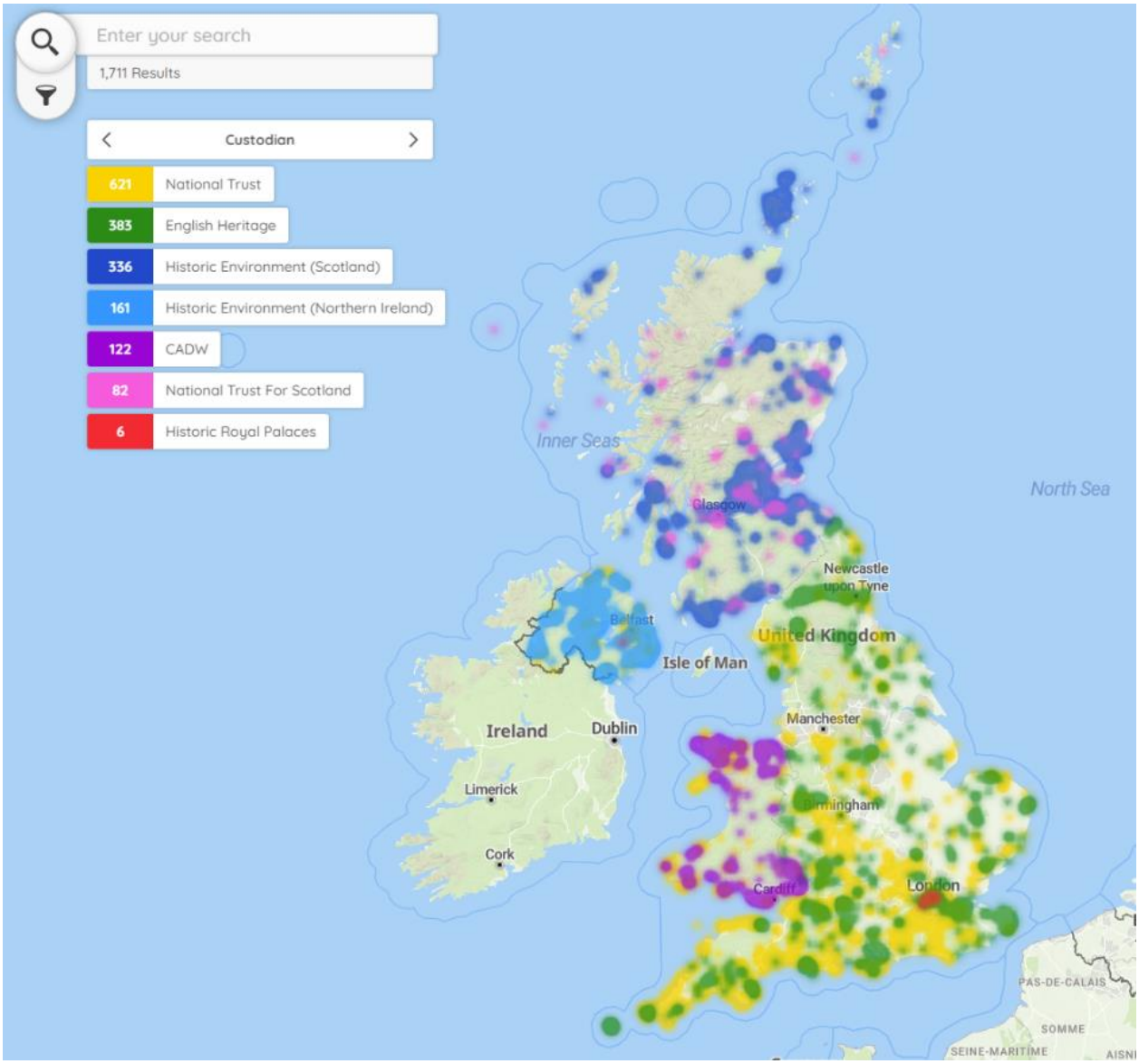


Figure 9. Visit Plus Dataset visualised in Peripleo Mapping Software.