Joining It All Up

New research questions combining site and artefact data in ARIADNE

Julian D RICHARDS, Archaeology Data Service, University of York, UK

Summary

This paper discusses the situation that exists in several European countries, whereby information about archaeological sites and monuments, and that about finds recorded by members of the public (primarily via metal-detecting), is held in entirely separate databases. This prevents heritage management decisions being taken with full awareness of known archaeology, and make research which seeks to draw on multiple information resources difficult. The paper demonstrates how the European ARIADNE e-infrastructure has facilitated the integration of large-scale artefact and site information for the first time. Over one million records from the British Museum Portable Antiquities Scheme database and over one million records for English sites, monuments, and grey literature have been integrated in an open access interface for the first time, permitting entirely new research questions to be addressed.

Worlds Apart

For England, as in most European countries, there are national and regional registers of archaeological sites and monuments. In England the primary record is managed at county level, where it is generally known as the Historic Environment Record (HER), although sometimes the previous nomenclature of Sites and Monuments Record (SMR) is still used. Whatever the terminology, its primary purpose is for heritage management, as it the main means of assessing the potential threat to known archaeology during development control and the planning process. However, it has a valuable secondary usage in addressing archaeological research questions. HERs are now largely digital and contain information about known sites and monuments, normally encompassing both the above-ground built environment and below-ground buried archaeology. They also contain continually updated information derived from archaeological fieldwork, largely compiled from unpublished fieldwork reports – the so-called grey literature. The county HERs for England are aggregated at national level

in the Heritage Gateway, managed by Historic England, which allows cross-county distributed searching.[1]

Whilst HERs provide comprehensive information about known sites, their coverage of discoveries of individual artefacts is generally poor. For that there is a parallel national database, the Portable Antiquities Scheme (PAS) Database, managed by the British Museum.[2] The PAS was founded in 1997, largely in response to the growth of metal-detecting as a hobby, and the perceived risk of loss of archaeological information. In England metal-detecting is entirely legal, so long as it is not undertaken on protected "Scheduled" sites. Recording is voluntary, unless the items are classed as 'Treasure', which broadly comprises artefacts and coins in precious metals as well as hoards. The PAS developed a national network of largely county-based Finds Liaison Officers (FLOs) to assist in the voluntary recording of finds and to maintain the database. The majority of FLOs are based in museums but even when they work in the same county council office as the HER officer, the separate database is maintained. Nonetheless, the scheme has been extraordinarily successful and as of June 2022 the database holds information about more than 1.5 million artefacts and coins. This is a rich research resource and countless research projects and PhDs, as well as undergraduate student projects, have made extensive use of the PAS database. The data is all available under an open licence. However, as a result of the separation of information the PAS is rarely, if ever, consulted in development control and the planning process. In a rare exception the local government archaeologist Boldrini (2006) undertook a study of the problems of using PS and HER together. Similarly, most academic researchers have struggled to use the PAS alongside HER information and grey literature. One of the few exceptions in University of Oxford's ENGLAID project which required major ERC funding, over ten researchers and a bespoke database in an effort to combine PAS and HER data in a study of the development of the English landscape (Gosden et al 2021).

In summary, site and artefact data effectively exists in two worlds in English archaeology. Sites are largely investigated by professional paid archaeologists, whose results end up in HERs; whilst artefacts are largely found by members of the public – amateur hobbyist detectors users – and recorded in the PAS database. The digital world mirrors the recording context, and makes it extremely difficult for heritage managers or researchers to use both sources of information. Yet both are essential in order to gain a complete understanding. Many archaeological sites of critical importance are known only from the artefact scatters, whilst many artefact distributions can only be interpreted in the light of the known archaeology of the area. For example, Anglo-Saxon brooches are regular metal-detector finds in lowland Eastern England – and generally originated as grave-goods placed in inhumation graves. They have invariably been disturbed by ploughing of hitherto unknown Anglo-Saxon cemeteries, and plotting such artefactual clusters can help complete the distribution map of such cemeteries. Similarly, my own research, into the Viking armies which invaded England in the ninth century is dependent upon use of the PAS to discover sites which the Vikings visited, and which exhibit characteristic assemblages of artefacts (Hadley and Richards 2018). This situation is not unique to England. In several Scandinavian and northern European countries, including Denmark, Finland,

---

[1] https://www.heritagegateway.org.uk/gateway/

[2] https://finds.org.uk

and the Netherlands, there are now national schemes for the recording of finds made by members of the public, but in each case, these sit outside the national state regulated heritage databases.[3]

Data integration via ARIADNE

The ARIADNE infrastructure brings together a wide variety of archaeological resources in its portal, allowing the cross-search of archaeological data drawn from over twenty countries.[4] The portal is underpinned by an RDF triplestore and data is mapped to a shared ontology, the AO-Cat, which is a subset of the CIDOC-CRM. The portal allows data discovery via three key parameters: What, When and Where. Interoperability is achieved by using the ISO WGS84 spatial standard for latitude and longitude information, mapping of all national period terms to absolute dates using the PeriodO web service, and mapping of all native subject terms to the Getty Art and Architecture Thesaurus (AAT) (Aloia et al 2017; Richards and Niccolucci 2019).

Fig. 1. ARIADNE portal, illustrating the landing page for the description of a specific artefact resource – a copper alloy strap end (id FAKL-5363F3) drawn from the British Museum Portable Antiquities Scheme. The inset map shows the 1km bounding box (red) with other artefacts (red pointers) set against other types of resources, including unpublished fieldwork reports and sites and monuments records (blue pointers).

---

[3] DIME (https://www.metaldetektorfund.dk/); PAN (https://portable-antiquities.nl); SuALT/FineSampo (https://blogs.helsinki.fi/sualt-project/)
[4] https://portal.ariadne-infrastructure.eu

The use of data standards and controlled vocabularies enhances access, by making data made available by several providers comparable. The portal now holds almost one million resources from the PAS database, and an equivalent number of records from the English HERs, as well as over 60,000 grey literature reports from the Archaeology Data Service. This is the first time that all these resources have been brought together in a single search interface. Already we can see how the portal can make it possible to address new research questions, allowing researchers to investigate how clusters of artefacts discovered by members of the public may relate to known archaeological sites or, in other cases, they may indicate the presence of hitherto undiscovered sites (Fig.1). Finally, the integrated search provided by the ARIADNE portal reinforces the importance of Citizen Science in contributing to new knowledge, particularly when this information can be placed aside existing knowledge created by professional archaeologists.

Funding

References

Aloia, N., Binding, C., Cuy, S., Doerr, M., Fanini, B., Felicetti, A., Fihn, J., Gavrilis, D., Geser, G., Hollander, H., Meghini, C., Niccolucci, F., Nurra, F., Papatheodorou, C., Richards, J., Ronzino, P., Scopigno, R., Theodoridou, M., Tudhope, D., Vlachidis, A. and Wright, H. (2017). 'Enabling European Archaeological Research: The ARIADNE E-Infrastructure', Internet Archaeology 43. DOI: 10.11141/ia.43.11

Boldrini, N. (2006). 'Planning Uncertainty: Creating an Artefact Density Index for North Yorkshire, England', Internet Archaeology 21, DOI: 10.11141/ia.21.1

Gosden, C., Green, C., Cooper, A., Creswell, M., Donnelly, V., Franconi, T., Glyde, R., Kamash, Z., Mallet, S., Morely, L., Stansbie, D. and ten Harkel, L. (2021). *English Landscapes and Identities: Investigating Landscape Change from 1500 BC to AD 1086*. Oxford University Press

Hadley, D.M. and Richards, J.D. (2018) 'In Search of the Viking Great Army: Beyond the Winter Camps', Medieval Settlement Research 32, 1-7. DOI: 10.5284/1059013

Richards, J.D. and Niccolucci, F. (eds.) (2019). *The ARIADNE Impact,* Archaeolingua, DOI: 10.5281/zenodo.4319058