

**FROM SITES AND MONUMENTS RECORDS
TO HISTORIC ENVIRONMENT RECORDS,
FROM PLANNING TO RESEARCH**

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March 2007

ABSTRACT

This thesis explores the development of Sites and Monuments Records (SMRs) and their transformation into 'Historic Environment Records' (HERs), paying special regard to their role as research tools. The study draws on extensive surveys of policy, recording standards, and operational practice. Detailed surveys have been carried out in order to characterise the use of SMR and HER information by researchers and other user groups.

SMRs and HERs have captured a vast unrivalled source of information about the historic environment, for which there is an established and increasing demand. Nevertheless, they are resources that are generally under-exploited for research and education purposes. It is argued that both the lack of use, and poor use, of SMR and HER information represent lost opportunities for interpreting our past, and seriously affect the integrity of current archaeological research.

The delivery of HER enquiry services using World Wide Web tools is fundamental to their future development and wider appreciation. Examples of Web-enabled HER and related services are reviewed. One of the main challenges faced in the development of online HER services is to embed intuitive assistance within the search process, so that users can more easily select data that matches their research needs. An equally important concern is the ability of current HER recording structures to represent non-monument thematic data (particularly landscape-scale concepts) and interpretative ideology. HERs must respond to these issues in order to engage more closely with the dialogue of archaeological research.

The use of metadata to extend and complement core HER records is explored, along with enhanced search tools, such as those exemplified by the Archaeology Data Service's Common Information Environment demonstrator and its use of techniques drawn from faceted classification. A main case study concerning Fenland archaeology and its research potential is used to test a model for a user-extensible Historic Environment Record.

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ACKNOWLEDGEMENTS

The MPhil phase of this study was supported by a consortium comprising the Association of Local Government Archaeology Officers, English Heritage, Northamptonshire Heritage, and the University of York. I thank these organisations for their financial assistance and their representatives; Steve Catney, Kate Fernie, Glenn Foard, and Kevin Walsh; for advice and discussion during and between Thesis Advisory Panel meetings. Julian Richards, as supervisor, has provided advice and stimulating discussion over a long period. I appreciate his patience and thoughtful assistance. I am also grateful for the comments of my examiners, Laurajane Smith and Gary Lock.

Mark Bennet of Lincolnshire SMR, Christine Addison of Northamptonshire SMR, Donnie Mackay of the National Monuments Record, and William Kilbride of the Archaeology Data Service provided access to correspondence and user records. Christine Addison also provided valuable SMR information for the Bronze Age landscape case study. Stewart Waller shared his experience of developing the ADS CIE demonstrator. I thank them for their time and thoughts.

The members of the academic user group helpfully provided frank views on their experience of SMR use. Many SMR (and latterly HER) officers and associated professionals throughout the country, have contributed to discussions concerning many issues touched on by this work.

I dedicate this work to my family.

AUTHOR'S DECLARATION

This work is the product of the author's own research. Material drawn from a formative version of Chapter 1 was published as a short paper in Oxford University Committee for Archaeology monograph no. 5, *On the Theory and Practice of Archaeological Computing* (Robinson 2000, 89-106).

INTRODUCTION

Sites and Monuments Records (SMRs), now more often known as Historic Environment Records (HERs), are the descendants of the archaeological monument inventories developed by the pioneers of landscape archaeology, archaeological conservation, and the Ordnance Survey, our national mapping agency. They were developed primarily in order to assist archaeological advisors to Local Planning Authorities, and have sought to become comprehensive inventories of the archaeological resource within the administrative areas that they serve. Despite their continuing non-statutory status as a required local authority function, SMR and HER services are now well embedded within national and local planning policy and wider archaeological resource management practice. They routinely inform strategic development plans, day-to-day planning decisions, conservation initiatives, and survey projects.

The first SMRs comprised collections of indexed record cards allied to Ordnance Survey paper map sets and overlays, on which the locations of sites and monuments, with associated reference numbers, were plotted. The use of computer databases for the management of core information is now universal, and most SMRs and HERs make use of Geographic Information Systems (GIS) to manage a range of spatial information (Bell & Bevan 2004, 12). SMRs and HERs are dynamic information resources that are continually updated as new archaeological work generates more data. Their database entries, libraries of fieldwork reports and other documentation, and collections of photographs, etc. (Baker 1999, 15-20; Newman 2002c) often comprise the most comprehensive source, or only source, of information about specific archaeological sites. SMRs and HERs have been able to accumulate information at a level of detail and at a pace that cannot be matched by traditional archaeological publication methods, or the national archaeological inventories.

The change of name, from Sites and Monuments Record to Historic Environment Record, has been brought about by the expectation of an expanding remit. Archaeological conservation and research now embraces a wider range of historic features than the first SMRs were designed to record. Better integration with other environmental databases is now considered desirable (Baker 1999, 19-20; Newman 2002c, 10). The term

'Sites and Monuments Record' does not accurately reflect these ambitions, so the term 'Historic Environment Record' has been enthusiastically embraced as the preferred alternative (for example, Department of Culture Media and Sport 2004; Davis 2005). Many SMRs were renamed HERs during the course of this study.

HERs are sub-categories of a wider class of 'Historic Environment Information Resources' (HEIRS) that seek to record various aspects of the archaeological resource and historic environment. The term HEIR also encompasses inventories such as the three National Monument Records and the database of the Portable Antiquities Scheme.

SMRs and HERs do not only support localised planning and conservation functions. Collectively, the English SMRs and HERs have become the nation's most comprehensive and up-to-date source of information about archaeology in the environment. As such, they have informed the national selection of monuments for designation as Scheduled Monuments, and provide information for other nation-wide and regional archaeological conservation initiatives.

The development of national data standards and the general encouragement and financial assistance provided by the national heritage agencies, have not yet produced a truly integrated national network of SMRs and HERs. The national community of SMR and HER services, each of which is maintained by separate organisations (usually one of the tiers of Local Government), under various management arrangements, displays significant diversity in structure, recording practice and user services (Baker 1999; Newman 2002c).

Nevertheless, the first important steps have been taken to make comprehensive aggregated HER information accessible via the World Wide Web.

Thesis aims

SMRs and HERs are highly successful tools for archaeological conservation and development control. They are also used to assist local studies work, education projects, and academic archaeological research at local, regional and national levels. There is a widespread perception, however, that SMRs and HERs have fallen a long way short of fulfilling their potential in these regards.

The failure of SMRs and HERs to fully engage with and inspire academic research is particularly worrying. It raises questions about the integrity of the academic exploration of our nation's past, and has serious implications for the future management of our environment. It represents an appallingly wasted opportunity.

My research has been instigated in the belief that HERs, as means to investigate aspects of the nation's archaeological resource within a range of contextual spatial environments, represent a crucial research resource.

I have sought to investigate how SMRs, during their transformation into online HERs, can become better research tools. What do researchers want from HERs? How should HERs develop in order to make a greater contribution to archaeological research effort? How can information and communications technology help achieve this aim?

The thesis examines the historic legacy of SMR development, in terms of information content, data structures, management policy and practice. The character of enquiries presented to SMRs by different users is analysed. The use of SMR and HER information in published research and within student work is characterised. The informational needs of higher level researchers are investigated.

The thesis then explores the ways in which developing information and communications technologies offer hitherto unobtainable opportunities for the networking and dissemination of HER information. How can HERs harness this potential, and what are the potential pitfalls?

I also seek to examine whether current monument inventory information structures and enquiry tools, the building blocks for future HER development, are suitable for research purposes. Do they allow archaeological evidence to be presented and interpreted in a variety of different ways? Do they encourage intelligent and participatory dialogue with research users, so that new perceptions of the historic environment can be captured and disseminated?

Background to this study

I began this study as part-time MPhil research during 1999, but my various experiences of Sites and Monuments Record services extend over a longer period.

My first introduction to an SMR occurred in 1989. The SMR concerned, covering Cambridgeshire, comprised a series of old 1:10,560 and 1:10,000 scale Ordnance Survey map sheets marked (in varying degrees of neatness and accuracy) with small crosses and site numbers. Crop mark plots were reproduced by hand on the base maps, or on transparent overlays for each 1:10,000 map sheet.

The database of site information was held on the County Council's mainframe computer system. The limited tools of the text editor made creating, formatting and changing SMR records tortuous. Launching searches for various forms of information and printing results was not straightforward. Text print jobs (there were no graphics or images) were collected from a slow dot matrix printer in a distant part of Shire Hall. Enhancing and searching the SMR database were not inclusive processes. They were 'black arts' known to only one or two people at a time.

Over the next few years, though mainly involved with excavation projects, I was occasionally seconded to various survey and SMR enhancement projects. These involved taking bundles of SMR entry print-outs and maps into the field, checking the veracity of information and the current status of sites, and generating new SMR information. The advantages of a dynamic inventory were readily apparent. So too was the necessity of ensuring that the inventory reflected the situation in the field. Sometimes I would I arrive

at a site to find that it had been built on or quarried several years before, or was surrounded by unfamiliar development. These important modern contextual landscape changes were not represented on the increasingly out of date Ordnance Survey base maps.

As development-led fieldwork increased and divisions between 'curatorial' and contractual services were defined, we established a contracting field unit. I became a consumer of SMR information for commercial archaeological projects. I routinely submitted requests for SMR information to assist the production of project designs and cost estimates, and to inform contextual discussion of project results. I could not contemplate planning a fieldwork project without first appraising SMR information and supporting sources. Though always appreciated, it was not always available as quickly or as comprehensively as I would have liked.

During the early 1990s I was able to introduce electronic surveying equipment and mapping software into the contracting unit's activities. We experimented with rudimentary Geographic Information System functions, such as site mapping and the intra-site analysis of artefact distributions. Although now fully immersed in contract archaeology, I was also called upon to review options for new SMR database software and to help steer the introduction of the first GIS facility for the county's SMR. During the course of this work I was able to further explore the various ways that different SMR services interpreted the business of recording archaeology in the environment.

Taking an MA in Archaeological Heritage Management at the University of York in 1992/1993 exposed me to some of the more theoretical issues that underpin landscape recording, the creation of record systems, and the use of GIS. I also became a student research user of SMRs for the first time, basing course work and part of my thesis on SMR information.

In 1998 I left contractual archaeology to become the archaeological advisor ('curator') to a new Unitary Authority, Peterborough City Council. The role required the establishment of a new SMR service, partly using information that derived from two existing SMRs (one of which was entirely paper-based and had not been actively maintained for some years), and the implementation of suitable database and GIS applications. Again, this

provided me with an opportunity to consider the various options then available, albeit with an emphatic awareness of operational constraints.

Since then I have been responsible for promoting the use of SMR and HER information for various purposes, and responding to thousands of information requests from a wide range of different users - members of the generally-interested public, museum colleagues, planning colleagues, students, teachers, researchers, farm managers, conservation agencies, archaeological contractors, consultants, media companies, etc.

In parallel with my main jobs in contractual and curatorial archaeology, I have had the opportunity to undertake some part-time teaching. I have designed and delivered short courses and sessions for certificated extra-mural University programmes, undergraduate and taught post-graduate programmes, and schools and colleges. This has enabled me to introduce many students to SMRs and HERs, and to encourage and guide their use of SMR and HER information for project work.

This multi-faceted experience of SMRs and HERs has undoubtedly assisted my research for this thesis in various ways. Accessing the professional networks (contributing to meetings and forums) has probably been easier for me as an 'insider', than it might have been for many postgraduate students. I have gained many useful insights into SMR and HER management issues, and how Information Technology and information standards are applied in practice. Dialogue with a wide variety of users over several years has helped me to appreciate their perceptions of SMR and HER services and information.

I have long been convinced of the value of SMR and HER information to research and many other applications, and I am confident that systems and management arrangements can adapt to meet the changing demands placed upon them.

Nevertheless, I have remained conscious of the need to take a step back from my own experiences and impressions. I have attempted to gather information about SMRs, HERs, and related systems, to form a solid well-documented platform, from which suggestions for further HER development can spring. My survey methodologies, therefore, ally

quantitative analysis with the qualitative impressions of others.

Methods

It is important first to understand the historic and current context for the development of Historic Environment Records, in order to discuss their potential for future development. The first section of the thesis draws on published works by academics and practitioners, professional technical papers, guidance notes, policy statements, and existing survey information. It appraises the practical and theoretical issues that have shaped SMR development, under a series of thematic headings (Chapter 1).

Future HER developments should be based on both a thorough understanding of the present research uses of SMR and HER information, and an impression of potential future informational demands. Potential audiences for SMR/HER information, within which education and research users figure prominently, have long been defined (Lavell 1985; Fernie & Gilman 2000; Grant 2002; Grant 2003). Very little detailed analysis, however, has been carried out across the SMR community of the actual use of SMR information and the informational needs of various SMR users (Grant 2002, 3; Chapter 1; Chapter 2). It has recently been observed, with regard to online Historic Environment Information Resources (HEIRs), that "...the user community has not yet been fully understood, nor do we understand in detail what users do with resources once obtained" (Brewer & Kilbride 2006, 1.1.2). This statement is equally applicable to earlier stages of SMR development as it is today. Now, however, SMRs stand on the threshold of their transformation to networked online HERs, and the anticipation of much wider use.

The second phase of my study, therefore, focused on creating and applying methodologies for analysing HER enquiries and their relationships to different user groups, and characterising the extent and nature of HER use for research purposes.

Chapter 2 incorporates the analysis of around 1,700 real enquiries that had been presented by external users (i.e. other than SMR staff and other

curatorial staff) to differing SMR services, the English National Monuments Records, and the Archaeology Data Service catalogue.

Chapter 3 complements the findings of Chapter 2, by focusing on the character of SMR and HER use as expressed in the products of research. Around 1300 articles from representative journals (such as *Britannia*, *Medieval Archaeology*, and *Northamptonshire Archaeology*) and student dissertations were appraised, in order to examine the contributions that SMR/HER information makes to education and research study.

These surveys provided good quantitative and qualitative benchmarks. They did not reveal much, however, about researchers' impressions of SMR and HER use, or their aspirations for future use. Frustratingly few written statements could be found that reflected research users' experiences of SMRs, or their thoughts on directions for future developments (Chapter 1, section 1.4).

Therefore, I assembled a focus group of ten researchers from various universities, with different research interests, and varying degrees of SMR experience. The focus group members helped me to examine the gaps between what SMR and HER services are currently able to deliver, and the actual informational requirements of various forms of higher-level research. The focus group was also able to assist with the assessment of the main data standards and structures already in place, and their appropriateness for research purposes. Its members also provided some very useful opinions regarding the key issues for future HER development. Chapter 4 and Appendix 4 present the findings.

Case studies, using real SMR datasets and research problems (Chapter 4, section 4.5; Appendix 5), helped to further explore the process of extracting meaningful research data from SMRs and HERs.

There are obvious attractions to researchers and other user groups in being able to obtain vast quantities of aggregated HER information remotely. The Internet and World Wide Web offer the best prospects for disseminating networked HER information, and there are now a variety of models that HER services could adopt for Web-delivery of their information. A representative selection of these has been reviewed

(Chapter 5; Appendix 8). The combination of the search techniques that they offer, and the data standards concepts that underpin HER development, have been assessed in relation to research user needs and preferred search strategies.

Despite the undoubted strengths of the various systems and an increasing number of creative ways to enable database searches, important shortcomings and issues for future development were revealed. The available online systems seldom provide sufficient search assistance, or appropriate contextual information, to ensure integrity in search results. They are not able to respond to research enquiries in the same helpful, intuitive ways that the best manual SMR/HER enquiry services are able to achieve.

Chapter 6, therefore, investigates some of the established and emergent knowledge and information management techniques that could provide a basis for an intelligent HER search interface. The type of system represented by the Archaeology Data Service Common Information Environment demonstrator is found to fulfil many of the defined criteria for a more responsive HER search interface.

In order to develop and respond to ongoing research efforts, HERs should also seek to assimilate concepts deriving from research, rather than simply presenting themes and relationships inherent in established monument recording data structures.

Chapter 7 comprises a case study that helps to explore some of these issues further. The Fenland historic environment and its research potential are used to examine the complexities of representing the historic environment in HERs.

Chapter 8 presents a model for a user-extensible Historic Environment Record that is able to capture research concepts and landscape-scale interpretations, and embed them within its structure alongside traditional SMR recording subjects. Examples are drawn from the Fenland historic environment case study.

The thesis mainly considers the experience and development of English SMRs and HERs, but references are made to related systems further afield and to wider information systems theory and practice. In accordance with its widespread usage and its official acceptance, the term 'Historic Environment Record' ('HER') is used to describe future Sites and Monuments Record development throughout this thesis. The term 'Sites and Monuments Record' ('SMR') has been retained to describe historic SMR development and those inventories that were still known as SMRs at the time they were studied.

Before reviewing the historic development of SMRs and HERs in more detail, it is necessary to define their place within the wider discipline.

The wider archaeological context for the study of SMRs and HERs

The examination of SMR and HER practice embraces four interwoven themes that are common to wider archaeological theory and practice:

'the archaeology of places' - the role that spatial relationships between groups of cultural remains and their geographical contexts have to play in understanding the past;

'classification techniques' - the collation of archaeological information and its ordering by type;

'resource management' - the management of archaeological remains within today's society and for the future;

'the dissemination of information' - the provision of archaeological information to assist appreciation, understanding and research.

The archaeology of places

The past can be considered a source of "values, self-understanding, and identification" (Vaughan 1985, 6). Perceptions of the past may derive from either theoretically structured academic work, or from an array of alternative observations (Hodder 1991, 172-174). Collectively, as societies

and cultural groups, and as individuals, we place values upon archaeological remains that reflect our prevailing perceptions of the past and our perception of them in the present (Lipe 1984, 2-9). In addition to the values we ascribe to archaeological remains on the basis of our perceptions of their temporal and cultural associations, our cognitive connection to them is, in part, based upon their spatial associations with each other, and with ourselves.

Provenance matters in archaeology. From the earliest days of treasure hunting, dilettante collecting, cabinets of curiosities, and grand tours, the collation of information regarding provenance, if only at a basic level, has always gone hand-in hand with the observation, recording, and accumulation of the remains themselves. The association of 'place' feeds into the symbolic or associative value (Lipe 1984, 2-9) attributed to archaeological remains. It determines whether they represent the exotic or familiar, and relates them to geographically bounded cultural entities. More prosaically, it influences their economic value (Lipe 1984, 2-9) as a reflection of the rarity of the remains within a specific context, and the efforts taken to transport them from that context, or to visit them.

The developing discipline of archaeology, however, while remaining attentive to symbolic (or associative) and economic values applied to its subjects, grew from a desire to explain the past, rather than simply to collect and marvel at its physical remains. 'Informational' value (Lipe 1984, 2-9) is archaeology's primary concern. The careful scrutiny of archaeological remains within their geographic context, and of their spatial relationships with each other, is crucial to their ascribed informational value.

A geographical or landscape-based approach to understanding the past, building on preceding antiquarian approaches to topographic study, was advocated and applied by people such as Haverfield, Myres, Crawford, and Fox, during the early years of the last century (Trigger 1989, 249). Indeed, archaeologists gradually came to recognise landscapes themselves as artefacts through which human behaviour may be explored and explained; not simply as terrain and soils upon which human behaviour occurred. Hoskins' assertion that the English landscape "...to those who know how to read it aright, is the richest historical record we possess" (quoted in Taylor

1973), has been greatly reinforced by archaeological practice over the last five decades. Firstly, by a close alliance between established archaeological techniques (such as aerial photographic interpretation, fieldwalking, earthwork survey) and certain aspects of social history research (place-name studies, social geography, etc.), and then by the development of various scientific techniques for palaeoenvironmental analysis. The former is exemplified in the post-war examination of deserted medieval settlements (Beresford 1983), land holdings (Bond 1979), and field systems (Hall 1995). The latter borrowed palaeobotanical techniques such as pollen analysis and soil micromorphological analysis, from areas such as Quaternary studies, to create the sub-discipline of environmental archaeology, which is now well integrated into standard archaeological practice.

Landscape Archaeology, which draws on this battery of technical and theoretical development (not least the relatively recent availability of Geographic Information Systems), is now a mature sub-discipline. It has moved from pure functionalist and structural concerns to the consideration of themes commonly associated with Post-Processual theory. Perceptions of landscape, the symbolism of landscape structure, and the effects of inherited landscape upon cultural development, are all embraced by modern Landscape Archaeology.

SMRs and HERs are concerned with documenting aspects of past landscapes and their manifestations in today's landscape. Whereas the term 'Sites and Monuments Record' implies an interest in discrete islands of heritage within the modern landscape ('monuments'), the term 'Historic Environment Record' suggests a more holistic representation of landscape heritage. It implies promise of an information resource that is better able to capture the history of places, rather than merely catalogue places of heritage interest.

Classification

Classification, as a means of defining typological sequences and obtaining relative chronologies, became extremely important with the establishment of evolutionary thought during the nineteenth century. The development of humans and their societies throughout our long prehistory could be

understood only if their material remains could be placed in the correct temporal order. Stukeley grouped monuments such as burial mounds into types based on their form as a means to ascribe their construction to specific peoples (Trigger 1989, 62). Cunnington and Colt Hoare also developed a barrow typology during their Wiltshire fieldwork. But it was not until the later nineteenth century that common typologies and dating frameworks were agreed and developed. Thomsen advocated the 'three age' system based on the use of stone, bronze and iron, and then refined chronologies on the basis of artefact context and stylistic progression (Trigger 1989, 73-81). Worsaae (sometime colleague of Thomsen and the University of Copenhagen's first Professor of Archaeology) and the Swede Oscar Montelius, significantly refined Thomsen's work (Trigger 1989, 73-86; *ibid* 156-161). Classification grew in complexity with the development of early scientific excavation techniques by archaeologists such as Pitt-Rivers and Petrie, and the culture-historical analysis of archaeologists such as Childe.

The systematic collection and ordering of large amounts of archaeological information, however, became pivotal with the advent of Processual or 'New Archaeology'. The distillation of archaeological observations into rational items of information, or data, in order to obtain interpretative truths was a general feature of the positivist approaches of 'New Archaeology'. The 'systems theory' approaches of Binford and David Clarke, particularly the functionalist interpretations, drew on quantitative methodologies (Clarke 1968; Trigger 1989, 310) and the automated analysis of information to produce classified data (Lock 2003, 136). The adoption of computer technology, as a means of number-crunching archaeological interpretation from large bodies of information, demanded more rigorous sampling and classification than had been necessary before.

Wholly scientific 'New Archaeology' approaches to the study of the past have received modern criticism (Hodder 1991, 33-34) but classification techniques, quantitative methods and computer data remain central to the post-Processual discipline (Lock 2003, 12).

SMR (and now HER) recording practice has been moulded by wider archaeological classification theory. It has been developed in consideration of the experience of computerisation of other forms of heritage information,

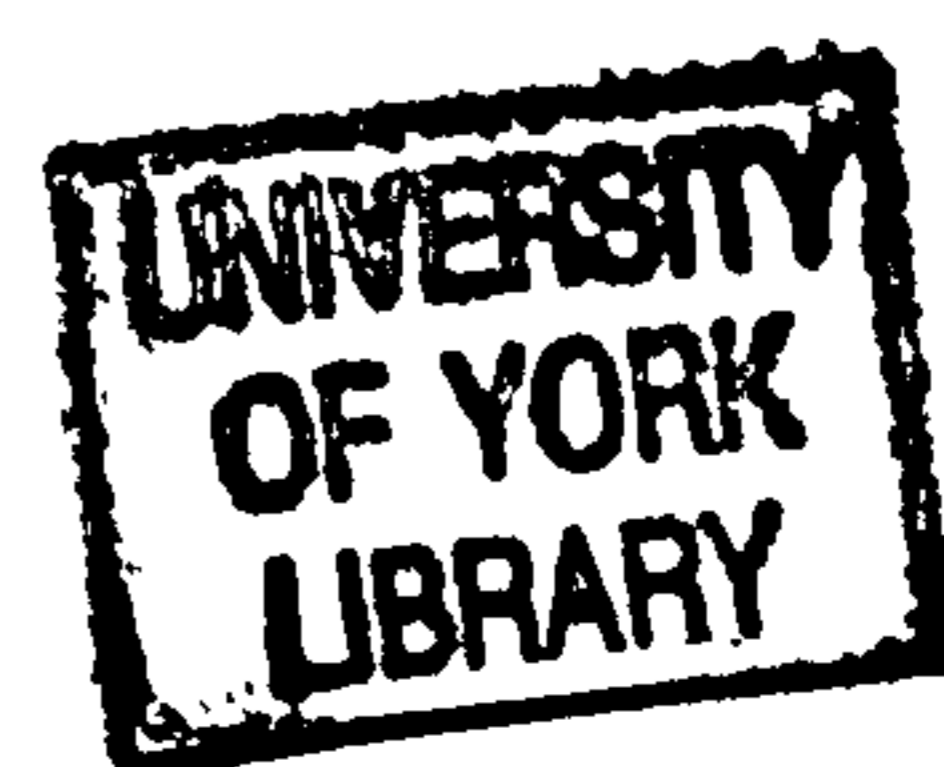
such as the management of museum collections. Past and current SMR and HER recording standards also reflect theory adapted from wider humanities and libraries models, and techniques adopted from Information and Communications Technology practice.

Resource management

The heritage conservation movement, whereby historic remains are systematically preserved and managed on the basis of commonly understood assumptions about their value as sources of information or for wider amenity purposes, is a modern phenomenon.

Until modern times, the protection of archaeological remains was highly selective, unsystematic, and usually achieved only as a reflection of their perceived symbolic value or monetary value. The protection afforded to burial places by ancient Germanic societies, for example, was a reflection of reverence for dead ancestors and their possessions in the afterlife (Kristiansen 1989, 24) rather than a desire to preserve them as a dwindling stock of monuments that could provide information about the past. The acquisition of unclaimed ancient treasure by the Crown throughout the medieval period, the basis of our current portable antiquities legislation (Cookson 2000, 229-250), was primarily a fiscal measure rather than one of philanthropic curatorship (Cleere 1989, 1).

Leland, as King's Antiquary from 1533, played an important role in cataloguing and rescuing ancient books and manuscripts for the English Royal Library (Trigger 1989, 47). His work is often cited as the first example of English state-sponsored heritage survey and conservation. Despite the growing academic interest in antiquity and its physical remains that had been encouraged by the Renaissance, however, systematic official protection for field monuments was not equally forthcoming. The English heads of State felt no need to implement the sort of protective measures that fifteenth century Popes applied to ancient structures in their domains (Trigger 1989, 36), or those that seventeenth century Royal Proclamations afforded to field monuments and antiquities in Sweden (Cleere 1989, 1; Kristiansen 1989, 25), for example.



Symbols of heritage have long been appreciated as tools to support national ideology and to lend legitimacy to ruling regimes and cultural identity. However, the rights of private property ownership have often been strong enough to inhibit direct state involvement in monument preservation. It is notable that countries in which the landscape was used more intensively, and where land tenure and ownership were devolved to relatively small units with much autonomy, have tended to be slower to adopt effective conservation legislation (Kristiansen 1989, 24-26).

It was not until 1882 that the British Government sought to intervene in the preservation of the nation's ancient field monuments. The *Ancient Monuments Protection Act*, which applied to both Britain and Ireland, fell well short of its chief advocate's (John Lubbock) aspirations (Cleere 1989, 1), but nevertheless paved the way for the stronger legal revisions that were introduced throughout the twentieth century. These culminated in the present *Ancient Monuments and Archaeological Areas Act* of 1979 (Cookson 2000, 63-205).

The concept of a list or 'schedule' of monuments to which protective measures should apply, was introduced with the 1882 Act. Inspectors and Commissioners of Works were appointed to maintain the Schedule. They had to employ increasing rigour and justification in selection as the Schedule grew and responded to the developing interpretations of what constituted nationally important archaeological monuments. Eventually, a formal criteria-led system was developed to aid the selection of monuments for Scheduling (Wainwright 1989, 16).

The *Ancient Monuments and Archaeological Areas Act 1979 (AMAA Act 1979)* and the current list of Scheduled Monuments still form the main legislative foundation for monument protection in England. However, the practice of conservation of archaeological remains as part of the historic environment now relies on the application and manipulation of a complex web of legislation, planning guidance, associated built and natural environment designations, and incentive-driven voluntary conservation agreements (Hunter & Ralston 2006; Department of Culture Media and Sport 2004, 5-8).

Nevertheless, despite the plethora of approaches to managing archaeological remains in the environment, it has come to be recognised universally that comprehensive systematic inventories (the type of resource represented by SMR and HERs) form the basis for all effective conservation measures. It is simply not possible to achieve defensible and effective conservation without first compiling comprehensive documentation regarding known archaeological resources, their location, extent, character, and condition.

Today's archaeological resource management practice is still shaped by its wider political, economic, and symbolic contexts, but it has also developed its own influential theoretical and methodological framework (Grenville 2006, 158-176). HER practice occurs within the developing resource management framework, and within these changing wider contexts.

Dissemination

The desire to disseminate the results of archaeological investigation through traditional publication in specialist journals, meetings and lectures, was a sign of the birth of archaeology as an academic discipline. It distinguished serious archaeological study from its origins in treasure hunting and cabinets of curiosities. Dissemination of archaeological findings encouraged the peer review of information, and facilitated explanation and debate.

The implementation of SMRs represents the later phases of a long-held ambition to provide comprehensive quick-reference guides to local archaeological resources. This process was begun by many individual antiquarians, local society journals, the Victoria County History series, and the inventory volumes of the national Royal Commissions on archaeology and historic monuments.

The delivery of HER information for education and public interest uses via the World Wide Web is a now major consideration for their future development. This sits within the wider developing context of dissemination and engagement in archaeology that includes traditional publication, tours and lectures, participation in fieldwork, education schemes, television

programmes, magazines, e-publication, and an increasing variety of online services (Hills & Richards 2006, 304-315).

The delivery of comprehensive, up-to-date, objective and useful HER information to researchers (and all those with a legitimate interest in the historic environment) is of vital importance to the health of archaeology as a research-led discipline.

CHAPTER 1 - A HISTORY OF ENGLISH SITES AND MONUMENTS RECORDS

1.1 Sites and Monuments Record prehistory - mapping archaeology in England

William Camden's *Britannia* of 1586 provided the first topographic county-by-county survey of Britain, incorporating discussions of documentary history and descriptions of ancient remains (Trigger 1989, 47). Subsequent editions of *Britannia*, produced throughout the next two centuries, incorporated illustrations of field monuments, and the work of other antiquaries (such as extracts from Aubrey's *Monumenta Britannica* in an edition issued by Edmund Gibson in 1695), to provide more comprehensive topographic and historic studies and monument inventories. But it was the fieldwork of antiquaries such as William Stukeley (1687 – 1765), Sir Richard Colt Hoare (1754-1838) and William Cunnington (1754-1810), fuelled by interest generated by the aristocracy's 'grand tours', that laid the foundations for a widespread blooming of gentleman-antiquary excavation and survey during the late eighteenth and nineteenth centuries.

This period saw the publication of many local, county, and regional antiquarian studies (for example, Colt Hoare 1810; Artis 1828; Figure 1), and the incorporation of antiquarian notes into wider topographical publications that also dealt with aspects of the natural environment, industry, and documentary history (for example, Miller & Skertchly 1878). Most English counties benefit from a large and varied, if uneven, selection of such publications (cf Currie & Lewis 1997), but since 1899 a systematic and authoritative addition to county topographic surveys has been underway. The Victoria History of the Counties of England, begun to mark Queen Victoria's Diamond Jubilee, was intended as a "historical encyclopaedia of England county by county and parish by parish" (Currie & Lewis 1997, 22).

In each county set of volumes commentaries on ecclesiastical history, manorial history, industry, churches and settlement development, have been complemented by improving considerations of historic secular

buildings, local archaeological discoveries and monuments. Simple field monument inventories accompanied by plans and illustrations have appeared from the earliest volumes (for example, Serjeantson & Adkins 1906, 397-418).

Production of the Victoria History is now undertaken under the auspices of the Institute of Historical Research at the University of London. At the time of writing fourteen complete county sets, comprising over two hundred volumes, have been published, and a similar number of county sets are in progress (<http://ihr.sas.ac.uk/vch/>). These 'VCH' volumes (as they are often known) have provided important sources of information and cross-referencing for those Sites and Monuments Records whose areas are fortunate enough to benefit from their coverage.

By the early twentieth century there was a growing interest in seeing cultural activity in the context of its 'natural' environment. F.J. Haverfield, the influential Romanist, for example, drew attention to the close relationships between Roman settlement in Britain and various types of geographical terrain (Trigger 1989, 249). Fox's (1923) *Archaeology of the Cambridge Region* provided the classic model for regional geographical archaeological studies. Fox produced a series of distribution maps for the region showing archaeological sites, monuments, and finds of each general period (neolithic, Bronze Age, Roman etc.) against the backdrop of terrain and broad interpretations of the contemporary environmental context (Figure 2). His work, first submitted as a PhD thesis, was undertaken to provide a basis "for the future detailed study, period by period, of the archaeological remains of the district and of the many problems connected therewith" (Fox 1923, xxi). He later extended his methods to explain the role of landscape in the development of cultures across Britain (Trigger 1989, 249).



Figure 1. An extract from a map of Roman sites in the Nene Valley produced by E.T. Artis (1828). Roman buildings are marked red. 'Potteries' are yellow. Original in colour.

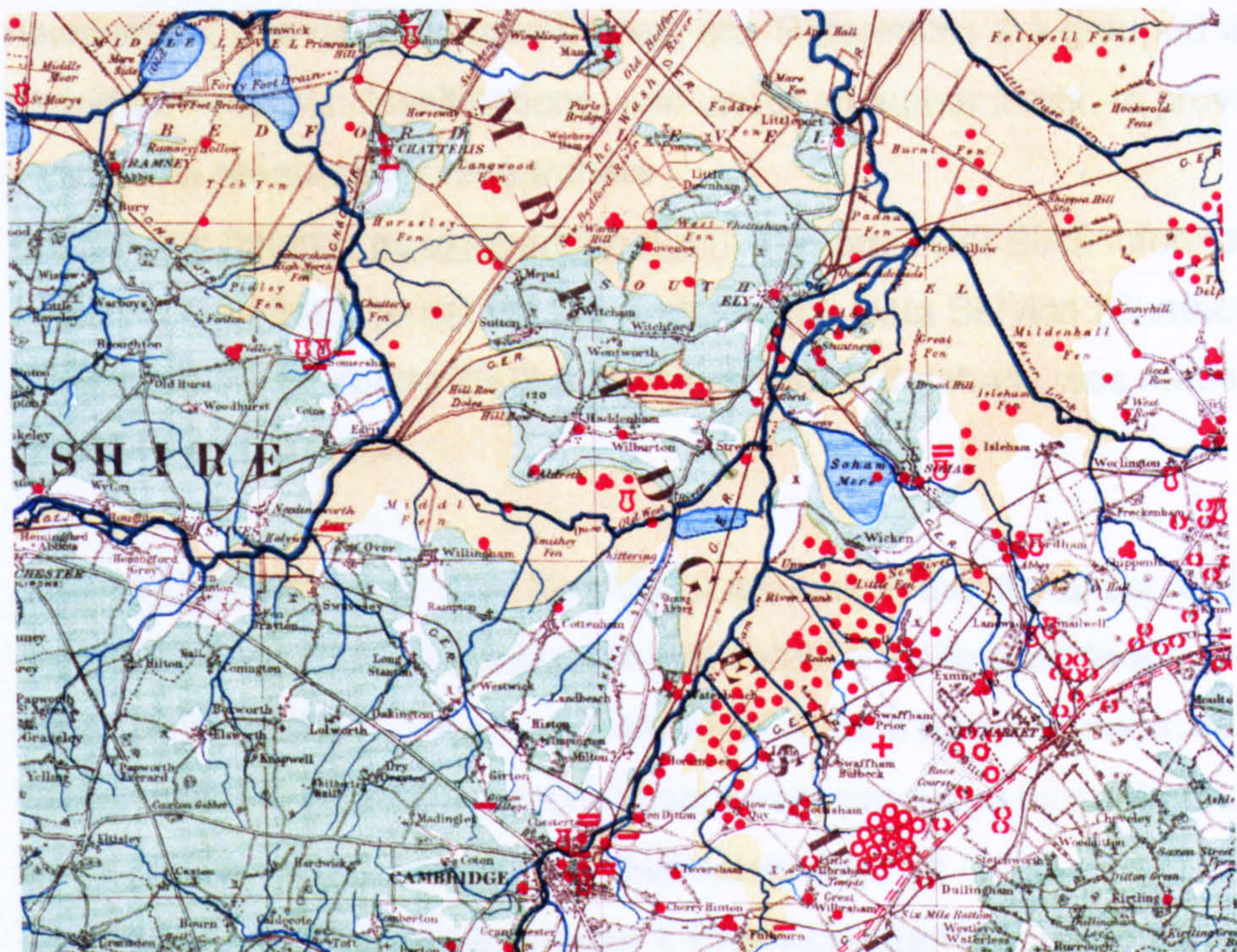


Figure 2. An extract from a distribution map produced by Fox (1923). Bronze Age sites have been plotted against colour-coded terrain. Original in colour.

In addition to the works of single authors, the proceedings and transactions of local antiquarian societies and museum societies, many of which were established during the late nineteenth and early twentieth centuries (Currie & Lewis 1997), have provided invaluable sources of local sites and monuments information. In common with the major national journals, such as the *Proceedings of the Prehistoric Society*, *Britannia*, and *Medieval Archaeology*, many local journals periodically publish indexes and annual fieldwork summaries, which have proved immensely important to researchers. Reports of archaeological discoveries have also appeared in local newspapers; large runs of which have been retained in County Record Offices and their equivalents.

On a national basis, from 1940, The Council for British Archaeology has published catalogues of archaeological reports within the *Archaeological Bibliography of Great Britain and Ireland* volumes. From 1968 this was complemented by the publication of *British Archaeological Abstracts* (Heyworth 1991, 15). Both services are now combined within the *British and Irish Archaeological Bibliography* (BIAB) volumes, which are published twice-yearly. The BIAB volumes seek to provide a comprehensive guide to publications such as specialist reports, fieldwork reports, society newsletters, and postgraduate theses, etc. References are grouped within period and subject classifications, and under an author index, to provide a very useful resource for researchers (<http://www.britarch.ac.uk/cba/biab.html>). The pre-1992 BIAB information is available over the Internet via the Archaeology Data Service (Chapter 2; Chapter 5). From spring 2003 a structured BIAB database was made available on CD ROM.

There have been other important developments in the digital capture of project reports. The OASIS project was established to provide a dynamic online index to the mass of 'grey literature' reports (reports produced in-house and with limited circulation) continually produced by contractual and other project-based archaeology (Hardman 2003, 6; <http://ads.ahds.ac.uk/project/oasis/>). Fieldwork staff can complete online forms that describe the nature of their project, its outcomes, and the archive it has produced. The reports can be validated by local SMR/HER staff, and then enter the National Monuments Record Excavation Index

and Archaeology Data Service (ADS) digital catalogues. By 2005 there were 140 contributors who had submitted a total of 1800 forms. Over 60 SMRs/HERs had registered with OASIS (Barratt 2005, 7). It is now possible to append full digital copies of grey literature reports to the OASIS records.

These combined sources of sites and monuments information have provided, and continue to provide, an immensely valuable resource for researchers. OASIS complements the traditional published indexes by allowing a near instantaneous and continuous accrual of new information. The benefits, with regard to the currency of information, over traditional single publications or publication cycles, are obvious. Nevertheless, a vast body of archaeological information does not generate any kind of formal project report. Incidental discoveries, additions to knowledge about known sites, and surveys and research which may be works in progress, may not merit reports in their own right. Individually, these items may not represent huge advances in knowledge, but corporately they are a large and integral part of the sum total of our knowledge of the nation's archaeological remains.

Arguably, the most significant influence in the development of local Sites and Monuments Records has been the historic work of the Ordnance Survey. In fact, British archaeology in general owes much to the work of the Ordnance Survey, both for its production of comprehensive and accurate map coverage of these islands, and for its involvement in the mapping of antiquities. William Roy (1726-90), the 'Surveyor-General of Coasts and Engineering for Military Surveys', is credited with much of the impetus for a national mapping programme and the creation of what became the Ordnance Survey (Crawford 1960, 36). Roy, a keen antiquarian, found time to survey and map notable monuments while charged with building a military road network in Scotland. His study, *The Military Antiquities of the Romans in Britain*, published by the Society of Antiquaries after his death, was hugely influential within the emerging discipline of field archaeology. This work, along with that of a few others who produced county maps during the eighteenth century, drew attention to ancient monuments as significant components of the landscape, thereby creating a model which was taken up by the Ordnance Survey.

The Board of Ordnance instigated a national mapping programme in 1791, in order to assist the planning of the nation's defences against Revolutionary and Napoleonic France and her allies. Selected antiquities were marked on the first one-inch-to-one-mile map sheets published from 1801 (Crawford 1960, 39). The remit of the Ordnance Survey, which remained under military management until recent times, was necessarily biased towards military mapping during times of threat, but otherwise reverted to its national utility mapping projects. During these times the work of the organisation was moulded by the interests of influential personalities within, and by lobbying antiquaries without. Major-General Henry James (Director during the second half of the nineteenth century), for example, used the excuse of experimentation in printing procedures to produce elaborate editions of many of the county volumes of the Domesday Book (<http://www.ordsvy.gov.uk/>). The Ordnance Survey acquiesced to requests for the collation and depiction of information on local antiquities during its large-scale mapping programme (Figure 3), and drew on local antiquarian advice to achieve these aims (Crawford 1960, 39; O'Neil 1946, 65). This ensured the prominence of archaeological sites and monuments on Ordnance Survey maps, but their inclusion was prone to poorly interpreted and edited information, the popular antiquarian mythology of the day, and was skewed by regional biases (Crawford 1960, 39).

The growing popularity of cycling, rambling, and motoring after the First World War led to the publication of maps aimed at the leisure market. Historic sites and monuments, as significant and interesting features of the landscape, were important elements in such maps. However, archaeology was becoming increasingly sophisticated as a discipline, and many new sites were being discovered or re-interpreted. The business of selecting evidence for inclusion on OS maps was becoming more complex. In response to public criticism of poor performance in this regard, the Ordnance Survey decided to take matters further into hand (Ordnance Survey 1963, 2; Phillips 1987, 97).

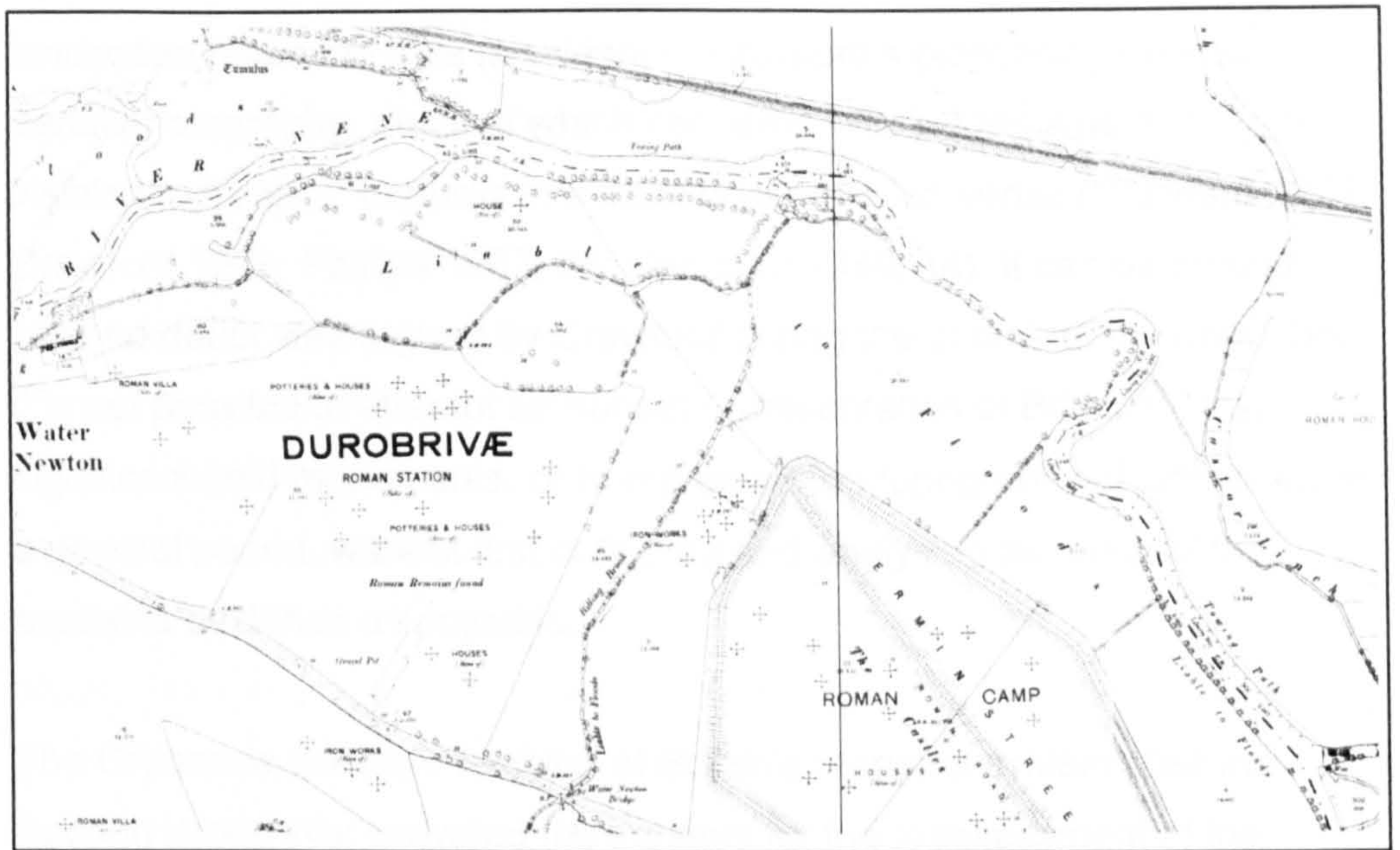


Figure 3. Extract from an OS map sheet of 1886. It incorporates much information supplied by much earlier antiquarian observations.

Director General Sir Charles Close appointed O.G.S. Crawford, “a forceful, but distinguished and likeable archaeologist”, to head a newly-formed ‘Ordnance Survey Archaeology Division’ (<http://www.ordsvy.gov.uk/>). Crawford vigorously set about defining the archaeological recording practices of the new Division within an organisation whose initial attitude to his activities has been described as “somewhat reluctant” and “indifferent” (Jones 1984, 5; Hampton 1989, 14). Crawford's first publication for the Ordnance Survey, the *Map of Roman Britain* (1924), however, was an unexpected resounding success with the public. Encouraged by its popularity, the Ordnance Survey launched a publication programme for archaeological and historical maps, which continues to this day, and persevered with its archaeological survey.

Crawford, however, was not solely concerned with drawing the touring public's attention to Britain's field monuments. He was acutely aware of the advantages that landscape context provided in the interpretation of archaeological remains, and perceived the value of comprehensive distribution maps in the interpretation of cultural groupings and their influence (Crawford 1960, 40-42). The rigour in information gathering demanded by these levels of archaeological interpretation drove the Ordnance Survey's archaeological recording programme well beyond the basic requirements of general public interest mapping, into the realms of

landscape research. This is evident in Crawford's pioneering work with aerial photography, much of which concerned buried remains that are not visible topographic features in a traditional mapping sense (Crawford 1924; Crawford 1929; Phillips 1987, 37; Hampton 1989, 14). It can be argued (and no doubt was argued by Crawford during the course of his work) that it is not possible to attempt an honest representation of Britain's most significant field monuments, or to represent the topography of Britain within a general period, without first collecting and analysing as much of the available evidence as possible.

The Ordnance Survey's revision of Britain's mapping system after the Second World War provided the impetus for the reassessment of the archaeological records it had collated. Further incentive for the revision of its treatment of archaeological information was provided by the increasing rate of development attrition suffered by archaeological remains (Phillips 1987, 109-110). The Ordnance Survey was conscious of the concurrent detailed archaeological recording roles of the Ministry of Public Buildings and Works Ancient Monuments Inspectorate, and of the Royal Commissions on ancient monuments and historic buildings for England, Wales, and Scotland. Consequently, the Ordnance Survey redefined its own role as creating a "non-intensive record" (Phillips 1987, 109-110), or "a quick basic record giving the most important facts about archaeological sites, and particularly their precise location" (Ordnance Survey 1963, 2) before they disappeared forever. The records created in this way were hoped to "go far to offset the threat to archaeological knowledge made by the activities of the modern world" (Ordnance Survey 1963, 2). This kind of 'rescue mapping' was assisted by the examination of existing written sources, aerial photographs, and by field visits by Ordnance Survey staff. But knowledgeable members of the public and archaeologists in other organisations, in the form of honorary correspondents and informants, were also invited to submit archaeological information, as they had been from the Ordnance Survey's earliest days, and during Crawford's tenure of the Archaeology Division (Crawford 1960, 23; Phillips 1987, 97). It was a data collection method that recognised the value of local input allied to central editing, and one which can be traced back to Camden's use of regional correspondents during the late sixteenth and early seventeenth centuries.

C.W. Phillips, the Archaeology Division's third leader, organised the Ordnance Survey's post-Second World War archaeological records into a system of structured record cards (Phillips 1987, 110). Each five by eight inch card contained information such as national grid reference, county and parish, a summary description, an annotated plan (in the case of field monuments), reference sources, and classifications of period and evidence types. Each site or find record within a 5km square (a single 1:10,000 or 1:10,560 map sheet) was allocated a unique record number. Blocks of cards representing 100km squares were stored sequentially, and these blocks were in turn stored in alphanumeric sequence, following the coding of the Ordnance Survey National Grid system (Leech 1986, 29; Phillips 1987, 110).

Despite the consistent structure of the record, Phillips remained concerned about the quality of information achieved throughout the record, an issue he felt was partly due to the Ordnance Survey's limited archaeological recruitment policy (Phillips 1987, 111). Nevertheless, the records became the most extensive inventory of British monuments. Helpfully, the record cards were made available to visitors to the Ordnance Survey's Southampton offices. Interrogation of the record cards on a geographical basis was simple, but a classified index to assist thematic searches was never completed (Leech 1986, 29; Darvill & Fulton 1998, 59-60).

The Ordnance Survey archaeological records provided the basis for much threat-led archaeological work during the 1960s and 1970s. These records, laboriously copied and sent out to the counties, also provided the backbone of many of the newly created local Sites and Monuments Records (Benson 1974, 226; Clubb & Lang 1996, 53). During the 1970s, however, the Ordnance Survey began to question its role in recording archaeological remains, and eventually concluded that such tasks were better suited to the three national Royal Commissions (Darvill & Fulton 1998, 60-63). The Ordnance Survey Archaeology Division was dissolved in 1983, and archaeological staff and archaeological records, including some 400,000 record cards, were transferred to the Royal Commission on the Historical Monuments of England (Clubb & Lang 1996, 55; Darvill & Fulton 1998, 64).

The Royal Commission on Historical Monuments of England (RCHME) had been established in 1908 in order to "...make an inventory of the ancient and historical monuments connected with or illustrative of the contemporary culture, civilisation and conditions of the life of the people...from the earliest times to...1700..." (RCHME 1926, xix). Similar Royal Commissions were established for Scotland and Wales. The Royal Commissions' county inventories were begun during the first decade of the twentieth century. The pre-Second World War volumes tended focus on architecture and earthwork monuments. The post-war volumes were able to draw on the increasing availability of aerial photographs and the growing appreciation of crop-marked buried archaeological remains. The RCHME inventory volumes provided the most authoritative survey of local archaeology, but were prone to becoming rapidly out of date in an era of increasing fieldwork. The growing mass of archaeological information to be assimilated made for slow progress through England's counties and eventually, in 1979, the publication of county inventories was abandoned and replaced by a thematic approach to survey and publication (RCHME 1999, 7). The National Monuments Record (NMR; formerly National Archaeological Record) was then to fulfil the requirements of cataloguing the nation's archaeological remains. The shift away from traditional publication allowed alternative strategies to be developed for the dissemination of archaeological information recorded by the RCHME and held in the NMR (RCHME 1999, 7).

The RCHME had gained responsibility for the National Buildings Record (NBR) in 1963. It began as an independent record, which was initially developed as an attempt to survey historic buildings threatened by enemy action during the Second World War. The acquisition of the NBR, with which RCHME had worked in close co-operation, combined with the archaeological records to form the integrated National Monuments Record. The NMR, already significantly boosted by the Ordnance Survey archaeological record, was further augmented by the transfer of the National Library of Aerial Photographs in 1984. The RCHME was then established as the lead body for national archaeological survey and record management, and the NMR was acknowledged to be central to its public information services (RCHME 1999, 8).

As early as the 1930s and 1940s, such notable archaeologists as W .F. Grimes and Sir Cyril Fox had identified the need for a suitably staffed national archaeological database to assist research (Lavell 1985, 95). The establishment of the NMR finally approached this important aspiration. Nevertheless, it was also recognised that SMRs could provide far more comprehensive inventories of local archaeological resources for local purposes.

A Royal Warrant in 1992 gave RCHME authorisation to establish national standards for creating and managing heritage records (RCHME 1999, 11). A computerisation programme for the monuments and buildings record components of the NMR was initiated in 1985. The creation of an integrated relational database was considered crucial to the fulfilment of NMR roles, which included the production of gazetteers for the Ordnance Survey's period maps and responses to research led enquiries (Leech 1986, 31; 33). An Oracle-based National Monuments Record database, 'MONARCH', was implemented in 1993 (Clubb & Lang 1996, 55). The establishment of a headquarters at Swindon in 1994 brought together the geographically dispersed elements of the NMR and allowed the development of much improved user services.

The English Heritage NMR datasets now include around 400,000 records pertaining to sites and monuments, the Excavation Index for England (around 70,000 records of archaeological investigations), and the Record of Scheduled Monuments (around 20,000 records). These datasets are held in the 'AMIE' database and 'HSIS' Geographic Information System (Fraser & Newman 2006, 25-29). The NMR Excavation Index is available online via the Archaeology Data Service's 'ArchSearch' facility (Chapter 2; Chapter 5).

RCHME was given the responsibility for the lead role for overseeing SMR development in 1989 (RCHME 1998c, 7), and it held this function until both it and NMR were absorbed by English Heritage in 1999. Within the new English Heritage structure, information and support for SMRs and HERs is provided through the National Monuments Record Centre at Swindon. The NMR, in partnership with the Association of Local Government Archaeological Officers, seeks to provide leadership for the strategic development of HER services by undertaking analysis of the HER

community, providing guidance on standards, hosting HER discussion and training forums, and acting as a broker for the exchange of national survey information and software development (English Heritage National Monuments Record 2003a).

1.2 The implementation and management of Sites and Monuments Records

Many Local Authority Sites and Monuments Records incorporated local archaeological record sets and lists collated by individuals and societies from earlier times, but none of these record sets could claim to be true SMRs in their own right. It is widely recognised that the first Local Authority Sites and Monuments Record to be created in England was that for the Oxford region. Conceived during the period 1965-67 at the Oxford City and County Museum, the Oxford region SMR was established to “bring together diverse and diverse sources of information about the physical remains of man and his activities in the Oxford region into one manageable index” (Benson 1974, 226). It was to be “locally accessible and comprehensive” (Benson 1974, 226) and was intended primarily to provide information to those interested in the “problems of the history and archaeology” of the region (Benson 1974, 226). A remit to assist research sat well within the aims of a museum service. Most SMRs were conceived and supported, however, on the basis of their usefulness as tools to manage archaeological resources; both to inform responses to local development proposals and as part of a national information pool to assist the selection of monuments for legal protection. Their development has been very closely linked to the work of archaeologists employed to advise Local Planning Authorities.

The great loss of archaeological remains through the extensive development and re-development schemes of the post-war decades was highlighted by many depressing, infamous, and often well publicised cases throughout the country (Jones 1984). Threats to specific types of archaeological environment (urban archaeology, lowland river valley prehistoric archaeology, etc.), and to specific areas was examined in detailed surveys and studies by organisations such as the RCHME and Council for British Archaeology (for example, RCHME 1960; RCHME 1969;

Heighway 1972). Lobbying based on the evidence of catastrophic destruction they described and the rescue excavation campaigns that they inspired, helped to draw attention to the need for a robust framework for the management of archaeological remains within the development process.

The Government's own investigation into the measures for the protection for 'field monuments', the 'Walsh Report' of 1969, also drew attention to the general failure of the systems then in place to safeguard supposedly protected ancient monuments. Significantly, the Walsh Report recommended that Local Planning Authorities should make use of archaeological record systems staffed by archaeological officers to provide local advice (Walsh 1969). Whilst many of the Walsh Report recommendations were not readily adopted (Jones 1984, 52; *ibid* 143) this latter recommendation gradually had some effect.

The first archaeological post within Local Government had been created during the early 1960s in Lancashire (Jones 1984, 26), but during the 1970s 'County Archaeologist' posts became increasingly common. There were nineteen by 1976. Most were initially based within or closely linked to planning departments (Jones 1984, 26-29).

The *Town and Country Planning Act* of 1947 had established the first comprehensive mechanism for the control of development through Local Planning Authorities (District Councils, Borough Councils, County Councils, etc.), and had also introduced Listed Building controls (Saunders 1989, 152-154; Cookson 2000, 334). Subsequent replacement Acts, supplementary Acts and guidance, have provided a framework for the protection of other aspects of the historic environment that might be adversely affected by the planning process. The protection of archaeological remains became crystallised as a legitimate "material consideration" in the planning process during the 1970s. A planning appeal case in 1975, prompted by the refusal of planning permission for a quarry development on the grounds of its inevitable destruction of an ancient monument, had much greater consequences than might have been anticipated at the time. Hoveringham Gravels Ltd contended that the protection of archaeological monuments should not be a consideration in the determination of the planning permission (Cookson 2000, 399). The

appeal findings went much further than many expected by stating that a Local Planning Authority could indeed legitimately consider the effects of development on Scheduled monuments, and also on *non-Scheduled monuments* (Pugh-Smith & Samuels 1996, 37; Cookson 2000, 435-436).

Now that LPAs were assured that the Secretary of State would uphold well-considered planning decisions regarding archaeological remains, many felt able to give greater consideration to these issues. If an LPA deemed that it was not feasible to prevent the destruction of archaeological sites and monuments in specific cases, it became incumbent on the LPA and its archaeologists to at least try to record them before their destruction.

Archaeologists based in Local Planning Authorities, and those based within external organisations such as Trusts and museums to whom some LPAs looked for advice, were able to apply for LPA support, Government funding and goodwill developer contributions for investigations and rescue excavations. Their work embraced development that fell within the remit of the local planning process (housing, mineral extraction, etc.) and development undertaken under other auspices (pipelines, major road schemes, etc.). Most archaeologists responsible for providing development advice quickly realised that a local Sites and Monuments Record, a comprehensive dynamic inventory of the archaeology within their administrative area, would form the primary tool for informing their work. Setting up an SMR became an imperative. Many Local Authorities recognised that their archaeological officers had to draw on a readily accessible and rational record of the local archaeological remains, rather than disparate collections of archaeological information, and supported SMR work accordingly.

Further encouragement to implement, maintain and enhance SMRs was often provided through grants from Government and its agencies, for data capture, technical development, and for archaeological support staff. Such posts often were initially jointly funded, with a gradual withdrawal of central government funding (English Heritage 1991b, 5). The implementation of SMRs, and Local Authority archaeology services generally, also benefited from the low cost and voluntary labour provided by individuals engaged on central government employment schemes (Manpower Services Commission, etc.), and students keen to gain some work experience.

SMR information gathering drew heavily on the historic archaeological information sources described above (section 1.1), and was accelerated by its devolution to a local level. SMRs' proximity to locally interested parties, the individuals and societies immersed in local archaeological work, and their physical proximity to the archaeology in question, assisted the relatively rapid accessioning of information.

| | | | | | | | | | |
|--|----|----|--------------|--|----------|---|---|---|---|
| TF | 20 | SW | 6" sheet no. | | N.G.R. | 2 | 4 | 0 | 4 |
| Cambridgeshire County Council Primary Archaeological Record Card | | | | 03036A | Card No. | 9 | | 1 | |
| Item/Site (brief description) | | | | PUNCH CARD CHECK LIST <input checked="" type="checkbox"/> tick | | | | | |
| Med. Kiln Windmill (PM) | | | | Parish Thorney | | | | | |
| Cross Ref: Th. 3 | | | | O.S. 25" sheet: | | | | | |
| Remarks (full description) | | | | Status | | | | | |
| Extensive burnt area with limestone fragments, bone, large quantity of 14th century pottery. A kiln site. Slight mound. Site of recent windmill. | | | | Period Med | | | | | |
| | | | | Record Types 34, 54, 47, 4 | | | | | |
| | | | | Geology gravel/clay skirt | | | | | |
| | | | | Land Use (present) Arable | | | | | |
| | | | | Land Use (recent) Windmill | | | | | |
| | | | | Ref: PCAS. Vol. XXXI. 1978 p. 28. H.C. Hughes. | | | | | |
| | | | | At ID | | | | | |
| | | | | Source DNH | | | | | |
| | | | | Local Contact | | | | | |

Figure 4. A typical SMR entry record card. Many thousands of these were compiled by SMR services before suitable computer databases became available. The reverse of the card has space reserved for management information, such as the monument's condition and the owner's address, and for recording the existence of further primary sources such as aerial photographs, correspondence, etc.

SMR services sought to capture information such as the boundaries of Scheduled Monuments, areas of earthwork remains, extents of excavated sites, crop marked remains, historic buildings, and the find spots of significant artefacts, etc., either directly on to Ordnance Survey base maps, or on film overlays (Figure 5). SMR maps have also often incorporated some associated environmental and conservation information, such as the boundaries of Sites of Special Scientific Interest, Conservation Areas and

Listed Buildings, Parks and Gardens, etc. SMR services have also compiled libraries of fieldwork reports or supplementary documentation and plans relating to the record entries, and have maintained collections of slides and photographs of aerial evidence, excavations in progress, monuments, and buildings (Baker 1999, 15-20).

During the 1970s SMRs began to make use of computer systems to capture basic text record information. The digitisation of this information increased dramatically with the availability of personal computers and easily customisable off-the-shelf database software. A typical SMR of the 1980s and 1990s comprised “....a computerised text database, supported by mapped depictions of monuments on a paper or film modern OS (Ordnance Survey) base map. The computer records are normally supported by secondary paper records, photographs, copies of historic maps and other material...” (‘Brief for SMR Assessment’ as reproduced in Baker 1999, Appendix 1).

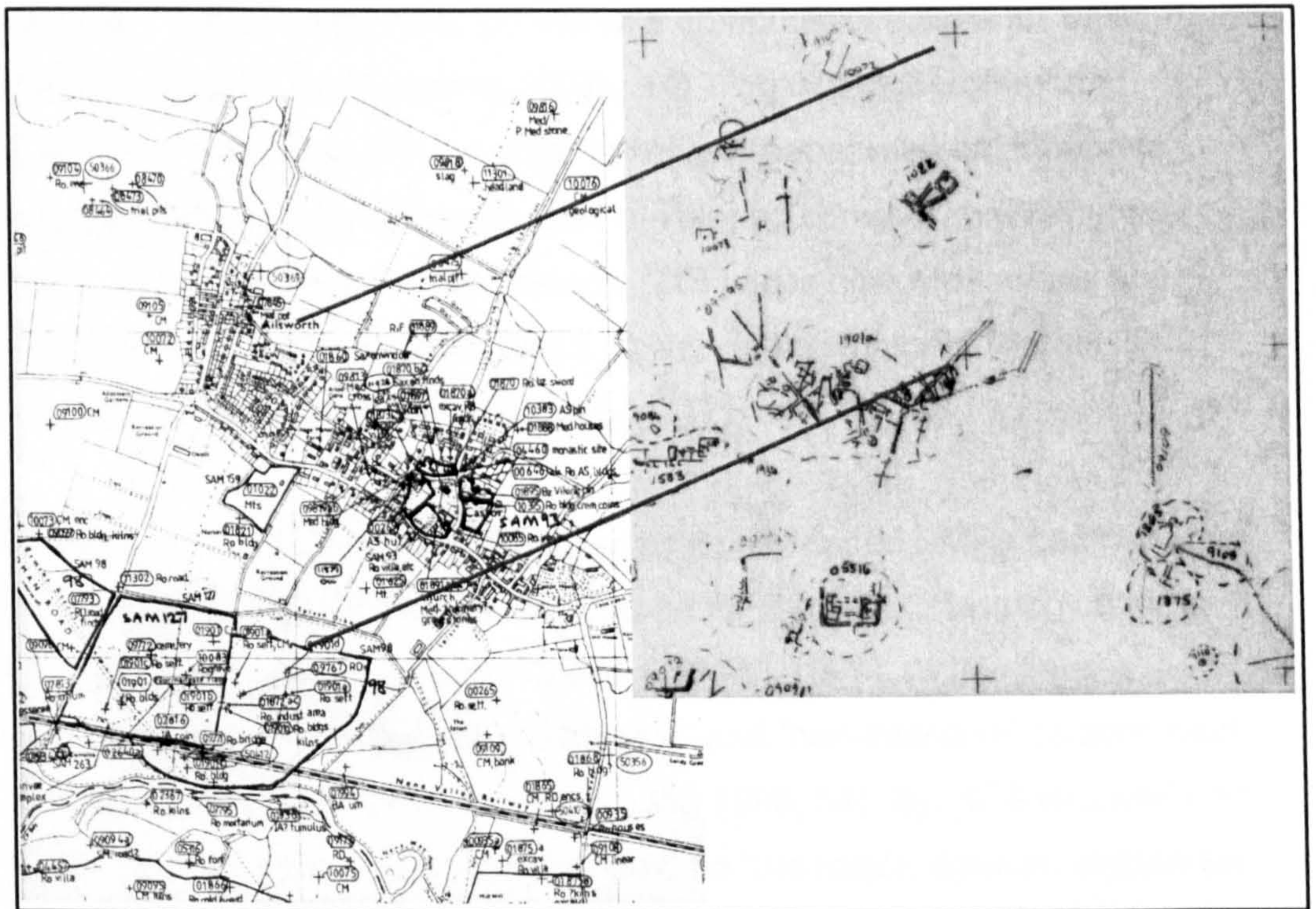


Figure 5. An extract from a SMR map on a 1:10,000 scale OS map base. Site centre points are plotted with their primary record number alongside. Scheduled Monument boundaries are marked in bold. Cropmark information is retained on a separate transparent film overlay. Such maps became cluttered and worn as

information was added and their use increased. The paper OS map bases became increasingly out of date as new development altered the landscape.

It is estimated that the total retrievable records within all SMRs increased by 117% between 1983 and 1995. From 1983 to 1993 the number of retrievable records in the National Monuments Record increased by about 43% (Darvill & Fulton 1998, 65-66). This disparity in record accessioning is all the more marked when the number of accessioned records is considered. There were 657,619 retrievable records in SMRs in 1995 and less than a third of this number in the NMR in 1993 (Darvill & Fulton 1998, 65-66). There are now around 400,000 primary site records in the English NMR (Fraser & Newman 2006, 28) and it is estimated that more than 1,000,000 records are held by English SMRs/HERs (Fraser & Newman 2006, 31). Even taking into account the differences in database record structure and recording practice, it is apparent that collective SMR data capture outstripped that of the NMR considerably.

All but a very few SMRs have been able to digitise the vast majority of their core card records and make full use of a computer database for basic record management (Newman 2002c, 14). The use of Geographic Information Systems (GIS) in order to replace paper map bases and to manage digital spatial data, has also developed considerably within the SMR community over the last decade. GIS use is now widespread and fundamental to HER services and their future development (Fernie 2000, 2; Newman 2002c, 16; Bell & Bevan 2004, 12).

The value of the information captured by locally based SMRs had been recognised in a joint report by the Council for British Archaeology and RCHME as long ago as 1975 (CBA & RCHME 1975). At this time, a distinction was made between “intensive” and “non-intensive” records held at national and local levels (Clubb & Lang 1996, 54). By 1978 RCHME had recommended that county SMRs should be “the major, detailed archive for their areas” (RCHME 1978). The Department of the Environment (DoE 1981, 2) also recognised SMRs’ value as “essential and primary data bases for the production of preservation and excavations policies”, and collectively they came to be regarded as “the best national archaeological database” (Wainwright 1989, 167).

The NMR retains its guiding strategic role in HER development (English Heritage National Monuments Record 2003a), and is currently involved in initiatives to create a national network of HERs (section 1.5, below). However, despite sharing many sources of data and the presence of agreements for data exchange between the NMR and HERs, the National Monuments Record remains an extensive and selective record that does not seek to replicate the level of local detailed coverage found in many HERs. The NMR now focuses on "...its own recording, fieldwork, and archive collecting, the systematic trawl of publications, enhancement projects addressing identified areas of weakness and public access initiatives" (English Heritage National Monuments Record 2003b). Therefore, in addition to its local uses, detailed SMR and HER information has remained pivotal to the success of national and regional conservation initiatives.

Accordingly, although SMRs were considered primarily to be "properly a Local Authority responsibility" (DoE 1981, 2), they have been required to play a crucial role in the strategic assessment and management of the national archaeological resource. The selection of monuments for statutory protection under the *Ancient Monuments and Archaeological Areas Act 1979*, for example, has relied heavily on SMR information (DoE 1981, 2; Wainwright 1989, 167; English Heritage 1991b, 4).

The *Ancient Monuments and Archaeological Areas Act 1979 (AMAA Act 1979)*, which still forms the core legal mechanism for protection of archaeological monuments in the United Kingdom, is the descendant of the first *Ancient Monuments Protection Act of 1882* and a succession of replacement and supplementary Acts introduced during the twentieth century (Saunders 1989, 152-153; Cookson 2000, 63-64). *The AMAA Act 1979* introduced a formal notification process for allowing rescue excavations in advance of development in designated Areas of Archaeological Importance. This relied on an authoritative local source to receive development notifications and to recommend excavation (a local authority archaeologist supported by an SMR, or similar provisions), nominated archaeological units to organise excavations within the permitted window of opportunity, and grant funding. While this part of the *AMAA Act 1979* was never widely implemented (only five historic towns were ever designated Areas of Archaeological Importance), it did pave the

way for the later introduction of archaeological planning guidance. The other provisions of the *AMAA Act 1979* were more successful and have had significant implications for the development of Sites and Monuments Records.

The *AMAA Act 1979* retained the concept of a national list or 'Schedule' of ancient monuments which had been present in the earliest Act. The *AMAA Act 1979* also strengthened the mechanism for obtaining consent to carry out works on Scheduled monuments (Wainwright 1989, 166; Cookson 2000, 95).

The Schedule has always been highly selective and now is intended to comprise only a representative sample of the nation's known monuments - the best-preserved and most significant examples. It came to be realised, however, that the Schedule of English monuments had not kept pace with growing numbers of known sites, and did not fully represent the range of known monument types. During the early 1980s it was decided to increase the Schedule from around 13,000 monuments to around 60,000 monuments, which was thought to represent around 10% of the nation's known monuments (Wainwright 1989, 167). This prompted a review of the selection process and the introduction of a formal criteria-based scoring system to aid selection judgement (Wainwright 1989, 164-170; Breeze 2006, 59).

The selection of candidates for designation as Scheduled Monuments under the Monuments Protection Programme, came to rely on comprehensive appraisals of all recorded monuments within the specific monument classes under review. This required scrutiny of both National Monument Record and local Sites and Monuments Record information, and of course the comparison of monument information held by different SMRs (Wainwright 1989, 167; Fairclough 2006, 258-261).

This provided an impetus to encourage greater consistency in information content and structure among the growing number of SMRs. To this end, a network of Regional Sites and Monuments Record Working Parties was established early on and information standards guidance was issued by the national agencies (see section 1.3 below). Copies of the newly computerised national Ancient Monuments Records were made available

to SMRs and information exchange with the National Monuments Record was encouraged at the outset (DoE 1981, 2).

Potential for tension existed, however, between the development of local Sites and Monuments Records as local information sources fit for local needs, and as 'cogs' in the machinery of national archaeological conservation strategy. A Local Authority that had implemented a Sites and Monuments Record primarily for the purpose of planning advice and the management of the local archaeological resource might be inclined to review its role as part of a national archaeological service. This would be especially true of those SMRs that were not lavishly funded and did not benefit from significant central government grant-aid. Local Authority archaeologists are forced to balance the resource implications of adopting best practice national standards to form part of a national information network, with the necessity of efficiently implementing and maintaining a working local record system fit for local purposes.

Planning policy and legislation was introduced during the late 1970s and 1980s that helped to increase the profile of archaeological considerations and SMRs within the local planning process. In addition to providing more emphatic confirmation that Local Planning Authorities had a duty to consider the effects of development on archaeological remains, the planning system also began to address the importance of SMRs in helping to reach well-informed planning decisions. *The Town and Country Planning General Development Order 1988*, for example, defined a "site of archaeological interest" as a Scheduled Ancient Monument or Area of Archaeological Importance defined under the Ancient Monuments and Archaeological Areas Act 1979, or a site "which is within a site registered in any record kept by a county council and known as the County Sites and Monuments Record" (Cookson 2000, 410).

Despite the increasingly routine consideration of SMR information and archaeological implications by many Local Planning Authorities, there remained great variation in the approaches adopted throughout the country. It was not until the 1990s that Government issued detailed planning guidance to Local Planning Authorities regarding archaeological remains.

The publication of *Planning Policy Guidance [note] 16: Archaeology and Planning* by the Department of the Environment in November 1990 (hereafter *PPG16*) has had a profound effect on archaeological practice in England. *PPG16* sought to create a more robust and consistent framework for the treatment of archaeological issues within the local planning process. It also shifted the primary responsibility for finding the resources for archaeological mitigation from central Government (and its agencies), and archaeological units, to the developer – the so-called ‘polluter pays’ principle that is common in other environmental concerns.

PPG16 emphasises the importance of considering known archaeological information and initiating early dialogue in order to avoid conflicts between development and archaeology. It encourages Local Planning Authorities to adopt archaeological policy within strategic Development Plans, and to identify areas where archaeological remains may pose potential constraints on development. It places archaeological evaluation (a limited sample-based field investigation in order to define the characteristics of a site) at the heart of the decision making process (Department of the Environment 1990).

PPG16 stipulates that Local Planning Authorities can seek the preservation of archaeological remains in situ, or their excavation and recording (‘preservation by record’) prior to or during development. The guidance makes it clear that the provisions of planning legislation can be brought to bear by Local Planning Authorities in order to achieve appropriate archaeological mitigation, by applying specific planning conditions or seeking voluntary legal agreements.

PPG16 recognises that the information contained within Sites and Monuments Records (and now HERs), is absolutely central to the appraisal of prospective development sites, and to the interpretation of the archaeological value of sites within their local and national contexts (Department of the Environment 1990, paras. 17, 19, 23, Annex 1, paras. 3-5). The guidance goes on to state that “...the SMR should have three main elements; a list, description and assessment of all known ancient monuments; a map record (commonly at a scale of 1:10,000) which identifies the boundaries of the site, and an archive which contains detailed records for specific sites, such as aerial photographs, survey and

excavation reports, references and other written and graphic records” (Department of the Environment 1990, Annex, para. 6).

Further validation of SMRs' role within the planning process has been provided by 'Planning Policy Guidance: Planning and the Historic Environment [PPG 15]' (Department of the Environment & Department of National Heritage 1994, 26), within advice regarding conservation issues in Local Plans (English Heritage 1993), and within the Hedgerows Regulations (Fraser & Newman 2006, 29).

The widespread adoption of the principles of *PPG16* across England, coupled by a sustained period of economic growth in many regions, has led to an increase in commercial archaeology and has altered the character of archaeological practice (Lawson 2006; Darvill 2006; Colcutt 2006). It has also altered the character of Local Authority archaeological services, which have had to act to avoid charges of conflict of interests and uncompetitive practice. Local Authorities have tended to create internal management divisions and careful post differentiation between staff engaged in contractual fieldwork, and those involved with development control and SMR/HER functions. Some former Local Authority field units have been externalised altogether.

There have been several surveys of the state of the archaeological profession over the years, but given the variable scope of the surveys and the differing nature of the services that respond, it is difficult to provide a detailed picture of the changing nature of 'curatorial' archaeology and SMR services. Nevertheless, it is obvious that the last thirty years have witnessed significant growth and diversification in archaeological provisions. At the time of writing there are, depending on how tightly the definition is drawn, around 100 locally-managed SMRs and HERs that cumulatively provide complete geographical coverage of the England (Baker 1999, 1; Newman 2002c, 7; Department of Culture Media and Sport 2006, 13).

They are usually managed by services within one of the Local Government tiers (County Councils, Unitary Authorities, or District Councils). Local heritage trusts and museums sometimes also provide HER services on behalf of Local Planning Authorities. HERs are also maintained by National

Park Authorities (which act as Local Planning Authorities), and by both the National Trust and the Ministry of Defence for their respective national land holdings. SMR services for one former Shire County Council that has been reorganised into six Unitary Authorities, were at one time provided by an engineering and environmental company on a contractual basis.

Exceptionally, English Heritage directly provides HER services for Greater London (Baker 1999, 1; Newman 2002c, 8).

The picture of HER management throughout England is further complicated by agreements for joint services across Local Government boundaries, some apparent duplication in HER coverage, and the presence of Urban Archaeological Databases (UADs). UADs are archaeological information records that are specific to some historic towns. They have been developed, with English Heritage support, in order to address shortcomings in the traditional SMR representation of urban archaeology. UADs usually include information about archaeological deposit character and interpretations of historic urban form. These aspects of the urban historic environment are often far more significant than the definition of individual discrete monuments, which have been the traditional subjects of SMR recording. UADs have been developed with a variety of local partners, and may or may not be fully embedded within existing Local Authority HER services, depending on local management circumstances (Baker 1999, Figure labelled 'Records Coverage in England'; Newman 2002c, 8).

By 1991, there were around 100 archaeological advisors to Local Authority Planning Authorities in England (English Heritage 1991b, 5), and in 1999 around 135 posts were reported to be engaged on archaeological 'development control' matters (Baker & Chitty 2002, 14). At this time, around 21 paid staff, some of who also benefited from assistant staff, were reported to be fully dedicated to managing SMRs in England. For the remainder of the 100 or so English SMRs, archaeological staff divided their time (to greater or lesser proportions) between SMR duties and wider curatorial duties. For example, 22 archaeological advisors to Local Planning Authorities (including those often referred to as archaeological 'Development Control' officers), were also engaged in SMR work. A third of them spent a third or more of their time undertaking SMR-specific duties (all figures drawn from Baker 1999, 12).

However, another survey during this period reported that a total of around 540 archaeological staff worked within English Local Authority curatorial organisations, including the National Parks (Aitchison 1999, 12). Evidently many of these staff were engaged in even wider curatorial responsibilities, such as monument management and interpretation, in addition to SMR work and planning advice. This figure also seems to include archaeologists working within Local Authority contracting field units, who may not have been routinely engaged in curatorial archaeology at all (Aitchison 1999, 12).

A more recent survey acknowledged returns by 96 “SMR Officers” (Newman 2002c, 2). This must be taken to mean that at least 96 post holders in England consider SMR (or HER) operation and management to be their principal role, or at least to figure very prominently among their primary responsibilities.

Localised political and economic environments inevitably lead to the variable implementation of heritage functions by individual Local Authorities. The provision of archaeological services, though encouraged by central government and now fully embedded into planning functions, has never been a full statutory responsibility for Local Authorities. Consequently, archaeological services have been vulnerable to stifled funding and budget cuts. The profile that archaeological issues gain in Local Authority areas is as much determined by the nature and vociferousness of the local heritage community as it is by the abundance and importance of its archaeological remains in those areas. The effectiveness of Local Authority archaeological officers in developing archaeological services is to a large extent influenced by factors beyond their direct control, but also relies heavily on their ability to engage their senior officers, elected council members, and external interest groups. The resources and internal advice that the archaeological officers have to draw on, the presence and strengths of allied conservation services (buildings, natural environment, etc.) and internal technical expertise and support, are further crucial determining factors in the success of Local Authority archaeological services and Sites and Monuments Records.

The distribution of SMR and HER community among different Local Authority tiers and the fragmentation of services caused by the re-organisation of Local Government have been suggested as other barriers to the development of satisfactory services (All-Party Parliamentary Archaeology Group 2003, 19). Modern administrative units often divide regions that have some historic integrity and which may, therefore, serve as better units for SMR and HER purposes. The periodic re-organisation of these administrative units, such as the merging and splitting of historic counties during the middle 1970s and the creation of Unitary Authorities from 1995, resulted in the reorganisation of some SMR provisions. Such changes may or may not result in better local SMR/HER management, depending on the specific circumstances of each Local Authority. The cumulative effect, however, has been a growth in the number of individual SMRs and HERs (Darvill & Fulton 1998, 63; Baker 1999, 58).

The great variation in individual SMR and HER service provisions throughout the country (Baker 1999; Newman 2002c) is a direct consequence of both of their differing local operational environments and the equivocal statutory status ascribed to them by central Government.

There is little doubt that formal status for HER services as statutory function of Local Authorities would considerably improve their standing and should ensure their more even adoption and development across the country. In fact, statutory status for SMRs was an ambition declared in the 1996 *Green Paper Protecting Our Heritage* (Department of National Heritage & Welsh Office 1996, 46) produced before the fall of the last Conservative Government. Following further supportive statements from English Heritage (English Heritage 2000, 39), the promise of statutory status was raised again during the preparation of the Labour Government's *Culture and Recreation Bill*, which was then aborted at the time of the following general election (Fraser & Newman 2006, 30).

The creation of an All-Party Parliamentary Archaeology Group (APPAG), with a very wide MP membership, helped to keep the issue alive. The first report of the APPAG, *The Current State of Archaeology in the United Kingdom*, includes recommendations both for a statutory basis for SMRs, and additional Central Government funding amongst its principal recommendations (All-Party Parliamentary Archaeology Group 2003, 7).

Anticipating a more rapid progress towards a statutory status for Historic Environment Record services, a set of HER service benchmarks was produced by English Heritage and the Association of Local Government Archaeological Officers. *Historic Environment Records: Benchmarks for Good Practice* sets out the standards necessary for individual SMR services to become officially recognised as adequate HER services. The document defines a two-stage assessment for individual SMRs based on categories covering 'User Services and Access', 'Information Coverage and Content', 'Information Management' and 'Organisation Management' (English Heritage & Association of Local Government Archaeological Officers 2002).

Meanwhile, however, the wider policy and legislation framework within which HER services and archaeological planning advisory services operate is undergoing changes. These have provoked further delay in securing statutory status and more pause for thought regarding the future shape of such services.

The local planning system has changed recently with the declared ambitions of creating processes that are both more streamlined for developers and more responsive to a variety of strategic and local development needs. At the same time, the new planning system is intended to be more responsive to the views of local communities and respectful of cultural issues, such as the conservation of the historic environment (Department of Culture Media and Sport 2003b, 1; Department of Culture Media and Sport 2004, 22-23).

Regional planning policy and decision-making has been introduced to shape strategic and large-scale development. Local Plans and Structure Plans are being replaced by Local Development Frameworks and Planning Policy Guidance notes are being replaced with Planning Policy Statements. At the time of writing, the Government is reviewing the entire national framework for the protection of the historic environment in consideration of these changes. Significant alterations to current mechanisms are anticipated, requiring the introduction of new legislation and guidance (Department of Culture Media and Sport 2003a).

There were no specific references to the desirability of statutory status for SMRs within the Government consultation document *Protecting Our Historic Environment: Making the System Work Better* (Department of Culture Media and Sport 2003a). However, the creation of sub-regional historic environment advisory teams, one of whose functions might be to maintain “Sites and Monuments Records on behalf of all the authorities in a sub-region”, is suggested (Department of Culture Media and Sport 2003a, 21). There has been much discussion within the profession about what constitutes a valid sub-region. The document also contains an interesting Freudian typing error that suggests the issue of statutory status had in fact registered in its compilers’ minds: “there are now over a 100 Statutory Monuments Records (SMRs) in England holding around 1 million sites” (Department of Culture Media and Sport 2003a, 33)!

As part of this wider Heritage Protection Review, a separate consultation paper specifically concerning Historic Environment Records was issued in 2003 (Department of Culture Media and Sport 2003b). The subsequently published review findings (*Review of Heritage Protection: The Way Forward*) did indeed recommend that “Government should require local authorities to establish and maintain or have access to Historic Environment Records” (Department of Culture Media and Sport 2004, 26). This recommendation has been reiterated recently (Department of Culture Media and Sport 2006, 13) but no firm timetable has yet been set for the introduction of primary legislation to implement this, and other recommendations (Department of Culture Media and Sport 2004, 10; Department of Culture Media and Sport 2006, 12-13).

The Heritage Protection Review also proposes other radical changes to the present system that will place further responsibilities on Local Authorities as custodians of the historic environment. If implemented these too will effect the future character of HERs. Firstly, it is proposed to amalgamate Listed Buildings, Scheduled Monuments and Registered Parks and Gardens, etc. within a “Register of Historic Sites and Buildings of England” (Department of Culture Media and Sport 2004, 9; Department of Culture Media and Sport 2006, 13). The Register will be compiled nationally, but it will be supplemented by local sections maintained by Local Authorities, that contain a record of conservation areas, local lists and registers, such as SMR/HER entries.

However, it is intended that Local Authorities, not the Secretary of State or English Heritage, will become responsible for the management of an integrated consent regime for proposals affecting items on both the national and local registers. The consent regime will also incorporate statutory management agreements for selected Register items (Department of Culture Media and Sport 2004, 10). These will rely on holistic appraisals of the characteristics of the sites in question. The ultimate effect of the proposed legislative changes will be to devolve even more responsibility for the curatorship of the historic environment to Local Authorities. This clearly has resource implications, and implies that mechanisms will have to be found for the closer integration of traditional Sites and Monuments Record type information with other environment record systems.

It is surprising that Government has not paved the way to these proposed far-reaching legislative and operational changes by providing emphatic recognition of archaeological advisory functions within the national suite of local government Best Value Performance Indicators (BVPIs). BVPIs comprise a set of targets (often numerical) through which the performance of council services, and therefore the adequacy of the council as a whole, is measured annually by the Audit Commission and compared with other authorities (Comprehensive Performance Assessment; <http://www.audit-commission.gov.uk/performance/guidance.asp>)

There are well-established BVPIs for Local Authority managed museums, which remain non-statutory services (such as BVPI 170b, visitors per 1000 of population, BVPI 170c school group visits). Archaeological advisory functions, however, figure only obliquely. BVPI 205, which refers to the quality of planning decisions, includes the provision of specialist archaeological advice within the planning process within its list of performance measures. The BVPI 219b and 219c notes recommend that Conservation Area appraisals should include scrutiny of HER information.

Individual Local Authority service plans, while necessarily responding to the fulfilment of BVPIs and the requirements of Comprehensive Performance Assessment, can also include locally adopted service performance measures. These can legitimately include measures such as

the number of HER enquiries dealt with annually, the number of HER records generated and amended, and progress towards fulfilling the suggested national benchmarks for HER services (English Heritage & Association of Local Government Archaeological Officers 2002). While these may be useful voluntary measures to help guide service priorities and lobby for resources, they do not provide the firm impetus for management support that statutory status should bring.

1.3 Developing information standards and Information Technology

In addition to adequate operational and management support, the implementation of any ambitious record system requires the systematic organisation of information and the application of classification, if information is to be retrieved efficiently and used with any integrity. The early manual systems adopted by SMRs (card files or paper records related to maps) demanded at the very least a record reference number, a short description of the remains in question, and standardised locative information, such as a parish name and grid reference.

Model record systems for early SMR services were provided by the post-war Ordnance Survey Archaeology Division, which employed an indexed monument record card system (section 1.1, above) and the Council for British Archaeology. The latter produced a monument record card template, batches of which could be purchased to assist the collation and conformity of local records (Council for British Archaeology 1952, Appendix III).

If record collections were to permit simple searches for various types of archaeological information (such as all Bronze Age barrows) using various indices, rigour in classification and terminology would be required. At the outset of SMR recording practice it was realised that such classification might pose problems for a rapidly developing discipline that did not benefit from a mature common vocabulary and standard terminology for all the categories of evidence that it encountered. Nevertheless, hand lists of keywords to describe monument types and evidence types were produced for both national and local monuments records (Benson 1974, 232; DoE 1981, 1; Darvill & Fulton 1998, 60). By the middle of the 1960s, it was

noted that 350 different field monument categories had been defined by the Ordnance Survey index (Darvill & Fulton 1998, 60).

Archaeological information has to become *data* when captured by a computer system. It undergoes an interpretative process that translates the information, or rather our perceptions of the archaeology in question, into manageable data items. In order to process the *data* and to retrieve *information*, ranges of acceptable data have to be defined and relationships between data items made explicit. The greater the limitations of computer memory and processing power, the greater the rigour that must be applied in information classification and synthesis. The severity of the transformations from information to data and back again, is proportional to the computer system's ability to represent both the range of source archaeological information and the relationships between information items:

The effects of the transformation from archaeological information into computer data are not now as obvious as they were when computer memory and processing power were limited and expensive. Early text databases had to make much use of sets of simple codes and acronyms to represent often quite complex information. There was little room for introducing uncertainty or multi-faceted interpretation into the digital record. There was no practical means to include digitised source material which could assist database users in their own interpretation of the evidence, such as full reports, site plans, and photographs. Database applications are more powerful today, but still require the reduction of extensive, complex and loosely-structured archaeological information into standardised items of information, and ultimately into long strings of simple machine readable code.

What we choose to record, how we choose to record it, how it is stored, and the tools available for its analysis and retrieval, inevitably require transformations of the source evidence and alter our perceptions of that evidence. The advent of cheaper personal computing and database software during the 1970s and 1980s presented opportunities for more efficient monument record management, but it also required new recording methods.

The question of information standards for ancient monument records, for example, was thrown into sharper focus by the desire to computerise the Department of Environment's Inspectorate of Ancient Monuments inventory of Scheduled Ancient Monuments. Advisory Note 32, *Ancient Monuments Records Manual and County Sites and Monuments Records*, set principles for the transfer of paper Scheduled Ancient Monuments records to an Ohio Scientific C3C microprocessor with a 26Mb hard disc (DoE 1981). The need to restrict data capture to the limited contents of well structured manual forms (AM7 - Ancient Monuments Record form; and AM12 Field Monument Warden Report Form) was recognised immediately. Even so, a new Ancient Monuments Record form (AM107) had to be designed to better cope with the demands of computerisation. At the time it was hoped that future developments would eventually permit the capture of a greater range of information than the new system allowed (DoE 1981, 1).

The Advisory Note encouraged the adoption of the Ancient Monuments Records Manual practices by county Sites and Monuments Records. It noted that few SMRs possessed detailed operational manuals, but hoped that where the Advisory Note principles could not be adopted immediately, SMRs could "take them into account in their own plans for future refinement and development" (DoE 1981, 2).

Advisory Note 32 also introduced the grammatical precision necessary for successful data retrieval, such as consistent use of upper case text and standard delimiters between information items. This and subsequent guidance issued in relation to Ancient Monument Records (DoE 1983) also ushered in changes in recording philosophy. Each separate 'site' was to be assigned a unique Primary Record Number to avoid potential confusion, because hitherto Scheduled Ancient Monuments had been assigned numbers in a county series. The strict adoption of glossaries of standard keywords for certain record fields was of prime importance in order to make use of database search facilities. Periodic amendments of the glossaries were envisaged (DoE 1983, 1).

The definition of what constituted a single archaeological 'site', already acknowledged as a somewhat subjective judgement (DoE 1983, 1), became an important issue. Contiguous or superimposed monuments (a barrow inside a hill fort was the example given) were to be broken down

into the constituent single sites. Complex sites, those sites that could be adequately described only by using more than one keyword within the fields "Site Type", "Period-general", "Period-specific", and "Form", could be recorded using multiple field sets separated by semicolons within Section 13 of the record. An example given related to a medieval manor, part of which was ruinous, part of which remained standing. It was suggested that the entry might read: "Manor/Medieval/C15/Ruined building; Manor/Medieval/C15/Roofed ruin".

Another example related to the occupation of the same site spanning two defined periods of time, and displaying evidence of several "Site Type", and "Form" definitions. The entry: "Hillfort/Prehistoric/Iron Age/Earthwork; Settlement/Roman/Romano-British/Finds" was considered acceptable. The entry: "Hillfort/Prehistoric/Iron Age/Earthwork; Beacon/Post-Medieval/Elizabethan/Other structure" was not. The latter demanded two separate records.

The completion of the record, therefore, involved some interpretation of the relationship between monument components; was the same site continuously occupied? Did the nature of occupation change sufficiently to merit re-classification under a separate record entry? Where uncertainty persisted it was possible to define separate cross-referenced records or to link records under a group number. A field for supplementary free text descriptions also could be used to expand upon the nature of the evidence. The actual application of this recording method, however, was dependent on any individual SMR archaeologist's preference for 'lumping' monument element information together or 'splitting' it down into its constituent parts. Such decisions were not quite so crucial in previous paper monument inventories.

Whilst the suggested record structure was logical, given the available computer databases at the time, it markedly differs from archaeological site descriptions found in traditional published descriptions. The necessity of a record distinction between ruined and roofed parts of a medieval building complex, for example, is perhaps a desirable feature for conservation management users, but the repetitive robotic nomenclature, forced by the flat-file structure of the database, does little for the wider appreciation of the monument. Severe limitations in computer memory led to the

widespread use of codes and abbreviations instead of complete words and phrases. These constraints perhaps created further barriers to the wider appreciation of SMR data by those used to reading the flowing monument descriptions contained in traditional publications.

The original keyword glossaries, especially the "Site Type" field, were augmented according to regional or local need. The "East Anglian Region Sites and Monuments Record Wordlist" of around 1983, for example, differed from the Department of the Environment standard wordlist of the time (Department of the Environment 1983, 15-19), which itself contained amendments to the National Monuments Record thesaurus of the time. The national agencies continued to publish updated thesauri in order to guide consistency in terminology use throughout the SMR community (RCHME & English Heritage 1989; RCHME & English Heritage 1992; RCHME 1998b).

Recording England's Past – A Data Standard for the Extended National Archaeological Record (RCHME & ALGAO 1993) provided the next major guidance on SMR data structure. The standard was drawn up in the context of the ready availability of relational databases, the integration of archaeological and architectural records within the new unified National Monuments Record, and the implementation of Urban Archaeological Databases (UADs). UADs are, in effect, specialised SMRs that have been designed to deal with the particular problems of the conservation of urban archaeological remains within the larger historic towns (RCHME & ALGAO 1993; Lang 1989, 41-49). The lack of guidance in the Data Standard regarding the recording of monument complexes, spatial information, and conservation or management information was acknowledged. So too was the effect that developing software might have on the nature of future data standards (Lang 1989, 3-4).

The unified RCHME National Monuments Record database (MONARCH), implemented in accordance with the 1993 Data Standard, highlighted the *relational* rather than *hierarchical* associations between monuments and archives, field workers, and 'events' (archaeological recording activities) (RCHME & ALGAO 1993, 2; Clubb & Lang 1996, 55). An 'event'-led structure had been adopted for the computerisation of the Greater London SMR in 1983 (Clubb & James 1985; Charlton 1999, 4). The definition of

'monuments' within urban deposits is very often a matter of interpreting and relating various recording episodes. Thus an 'event'-led, rather than monument-led, record was considered better suited to the requirements of this urban SMR. An 'event'-based model was also adopted by the predominantly rural Northamptonshire Sites and Monuments Record at its inception (Foard 1978; Foard 1996). Until recent times, however, these SMRs were exceptional in terms of the relationship between events and monuments that was inherent in their structure.

The latest principal monument data standards guidance, *MIDAS – A Manual and Data Standard for Monument Inventories* (RCHME 1998a), was drawn up by the RCHME Data Standard Unit in association with the Association of Local Government Archaeological Officers, British and Irish Archaeological Bibliography, English Heritage, and the National Trust, along with a large number of professional peer group reviewers (RCHME 1998a). It builds upon general principles and structures established by the International Documentation Committee of the International Council of Museums for archaeological sites and monuments inventories (CIDOC 1995). It also draws on the philosophy behind the SPECTRUM standard of the Museums Documentation Association, within which the Museum Documentation Association's archaeological objects thesaurus is framed.

In many respects, MIDAS is less prescriptive than earlier sites and monuments inventory standards, in that its aim is not to "control the *content* of an inventory, but to provide a common *framework* within which inventories should develop" (RCHME 1998a, 1). MIDAS does not require the use of a specific word list or thesaurus, although it encourages the use of established thesauri such as the English Heritage Thesaurus of Monument Types.

MIDAS defines four main information schemes for an inventory structure:

'Monument Character' - physical features that belong, or may be related to, the present landscape; place-names, finds location, etc.;

'Events' - recording activities that help define the character of 'monuments');

'Bibliography, Documentary Archives and Objects' - which has often been abbreviated to 'sources' or 'archives' and which comprises information about supporting resources such as reports, documents, photographs, and maps, some of which will be products of 'events';

'Monument Management' - information about conservation issues for a monument, such as planning applications and management agreements.

There are other information schemes, concerning 'names and references', 'people, organisations and roles', and 'location', that fit within the main information schemes. For each information scheme 'units of information', the informational building blocks (or 'fields') of the inventory, are defined. Some are mandatory, others are optional (RCHME 1998a).

The MIDAS units of information reflect both the need to retain administrative and management information about a monument (for example, 'Condition', 'Land Use', 'Management Proposal Recommendation', 'Postcode', 'Protection Status', 'Unitary Authority') and include items that are likely to be useful in a research context (such as 'Archive/Source Title', 'Evidence', 'Monument Type', 'Period', and 'Scientific Date' - RCHME 1998a, 71-105).

Importantly, MIDAS promotes a clear division between 'Monument Character', which may be subject to iterations of re-interpretation, and the reporting of individual recording 'events' (RCHME 1998a, 44). Events, such as geophysical surveys, excavations, or watching briefs, are the building blocks for the interpretation of a monument's character, but they are not themselves matters for interpretation.

MIDAS also introduced monument inventory compilers to the potential uses of 'metadata', information about *information* (Miller 1998, 5; <http://www.ariadne.ac.uk/issue5/metadata-masses/>; Chapter 5), in order to help users assess whether inventory contents are likely to be relevant to their needs (RCHME 1998a, 38).

The promotion of information standards such as MIDAS and its predecessors by the national agencies, led by the imperatives for computerisation during the 1980s and 1990s, have gone a long way

towards assisting cohesiveness in Sites and Monuments Record information, not least by encouraging the SMR community to participate in the development of those standards (DoE 1981, 2; RCHME 1993, iv; Clubb & Lang 1996, 57; Foard 1996, 3; RCHME 1998a, 'Acknowledgements'; Ray 1998, 4; Bourn 1999a, 3-7). Nevertheless, the criticism that "traditionally, local SMRs have not concerned themselves greatly with data standards" (Clubb & Lang 1996, 57), can be levelled with some justification. Many of the practical and psychological barriers to the discretionary adoption of national standards have been persistent. For example, while there was an early and growing consensus that the MIDAS 'event-monument-archive/source' model was appropriate for SMRs (Foard & Catney 1999, 1; Bourn 1999b, 7), some dissent was still evident at gatherings of SMR archaeologists. This was apparently partly fuelled by the lack of real examples of MIDAS's actual application to monument recording and by the anticipated heavy workload in recasting existing SMR data to conform with the new standard (Catney 1999, 3).

It is worth remembering the wide range in information quality that many SMRs and HERs have to accommodate. Many entries have been formed from information gathered under the most exhaustive modern archaeological investigation. Other entries are created from less secure sources. I know of one notably vague SMR entry that contains only the following information in its free text description field: "It is said locally that in about 1930 a Major Munday found 'caves' at this place, into which a boy was lowered to bring up 'vases filled with grain'". A parish is named and a six-figure grid reference is given, but no cross-references, or corroborating evidence are cited. It is difficult to shoehorn such a record into the current thesaurus terms (perhaps we should add 'dangling infants' to our developing terminology for remote sensing events?), or MIDAS standards. And yet, the judgement had been made that this information might just as well reside in the SMR, in hopeful anticipation that further supporting information will be forthcoming, or that formal archaeological survey will eventually find something that explains the anecdote. After all, it is information that is unlikely to be recorded elsewhere. Some SMRs have been much less tolerant of this sort of 'fuzzy data' of course. All SMRs and HERs, however, face the problem of placing real world archaeological evidence into rigid information structures and standards that might not quite fit comfortably.

MIDAS, while containing some advice about constructing local thesauri and wordlists, stresses the advantages of using established national thesauri (RCHME 1998a, 109-114). Latterly, The Forum on Information Standards in Heritage ('FISH', formerly 'FISHEN' to reflect its original English remit) has undertaken important work on the creation of data standards (Lee 1999, 8; <http://www.fish-forum.info/>). FISH is administered through the English Heritage National Monuments Record, and comprises members from the community of HER practitioners and academic institutions.

Thesauri and word lists either maintained or endorsed by FISH are available via its website as part of the INSCRIPTION national heritage data reference set. INSCRIPTION includes sets of terms for things as diverse as building materials, historic aircraft, and marine craft and, of course, includes the current Thesaurus of Monument Types. The thesauri and wordlists are dynamic, and are updated as candidate terms are submitted for inclusion. The ease of access of these terminology resources has undoubtedly contributed to their widespread use and adoption by Historic Environment Records.

Compliance with MIDAS data content standards and conformity with INSCRIPTION thesauri and wordlists now form part of the 'Information Management Performance Measures' within the national HER benchmarks (English Heritage and Association of Local Government Archaeological Officers 2002, 7; DCMS 2003b; DCMS 2004, Appendix 2).

Important work in setting standards for digital archives resulting from specific archaeological activities has also been undertaken by the Archaeology Data Service. The ADS has released a set of good practice guidelines covering subjects such as Geographic Information Systems and digital excavation and survey archives (<http://ads.ahds.ac.uk/project/goodguides/g2gp.html>).

RCHME, and latterly English Heritage, sponsorship of SMR/HER Audits, has enabled individual services to assess their management structure and resources, and to measure their information content and quality against national standards. The audits are part-funded by the National Monuments Record and follow a standard NMR specification (English Heritage National

Monuments Record 2003a). Many SMRs have reported that significant benefits arose from the audit process; not least in the preparations for data migration to new computer systems (Newman 2001; English Heritage National Monuments Record 2003a).

The hardware and software used by SMRs and HERs has been largely determined by the systems preferred or tolerated by their respective organisations (Ferne 1997, 2; Foard 1997, 3; Gilman 1997, 4; Condon et al 1999, 62). Archaeologists have had to consider the Information Technology policies adopted by individual local authorities, the availability or otherwise of IT support within the authority, and the expense of implementation in their decision to adopt particular systems.

The national agencies have made significant contributions to SMR software development. Monument record software was produced by English Heritage to assist initial SMR computerisation. The early 'Version 1' software was later replaced by a 'Superfile'-based system. RCHME developed an SMR version of the Oracle-based MONARCH monument database (Clubb & Lang 1996, 54). These systems came to be adopted by many SMRs. Many other SMRs, however, have employed systems developed 'in-house'. Amongst these, 'Dbase', 'Foxpro', and 'Access' based applications have proved popular in recent years (Condon et al 1999, 62-63). A new SMR database package, 'HBSMR', the result of a partnership between English Heritage and commercial software company ExeGesIS SDM Ltd, was launched in 1998 and is now well-established.

The most important technical development for Sites and Monuments Records during the 1990s was the introduction of Geographic Information Systems. By 1998 around 30% of SMRs made use of a GIS application that linked a relational text record database with a digital map base facility (Baker 1999, 18). At the same time, a total of 67% of SMRs reported the availability to their service of some form of digital mapping provision (Baker 1999, 15). In 2000, 75% of the 66 SMRs that responded to the SMR Users Group Survey made use of GIS. Several other SMRs reported that they were on the point of acquiring a GIS (Ferne 2000, 2). In 2002 it was reported that 88% of SMRs used a GIS package (Newman 2002c, 16). This figure is now almost certainly in excess of 90% of SMRs/HERs (Bell & Bevan 2004, 12).

GIS allows SMRs and HERs to archive their out-of-date paper Ordnance Survey base maps and to view archaeological database information in combination with a variety of off-the-shelf and customised digital map data. At a simple level, SMR/HER GIS applications allow site centre points to be plotted automatically on a variety of digital maps to create distribution plots. They also allow SMR/HER database entries to be viewed and selected from the GIS interface using a range of spatial searches (circle, rectangle, polygon, etc.). Positional data verification is one immediate benefit gained from the introduction of GIS applications to SMR and HER services. Obvious errors and inaccuracies in recorded grid references quickly come to light when GIS plots are generated from source databases. There were also immediate benefits to researchers. For the first time, many SMRs and HERs were able to generate up-to-date, customised distribution plots of particular record entry types (Roman villas, Bronze Age barrows, etc.) - something that was virtually unmanageable previously.

The categories of data now recorded as layers of points and polygons within GIS HER applications is impressively wide. Scheduled Monument boundary information, Conservation Areas, Registered Parks and Gardens, historic landscape characterisation, event extents, and other spatial information in the form of layers of polygons, have been added as GIS use has become increasingly embedded into practice over the last decade (Figure 6; Figure 7). However, most SMRs and HERs still rely heavily on point depictions of information that really should be represented in polygon and line form. Furthermore, many important categories of spatial historic landscape information have not been captured at all (Baker 1999, 15-20; Fernie 2000, 3; Newman 2002c, 5; Newman 2002c, 12-15; Bell & Bevan 2004, 15-16).

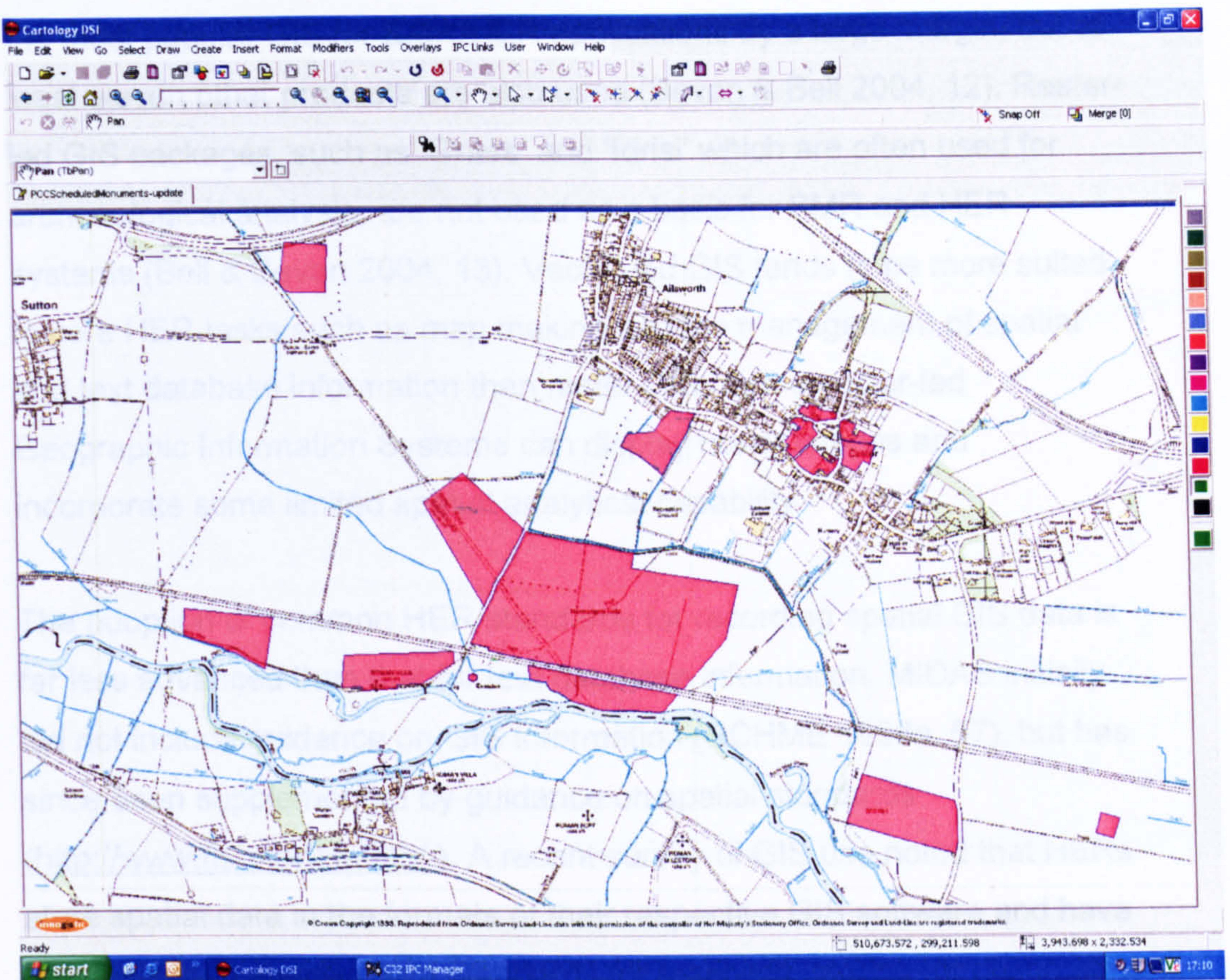


Figure 6. GIS SMR layer depicting Scheduled Monuments as polygons on a raster OS map base. Other layers of archaeological information have been suppressed. Original in colour.

The more dynamic GIS SMR/HER applications operate directly with the core SMR/HER text database and allow the alteration of the database records from the GIS interface. Others require that the map interface operates with an uploaded copy (or partial copy) of the core record database, which can be read but not altered from the GIS (Fernie 2000, 3). The national HER benchmarks (English Heritage & Association of Local Government Archaeological Officers 2002) stipulate the use of a fully dynamic link between the core HER database and GIS, but it seems that this is not yet widely understood or adopted (Bell & Bevan 2004, 16).

Surveys of SMR/HER use of Geographic Information Systems and Computer Aided Design packages for mapping, reveal similar variation in software choice as is apparent in their text database systems. 'MapInfo', 'ArcView/ArcInfo', and 'Wingz', proved popular initially, although at least

nine other products were in use amongst the 44 respondents at the time of the first survey (Ferne 1997, 2). 'MapInfo' and 'ArcView/ArcGIS' remain the most popular GIS for SMR/HER applications by a large margin, but at least eleven other products are also used (Bevan & Bell 2004, 12). Raster-led GIS packages, such as 'Grass' and 'Idrisi' which are often used for archaeological analysis, are not used as a basis for SMR and HER systems (Bell & Bevan 2004, 13). Vector-led GIS tends to be more suited to core HER tasks such as map making and the management of spatial and text database information than raster GIS. Some vector-led Geographic Information Systems can display raster images and incorporate some limited spatial analytical capability.

The adoption of common HER standards for recording spatial GIS data is far less advanced than that for text database information. MIDAS initially did not include guidance on GIS Information (RCHME 1998a, 57), but has since been supplemented by guidance on spatial standards (<http://www.fish-forum.info/>). A recent survey of GIS use noted that HERs store spatial data in the formats of their respective GIS software and have not developed specific data standards for receiving, storing, or distributing spatial data (Bell & Bevan 2004, 16; Bell & Bevan 2004, 18). Some, however, have developed in-house guidelines and house styles for the digitisation of polygons, and adhere to Archaeological Data Service or National Geospatial Data Framework best practice guidelines (Bell & Bevan 2004, 30).

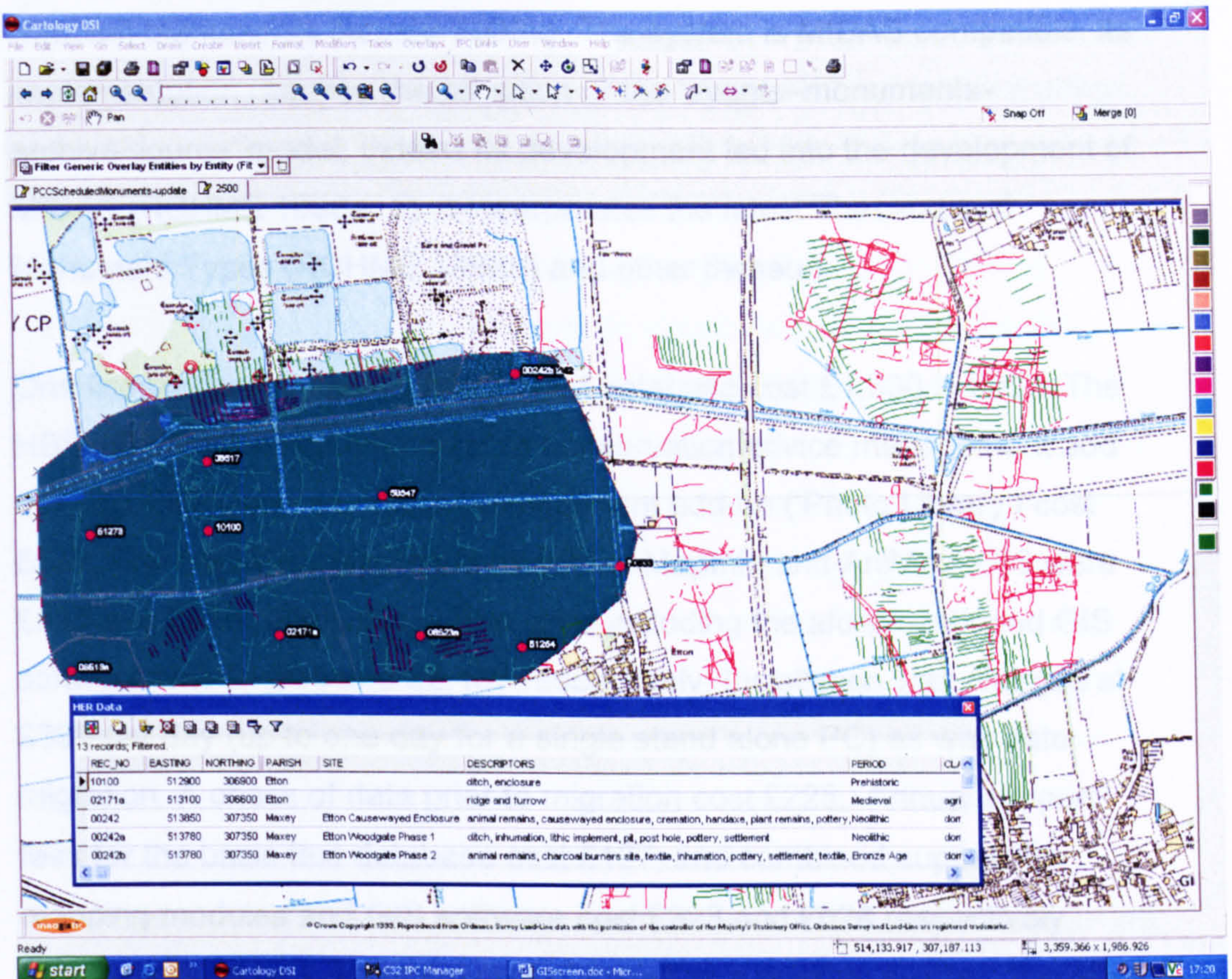


Figure 7. SMR site centre points plotted with vector crop mark plots on an OS map base. A search area has been defined as a polygon and relevant database entries have been highlighted and retrieved automatically. This GIS application allows spatial and text attribute search results to be exported in common data table formats. Original in colour.

An important step towards SMR software conformity and further encouragement towards the adoption of standard recording practice, has been provided by the launch and on-going development of the ExeGesIS HBSMR package. This has been achieved through English Heritage's partnership with commercial software developer ExeGesIS SDM Ltd, and has also benefited from the support and endorsement of the Association of Local Government Archaeological Officers.

The ExeGesIS HBSMR product is based on Microsoft's 'Access' database software with interfaces to 'MapInfo' and 'ArcView' Geographic Information Systems. HBSMR was launched in March 1998 and by June 1999 25 SMRs had purchased the system (Fernie 1999b, 12), enough to warrant the establishment a user group (Bourn 1999b, 12). It has now become the most widely used SMR database software package (English Heritage

National Monuments Record 2003a). The system is MIDAS compatible. Its implementation requires the adoption of the 'events–monuments-archive/source' model; indeed its development fed into the development of MIDAS (RCHME 1998a, 1). It incorporates the latest Thesaurus of Monument Types (RCHME 1998b) and other thesauri.

One license for the basic HBSMR text database cost £1,330 in 2002. The HBSMR 'Consultations Module' (a conservation advice management add on) cost £600, and an image management add-on ('Photo Library') cost £557. The HBSMR mapping modules for MapInfo and ArcView GIS were £815 and £970 respectively. The price including the aforementioned GIS software was £1,505 and £2,137 respectively. Installation was charged at £395 per day (up to one day for a single stand alone PC) as was data migration. A check of data prior to migration cost £225. Annual support fees for the basic text database cost £187, and combined support for mapping modules and GIS software cost £323 and £626 respectively (www.esdm.co.uk). The total cost of installing a working system, therefore, was somewhere between around £3,500 and £6,000. This is a relatively significant outlay considering that the true costs of IT provisions are often not met by individual SMR services, but absorbed in corporate IT budgets (Bell & Bevan 2004, 10).

The HBSMR package suffered a few of the initial teething problems typical of software launched into a real working environment for the first time. However, the partners have been committed to the long-term support of the package (ExeGesIS SDM 2002), and the growing number of users has helped to ensure its development remains viable. Several new versions of the software have been released in response to feedback from the HBSMR User Group, the availability of new data sets deriving from national surveys and developing recording practice. New modules have been added, and a web browser version has been developed (www.esdm.co.uk).

The price of the package and the developmental emphasis on 'MapInfo' and 'ArcView' GIS links, whose use is not supported by all Local Authorities, might present disincentives for the adoption of this system by some. Nevertheless, the development of the ExeGesIS SDM LTD HBSMR package, its promotion and significant take up by the SMR/HER

community, marks a considerable achievement and a significant step towards levering in greater structural conformity to HER recording practice.

HBSMR, however, has rivals. Notable alternative HEIR applications have been developed by Oxford ArchDigital, a company formed by Oxford University that specialises in computer applications and training for the heritage field (www.oxarchdigital.com). Oxford ArchDigital's applications are based on its Integrated Information Management System (IIMS), which can be configured to accommodate the specific requirements of various applications. The IIMS is orientated towards the management of images and spatial data, in addition to documents and inventories. It also has the advantage of integrated Web-based functionality and easier multiple user access. For these reasons, organisations that retain several operational centres, but that want to share a single information resource, have been particularly drawn to this system. The Ministry of Defence, the Welsh archaeological Trusts, and the Portable Antiquities Scheme, employ Oxford ArchDigital's products.

The fact that most HERs have now achieved computerisation of the majority of their primary text records (Bell & Bevan 2004, 5), and are converging towards MIDAS, should greatly assist the task of migrating information to new systems. It should also improve the accessioning data from other inventories. All data migration contains an overhead in terms of policing and validating automated data re-configuration and then undertaking the necessary manual editing. Nevertheless, achieving greater coverage of information and consistency across the HER community, theoretically, ought to be a lesser mountain to climb in the future than that faced during the initial digitisation of SMR information from manual records.

However, in order to maximise the potential of automated accessioning and dissemination of digital information, the development of national HER recording standards has to keep pace with current survey recording practices. Equally, the output of surveys should be designed to conform as closely as possible to MIDAS and common HER recording practice. There is evidence to suggest that this is not happening (Bell & Bevan 2004, 18; section 1.6 below).

Significant progress has been made in the delivery of HER information via the World Wide Web in recent years, although still only a few English SMRs/HERs have Web-browseable database or GIS facilities (Bell & Bevan 2004, 5). Two paths to Web-accessibility have been adopted. Some HERs have developed their own systems, usually with Heritage Lottery funding or other external grant aid. Others have prepared and submitted their core data to the Archaeology Data Service 'ArchSearch' catalogue, a collection of Web-browseable archaeological information resources. The resource implications of implementing such systems, both in direct costs and in staff time, have been cited as significant reasons why more SMRs and HERs have not achieved a more ambitious Web presence. Web access is discussed more fully below.

We are becoming a more ICT literate society. Internet use has grown exponentially, and things such as multi-functional mobile phones and Global Positioning Systems, that were once expensive gadgets for a few enthusiasts, are now commonplace. The public generally does not want to tinker with ICT in the same way that enthusiasts enjoy tinkering. Most users expect their ICT to be reliable, appealing and easy to use. It must deliver results quickly. HER services are not at all immune from these expectations.

Although Geographic Information Systems, for example, are now very well established in local government services and agencies elsewhere, I still find that a demonstration of Peterborough's HER GIS application tends to greatly impress the public, councillors, mature students, local society members, etc. They are amazed that the GIS is able to find their address; that it can produce a variety of current maps, historic maps, or vertical aerial photographs centred on their house; that it can plot a distribution map of archaeological remains in the locality (according to multiple criteria) and then produce descriptions of those remains. Increasingly, however, students and younger people generally, are not over-awed. Instead they are somewhat surprised that all this information in its various configurations is not yet available to them at home via the World Wide Web.

There is now considerable pressure for HER development to keep pace with wider ICT developments, and particularly with those developments that assist our presentation to the outside world. The use of ever more

complex ICT by SMR/HER services has raised skills issues for staff, who have to balance the benefits of installing new systems against the 'learning curve' and general distraction to routine tasks inherent in their implementation. There has been a paucity of formal SMR-specific training for SMR officers in the past (Lang 1997, 8). This conforms to the impression that more ICT training is needed across the archaeological profession in this country (Condrón et al 1999, 72), which in turn reflects an identified ICT skills gap among archaeologists further afield (Eiteljorg 1999, 6).

Learning and maintaining the ICT skills necessary to manage Historic Environment Record applications, must sit alongside the development of the non-ICT skills necessary to run a publicly available heritage information service. These include the need to maintain currency in general archaeological and historical knowledge, obtaining detailed knowledge of archaeological reference sources and investigative techniques, maintaining comprehensive knowledge of local archaeology, understanding and applying customer care policy, adopting freedom of information and copyright policy, acquiring knowledge about the planning system, agri-environment schemes, etc. Appropriate ICT training may mitigate the tension between and acquisition of new ICT skills and other HER tasks. The efficacy of such training, however, is to a large extent dependent upon the aptitude of the trainee, and the sophistication of the applications in question.

The frustrations that some SMR/HER archaeologists feel in the distractions caused by new technology have been voiced at meetings and gatherings, but have seldom been committed to print. The words of one SMR officer, however, represent the thoughts of others. This SMR officer wondered whether the profession was becoming too "bogged down in technology" and was danger of "forgetting what it is there for" (Smith 1997, 8). At the same time, she drew attention to the important consideration that some ICT knowledge is necessary just to communicate effectively with ICT support staff. Such thoughts probably reflect the fact that many archaeologists did not take up SMR/HER positions to become ICT technicians, but nevertheless concede that ICT awareness is an important part of the job.

About 70% of SMR services benefited from the availability some form of relevant corporate ICT training in 1998 (Baker 1999, 13). In 2000, however, only 62% of SMR officers reported that they had been offered training for their Geographic Information System. Only 34% had an operators' manual for their GIS (Ferne 2000). The situation seems to have improved over the last few years, with HER services making use of internal and external courses and manuals. Fewer than 20% of HER services now report the absence of any form of GIS learning provisions (Bell & Bevan 2004, 10). Though curiously few report the use of Web-based learning (Bell & Bevan 2004, 10). As far as wider technical support is concerned, a significant number of HER services still consider that it is inadequate (anon. undat. *Heritage Gateway Evaluation of User Requirements Survey*).

ExeGesIS SDM Ltd offers training programmes for purchasers of the HBSMR product, and has sought accreditation under the Archaeological Training Forum scheme (ExeGesIS SDM 2002). One-off courses designed to plug the gap in the training of general aspects of SMR use also have been arranged occasionally. The University of Leeds, for example, implemented one SMR course within its series of Professional Archaeology courses under the sponsorship of English Heritage in association with the Institute of Field Archaeologists and the Archaeology Training Forum (Newman 2002a). The Archaeology Data Service has arranged a variety of courses and seminars covering use of its own services and the management of digital archives generally.

The publication of a nationally-distributed manual of SMR management guidelines (Ferne & Gilman 2000), was a further important initiative in guiding SMR training, assisting system conformity, and setting aspirations for those SMRs that found themselves at lower levels of development. *Informing the Future of the Past: Guidelines for SMRs* (which covered subjects such data standards, disaster planning, managing collections, outreach, etc.) has undergone an extensive revision recently. The revised edition has been released as a Web-based document that can be updated regularly in consideration of changing technology and practice (Gilman 2005, 2; Gilman & Newman 2007).

Despite improving learning provisions, the future development of HERs is likely to pose further serious questions about skills provisions among HER

staff. The traditional SMR recording subject areas continue to widen and embrace aspects of related environmental disciplines and specialist sub-disciplines (see section 1.6, below). The growing necessity for Web delivery and the desire for interoperability between separate HERs and related databases, have also brought in new skills considerations (section 1.5 and Chapter 5). There have been recent calls, for example, for HER staff to make greater use of mark-up languages and data standards drawn from wider humanities, geographic and scientific applications (Bell & Bevan 2004, 29).

Models for local HER management and staffing structures have been suggested (Baker 1999, 4; Fernie & Gilman 2000, A.3.3; English Heritage & Association of Local Government Archaeological Officers 2002), but it is generally acknowledged that a single model does not suit the needs of all local services.

Should future HER staff be interpreters of the full range of historic environment information they curate? Do they need to be database administrators, digital archive curators, GIS technicians, mark-up language specialists, all of these things, or something else entirely?

One of the chief strengths of locally managed SMRs has been the ability of staff to become thoroughly familiar with the datasets that they manage, and the character of the local archaeology they seek to record. This type of intimate individual knowledge cannot be replicated by staff in large centralised services (Fraser & Newman 2006, 31).

The massive catalogue of digital information maintained by the Archaeology Data Service, for example, is targeted primarily at “knowledgeable” users, and at providing support for education and research (section 1.5; Chapter 5). Its records are created and supplied by various contributing specialist databases. The datasets are prepared for integration within the catalogue with the assistance of ADS staff. However, the records are not actively updated and edited by ADS staff in the same way that SMR and HER staff are expected to maintain their records. HEIRPORT (section 1.5; Chapter 5) links several different online databases within one portal, which itself requires a minimal curatorial overview.

Local knowledge is clearly very important to the successful maintenance and use of historic environment information, for many applications. It is questionable, however, whether insular local management alone (even that currently achieved by the largest SMR services) really provides a solid enough basis for continuing technical development and standardisation in an increasingly complex world.

1.4 A remit for education and research?

1.4.1 The policy framework

The very first SMR, that covering the Oxford region, was implemented with research and public use firmly in mind. Although its creators considered that an entry within SMR was not intended to be a “substitute for publication”, they were keen for the SMR to provide a “starting point for many aspects of research”, and to play an “essential role in answering enquiries whether from members of the general public, local archaeological and historical societies or professional archaeologists and historians” (Benson 1974, 232).

Historically, much of the guidance and policy statements issued by the national agencies to SMRs has greatly emphasised narrow resource management functions, and has tended to consider research and educational use as secondary considerations, or only as potentially useful by-products of data gathering. Advisory Note 32, issued by Department of the Environment Inspectorate of Ancient Monuments, for example, a seminal document in the development of SMR data structure and content, was driven by a conservation management initiative - the better (computerised) management of Scheduled Monument information. Advisory Note 32 sought to encourage SMRs’ use of “academically acceptable” monument definitions (Department of the Environment 1981, 1), and mentioned SMR use in helping to formulate excavation policy (Department of the Environment 1981, 2). There were no references to wider academic uses of the information, however, and the suggested data fields were very heavily weighted towards the capture of management information (Department of the Environment 1983, 3-4). In this respect, the

'AM107' record structure adopted by the Inspectorate contrasts significantly with the punched card-based record structure of the Oxford Region SMR, which places much less emphasis on management information (Benson 1974, Appendix).

Subsequent structural guidance issued to SMRs was non-committal on the question of research needs and it is not clear how much academic input was sought in the formulation of such guidance. Most individuals and organisations who contributed to *Recording England's Past - A Data Standard for the Extended National Archaeological Record* (RCHME & ALGAO 1993), for example, principally were professionally involved in data and resource management, rather than academic research.

Exploring Our Past – Strategies for the Archaeology of England (English Heritage 1991b), was a bold attempt by English Heritage to provide a concise summary of research and management objectives for English archaeology. It was widely circulated among the profession, and has only recently been superseded as a source of inspiration for research direction in development-led archaeology, and as guidance to support project grant applications. *Exploring Our Past* placed great emphasis on the development of the SMRs' conservation management applications, but limited its statement on the wider uses of SMRs to the rather weak "consideration should also be given to the means by which SMRs may be made accessible for research purposes" (English Heritage 1991b, 48).

PPG16 (Department of the Environment 1990) has governed the form of development-led archaeology in this country since its adoption, and has had a profound influence on the development of archaeological practice generally. It is a document that is principally concerned with the treatment of archaeological remains within the local planning process, but also mentions some wider informational uses of SMRs (Department of the Environment 1990, Annex 1, para. 5). Despite its near universal acceptance and appreciation among archaeological practitioners, the lack of clear guidance within *PPG16* regarding responsibilities for archiving, publication and research has been a source of much criticism and dissatisfaction. Some have attributed a serious fracturing of the relationships between amateur, academic, and development-led archaeology directly to the implementation of *PPG16*. It is a criticism

perhaps that would be less sustainable had the document placed greater emphasis on the research outcome of development-led archaeological work and the role of SMRs as inspiration for research and repositories of original research results. Raising the profile of research ambition within *PPG16*, however, might have made it much less palatable to developers, who are conscious of the implied extra cost of research over basic rescue recording.

Protecting Our Heritage, a consultation document issued by the Department of National Heritage in 1996, proposed that the maintenance of a Sites and Monuments Record could be a statutory obligation of Local Authorities. However, although it recognised the importance of SMRs the document failed to identify any functions beyond those of development advice (Department of National Heritage & Welsh Office 1996, 46). The *Local Government Reorganisation – Guidance Notes for New Authorities* (Department of National Heritage 1995), encouraged the adoption of SMR services by the new authorities. Although there are no specific references to SMRs' wider functions, the necessity of education, interpretation, and public access to conservation and heritage source materials is noted (Department of National Heritage & Welsh Office 1996, sections 24 and 25).

More recently, much greater emphasis has been placed on encouraging SMRs' amenity, educational and research functions. *Unlocking Our Past for the New Millennium* (RCHME, ALGAO & English Heritage 1998) places support for SMR development in these regards firmly at the heart of its policy for co-operation between the archaeological agencies and their partners. The *English Heritage Archaeology Division Research Agenda of 1997* (English Heritage 1997), the provisional update to *Exploring Our Past*, paid more attention to the integration of SMR information and research effort. The dissemination of SMR information through "regional research centres" was envisaged (English Heritage 1997, 17), along with the goal of SMR enhancement as a product of commissioned projects (English Heritage 1997, 27). The success of creative SMR public access projects in Cornwall and Wiltshire also was noted (English Heritage 1997, 32-33). Two subsequent important and wide-ranging national policy statements and recommendations regarding the management of the historic environment (*Power of Place – The Future of the Historic*

Environment and The Historic Environment: A Force for Our Future) both strongly encourage the use of the historic environment as a 'life-long learning' resource and recognise the SMR's role in this regard (Department of Culture Media and Sport 2001, 15; English Heritage 2000, 39).

Proof that there is a strong public and educational demand for information about the historic environment is provided by authoritative sources. The MORI study 'Attitudes to the Heritage', was commissioned by English Heritage in 2000 to help gauge public attitudes towards heritage and the historic environment (www.english-heritage.org.uk). The survey established, amongst other findings, that:

- 98% of people think that heritage is important to teach children about our past, and that all schoolchildren should be given the opportunity to find out about this country's heritage;
- 96% of people think the heritage is important to teach us about our past;
- 95% of people think heritage is important for giving us places to visit and things to see and do, for encouraging tourists to visit, (94%), and creating jobs and boosting the economy (88%);
- 76% of people agree that their lives are richer for having the opportunity to visit and see examples of this country's heritage;
- 25% of respondents mentioned that improving the provision of information and advertising would make heritage more relevant to them.

Gratifyingly, the public information and educational role of SMR/HERs has also been recognised in the wide ranging review of heritage protection recently carried out by the Department for Culture, Media and Sport (DCMS 2003a; DCMS 2003b; DCMS 2004). The review recognised the "volume of support" and "high regard" for these aspects of HER services (DCMS 2004, 59).

It declared that “one of the Government’s key aims is to widen access for everyone to the historic environment and develop the resources everybody needs to enjoy and learn about our heritage” and further, “...to work with all sectors to develop workable solutions that are flexible and responsive to both current demands and those of the future, and to make these records available to professionals, schools, colleges, and the wider public alike” (DCMS 2004, 59).

It remains to be seen how the statements will be acted upon by central Government. Nevertheless, they signal a strong desire at the highest level to encourage the use of the wider informational potential locked in Historic Environment Records.

1.4.2 The practitioners’ response

Encouraging statements are one thing, but practice is another. The individual Local Authority management frameworks that have governed the development of most SMRs have not been conducive to the fulfilment of SMR education and research potential. Lavell, writing in 1985, for example, noted the early success of SMR data gathering and their well-established development control and conservation management functions, but drew attention to the lack of emphasis placed on the development of the national archaeological database as a research and education tool (Lavell 1985, 95). In consultation with three SMR officers and other archaeological colleagues, she identified a wide range of potential users for a national archaeological research database, including school groups, research groups, and university departments (Lavell 1985, 96).

The imperative of conservation management functions and historic funding shortfalls often relegated other, more public-facing, functions to the status of resource-hungry luxuries that few SMRs had the means to develop properly. Nevertheless, it may safely be assumed that most SMRs were in fact implemented and developed with ‘external’ research and educational use somewhere in mind. Many of the archaeologists involved in the early days of what has come to be termed ‘curatorial’ archaeology, were also involved personally in research of one form or another, and thus receptive to the possibilities for SMR research use.

However, the domination of SMR use by those also involved with their development, or those engaged in planning advice and resource management (who were often in fact the same people), has undoubtedly caused a somewhat introspective approach to SMR development. Today, 'academic researchers', the 'general public', 'historical researchers', 'lifelong learners', 'professional or specialist researchers', and 'teachers', are now frequently named as target audiences of Historic Environment Information Records of various types, including SMRs and HERs (Ferne & Gilman 2000; Grant 2002, 16). The development of SMR services (and now HER services) for specific external user groups, however, has not been greatly assisted by formal studies or surveys of use or user needs.

The lack of a detailed analysis of SMR use and users was first identified as a significant concern by the Inspectorate of Ancient Monuments (Department of the Environment), and others, as early as the middle 1980s (RCHME 1993, 2; Lavell 1985, 97). But since that time there have been remarkably few formal studies of SMR use, or formal attempts to engage academic opinion on the future directions for SMRs and HERs.

There is little evidence that the policy of integrating a comprehensive user requirements study with SMR implementation, as advocated by David Evans (1985, 65), for example, was ever carried out widely across the growing SMR community. There are very few published mentions of the means by which SMRs ensured that external user needs fed into their development. The development of the Greater London SMR, however, provides one example. The development of this SMR was guided by the anticipation of a wide range of users, including academic researchers. It drew on an Advisory Group whose members were representatives of organisations that comprised potential users of the SMR. SMR staff worked within local organisations who were both contributing to and drawing on the record, in order to get a feel for its developmental needs (Jones 1989, 34). The creation of the Humberside SMR was also led by consideration of uses beyond those of planning advice. From its creation in 1984, a programme of promotion amongst local interest societies ran alongside its development (Wood 1989, 28-29). A rare example of a user survey that was intended to guide service delivery was carried out by a commercial

consultant for the North Yorkshire SMR (Bullen Consultants 1999). The findings of this survey are considered in more detail below.

A detailed analysis of SMR use was beyond the scope of the important 1998 'Baker' survey. Nevertheless, the findings regarding 'Volumes and Types of Users', 'User Access' and 'Outreach', along with consideration of various other factors within the management context of SMRs, provided a very useful picture of the SMR community's ability to accommodate external users (Baker 1999, 14; 24-26).

There were 75 SMR respondents to the survey. The analysis of SMR user profiles, however, was greatly inhibited by the lack of enquiry information recorded by individual SMRs. Only 60% of responding SMRs kept some kind of register of users (Baker 1999, 84). The results of the assessment of "relative volumes of users by ranking" must be seen in the context of vagueness in the definition of user registers, and of the lack of definition or guidance in the description of the user and use types. For example, development advice consultation by colleagues in the same department was registered as an enquiry by some SMRs, but evidently was not counted as an enquiry by others. SMRs were permitted to state their volumes of users in either absolute numbers, or as a percentage of total enquiries. The latter implies some 'guesstimation' on the part of some SMRs, but these figures were turned into "real numbers" for the purposes of the assessment. An annual total of just over 34,000 enquiries was estimated for the 45 SMRs that kept a register of use (Baker 1999, 84).

Despite severe problems in the definition of user categories and lack of consistency in SMR responses, it is still possible to see from this survey that SMRs considered that the bulk of enquiries that they received were connected with development and planning advice, and conservation management, rather than with research, or general interest and education. The latter categories, under the survey's figures, were estimated as comprising around 14% of all SMR enquiries (Baker 1999, 84).

Evidently most SMRs were quite willing to offer some support for external user enquiries (Baker 1999, 14), but found it necessary to interpose SMR staff between the information and the user. Only 57% of SMRs had set aside a table or desk for use by external users, and direct access to the

SMR database was available in only 9% of cases (Baker 1999, 14)! 81% of SMRs were unavailable outside normal office hours, and 40% required users to make prior appointments for visits (Baker 1999, 14). On-line access from public libraries was available in only three cases (Baker 1999, 24). 45% of SMRs apparently had no form of wider outreach at all (Baker 1999, 24).

The Baker report suggests that many SMRs experienced difficulty in providing a satisfactory service for all users, and this is further amplified by more recent statements from the profession.

Emails posted on SMRFORUM (now HERFORUM:

<http://www.jiscmail.ac.uk/lists/HERFORUM.html>), a discussion group for SMR/HER practitioners, in January 2003, illustrate the diverse response of SMR/HER services to enquiries from students and researchers. There is evidence to suggest that SMR/HER services often find enquiries from these user groups particularly challenging. Faced with a demanding student enquiry that had generated a search result of 700 SMR database entries (comprising 1000 printed pages), an SMR manager asked the forum for its opinion on what constituted a reasonable service to a student user. The SMR had a policy to supply only up to 100 printed records for postal queries. The student had questioned this policy, pointing out that other SMR services were able to provide more records. Amongst other things, the SMR manager wanted to know how other SMRs responded to enquiries that generated a large general data set, which the student wished to scrutinise at their leisure.

Some SMR managers suggested that for such enquiries the student should make an appointment to visit the SMR, sit in front of a terminal and select relevant records to print out there and then. Until a recent software upgrade provided a more efficient facility, one SMR had a policy not to answer student requests at all. Another (Scottish SMR) stated it would redirect such requests to the National Monuments Record for Scotland. A few SMRs offered remote access by emailing search results (as Excel tables, Access database extracts, Word documents etc.) or posting compact discs. Some preferred to provide guidance on how a student could narrow their search.

The facilities offered by the National Monuments Record (for England), provide useful comparisons with non-Web enabled SMRs and HERs for user demand and user services. The NMR's remit is to "encourage the understanding and enjoyment of the historic environment by providing access to our archives and information sources", and to "preserve unique archives and data for future generations" (<http://www.english-heritage.org.uk>). Other national data sets of the former RCHME and English Heritage, now under the management of English Heritage and increasingly integrated within the NMR, are orientated towards national conservation functions, such as Scheduled Monument and Listed Building management, and the management of survey information generated internally (Clubb & Lang 1996, 51-59). The NMR cannot be described simply as an SMR for the nation. The NMR does not aim to provide the same intensity of record coverage found in many SMRs, and does not aspire to providing the definitive historic environment information resource for Local Authority conservation purposes (Clubb & Lang 1996, 54; English Heritage National Monuments Record 2003a; English Heritage National Monuments Record 2003b).

However, the NMR's role as a public information service is very much more firmly integrated into NMR policy and practice than it appears to be in many SMRs (RCHME 1999, 7-8, 10). This is apparent in both the facilities it can offer users, the record it keeps of its performance in this regard, and the preparation of detailed business plans for enquiry services (Donnie Mackay pers. comm.).

Of the c.15,800 enquiries to the NMR recorded for the year 1997/8 (Mackay 1998, 29), "Public" and "Education" users (which broadly conform to the user categories "General Public Interest", "Research", "Education – pupils and students", "Education – Teachers", used by Baker (1999, 84)); accounted for 49% of external users (RCHME 1998c, 12). In the year 1998/99, there were 13,609 remote enquiries to the NMR and 4,296 visits to either the Swindon or London search rooms. Of these, "Public" and "Education" users accounted for 58% of all enquiries (Donnie Mackay pers. comm.).

Of the remote enquiries, 1,252 (9.2%) focused on archaeological records. The remaining remote enquiries were concerned with historic and Listed

Buildings records, the air photograph collection, or the maritime records. Of the archaeology users, a similar percentage figure (64%) as for total NMR enquiries, were identified as "Public" or "Education" (all figures supplied by Donnie Mackay, Public Services Section, National Monuments Record).

These figures suggest that the measures for wider access to archaeological information employed by the NMR, have indeed encouraged relatively greater use by those beyond the heritage profession, despite the greater amount of information and enquiries collectively managed by local SMRs.

Happily, despite the continuing absence of direct central Government resources or a solid legislative framework for local authority HER services, the last few years have seen a number of initiatives to increase public awareness and use of HERs.

Informing the Future of the Past: Guidelines for SMRs (Ferne & Gilman 2000), the first comprehensive national guide to good working practice for SMR management, was distributed to all SMRs. In addition to giving advice regarding recording standards and general operational management, it incorporated useful statements on the delivery of a public information service as an integral function of SMR services. The second edition, released as Web publication, incorporates much enhanced guidance on meeting user needs (Gilman & Newman 2007).

The draft HER standards document *Historic Environment Records: Benchmarks for Good Practice* (English Heritage & Association of Local Government Archaeological Officers 2002, 5; DCMS 2004, Appendix 2), is another joint initiative between English Heritage and local curatorial practitioners. The benchmarks, anticipating a statutory status for HERs, were intended to under-pin the official recognition of the transformation of individual SMRs into HER services. The benchmarks give some prominence to the importance of providing a service to external users, without specifically identifying the need to support academic research.

Many SMRs and HERs have found that winning external grant aid for specific projects is the best route to enhancing user services. Some of the most exciting new developments have been facilitated by project funding

won through grant schemes such as the Heritage Lottery Fund and New Opportunities Fund (Heritage Lottery Fund 1999; New Opportunities Fund 1999).

User surveys are often a prerequisite for successful applications for SMR/HER Heritage Lottery Fund grants for public access Web-based projects. There is questionable value, however, in requiring each separate applicant SMR/HER to prove that there is a public demand for SMR/HER information. There have been several plaintive requests for advice regarding surveys from potential HLF applicants via the HERFORUM email discussion group. These user surveys and applications tend to focus on education and wider public access (for example, Grant 2002, 24), rather than research or academic access specifically.

1.4.3 The research community and SMRs

The perception of SMRs among academics and the research community, seems to be closely related to their attitudes regarding the value of 'rescue archaeology', or development-led archaeology generally.

Historically, the research community appears to have been slow to encourage and exploit SMR information. Cheetam (1985, 50) summed up the possible reasons for low research use of the SMRs of that the as their restricted availability for consultation, a general lack of awareness of their potential, and a perception of their lack of reliability and credibility as information sources for hard archaeological analysis. It is clear that despite considerable SMR development over the last twenty years, such perceptions still survive in some quarters. One eminent landscape archaeologist has written of the publication of one of his detailed surveys: "It thus seemed to the writer that, instead of consigning the newly discovered plan to the dustbin...or depositing it in local or national Sites and Monuments Records with much the same result, it was perhaps worth publishing in these proceedings" (Taylor 1999, 81)!

There are examples of greater academic appreciation of the value of SMR information. The University of Leicester, for example, supported an initiative to make Sites and Monuments Record information readily

accessible to students. To achieve this, a custom-built computer application to manage and analyse information from eight East Midlands Sites and Monuments Records, had to be constructed (Martlew & Creaser 1989).

In a recent address to the Society of Antiquaries, Richard Bradley of the University of Reading, examined the cultural differences between archaeology as practised by academia and commercial archaeology (Bradley 2006). He had initiated a project to write a synthesis of the prehistory of the Britain and Ireland informed by the fieldwork that had taken place over the last twenty years. The research involved the scrutiny of 'grey literature' reports held at many different HERs and similar archives (Bradley 2006, 18-21). Bradley started from a position of dejection that commercial archaeology was producing little of value to research, and scepticism that its work could be assimilated in this fashion. He then became convinced that 'grey literature' represented a crucial reservoir of research knowledge, declaring that "data from a decade of developer-funded work is set to revolutionise the study of prehistory, and there is no doubt that the same will apply to later periods too." (Bradley 2005, 18). Despite the caution that it was important also to talk to field staff, rather than to rely solely on HER holdings for information about on-going work, he concluded that important new information concerning fundamental national archaeological research issues had been revealed by developer-funded work, and was being captured in HERs and grey literature (Bradley 2005; Bradley 2006).

Personal experience and discussion with colleagues suggest to me that negative perceptions of the value of SMR/HER information amongst the research community are far from universal these days. The information seems to be generally well appreciated by researchers who choose to consult it. Nevertheless, the profession as a whole has reported relatively low levels of educational and research use and many practitioners are disappointed by this. Rogerson and Hutcheson (pers. comm.), for example, brought a recent regional conference's attention to the lack of academic use of the Norfolk Portable Antiquities Scheme data collated by the SMR, Norfolk SMR information generally, and the Norwich Urban Archaeological Database. Low levels of research use across the country are suggested

by the available national survey information (Baker 1999, 84; Bell & Bevan 2004, 14).

There are, however, significant indications that there is a growing demand for SMR/HER information among the educational and academic community. Useful information regarding the demand for SMR-type information was provided by a survey of user needs in archaeological digital data undertaken by the Archaeology Data Service - *Strategies for Digital Data* (Condrón et al 1999). The survey sought and obtained responses representing the widest spectrum of archaeological organisations and individuals within the British Isles – archaeological consultants and museums, the national agencies and local government, society members and school teachers (Condrón et al 1999, 16-21). The respondents indicated a widespread demand for the availability of SMR and NMR data via the Internet (Condrón et al 1999, 57), and an overwhelming support for free access for educational and research purposes (Condrón et al 1999, 46).

In 2002 the Historic Environment Information Resources Network (HEIRNET) commissioned a report on the users and uses of historic environment information resources. The report drew on existing documentation and data provided by evaluation exercises previously carried out by individual historic environment records. Two focus group meetings were also held. These were attended by a spectrum of HEIR practitioners (Grant 2002). Although detailed information regarding user profiles for HEIRs was hard to come by, it was established that there is “a large and increasing demand” for HEIR information. There is evidence for a shift towards greater public use of HEIRs, but, in line with the Baker report findings, schools use was noted to be very low. Higher Education use, however, was described as “widespread”. Once again, significant user preference for online access was identified (Grant 2002, 3). Importantly, because little is yet known about the actual use of HEIR data by their user constituency, it was recommended that steps were taken towards the consistent formal recording and analysis of HEIR use across the sector (Grant 2002, 3). The recommendations are discussed in more detail in Chapter 2. Chapter 2, Chapter 3, and Chapter 4 provide case studies of SMR use analysis that may be used as models for wider application.

HEIRNET undertook another survey specifically directed towards users of online Historic Environment Information Resources in 2005. The survey determined that there is now a well-developed community of online HEIR users, and that each of the HEIRs represented in the survey had a dedicated group of frequent users. This survey, and other survey findings, are discussed below (Chapter 2).

Even though we do not know the extent of SMR/HER use among the research and education community, or exactly how research and education users have used SMR/HER, we do at least know that some information is being put to some use. But how should the products of current research influence the content of HERs?

Research should be a two-way process. If HERs are to fulfil a meaningful role in supporting archaeological research, the information they contain must reflect current knowledge. Records must be added and modified in order to maintain integrity and reflect current archaeological theory.

Therefore, in addition to dispensing archaeological information, HERs require effective systems to accession current archaeological information. This is straightforward for certain categories of information. Requirements for the submission of summary reports or full reports for archaeological investigations, can easily be written into 'briefs' and 'specifications' for work initiated through the planning process. Indeed, the advice do to so given by Association of County Archaeological Officers (1993, 12; now the Association of Local Government Archaeological Officers) is firmly embedded in local curatorial practice. SMRs and HERs accumulate 'grey literature' reports generated by development-led archaeological work on a daily basis, and create new database records accordingly. English Heritage, the most important grant-aiding body for non-development-led archaeological investigation projects, also recommends the submission of project reports to SMRs and HERs as a condition of its grants (English Heritage 1991a). OASIS, administered through the Archaeology Data Service (Hardman 2003; <http://ads.ahds.ac.uk/project/oasis/>), provides another mechanism for the submission of reports to SMRs and HERs. Report forms can be filled in online by the archaeologist responsible for the project and, after endorsement by the local SMR/HER, enter into the Archaeology Data Service catalogue (Barrat 2005, 7). The completed

OASIS reports can be exported to individual SMR/HER services in a variety of formats.

Courtesy copies of papers, theses and dissertations are sometimes forwarded to SMR/HER services by students and academics, especially those that have drawn on the assistance of those services. There is a widespread perception, however, that SMRs/HERs are missing out on much of this material, and other information generated by non-contractual archaeology projects (discussion on HERForum, October 2006: <http://www.jiscmail.ac.uk/lists/HERFORUM.html>). To quote just one contributor:

“We sometimes find it difficult to find out what academic based researchers are up to in our area even when we know they are researching in our area. And there are probably a fair few we don't know about at all. This sort of problem also applies to Local Societies sometimes. Often, we know they are doing fieldwork, but don't always get included in the information loop of what they have done and where. This might be because they may not think we are interested, or just don't think to inform us. When we are included, it is also sometimes difficult to get data in a way that makes entry into the HER easy. All of this means it is difficult for us to manage the Historic Environment as often we won't know something is there unless we get a panicked phone call.”

The problem appears to be particularly acute in large counties, where centrally-based HER staff find it difficult to keep themselves informed of all the investigations and on-going research that takes place.

The licensing arrangements used by some SMRs have provided a mechanism to help ensure that research results are fed back into the system. In obtaining a license to use Northamptonshire SMR information, for example, users agree to submit the results of their research to the SMR, although in practice a low incidence of feedback has been reported (Christine Addison pers. comm.). In general, a lack of formal report production, or long delays in reporting new investigative work or analysis to SMRs, are not uncommon phenomena.

1.5 Towards a national network?

Until recently, all users who wished to gather regional and national monuments information from SMRs had to make arrangements to consult individual services.

The availability of comprehensive combined nation-wide HER information through a single search interface would be useful to many researchers and other users.

The increasing roles of regional government and regional agencies (for economic development, planning, culture, the environment, etc.) and the growing importance of cross-authority large strategic development initiatives (such as airport expansions, large road schemes, and new settlement development, etc.) also demand integration and assimilation of HER information at a regional level. National conservation initiatives such as the successors to the Monuments Protection Programme and agri-environment incentive schemes (see below), could also benefit from the availability of seamless comprehensive data from across Local Authority boundaries.

Theoretically, with considerable time and a massive re-allocation of resources, the multiple data sets of local SMRs and HERs could be integrated under rigidly applied common standards within the National Monuments Record. While this approach superficially appears highly attractive and logical, it could jeopardise the close links between SMRs/HERs and their primary user group – Local Planning Authority archaeology services. There is a widespread view that HER information, most of which does not concern sites that are managed by national organisations, or protected under national legislation, should be adopted, supported, and fully recognised by Local Planning Authorities. These are the bodies responsible for making the majority of decisions regarding their management in changing environments.

For the foreseeable future, it is highly unlikely that sufficient resources or the political desire will be found to create a single national Historic Environment Record. Instead, all the recent national policy statements envisage the creation of a network of multiple centres for historic environment information, built upon existing SMR services (Department of

National Heritage & Welsh Office 1996, 46; English Heritage 2000, 39; All-Party Parliamentary Archaeology Group 2003; Department of Culture Media and Sport 2001, 15; English Heritage 2000, 39; English Heritage & Association of Local Government Archaeological Officers 2002; Department of Culture Media and Sport 2003b; and below, www.heritagegateway.org.uk).

In 1987-88, only four SMRs operated within a computer network (Chadburn 1989, 14). English Heritage's strategy for English archaeology, however, anticipated that the 1990s would see the "linking [of SMRs] under the aegis of the National Archaeological Record to form a true national archaeological record" (English Heritage 1991b, 48). This ambition was not at all achieved during the 1990s (RCHME 1998c, 7), and remains unfulfilled today. The fantastic development of the Internet and World Wide Web during the late 1990s, however, has opened possibilities for networking HER information and services that simply did not exist a decade ago.

The creation of an email discussion group, 'SMR Forum' (now named 'HER Forum') is one example of the professional networking that Internet technology has brought to the SMR community (Ferne 1999a, 11; <http://www.jiscmail.ac.uk/lists/HERFORUM.html>).

For the first time, SMR archaeologists, often working in physical isolation, were able to communicate with most of their peers across the country and participate in ad hoc mini virtual seminars as often as they wished. Hitherto, the few annual regional and national meetings, followed by national newsletters, provided the only means for SMR archaeologists to get together to discuss policy and share experience. These meetings and newsletters are still valuable, but HERForum has now become the primary method for issuing news, initiating consultation on new documentation, seeking information, sharing problems and solutions, and advertising HER-related jobs. HERForum is complemented a by handful of related specialised forums, notably the FISH forum (<http://www.jiscmail.ac.uk/lists/FISH.html>) which deals specifically with data standards and recording practice.

One of the most important practical demonstrations of the potential for networking HER information via the World Wide Web, however, has been provided by the Archaeology Data Service (see Chapter 2 and Chapter 5). The ADS, which forms part of the Arts and Humanities Data Service funded by the Joint Information Systems Committee and the Arts and Humanities Research Board, “collects, describes, catalogues, preserves and provides user support for digital resources created during archaeological research” (Archaeology Data Service 1999b, 8; <http://ads.ahds.ac.uk>). As this remit implies, the ADS digital holdings, and its links to digital holdings elsewhere, comprise a very wide range of archaeological resources; from indexes to radiocarbon dates (Archaeology Data Service 1999a, 5), to comprehensive digital excavation archives (Archaeology Data Service 1999b, 7). The ADS digital catalogue also incorporates a large number of records supplied by individual SMR/HER services.

At the time of writing, HEIR datasets already available through the ADS include, among many others, the National Monuments Record Excavation Index for England, National Monuments Record of Scotland, West of Scotland Sites and Monuments Record, the Sites and Monuments Record for Northern Ireland, the Greater London SMR, the Shetland SMR, the South Gloucestershire SMR, the Somerset SMR, the Northumberland SMR, the National Trust SMR, and the Clywd Powys SMR. These records are available to search online through ‘ArchSearch’ portal (<http://ads.ahds.ac.uk/catalogue/>). The development of the ADS catalogue and its search technology have important implications for the future development of HERs - especially their use of metadata. The ADS catalogue is explored further in Chapter 5.

A different approach to networking HER-type information has been employed by the HEIRNET (Historic Environment Information Resources Network) consortium, led by the Council for British Archaeology and several partners (<http://www.britarch.ac.uk/HEIRNET/>). HEIRNET provides a comprehensive searchable online register of historic environment inventories and related information resources, with links to those available online. More importantly, however, its HEIRPORT portal employs interoperability technology to allow simultaneous searches of several large searchable online inventories from one interface. These include the

Archaeology Data Service catalogue, the Portable Antiquities Scheme database, and the Scottish Cultural Resource Access Network.

HEIRPORT, investigated further in Chapter 5, has demonstrated that it is now possible to network online HER resources with different core data structures, and still achieve meaningful cross-resource searches. Linking all MIDAS compliant local HERs within one large national metadata catalogue (Archaeology Data Service), or through a single search portal (HEIRPORT), is now within grasp.

English Heritage, in partnership with the Association of Local Government Archaeological Officers and the Institute of Historic Building Conservation (IHBC) has now implemented the 'Heritage Gateway', a project to build a "virtual national monuments record for England" (English Heritage, ALGAO, IHBC undat.). Currently this includes a register of local HERs and UADs (accessible through a clickable map of England), the archives of SMR/HER News, and some case studies. There are links to those HERs with online searchable databases, and it is anticipated the more of these will become available over the next two years (www.heritagegateway.org.uk). Recently the Heritage Gateway has been augmented with a trial portal for online cross-HEIR searching. Both text-based searches and a simple map search interface are included. This currently provides access to English Heritage datasets, such as the NMR Excavation Index, *Pastscape*, and the Images of England database. It also incorporates access to the basic database records of three HERs - Cambridgeshire, Essex and Norfolk. These all use ExeGesIS HBSMR-based online systems, but the trial is due to be extended to other online systems in the near future (Cload 2007, 5).

The potential misuse of information and copyright and licensing issues have all been cited as potential hazards to implementing online HERs (anon. undat *Heritage Gateway. Evaluation of HER User Requirements Survey*).

Debate has raged within the profession about what constitutes appropriate use of HER information, and whether systems should be designed that deny some users full access in the expectation that they will misuse the information. There is justifiable concern, for example, that the availability of detailed location information within site records will allow some metal

detector users to find targets for looting far too easily. Obviously, reasonably precise coordinates will enable rogue metal detector users to find sites, but this information would be available to them anyway through a visit to the local SMR/HER and manual searches of its holdings.

Some archaeological advisors to planning authorities are concerned that archaeological consultants, contractors, and planners will be inclined to bypass consultation with local SMRs/HERs, in preference to gleaning information from a website. Approaches to SMR/HER staff often provide the first notice of development proposals, and present an opportunity for early dialogue between curatorial authorities and those representing prospective developers. Digital SMR/HER resources are complemented by a huge amount of non-digitised paper and photographic sources (Baker 1999, 15-20; Newman 2002c; Chapter 1, section 1.6) that may be crucial to an appraisal of a prospective development site's archaeological potential. Developers or planners who do not choose to draw on archaeological advice, or to consult the full range of available sources could easily misinterpret archaeological data and expose archaeological remains to unnecessary threat, or expose new development to unacceptable expense or delay.

The *Freedom of Information Act 2000* provides a right of access to information held by public authorities. The Act requires public authorities to implement a scheme that sets out the types of information that the authority holds (for example, Peterborough City Council 2003). Anyone is able to make a request in writing for information recorded by a public authority. There are a few categories of information that are exempt, notably (under the *Environmental Information Regulations*), information which, if released, would prejudice the environment to which it relates (Cuming 2002). There are differing interpretations about whether all SMR and HER information is covered by this legislation. Nevertheless, it is generally accepted that SMR/HER information cannot be denied to certain users, solely on the grounds that they might be inclined to use it for purposes that archaeologists do not endorse.

Many HEIRs (including the NMR, ADS, and some local SMRs/HERs) ask users to sign up to a licence agreement that may help to discourage the abuse of data. Strict enforcement is often problematic.

Copyright issues present another potential minefield to navigate through on the way to liberal information access. Database originators must secure permission to disseminate bodies of information belonging to third parties in order to avoid potential conflict. Most individual SMR/HER databases are compiled largely from synthesised extracts or interpretations of third party reports, and so often avoid too much copyright difficulty. Since 1998, the *Copyright and Rights in Databases Regulations 1997* have been in operation. These permit the owner of a database control over copying and dissemination of all or a substantial part of the database contents for a period of fifteen years from its creation (Fricker 2002).

None of these issues have yet presented insurmountable barriers to the dissemination of HER information via the Internet. A far more significant issue is HER services' ability to implement online provisions alongside their day-to-day duties. Considerable resources are usually required to prepare data for public consumption and to implement and manage projects that result in an online HER facility. The process of putting together Heritage Lottery Fund (and similar grant) applications often requires significant staff time, and seems to be off-putting to many.

Progress towards widespread online access has been slow. At the time of writing, only around fifteen SMRs/HERs have a searchable online database facility. Since the first was created, typically fewer than three have been introduced per year.

It is probable that the rate of implementation of online HER facilities will accelerate over the next few years. It will certainly do so if the necessary Web technology becomes cheaper and easier to apply, so that projects can be corporately funded and are less reliant on large external grant applications. Encouraging individual HERs to apply for and complete Heritage Lottery Fund (or similar) projects to implement their own versions of online services has been successful in promoting creativity and systems that meet local requirements. These include some very good facilities that have extended the use and appreciation of the HER data sets concerned (Chapter 5). This path alone, however, is not likely to result in a comprehensive national HER network within the next decade.

The implementation of a national project that assists HERs to prepare and submit metadata and core data to an existing provision, such as the Archaeology Data Service catalogue, arguably would provide a faster and more cost-effective path to achieving an integrated national HER information network.

1.6 The elastic SMR - diversification and broadening remits

SMRs originated as simple monument record inventories, following the models established by the Ordnance Survey Archaeology Division and the Royal Commission on the Historical Monuments of England. The range of information captured by SMRs, however, has broadened in recent years. This has occurred in the context of a broadening definition of mainstream archaeological practice, which now considers subjects such as the military remains of the recent past, gardens and several classes of post-1900 standing buildings that hitherto were only fringe concerns.

The 'Defence of Britain Project', for example, an unprecedented survey coordinated by the Council for British Archaeology (Lowry 1995), generated a huge database of twentieth century military sites. The project and the subsequent incorporation of the inventory information into the National Monuments Record and local SMRs, which had seldom previously accessioned such information, demanded the creation of a new thesaurus of suitable monument terms (<http://thesaurus.english-heritage.org.uk/>).

Specialist sub-fields in archaeological survey and analysis (many branches of palaeoenvironmental research, geophysical survey, etc.), which were minor considerations at the inception of most SMRs, have developed to form important components of routine archaeological practice. A common thesaurus and recording structure to describe scientific recording events and palaeoenvironmental data, however, is only now being defined for HER use (Boldrini 2005, 1-2).

The recording of single artefact finds and artefact scatters has always been a problematic issue for monument inventories. Provision for describing such archaeological evidence appears in both early and revised SMR information standard guidance (Department of Environment 1983, 21;

RCHME & ALGAO 1993, 97), and many SMRs have a long tradition of recording these things (Baker 1999, 20). The standardised detailed description of artefact finds does not sit very comfortably within earlier SMR recording standards or the MIDAS standard (RCHME 1998a, 82), however, and there is considerable variation and a lack of consistency in local recording practice.

The Museum Documentation Association Thesaurus of Archaeological Objects is a helpful source of individual general indexing terms, but does not help SMR/HER services to decide how thoroughly to apply and integrate artefact recording within their systems. A single find could indicate the presence of a 'monument', but might be nothing more than an isolated loss or deliberate deposition at a site that does not fit any monument type (such as within topsoil on open land, or within a river or pool). Most SMR services would think twice about attempting to list all categories of artefact produced by a large-scale excavation or fieldwalking event, preferring instead to index the records with monument and component terms. Surface scatters of finds are often difficult to interpret as 'monuments', although helpfully 'artefact scatter' is now a legitimate monument type (<http://thesaurus.english-heritage.org.uk/>).

Artefact recording practice as typically applied by SMRs throughout the country did not meet the needs of the Portable Antiquities Scheme (PAS), a national programme to record small finds made by members of the public and reported through a network of Finds Liaison Officers (Portable Antiquities Scheme 2005). Instead the PAS commissioned and maintains a custom-designed database (Department of Culture, Media and Sport, Buildings, Monuments and Sites Division 1999, 25). Finds Liaison Officers around the country are now able to add detailed finds records to the national database online (<http://www.finds.org.uk/>). Information from this database then has to be transferred to individual HERs, and this process has proved challenging even for HERs using the MIDAS-compliant ExeGesIS HBSMR software (Sargent 2002a; Sargent 2002b ; Bell & Bevan 2004, 18). The insistence by metal detector users on maintaining secret, or deliberately vague, location information in finds records has not helped the transfer of this data, or its subsequent management by HERs.

The traditional SMR recording areas have expanded in other ways. Archaeological resource management has come to take an increasingly holistic view of its place within wider environmental management (Fairclough 2006). There have long been recommendations to strengthen links between SMRs and related environmental databases (Department of National Heritage 1995, section 10; RCHME 1998c, 10-11; Baker 1999, 4), and an identified need to increase SMRs representation of various non-monumental aspects of the historic environment (Baker 1999, 19-20; Newman 2002c, 10). The suggestion that SMRs should develop as one strand of integrated "Local Environmental Information Management Systems" (Baker 1999, 33) has been crystallised into the firm resolution that SMRs should develop into Historic Environment Records (English Heritage 2000, 39; Department of Culture Media and Sport 2001, 15; Department of Culture Media and Sport 2003a; Department of Culture Media and Sport 2004). It was envisaged that this transformation would be underpinned by adherence to nationally-agreed benchmarks (English Heritage & Association of Local Government Archaeological Officers 2002).

The new title reflects ambition in a more holistic and integrated approach to recording, which has not yet been matched by the development of common standards or methods for the enhanced record.

For example, established SMR/HER recording practice has not lent itself to easy integration with other forms of environmental data, such as those required by the Entry Level Stewardship agri-environment scheme administered by the Department of Environment Farming and Rural Affairs (DEFRA; Trow & Tunnicliffe 2005).

The scheme allows farmers and land managers to receive payments for the beneficial management of the natural environment and historic features. It requires that discrete areas of archaeological interest are identified on land holdings and recorded as polygons with terse and easily understandable text descriptions. After an initial trial with a handful of re-worked SMR data sets in 2004, it was determined that it would not be possible to assess, assimilate, and digitise as polygons all the potentially relevant (non-Scheduled) monument information held by English SMRs. Consequently, only selected monument information supplied by English

Heritage appears as standard in the Environmental Information Base Maps issued to applicants to the Entry Level scheme (English Heritage 2005c). It has been suggested that individual HERs can volunteer suitable datasets when available, but resources required to do this have precluded their voluntary participation. Applicants are informed that further information may be available from their local HER (English Heritage 2005c), but this is a poor substitute for having the information ready to hand.

The continuing absence of synthesised HER information within the Environmental Information Base Maps has very worrying implications. It means that the majority of the country's archaeological remains and historic features will not be recognised or considered as potential subjects for positive management under the most widely applicable rural conservation measure ever implemented.

The implementation of Historic Landscape Characterisation (HLC) projects has also raised issues about local Historic Environment Records' ability to manage spatial information that does not relate back to simple monument types. The prototype for the national programme of HLC projects, supported by English Heritage, was provided by a project to characterise the development of land use units in Cornwall (Cornwall Archaeological Unit 1998). The Historic Landscape Characterisation programme is now progressing through the English regions on a county-by-county basis. It requires the digitisation of polygons and attribute information that describe landscape character types (Fairclough 2001, 25), such as areas of ancient woodland, medieval open fields, or ancient enclosed fields. The characterisation maps created in this way are used to inform local and strategic land-use planning, and provide a research resource.

However, there are wide and fundamental variations in the approaches to HLC recording adopted for the individual counties. Significant problems in fully integrating the data with existing SMR and HER recording systems have also arisen (Aldred & Fairclough 2003; Chapter 8, section 8.1).

Again, Historic Landscape Characterisation, is an important recent form of historic environment recording that has not slipped neatly into the monument-centric approach historically favoured by Sites and Monuments Records. MIDAS has proved extensible to a certain extent, but is now in

need of revision to reflect the expanding remit of Historic Environment Records. MIDAS II is intended to pay greater regard to landscape character, artefacts, ecofacts, archaeological science data, and GIS.

A glance at the large array of thematic historic environment databases now being maintained by various organisations (Brown 1999, 8; see 'HEIRNET', Chapter 5) indicates the wealth of knowledge and data being accumulated. It suggests to me that local HER recording systems will continue to struggle to satisfy fully the particular recording requirements of many specialist areas of historic environment interest. Even if HERs are intended to provide nothing more than a pointer to more detailed sources of digital information, rather than comprehensive sources in their own right, HER information structures and data gathering have to adequately match the breadth of subject areas they seek to represent.

It has been pointed out that the broadening remit of HERs, the widening range of data sets they attempt to assimilate, and their increasing desire to accommodate the requirements of a broad range of user demands is likely to exacerbate data backlog problems (Boldrini 2005, 2). Historically, many SMRs have reported major problems in managing input backlogs created by the submission of development-led investigation reports, and the need to digitise copious amounts of existing paper-based information. Until recently, some SMRs have reported substantial backlogs of primary record data that still resides on card index systems (English Heritage 1997, 64; Baker 1999, 18-20). Many HERs now offer a wide, but patchily recorded, range of historic environment information (Baker 1999, 15-20; Fernie 2000, 3; Newman 2002c, 5). It has recently been determined that very substantial resources still need to be allocated in order to reduce back-logs and bring all HERs up to benchmark standards (Baker et al 2004).

The research integrity of HERs is potentially threatened by the assimilation of a wide range of historic environment information that provides only poor and uneven coverage of the respective subject areas. HER development has to guard against wasting resources by accessioning information that does not quite fit recording structures, or that has been simplified to a level that is not capable of supporting research enquiries and other uses.

The simultaneous searches of different online databases made available through the HEIRPORT Web portal effectively link a selection of diverse, but related, historic environment information datasets (Chapter 5).

The Archaeology Data Service (ADS) catalogue brings together a much larger collection of diverse archaeological datasets, so that they can be searched as one.

The attractions of these national initiatives to researchers who want easy access to different information types at the same time, are obvious. However, it is debatable whether these types of initiatives could be, or should be, replicated at a local level by individual HER services, given their current management structure, limited resources and variable ICT support.

1.7 Conclusions

Many SMRs were implemented before the advent of suitable, economic, data processing systems, and certainly before the introduction of effective purpose-built heritage information applications. The information that SMRs and HERs now contain has been collected from a wide variety of sources, under different theoretical regimes applied with greater or lesser degrees of academic rigour, and with various degrees of accuracy. Some of these sources are several hundred years old, dating to the dawn of academic interest in our past. Many pre-date the production of accurate scale maps of the country and any reliable means of obtaining the detailed locative information we demand today. Increasingly, however, HERs seek to record complex and specialised historic environment information, generated with precision by state of the art investigation, and intended for a wide variety of uses.

The Sites and Monuments Record was not a child of the Information Age. The HER is, however, and therefore must make good use of the technical advances now available, and respond to the challenges posed by an information-hungry world. In order to remain relevant, they must improve their accessibility and wider appeal. HERs must also reflect current archaeological knowledge and thought.

Despite having a relatively short history of only thirty years or so, it is possible to trace how developments in wider archaeological theory and practice have influenced SMR and HER development over that time. At the time of the creation of the first Sites and Monuments Records, 'New Archaeology' with its emphasis on positivism, functionalism, processes, the application of systems modelling, quantitative methods and information sciences, was a driving force in archaeological theory. The wider availability of computer processing actually encouraged the development of quantitative methodologies within archaeological research, rather than simply accommodating a research trend that had developed of its own accord (Clark 1982, 229; Lock 2003, 2). It was natural and increasingly feasible for SMRs to make use of computers to manage information throughout the 1970s. Mirroring the themes of 'New Archaeology', the development emphasis for SMRs was data gathering and the creation of large, rational, data sets from which deductions could be drawn and choices made. There was an emphasis on the expression of 'hard facts', rather than the expression of perceptions, ideas, and uncertainty. The units of topographic information typically adopted for pre-GIS SMR record entries ('drift geology', 'soils', 'height above sea level', 'land classification', 'proximity to water', etc.), were well rooted in the earlier geographical archaeology of Fox and others and were not generally complemented by the increasingly adventurous perceptions of landscape character expounded by modern landscape archaeologists. Even the expressions of periods of time preferred by many SMRs ('Beaker', 'Celtic', 'Roman', 'Hadrianic', 'Saxon', 'Norman', 'Plantagenet', 'Hanoverian', etc.) is more reminiscent of culture-history theory, than the more sophisticated modern models of change throughout historical epochs.

In the application of new mapping technology (Geographic Information Systems) SMRs and HERs have inevitably concentrated on resource management functions (Ferne 2000, 2-3; Bell & Bevan 2004, 14). The distribution maps of various evidence types, plotted against terrain, that many HER GIS applications can now produce, often play a helpful role in research and education. But this is essentially a traditional approach to monument and landscape analysis using new technology (Lock 2003, 166), rather than one that represents modern developments in archaeological thought and uses the full capabilities of GIS. Some slightly more adventurous projects are beginning to enter into HER recording

practice, such as the reconstruction of landscape in three-dimensions and view-shed analysis (Gilman 2000, 8), albeit long after they have become well-established in archaeological research (Lock 2003, 168-174).

Such alternative ways of visualising monuments in the landscape are considered to be within the provenance of Post-Processual thought. It is also possible to detect hints of Post-Processual theory in current and emerging HER data standards. MIDAS recommends the clear separation of the interpretation of a 'monument' from the 'events' leading to that interpretation. Some of the bias inherent in the event process is exposed, and the relationships between the events and the description of the monument can be explored by the user. This approach reflects both new archaeology's concern with objectivity ('how do we know?') and nods towards Post-Processual archaeology's interest in the relationship between material evidence, its interpreter, and their values and methods (Hodder 1991, 163-166). MIDAS allows some flexibility and creativity on the part of individual record compilers. It rejects the rigid prescriptive nature of earlier SMR data standards, in favour of a record structure that allows non-standard information to be welded on to a structured information core (section 1.3; Chapter 5). The lesser confidence with which particular terminology and classifications are insisted upon under the MIDAS scheme differs from the previous rigorously positivist monument inventory structures (section 1.3). Most of these required the definition of a discrete monument selected from one approved list, to which various 'events' had been applied. These stipulations did not of course prevent significant variations developing in practice (section 1.3 above).

While SMR practice has been influenced by developments in wider archaeological theory, a generally recognised sub-discipline of archaeological resource management, within which SMR theory and practice might have been formed, has been slow to develop a distinctive academic basis (Mayor-Oakes 1989, 52-58). The absence, until recently, of specific academic attention to what may be incorrectly dismissed as a purely administrative concern, has undoubtedly greatly inhibited SMR development. Wider archaeological theory *has* filtered through to the world of SMRs, regardless of general acknowledgement or perhaps even awareness amongst practitioners, but it has not been adopted rapidly. Nor

it seems have recent trends in archaeological research responded very well to the opportunities offered by the SMR information resource.

The development of historic environment information resources deserves a distinctive place in academic endeavour. HER theory must draw on advances in ICT and information management and conservation policy. However, it must not do so at the expense of proper integration with archaeological research, which would only serve to drive a further damaging wedge between the worlds of academic endeavour and archaeological resource management practice (Lucas 2006, 15; Grenville 2006, 175). HER theory and practice must be developed within the frameworks provided by wider archaeological theory and research (which themselves are influenced by wider anthropological and sociological thought), in order that HER information remains relevant and responsive to the most challenging informational demands.

In summary, the implementation and development of Sites and Monuments Records has taken place within a framework that almost guaranteed to produce national variability, theoretical conservatism, and inadequate user services. It is arguable whether the national agencies provided enough incentive, support, and guidance to address these issues adequately, or whether Local Authorities were always sufficiently conscious of their responsibility as guardians of their patch of the national historic environment.

Sadly, the perception of the last twenty years that SMRs' collective "contents remain an uneven and inadequate representation of the surviving remains of England's archaeological past" (Wainwright 1989, 167), remains true as they transform into Historic Environment Records (Newman 2002c; Baker et al 2004).

Nevertheless, the implementation of ICT and the creation of a huge amount of digital archaeological information by SMRs over the last thirty years have been considerable achievements (Clubb & Lang 1996, 53; Darvill & Fulton 1998, 65; Catney 1999, 1; Bell & Bevan 2004;). The 1,000,000 or so retrievable records and associated sources collectively held in SMRs/HERs (Fraser & Newman 2006, 31) represent a huge reservoir of information for archaeological research. It is a resource that

surpasses all comparable historic environment information resources in range, detail, depth of coverage, and magnitude.

ICT developments now offer feasible paths to the remote interrogation and networking of HER information that could barely be imagined two decades ago (see Chapter 5). It is now possible to envisage HER systems that harness local data gathering and ownership, which has done so much to ensure their success as a conservation management tools, with integrated national accessibility, which is crucial for their development as research resources.

HERs potentially represent a crucial meeting point between academic research, education, threat-led investigation, conservation, and even alternative perceptions of the past. However, they will only succeed in meeting their potential if they fully engage with current archaeological research effort, develop a meaningful dialogue with their user constituency, and understand how people wish to use HER information.

CHAPTER 2 – THE CHARACTER OF SMR ENQUIRIES

There is very little solid information about the use and users of SMRs and HERs (Baker 1999, 84; Grant 2002, 3; Brewer & Kilbride 2006, 1.1.2; Chapter 1, section 1.4.2). Clearly, such information is crucial to our understanding of the services that SMRs and HERs provide and how these services should develop in the future.

This chapter, therefore, attempts to analyse past and current use of SMR and HER information by looking at the profile of users and the questions they ask of SMR services. Evidence for patterns and relationships between user groups and enquiry types has been sought. In particular, an emphasis has been placed on understanding research and education enquires, since these are widely believed to be under-represented and poorly understood (Chapter 1). The implications of these findings for the development of automated online HER enquiry services are then examined.

Specifically, the survey aims to:

- 1) obtain an impression of the relative levels of SMR use amongst different user groups;
- 2) obtain an impression of the range of enquiries from external users submitted to SMRs (and related HEIRs);
- 3) define the relationships between user groups and enquiry types;
- 4) define the structure of research enquiries;
- 5) identify any differences in enquiries submitted to manual and online systems;
- 6) help assess the relevance of the MIDAS data structure in satisfying user services;
- 7) identify issues relating to the acceptance of remote enquiries and the automated delivery of SMR information.

Finally, it was expected that this survey would provide useful comparison with the survey of research user needs (Chapter 4) and thus define any gaps and discrepancies between the present delivery of information and expectations for future requirements.

The survey considered five contrasting historic environment information provisions. Three of these were known as SMRs at the time of the survey but, in common with most other SMRs, are now known as HERs.

The Northamptonshire Sites and Monuments Record is long established and was judged to be amongst the very best County SMRs (Baker 1999, 20). Peterborough City Council SMR serves a new Unitary Authority, a much smaller administrative unit than most counties, and has far fewer database entries than county-wide SMRs. Lincolnshire SMR operates within a large county, which is also partially served by other archaeological record sets. The English National Monuments Record is very much larger than county-based SMRs and has a well-defined national public service remit. The Archaeology Data Service's catalogue is a fully digital resource accessible via the Web-based 'ArchSearch' interface (Chapter 5).

The latter two were chosen to assess any differences in use patterns between local HEIRs and national services, and particularly whether the form of archaeological enquiries submitted by users to the on-line facilities of 'ArchSearch' differed to those submitted to hybrid manual-digital SMRs with no online search facilities.

The survey required visits to the respective SMRs and the NMR in order to view enquiry correspondence files and involved scrutiny of ADS search records. Around 1,700 routine SMR/HER-type enquiries were examined. The appraisal of original correspondence submitted by users was important in order to get a full sense of the nature of the enquiries. Standard enquiry forms, filled out by the user or a facilitator, were often found to be insufficiently detailed to give much background to the enquiry. Unstructured requests received by letter or email often provided more justification for the enquiry, and therefore revealed more of the user's background and objectives.

The enquiries, by definition, were submitted mainly by those users who had previous experience of SMR (NMR or ADS), use or by people who at least had some previous awareness of these services and had made a positive decision to use them. It was not possible to assess users' previous experience of the various services consistently. This is clearly a potential

factor in the definition of the form of the enquiries submitted, the implications of which are discussed further below.

2.1 What is a SMR research enquiry?

'Research' is defined simply as the "systematic investigation into and study of materials and sources etc. in order to establish new facts and reach new conclusions" (Oxford Dictionary). There is no qualification in this definition regarding the background of the person undertaking research, or their affiliations with any particular institutions. A researcher is anyone who undertakes research. Clearly, however, research takes places at many different levels of aspiration and competence.

A member of a local history society or independent local historian who makes use of SMR information in writing a parish history, could be undertaking research. 'A' and 'AS' level archaeology projects are expected to demonstrate some research effort in order to achieve good marks. Obviously both the character and end product of such examples of research are likely to be much less sophisticated than that of post-graduate students, or post-doctoral projects.

Archaeological research takes place in many different contexts. Lavell (1985, 97) has noted that for archaeology the "separation of pure from applied research is always going to be somewhat artificial". Indeed, the notion that threat-led (or 'rescue') archaeology can operate without reference to wider research ambitions seems somewhat absurd. Nevertheless, there appears to be some lack of confidence amongst the profession in the application of research questions, and much dissatisfaction with the research contribution of threat-led archaeological work has been expressed (Biddle 1994; Carver 1996; Glazebrook 1997, 1; Brown & Glazebrook 2000, 1-3; Grenville 2006). The apparently poor integration of pure and applied archaeological research effort across the discipline extends to the perception of the use of HER information. Requests for SMR information to inform planning advice or threat-led work, for example, generally have not been considered to qualify as research use (cf Baker 1999, 23). Such enquiries, however, may indeed form the basis for research effort if they are intended to assist the production of

project designs and objectives, or to help provide a contextual framework for the discussion of results.

The informational value of archaeological remains is recognised in Planning Policy Guidance (Department of the Environment 1990, para. 6). The significance of academic priorities and research questions in relation to threat-led investigation is noted (Department of the Environment 1990, Annex 3, para. 18). The integration of academic objectives is also recognised within general archaeological project management guidance (English Heritage 1991a, 2). Nevertheless, the term “preservation by record”, used in PPG 16 to describe the alternative to “preservation *in situ*” as an archaeological mitigation measure, raises the false promise that archaeological excavation can produce a total record of a site. This is not helpful. In fact, the preservation of any kind of useful record requires an investigative agenda.

In practical terms, PPG 16 investigations take place within the context of balancing all the planning considerations of the proposed development, and the terms of fairness, reasonableness, and practicality (Department of the Environment 1990, para. 29) demanded in all types of planning condition. In theoretical terms, investigative methods, no matter how thorough, do not permit the total recovery of all site evidence. All investigation requires the selection and application of a limited range of techniques in order to capture information according to certain agendas. This occurs regardless of whether the agendas are made explicit, or whether they conform to accepted theoretical standpoints or have been generated on a more ad hoc basis. In order to produce meaningful results, all archaeological investigation should take place within an appropriately formulated research framework and should be considered, therefore, an archaeological research opportunity.

In a bid to address the historic problems with the deductive empirical approach to ‘rescue archaeology’, the unmanageable quantities of materials it has produced, the lack of dissemination of its results, and the lack of direction in the allocation of investigative resources (Rahtz 1974, 57; Biddle 1974, 104-105), there have been moves to introduce explicit formal ‘research agendas’ into threat-led archaeological work (Carver 1993). The broad national academic objectives described in documents

such as *Exploring Our Past* (English Heritage 1991b, 34-43) and the *English Heritage Archaeology Division Research Agenda* (English Heritage 1997), are quoted in 'briefs' and 'specifications' for threat-led archaeological projects. Regional research frameworks, which provide a regional context for threat-led and other projects (for example, Glazebrook 1997, 1-4; Brown & Glazebrook 2000), are a welcome addition to the national initiatives.

It is probably still too early to assess whether the latter have made a significant impact on national research effort, but it has now been proven that the last fifteen years or so of *PPG16* fieldwork has indeed made substantial contributions to our understanding of English prehistory (Bradley 2005; Bradley 2006). Its contributions to other period studies have yet to be appraised fully, but it is difficult to believe that it has been insignificant.

Having accepted that threat-led archaeological work can, and should, contribute to research effort, it is necessary to further define how this contribution is made within current archaeological practice. Archaeological advisors' use of SMR information to provide an initial appraisal of the potential impact of development or conservation schemes, generally cannot be considered as significant research. Nevertheless, some interpretation of the results of this type of SMR search will be required in order to consider such things as potential bias in recorded evidence and to formulate a predictive model for the occurrence of archaeological remains. Indeed these models might be constructed with the aid of regional and national resource assessments (Glazebrook 1997), although they tend to be inherently conservative since they must operate within the bounds of reasonableness demanded by planning guidance (Department of the Environment 1990, para. 29). There is little room in the planning process to insist on provisions for archaeological work that is justifiable only on the grounds of testing interesting hypothesis formed without consensus. The initial product of this 'low-level' research by a curatorial archaeologist might be limited to a few lines in correspondence to a planning officer, and introductory statements within a 'brief' for archaeological work. Nevertheless, the eventual outcome of this rapid appraisal of SMR information may include the implementation of a protracted fieldwork

campaign that does indeed provide a significant contribution to archaeological research effort.

Requests from archaeological consultants or contractors for lists of SMR entries that are simply regurgitated as an appendix to 'desktop assessment' reports, 'environmental statements', etc., cannot be considered significant contributions to research effort. When this information is assimilated and analysed, however, and used for inference in regard to the distribution or character of archaeological remains, or to inform investigative strategies, an element of original research has been undertaken.

Most archaeological reports produced in order to satisfy conditions and contracts for threat-led or conservation work, incorporate an archaeological 'background' statement and conclusions that seek to discuss the local archaeological context of the project findings. Such statements are usually based on information held by the local SMR or HER, amongst other sources. Indeed, a requirement to consult the relevant SMR may be incorporated within the 'brief' or specification for such work (for example, Lincolnshire County Council Archaeology Section 1998, section. 14.6.6).

Finally, in order for a piece of archaeological work to qualify as a significant contribution to research, some dissemination of results has to take place. At the upper end of research effort this would involve the publication of a book or monograph, a paper within a refereed journal or conference proceedings, a thesis distributed to relevant libraries, or work made available via a refereed path through the World Wide Web. The production of 'grey literature' solely for use within the planning process or for conservation guidance cannot qualify as significant research output. Much 'grey literature', however, is in fact readily available within SMR libraries and the National Monuments Record, and is sometimes distributed to local studies centres and libraries. Digital dissemination is increasing its availability. It is now possible, for example, to append entire digital fieldwork reports to OASIS entries (<http://ads.ahds.ac.uk/project/oasis/>). Indeed, some 'grey literature' reports of threat-led fieldwork may be much more publicly accessible than non-published post-graduate theses and dissertations, and as such may qualify as a significant research resource.

Clearly, there is considerable variation in the research value of individual threat-led or conservation-based archaeological projects. Archaeological evaluations, which are intended to rapidly characterise the archaeology of a site using limited sampling (Department of the Environment 1990, para. 20) are unlikely to present the best research opportunities. The archaeological quality of a site thought to be significant may not live up to initial expectations during excavation. Funding and time pressures may prevent a project reaching its full potential. Project staff (often chosen under criteria other than those necessary to achieve best investigative results), may not always be very well equipped to approach the academic opportunities offered by the project. Nevertheless, at their best, threat-led archaeological projects draw on the efforts of talented and knowledgeable archaeologists and deliver significant research results. All threat-led archaeological work potentially qualifies as a research opportunity, and SMR enquiries within such work may qualify as research use of SMR information.

The nature of research within academic and educational institutions is far more clear-cut. It encompasses investigative archaeological projects, both those that involve fieldwork and those that make use of existing information, which intend to advance knowledge and reach new conclusions.

Broadly speaking then, an SMR or HER research enquiry may be defined as: *Any SMR enquiry which is made with the intent of undertaking analysis of HER information and associated information in order to produce significant, disseminated, interpretative statements based on that analysis.*

SMRs and HERs, as resources open to use by all archaeologists, represent a strong point of contact between pure research and applied research. They hold potential to assist the re-integration of academic and threat-led archaeological endeavour by providing a common reservoir for the exchange of information and ideas.

The primary aim of this study is to explore SMR and HER provision in terms of academic need, such as is usually associated with higher education establishments. The requirements of archaeologists working within the framework of local planning and other conservation

management mechanisms, are clearly visible in the development of SMRs and HERs. The influence of other user categories, especially those involved in pure research, however, is less easily perceived (Chapter 1, section 1.4). This is a developmental imbalance that must be addressed if SMRs are to develop their potential as HERs, and increase their academic acceptance as research tools. Therefore, in the following chapters emphasis has been placed on the analysis of SMR use by 'external' users with research intent, rather than that of users intimately connected with the management and operation of SMR systems. Further emphasis is placed on an examination of the needs of university-based researchers. 'Internal' users (archaeological development advisors, SMR officers, etc.) whose enquiries (such as those for day-to-day development appraisal) are routine and usually remain unrecorded, were purposefully excluded in this survey. Nevertheless, the value of this study will be increased by recognising at the outset the range of different paths through which archaeological research can be accomplished.

2.2 The definition of external user groups

The lack of a significant history of SMR use and user analyses (Chapter 1, section 1.4) has inhibited the adoption of common or consistent definition of categories of users and uses (Baker 1999, 84; Grant 2002, 3). Grant recommends "improving the consistency and depth of evaluation material to HEIRs" and "increasing awareness and expertise about evaluation across the HEIR community" (Grant 2002, 35). She makes further specific recommendations regarding the identification and targeting of user groups by gathering quantitative and qualitative data (Grant 2002, 36 - recommendations 1, 2, 5, 6). Clearly, the consistent definition of user groups is the starting point for any examination of HER use.

The 1999 Baker survey invited SMRs to provide "relative volumes of users by ranking" without providing definitions of the listed use/user categories. The listed use/user categories were: 'planning advice', 'conservation management', 'development-related enquirers', 'general public interest', 'research', 'education – pupils and students', 'education – teachers' (Baker 1999, 84). The results of this part of the survey are compromised by both a non-standard, or non-existent, approach to keeping enquiry records on

behalf of the respondent SMRs (Baker 1999, 84), and by the lack of guidance on the definition of some user categories. Survey respondents must have experienced difficulty in deciding where the boundaries between 'research' and the efforts of students (which presumably includes both undergraduate and post-graduate students) lay. Under the Baker categories the intent of use ('research') is inappropriately catalogued alongside user backgrounds ('education – pupils and students', 'development-related enquirers', etc.).

More consistently, the National Monuments Record has used the user categories 'public', 'local authorities', 'conservation heritage', 'education', 'government departments and agencies', and 'commercial', in order to assess user demand (information supplied by Donnie Mackay, National Monuments Record). Bullen Consultants' assessment of the North Yorkshire SMR invited survey respondents to state whether they were an 'archaeological contractor', 'other contractor', 'local archaeology project', 'academic research' (sic), 'member of the public', or 'other' (Bullen Consultants 1999, Appendix 1.1). Northamptonshire SMR and Peterborough SMR record, respectively, have three and four simple user categories (see below).

Strategies for Digital Data, a very wide survey of user needs for digital data throughout archaeology (not just SMRs), defined a much more segregated user constituency than those described above. The category list comprised: 'archaeology consultants', 'local government archaeologists', 'national body employees', 'contracting field archaeologists', 'museum archaeologists', 'other museum professionals', 'university/college staff', 'university/college students (post-graduate and undergraduate)', 'society members', 'independent archaeologists', 'librarians/archivists', 'school/FE college teachers', 'developer employees' (Condrón et al 1999, 16-20). This attempt to canvass the opinions of a broad spectrum of users and potential users of digital archaeological data was successful, despite the difficulty of some respondents in identifying with the pre-defined user categories (Condrón et al 1999, 16-20).

The HEIRNET User Survey 2005, examined use of online historic environment information resources using the following user groups: 'graduate and undergraduate at an HE or FE institution'; 'personal

researcher and non-vocational archaeologist', 'professional archaeologist', 'teachers and lecturers', 'local government officers', 'life-long learners and 6th form college or high school students', 'museum professionals' and 'others' (Brewer & Kilbride 2006, section 3).

Informing the Future of the Past, the SMR management guidelines, encouraged SMR managers to consider the varying needs of different categories of user. SMRs are advised to "take a step back from the requirements of individual users and consider the SMR audience as being made up of distinct groups". The SMR 'audience' is described as 'local-authority planning and conservation users', 'heritage managers', 'consultants', 'countryside managers', 'education professionals', 'students and researchers', and 'general users'. The manual provides a helpful summary of the likely SMR familiarity and information needs of each audience group (Ferne & Gilman 2000, E.2). The benefits of such an approach to managing service delivery are clear given the volume of enquiries many SMRs have to deal with and the significant SMR staff time that is still required to answer many enquiries.

Nevertheless, it is unfortunate (but perhaps understandable given the operational circumstances outlined in Chapter 1) that the specific informational needs of an individual user might be sacrificed to an approximation of their requirements, based only on their affiliation to one of the defined user groups. Whilst the 'audience' groups provide neat and comprehensive stereotypes on which to base service delivery, they do not necessarily respect the intent of the individual user enquiry. It is the intent of the user, rather than the background of the user, that dictates their informational requirements and their use of the data. This point has been accepted in the thoroughly revised *Informing the Future of the Past: Guidelines for Historic Environment Records (Second Edition)* (Gilman & Newman 2007).

It is not valid, for example, to assume that *all* archaeological contractors *always* consult an SMR or HER *only* to obtain an idea of archaeological constraints within a specified geographic area. In fact, an archaeological contractor's background research to support investigation project designs, or analysis, or concluding contextual observations within final reports (section 2.1), might be closer in its informational needs to that of the

'students and researchers' category. Most archaeological contractors were once students, and may still apply study and research tactics developed during that time. An archaeological contractor could be engaged in formal study beyond the boundaries of their day-to-day job. They might have a casual interest in an area as a tourist or visitor, which is completely unconnected with their work. Survey evidence suggests that individuals often find it difficult to identify with particular user groups, and some identify with several (Brewer & Kilbride 2006, section 3.2.1).

Generally, however, it is fair to assume that there are likely to be some significant differences in approach between an archaeological contractor gathering HER information for a rapid appraisal for a developer, and a student engaged in a research project.

An SMR or HER service's approach to satisfying an enquiry is also likely to be dependent on the individual user's previous experience and knowledge of the information. Frequent users amongst research and commercial user groups are likely to require less assistance than first time users in either category.

Finally, there is some danger that the division of user categories based on users' institutional or administrative backgrounds could propagate the perception that research only takes place in formal education and research institutes. Or that management and conservation information is only of interest to heritage and conservation managers. Ideally, a successful response to an enquiry requires the SMR service to understand the purpose of the enquiry. Analysis of the uses of SMR information also requires the purpose of the enquiries to be understood.

In addition to satisfying and managing enquiries, however, SMRs may need to record information to assist their own management. For example, many HERs charge for the preparation of information for commercial use (Baker 1999, 86; Fernie & Gilman 2000, E.4), and so it is necessary to record whether a request for information is made within a commercial project. HER services have an increasing interest in formally demonstrating their relevance to their parent authorities and wider community (Chapter 1, section 1.2), and so may have a further incentive to

note enquiries from specific sectors of the public, such as school pupils, students, teachers, and members of ethnic minorities.

For the purpose of this survey, however, the following external HER user groups were defined:

School/Further Education college (information required by a teacher or pupil, from primary school to 'A' level and adult education certificates, etc.);

Undergraduate (information required by a student enrolled on a programme of undergraduate study) ;

Post-graduate (information required by a student enrolled on a programme of post-graduate study);

Post-doctoral/academic staff (information required by research assistants and paid academic staff);

Private individual research/interest (information required by an individual for independent research or personal general interest, not connected with formal study);

Research/interest society (information required for work undertaken on behalf of special research interest organisations such as the Society for Medieval Studies, local history societies, etc.);

Management organisation (information required by management organisations such as English Heritage, English Nature, County Councils, District Councils, etc.);

Commercial (information required by an archaeological contractor, developer, developer's agent, solicitor, etc.);

Unknown Individual (no stated affiliation to any of the defined user groups).

In order to assist further the analysis of the survey results it was decided to amalgamate certain user categories. The broader user categories became:

Commercial (as above);

Management (as above);

Independent research/general Interest (private individual research/interest and research/interest society);

Education (school/FE college, undergraduate, post-graduate, post-doctoral/academic staff);

Higher Education (undergraduate, post-graduate, post-doctoral/academic staff);

Unknown individual (as above).

2.3 The definition of enquiry types

Lavell (1985, 97) estimated that 90% of all enquiries received by the National Archaeological Record of the time were “topographical” (all sites within an administrative area or otherwise geographically defined area), “period-based” (for example, all sites of a specified period within a defined area), or “typological” (for example, all castles). She noted that the complexity of enquiries was likely to increase in time with recognition of the quality and potential of the record (Lavell 1985, 98). In the absence of the definition of any further categories for the analysis of enquiries, but in expectation that recent SMRs and HERs allow more sophisticated forms of interrogation than those of 1985, new enquiry categories were defined for this survey.

Answering an SMR enquiry often requires the dissemination of a greater range of information than that specifically requested by the user (Appendix 5; Appendix 6). For example, a request for all archaeological information recorded within a certain parish typically should result in the delivery of information about archaeological monuments, events (recording episodes), one-off finds, archives and relevant publications, even if these categories of evidence were not specifically requested. The purpose of this survey, however, is to assess the way in which users approach enquiries (i.e. how they choose to frame their questions and approach their enquiries) rather than to examine the individual HER’s approach to answering enquiries. An enquiry of the catch-all type described above, therefore, has been recorded as an *area* enquiry (analogous to Lavell’s ‘topographic’ enquiry, see below), rather than a *monument specific* enquiry or *event specific* enquiry (see below). The latter categories have been reserved for enquiries that make it clear that the user wants information about a specific monument (or list of monuments) or archaeological recording action (or list of events).

The following enquiry categories were defined for this survey:

Monument specific. This is a request for information regarding a single monument or landscape feature or list of specified monuments, but not a request for information on all monuments of a specified type (see *monument type specific*, below). *Monument specific* questions are amongst the simplest forms of enquiries received by HERs. The user knows of the existence of a monument, having perhaps visited the site in the field or read something about it or noted it as a feature on an Ordnance Survey map, and seeks more information about it. Examples of this type of enquiry encountered during the survey include requests for more information about a prominent castle mound; a series of named long barrows; some known aircraft crash sites; earthwork features of uncertain origin; a list of named Anglo-Saxon cemeteries, etc.

Difficulties may arise in the identification of the monument in question when users refer to the monument by an unfamiliar (perhaps very localised) name alone, or try to describe its rough location without the support of a grid reference or otherwise accurate location information. HERs may simply not know what the enquirer is trying to describe.

It was noted during the survey that researchers obviously engaged in some form of thematic survey sometimes requested information about a list of specific monuments, but did so without asking whether other similar sites, of which they may not have been yet aware, were also recorded by the HER. Clearly, a sympathetic HER officer with a sense of the purpose of the enquiry would be able to offer information to supplement the original request and could point the user in the direction of other potentially relevant data.

Monument specific questions may bring hitherto unrecorded features to the attention of the HER. A user enquiry may draw attention to a feature that has not been recognised previously or yet noted by the HER.

Event specific. A request for information regarding the occurrence of (or results of) excavations, survey, or other archaeological interventions. Again, *event specific* enquiries may suffer from poor or misleading information submitted by the user as a basis for the search. The years in which the event took place, the names of organisations or people involved,

and exact location may be quoted incorrectly by the user. HER officers frequently interpret the request in a broader way than originally expressed in order to make sure that the correct event has been identified, or to provide a slightly wider context for the quoted event. For example, a user may know that an excavation took place in 1978 at a particular site and seek further information from the HER about this excavation, but may not know that subsequent excavations or geophysical surveys etc. have taken place at the site.

Enquiries of this type encountered during the survey include a request for information about one discovery of a prominent antiquarian (i.e. combined with a *person-specific* request to form a *compound* enquiry); a request for a list of all archaeological interventions within a specified time period for a national management project; a request for all Anglo-Saxon sites excavated after 1976 (i.e. combined with a period enquiry to form a *compound enquiry*); and an enquiry which simply requested whether any archaeological work had ever been carried out within a specified area.

Archive specific. A request for information regarding the location or composition of a project archive, whether material, documentary, or electronic. *Archive specific* questions encountered during the survey included a request for information about the whereabouts of pottery reputedly donated to a museum following an excavation; the transfer of title of ownership of a shoe found during development; and the whereabouts of certain named excavation archives.

Management specific. A request for information regarding the state of preservation of a monument, its legal status, conservation measures or interpretative measures, for a single monument or group of monuments. *Management specific* enquiries noted during the survey included requests for confirmation of a named monument's legal status; Scheduled Monument identification numbers; the survival of historic hedgerows; identification of sites suitable for a fieldwalking project (i.e. sites generally under cultivation); an enquiry about the effects of tree growth on a named monument and an enquiry about the effects of vandalism on megalithic sites in Cornwall.

Area. A request for information of a comprehensive or general nature regarding a specified administrative area (for example, all archaeological records for town, parish, district, etc.) or specified mapped area (potential building site boundary, centre point and radius or square kilometre area). Area enquiries typically encountered during the survey were phrased in the fashion: "please supply all (or any) information you have regarding archaeological remains within...". The search area typically was either specified by a polygon drawn on a map, a named parish, or by coordinates and dimensions (using the NMR request system). Where such requests were combined with a *period specific* request (for example, "I would like a list of all records pertaining to Roman activity in Christminster") they were counted as *period* enquiries (see below). Where a named monument or building formed the focus of the search (for example, "records for Christminster Abbey and all records within 500m of the Abbey church"), these were also recorded as *compound* enquiries (i.e. *building specific* or *monument specific + area*).

HERs faced with a request for "all information" regarding a specific area, seldom in fact supply all information to the user. The surveyed SMRs all have defined standard output types, which may then be customised to the needs of the individual user. Certain categories of information, such as sensitive management information or names and addresses, may be automatically withheld from general users. Logistics alone often demand that users are provided with summary records or a simple list of records in the first instance, rather than complete database records. Often associated HER archive or source materials (maps, reports, surveys etc.) are mentioned but not automatically forwarded to the user. Area enquiries, therefore, often generate follow-up enquiries of a more discriminating character.

General Period. A request for information of a non-specific nature (i.e. "all available information", "any information") regarding evidence for the occurrence of remains from a particular period of history. The request may be geographically constrained. *General period*-based enquiries encountered include: a request for all information on the prehistoric archaeology of a parish; a request for a list of all early and middle Saxon sites recorded by the SMR; and a request for any information regarding a named village in the year 1900.

Thematic. A request for information regarding a theme, which may involve multi-period searches or may be confined to a specific period. The request may be geographically constrained, but must specify a *theme* of research rather than merely a list of monument types. *Thematic* origins to many enquiries could be inferred in enquiries defined under other categories above. Someone who has requested a complete list of Anglo-Saxon sites probably intends to use the information to approach a particular research theme. Enquiries were only logged as *thematic*, however, where the theme of the research was expressed as information to support the enquiry. Thematic enquiries noted during the survey included: requests for assistance in a study of pre-modern iron production (all information connected with iron extraction and working) and historic stone quarrying; a request for information regarding the extent of medieval fen islands; a request for information on Roman religious sites and cult objects (*compound*, with *finds*, see below); a request for information regarding Anglo-Saxon settlement; a request for information regarding items associated with 16th and 17th century folk magic (*compound*, see *finds*, below); medieval judicial sites; medieval settlement around Bartoft; and “salt paths”.

SMR staff may help the user by suggesting categories of monument or event information that may contribute to the research theme. Thematic enquiries are often complex since they may require searches for multiple monument types delimited by period specific information. They very rarely coincide with the monument class descriptions of the English Heritage Thesaurus of Monument Types.

Findings. A request for information regarding a specific artefact, list of artefacts, or search for the occurrence of an artefact type, within a defined geographic area. *Findings* enquiries were noted concerning the occurrence of serrated flint tools; the discovery of prehistoric canoes; lists of coin finds within named parishes; neolithic axe finds within the environs of the River Nene, etc.

Monument type specific. A request for information regarding a particular monument or landscape feature type (i.e. a comprehensive list of all monuments of a particular type), but not an enquiry directed at specific

examples of monuments (see *monument specific enquiries*, above). The request may be geographically constrained. *Monument type specific* enquiries noted by the survey concerned shrunken and deserted medieval settlement sites; historic hedgerows; Roman bath houses; bank barrows and cursus monuments (for a national management survey); *vicus* and fort sites in the Borders region; timber castles in Warwickshire; a list of parks and gardens records. These enquiries are often very closely related to thematic research, but they differ in that the enquiry specifies only information regarding particular monument categories (often based on widely accepted monument terms), rather than stating a general theme of research.

Building specific. A request for information regarding a named standing building or list of named standing buildings. *Building specific* enquiries concerning named churches, school buildings, and stately homes, were noted, along with *building type specific* enquiries regarding almshouses, toll houses, and pillboxes and blockhouses of the Second World War. Clearly this enquiry is of the same type as a *monument specific* enquiry, but was defined in order to assess the degree to which SMRs tend to be consulted about standing buildings.

Building type specific. A request for information regarding particular standing building types. Again this enquiry is analogous with *monument type specific* enquiries.

Person-specific. A request for information regarding historical figures, well-known people, families, architects, or archaeologists. *Person-specific* enquiries concerning individuals involved in excavation and survey, families (usually in relational to their association with particular houses and villages), and the work of named architects, were noted during the course of the survey.

Feature -specific. A request for information regarding a particular detail or feature of a monument or building, i.e. a request for information at a greater level of detail than the accepted monument definition. Users may have to examine all or many records for medieval gate houses to find those with evidence for a portcullis, for example, since the term 'portcullis' and associated evidence terms are not monument index terms. Research

regarding a particular aspect or feature of a monument or building is implied in some *thematic*, *monument type*, and *building type* enquiries. Enquiries were logged as feature or detail specific, however, only where this was made clear in the enquiry.

Feature specific enquiries concerning inscriptions to specified Roman gods, and architectural features of high status Roman buildings, were noted.

Compound. Requests that are compound in nature embrace two or more of the above categories. For example, a request for information regarding a particular monument and whether or not it might be connected with a specified historic person. For example, the enquiry “I would like some information about Cadbury Castle, and particularly any evidence for its association with King Arthur”, would be logged as *monument specific*, *person-specific*, and *compound*.

Many *compound* enquiries were noted, sometimes comprising three or more of the defined enquiry categories. A *thematic* enquiry concerning assembly places, for example, also included a request for associated artefacts (*finds*) and also referred specifically to several *monument types*. A request for information about a Roman quern find and hut site was recorded as a *compound* enquiry, as were Hedgerows Act enquiries which required information about a specific ‘monument’/landscape feature (a hedgerow) along with information about the legal status of land in its environs (*management specific*). An enquiry about archaic raised peat reserves and associated archaeological sites within a defined area was also recorded as a *compound* enquiry.

Other enquiries. Enquiries received by the SMRs and NMR that should have been directed to alternative services, or which could not be catalogued under the criteria defined above were also noted. These included enquiries concerning opportunities for paid or voluntary excavation work and visits to excavations; the legal requirements for undertaking excavations on UK archaeological sites (from a foreign user); general introductions or guided tours to SMR use; ideas for development names (i.e. for housing estates and roads); information regarding the outcome of battles (rather than information about battlefields); information

on the difference between two monument types; management practices for the development of golf courses; the biographies of historic people; a request for a cost estimate to undertake an SMR search within a defined area; and a request for information about what a medieval Christmas would have been like!

In addition to the above enquiry types, for each enquiry it was noted whether a preference for a particular *period* was specified in the enquiry. The general period of the subject of the enquiry was noted. Categories comprised: prehistoric (palaeolithic – 43 AD), Roman (43-410 AD), medieval (410 – 1540), post-medieval (1540-1901), modern (1901-). It was also noted whether a particular *output type* had been requested. Categories comprised: *no preference* (i.e. “all” or “any” information), *narrative text report(s)*, *formatted record(s)*, *simple lists or indexes*, *feature or survey plan(s) or maps*, *distribution maps*, *other images*, *other replies* (such as, yes/no answers, personal comment, referral to other sources). Unfortunately, the results of this part of the survey were lost before they were copied when the bag that contained them was stolen from my car! The general impression I gained, however, was that enquiries covered all periods, but enquiries regarding the post-medieval and modern periods seemed to be less frequent than enquiries regarding the subjects of the preceding periods. Commensurate with the dominance of *area* enquiries (see below), most users expressed no preference to limit their enquiry to a specific period, though this might be implied in the type of information requested.

Most users did not express a preference for a specific output format. This probably implies familiarity with (and possibly a general satisfaction with) the type of response that the SMRs generally provided for frequent users (archaeological contractors, consultants, etc.). However, it was clear from the correspondence that many first-time users did not know what they could expect from HERs and consequently often were shy of requesting information in specific formats. Nevertheless, requests for all the output types defined above were encountered during the survey.

2.4 SMR users and their enquiries

2.4.1 Northamptonshire Sites and Monuments Record

Northamptonshire SMR was established at Northamptonshire County Council during the mid 1970s. At the time of this survey, the SMR was managed by an SMR officer and an assistant, who operated under the management of the County Archaeologist. Another officer had primary responsibility for development control advice. The core of the SMR was held by a custom-built database linked to a 'MapInfo' Geographic Information System. The SMR was unusual in the historic prominence it has given to an event-monument structure. The ExeGesIS SDM HBSMR application had just been installed at the time of survey, but was not yet in service. The SMR holdings also included a library of relevant reports and publications, and a collection of slides for lectures, etc. The SMR was rated amongst the top six of the country's SMRs under the Baker survey assessment (Baker 1999, 29).

The SMR was available for consultation during County Council office hours by prior appointment. Enquiries are also received by mail, telephone, fax and email. Users are expected to abide by guidelines for SMR use (Northamptonshire County Council undat.), which draw on the guidance for SMR use produced by the Association of County Archaeological Officers (1993). There was an SMR enquiry registration form, on which the purpose of the enquiry (whether "commercial", "educational", or "private") is recorded, and the nature of the enquiry may be expressed. In the absence of specific output requests SMR staff usually provided simple index lists of record entries. Charges were made to commercial users, and for copying photographs.

A sample of 156 documented external enquiries received by the SMR during 1999 (comprising around a full year of such enquiries) was assessed for this survey (Figure 8; Figure 9; Appendix 1). Users working within *commercial* projects comprised the largest external user group (25.6%) after individuals with unspecified affiliations (26.9%). Thereafter, individuals undertaking *private research* or study (15.4%) and *management organisations* (12.2%) comprised the next highest of the user groups. All of the defined user groups were represented, the lowest being

those who identified themselves as *post-doctoral or academic staff* (2 enquiries - 1.3%).

Of the broader user groups, *commercial* (25.6%) led *independent researchers* (18.6%), *education users* (16.7%) and *management organisations* (12.2%).

Requests for archaeological records within a specific geographic area (*area enquiry type*) dominated the enquiries. 49.5% of all enquiries concerned information of this nature, and most did not specify a preferred form of output, apparently preferring to leave this to the discretion of the SMR staff. The lack of specified preferred output by *commercial* users may be explained by familiarity and general satisfaction with the default output produced by Northamptonshire SMR, or through non-recorded dialogue with staff to help support their formal requests. Some requests from other user groups were for “any information you may hold”, or framed in other ways to suggest a lack of familiarity with the SMR content.

Requests concerning a specific monument or list of monuments amounted to 13.6% of all enquiries. None of the remainder of enquiry types comprised more than 10% of total enquiries. *Building specific* enquiries (8.2%) and enquiries for *management-specific* information (7.6%), formed the next highest enquiry groups. All of the defined enquiry types, however, were represented in the sample, and there were 24 compound enquiries.

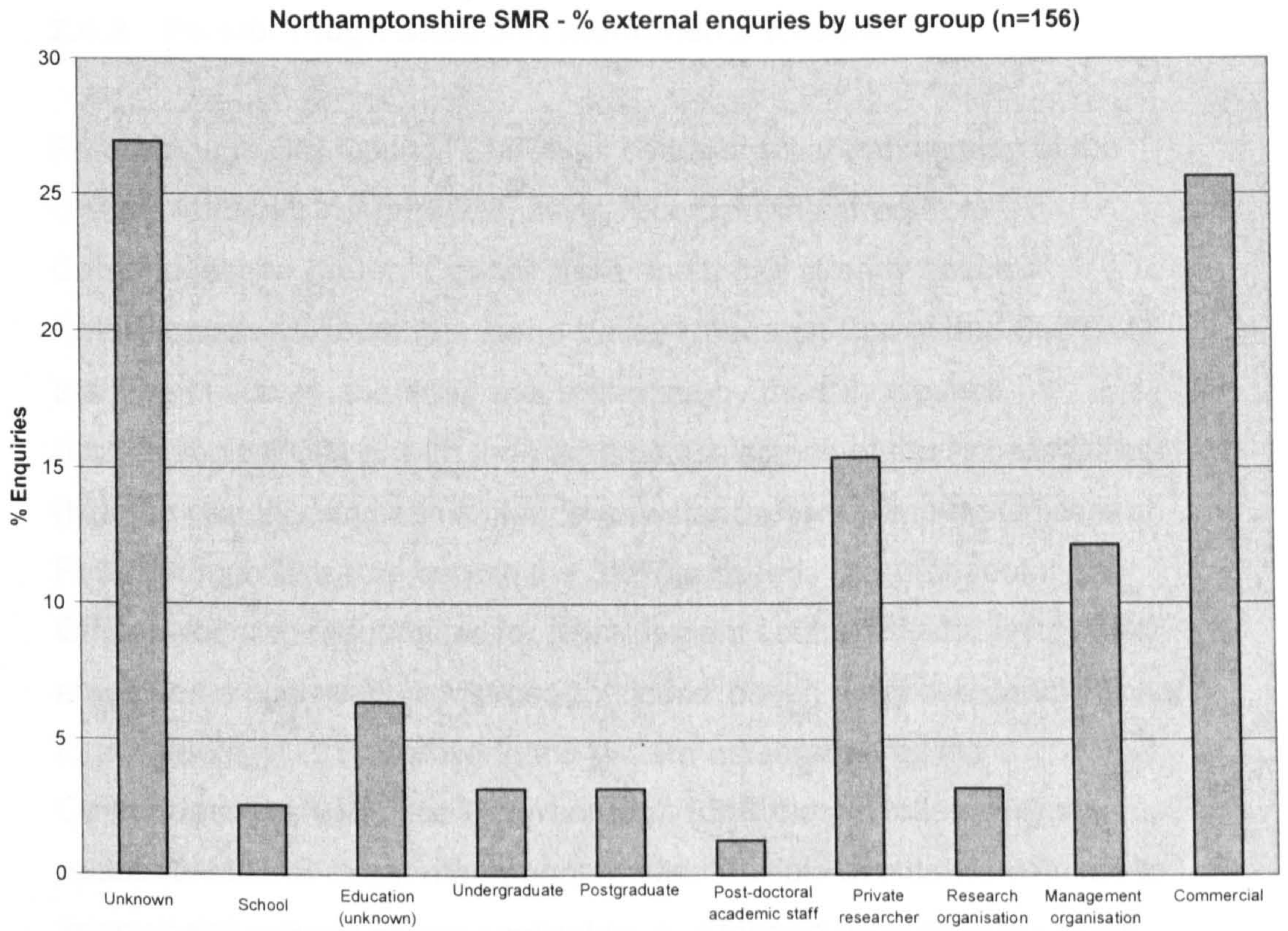


Figure 8. Enquiries by user group at Northamptonshire SMR.

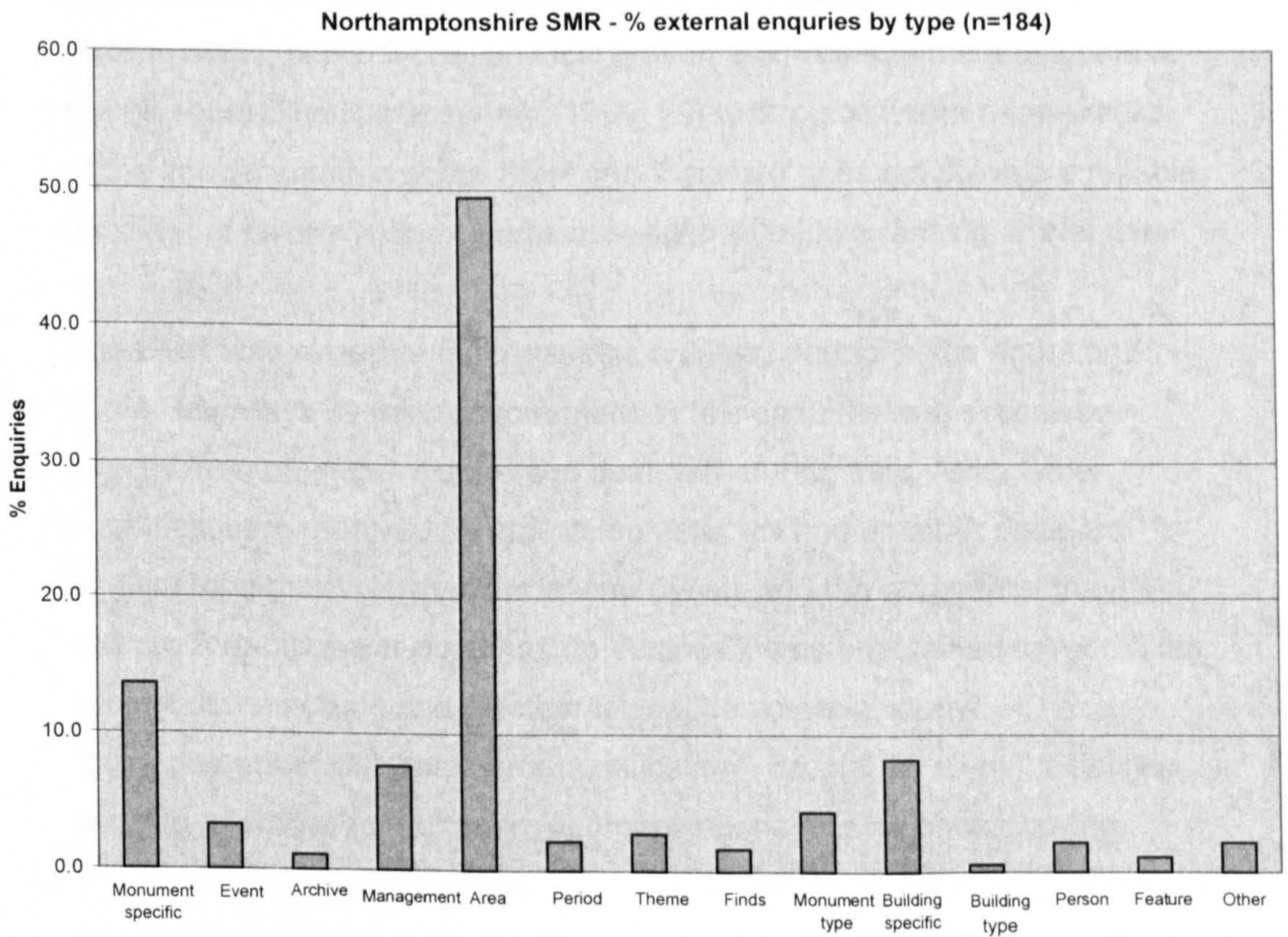


Figure 9. Enquiry types at Northamptonshire SMR.

2.4.2 Peterborough Sites and Monuments Record

Peterborough City Council SMR was established at the creation of the Unitary Authority in April 1998, using records transferred from Cambridgeshire County Council SMR and those already held by Peterborough Museum (the Nene Valley Research Committee SMR). At the time of survey, the SMR was managed by the City Council Archaeological Officer with the part-time assistance of the Access Officer (Human History), and some clerical assistance from Museum Officers at Peterborough Museum, where the SMR is based. The Archaeological Officer was also responsible for development control advice. The SMR employed a custom-built Microsoft 'Access' based database directly linked to a 'Cartology' GIS. Following the pattern established by the Cambridgeshire SMR, the Peterborough SMR did not follow fully the relational MIDAS event-monument model. Multiple events were linked to 'monument' records where applicable, and formed records in their own right if no 'monument' was identified. SMR holdings also included collections of aerial photographs, a library of books, reports and publications, and a slide collection. Users had access to holdings of historic maps, publications, and excavation archives and materials held at the Museum. The Baker survey (1999, 29) took place within a few weeks of the implementation of the SMR and therefore does not provide a reliable indicator of its provisions - it was assessed as middle ranking at that time.

The SMR was available for consultation during normal office hours and some Saturdays by prior appointment. A few enquiries were received directly from museum visitors and dealt with during their visits. Other enquiries were received by mail, telephone, fax and email. A standard enquiry registration form records user details and the purpose of the search. A database of enquiries (in 'Access'), was maintained to record the subject of the search and whether it was "commercial study", "management study", "study for qualification", or "private study". Charges apply to searches for commercial organisations and for photocopying.

A sample of 148 external enquiries received during 1998/99 (amounting to just over a full year of documented external enquiries) was assessed for this survey (Appendix 1, Figure 47). Users working within *commercial*

projects comprised the largest external user group (33.8%), after which came *school/FE college* users (18.9%), and individuals undertaking *private research* (16.9%). The relatively low incidence of individuals for whom no affiliation was recorded (8.1%) and *unspecified education* users (3.4%), may be explained by the application of the enquiry registration form and the fact that the vast majority of the enquiries were handled personally by the author of this survey. The relatively high proportion of *school/FE* users is due to strong links with Peterborough Regional College and Peterborough College of Adult Education. The former ran archaeology GCSE, 'AS' Level and 'A' Level full time and evening class courses, and the latter ran certificate courses in history and archaeology administered by Cambridge University. The 5.4% of enquiries classified as *other* types of enquiry, were mostly introductions to the SMR for these and other classes. All but self-declared *post-doctoral/academic staff* users were represented in the survey sample.

Of the broader user groups, *commercial* (33.8%), *led education* (29.1%), *independent* (23%) and *management* (6.1%).

There were 15 compound enquiries. *Area* enquiries accounted for 44% of all enquiries - a similar figure to that recorded at Northamptonshire. None of the other enquiry types rose above 10% of the total, but the next highest (as at Northamptonshire) was for a specific monument or list of named monuments (8.4%). *Thematic, monument type, and period* enquiries were slightly higher at Peterborough, but *building* enquiries were lower. Historic buildings were very under-represented by the Peterborough SMR at the time of survey.

2.4.3 Lincolnshire Sites and Monuments Record

Lincolnshire SMR is another long-established record with an ancestry in local society records dating from the 1940s. The SMR was situated within Lincolnshire County Council's Planning and Development Group at the time of the survey. An SMR officer and two assistants were dedicated to running the SMR, with separate officers (also part of the Archaeology Section) taking responsibility for development control advice. SMR coverage in Lincolnshire was complicated by the presence of a UAD for

Lincoln (which managed within Lincoln City Council), and by SMR facilities held by the Heritage Trust for Lincolnshire that cover three District Council areas. The Districts concerned, however, recognised the Lincolnshire SMR as the primary record. North Lincolnshire, as a Unitary Authority, maintained entirely separate SMR facilities.

The core records of Lincolnshire SMR were held on the ExeGesIS SDM HBSMR application, using both the limited and full 'MapInfo' Geographic Information System. At the time of survey, the area of SMR coverage was not fully computerised. Inputting from a manual record card system was progressing on a parish by-parish-basis. Although difficult to quantify, the backlog probably comprised 25% of the existing primary records.

Lincolnshire SMR had just attained formal responsibility for the curation of Historic Building information (including Listed Building Information) for its area of coverage. SMR holdings included paper maps, National Mapping Programme (aerial photo plot) overlays, project reports, parish files, and a small library of relevant books.

The SMR was available for consultation during office hours by prior appointment. Enquiries were also received also by mail, telephone, fax and email. Lincolnshire SMR recorded enquiries in two ways. Visitors to the SMR signed a visitor book and a form that records their name, date of enquiry, their affiliation to an organisation, which member of SMR staff handled the enquiry, and the purpose of enquiry. The latter was not constrained by a list of choices, but may be expressed as the user wishes. The form contained a checklist of SMR holdings that serves as an aid memoir for consultations. A form to record all enquiries had just been introduced at the time of survey. This required that a user specifies whether the enquiry is from a: 'student/academic/researcher', 'contractor/consultant', 'other planning related', 'public', 'English Heritage', 'national body', 'Local Authority', 'District Archaeologist', or 'other'. Enquiries received by post, fax, or email, were retained in correspondence and parish files.

The SMR staff endeavoured to tailor the enquiry output to the needs of specific user. Visits were encouraged for large or complex searches, so that staff may better help the user to gather their own information.

Frequent users were encouraged to use the SMR resources without heavy

staff input. The Baker survey assessment ranks Lincolnshire SMR among the better equipped and managed of England's SMRs (Baker 1999, 29).

A sample of 141 'remote' external enquiries received by the SMR during 2000 and retained in correspondence files, was assessed for this survey (Appendix 1, Figure 48). In addition, the backgrounds of 126 SMR visitors were noted, although for these users there was usually no record of the types of information they were seeking (Appendix 1, Figure 49). Again, this constituted approximately a full year's worth of recorded external enquiries.

Users working within *commercial* projects comprised the largest external user group (44% of correspondents, 53.2% of visitors). *Private researchers* formed the next highest visitor group (12.7%), after which individuals involved with *non-specified education* programmes (10.3%), individuals with no recorded affiliation (7.9%) and *post-graduate students* (6.4%), were the next most frequent visitors. *Management organisations* were represented by only 2.4% of enquiries.

The broader visitor groups were: *commercial* (53.2%), *education* (22.2%), *independent* (14.3%) and *management organisations* (2.4%).

The correspondent (remote) users' profile was slightly different. After *commercial* users (44%) came *management organisations* (19.2%), *research/interest groups* (6.4%). Although all user groups were represented, no others comprised more than 3% of the total.

The corresponding broader user groups were: *commercial* (44%), *management* (19.2%), *education* (10%), then *independent* (7.8%). Individuals with no declared affiliations amounted to 19.2% of the remote enquiries. The greater figure testifies to the usefulness of the visitor forms in recording an individual's background. Management organisations based outside Lincoln are clearly more inclined to rely on correspondence than personal visits to the SMR.

As mentioned above, the character of visitors' enquiries to the SMR was seldom obvious from the information supplied by the visitor forms. The assessment of the character of enquiries, therefore, was based exclusively on the correspondence files.

There were 30 compound enquiries. External enquiries of the *area* type (45%) were followed by those concerning *specific monuments* (14.1%) and those concerning *management information* (12.6%) in popularity. No other enquiry types comprised more than 5% of the total, although all apart from *building specific* and *feature specific* enquiries were represented in correspondence.

2.4.4 National Monuments Record

The history of the National Monuments Record has been outlined above. The NMR's remit is to "encourage the understanding and enjoyment of the historic environment by providing access to our archives and information sources and to preserve unique archives and data for future generations". At the time of survey, the NMR comprised around 10 million items covering England's buildings, archaeology and maritime sites. The collections include photographs of buildings, almost total aerial photographic coverage of the country, survey reports on buildings and archaeological sites, Listed Building descriptions, a database of archaeological sites, and a specialist reference library. Not many of the NMR holdings were yet available on-line, so searches (whether remote or in person at the NMR offices) were carried out on the user's behalf by NMR staff.

The MONARCH database contained around 300,000 archaeological entries at the time of survey. Archaeological enquiries could be made by a visit to Swindon, by mail, telephone, fax, or email. Public search rooms were open Tuesday to Friday 9.30am to 5pm. Users were encouraged to complete a "Search Request" form, which requires a search area to be defined. This may be expressed either as the Ordnance Survey national grid co-ordinates of the origin and north-east corner of a box, or the centre point of the search area and its radius or rectangular dimensions. The form also had a space for the reason for the request to be explained (English Heritage undat. b). Users had to obtain a license to use NMR information, which places an obligation on the user for the responsible use of the information.

Standard searches were carried out free of charge by NMR staff (with the aim of despatching results within fifteen working days), though priority searches, and extensive research services were subject to charges. Charges were also made for reproduction and some database printouts. Thematic research searches (up to a maximum four hours of assistance) were charged at £40, thereafter the rate doubled. Index reports (which give monument name, county, district, parish and location within a kilometre square, date or period and monument type, and the number of entries in the NMR Activities Index for the specified area), covering areas of less than 25 square kilometres, were free. Larger areas were charged at 5p per index record. MONARCH 'long reports' and 'activities index reports' were charged at 34p and 10p, respectively. Priority searches, whereby a response is despatched within two working days, cost £35 (English Heritage undat. a; NMR price list, up to September 1999).

There were 13,609 remote enquiries in the financial year 1998/1999. Of these, 1,252 (9%) concerned archaeological records. The remaining remote enquiries were concerned with historic and Listed Buildings records, the air photograph collection, or the maritime records.

A sample of 136 external enquiries was examined (Appendix 1, Figure 50). These had been received during 1999, and were recorded within the archaeology enquiry correspondence files. After individuals for whom no affiliation could be discerned (32.4%), *commercial* users comprised the largest external user group (25%). Next came *school/FE college* users (13.2%), followed by *management organisations'* enquiries (12.5%). The only other user group to rise above 5% of the total were *post-graduate students* (5.1%). All the education users expressed their affiliation to a particular study level, so none had to be recorded as *education (unspecified)*.

In terms of the broader user groups, *education* (24.3%), *management organisation* (12.5%) and *independent researchers* (5.9%), followed the *commercial* (25%) user group.

There were 12 *compound* enquiries. *Area* enquiries (35.1%), marginally exceeded *monument specific* enquiries (31.8%). No other enquiry types comprised more than 10% of the total, the next most prolific being *event*

specific and building specific enquiries, which each comprised 6% of total enquiries.

2.4.5 Archaeology Data Service Catalogue

The Archaeology Data Service, managed at the University of York, is part of the Arts and Humanities Data Service. It is funded by the Joint Information System Committee and the Arts and Humanities Research Board. The ADS aims to “collect, describe, catalogue, preserve, and provide user support for digital resources that are created as a product of archaeological research”, and has “a responsibility for promoting standards and guidelines for best practice in the creation, description, preservation and use of spatial information across the AHDS as a whole”. Furthermore, “the ADS collaborates with national and local agencies to promote greater use of existing services” (<http://ads.ahds.ac.uk/project/about.html>).

To this end, it has produced 'Guides to Good Practice' for Geographic Information Systems use, aerial photography and remote sensing data, geophysical data, computer aided design, virtual reality, and digital archives from excavation and fieldwork (see Bibliography below for examples). ADS sets up and contributes to seminars and lectures, and may provide advice on specific digital archiving projects. The core of its activities, however, are centred on developing and maintaining an on-line digital research resource for “a relatively well-informed user community” (*Archaeology Data Service News*, Issue 7). An emphasis is placed on allowing users to work with primary data in order to strengthen links between data production (and those who produce it) and academic endeavour. See Chapter 5 for a full description of the on-line catalogue and its search mechanisms.

By January 2001, the ADS catalogue comprised over 300,000 index records. By January 2003, it comprised over 450,000 index records. These had been supplied by various archaeological organisations and principally relate to the archaeology of the British Isles. The catalogue uses links to related project archives and on-line publications, but is not too dissimilar to Sites and Monuments Record holdings in terms of the categories of information available to a researcher. These include not only abbreviated

SMR/NMR entries and national excavation indexes, but also digital project archives, scientific dating and artefact databases, and a 'library'.

The 'ArchSearch' facility allows enquiries to be constructed via a 'keyword' (single words or a phrase), within 'who', 'where', 'what', 'project title' categories, or a map-based route. Enquiries are processed using metadata tables that describe the key attributes of the data clusters. Searches are further assisted by 'fuzzy matching' (which strips certain search terms down to a common denominator to help catch all permutations), and a built-in thesaurus (that adjusts the search to cope with equivalent terms). Map-based searches are carried out either by defining the origin and top right hand corner of a rectangular search area using national grid coordinates, or by pointing at a map. The latter produces all catalogue entries within a 10km square centred on the selected point. The enhanced map search facility (Chapter 5) had not yet been implemented at the time of this survey.

For the purposes of the survey, a file of around 9,920 unique queries made through ArchSearch was supplied by the ADS. A sample of 1,000 enquiries was extracted by selecting one in ten enquiries through an alphabetically sorted list, plus some random selections. Where the meaning of the search was totally ambiguous because of the wording or format of the enquiry, the previous search term was selected. Enquiries were recorded in accordance with the enquiry categories defined above. The results are reproduced in Appendix 1 (Figure 51). The user background for each enquiry was not recorded by the ADS.

Area enquiries (34.5%), constituted the most abundant enquiry type. 'Other' types of enquiry (those that did not fall within the defined enquiry types) formed 13.1% of all enquiries, and these were followed by enquiries regarding *monument types* (9.6%), a *specific monument* or list of specific monuments (9.2%), *thematic* (9.2%), and *finds* (7.2%). None of the other enquiry types comprised more than 5% of the total. Only 7 enquiries were classified as *compound* in nature.

2.5 Some observations regarding the external user groups

All of the defined user categories were represented by enquiries to the SMRs and NMR, with the exception of self-declared post-doctoral or academic staff at Peterborough. In practical terms then, the records are recognised and used by a wide spectrum of users.

Unsurprisingly, and in accordance with the estimates of SMR use provided by the Baker survey, *commercial* users comprise the highest number of external users for each of the HEIRs. In total, 32% of the external enquiries presented to the three SMRs and NMR were submitted by commercial users (Figure 10; Appendix 1). The next highest category, users of *unknown* affiliation (21.5%), could contain members that belong to any of the other user groups. *Education* users (19.9%), *independent research/general interest* users (14.1%) and *management organisation* users (12.4%) formed the next highest identifiable users.

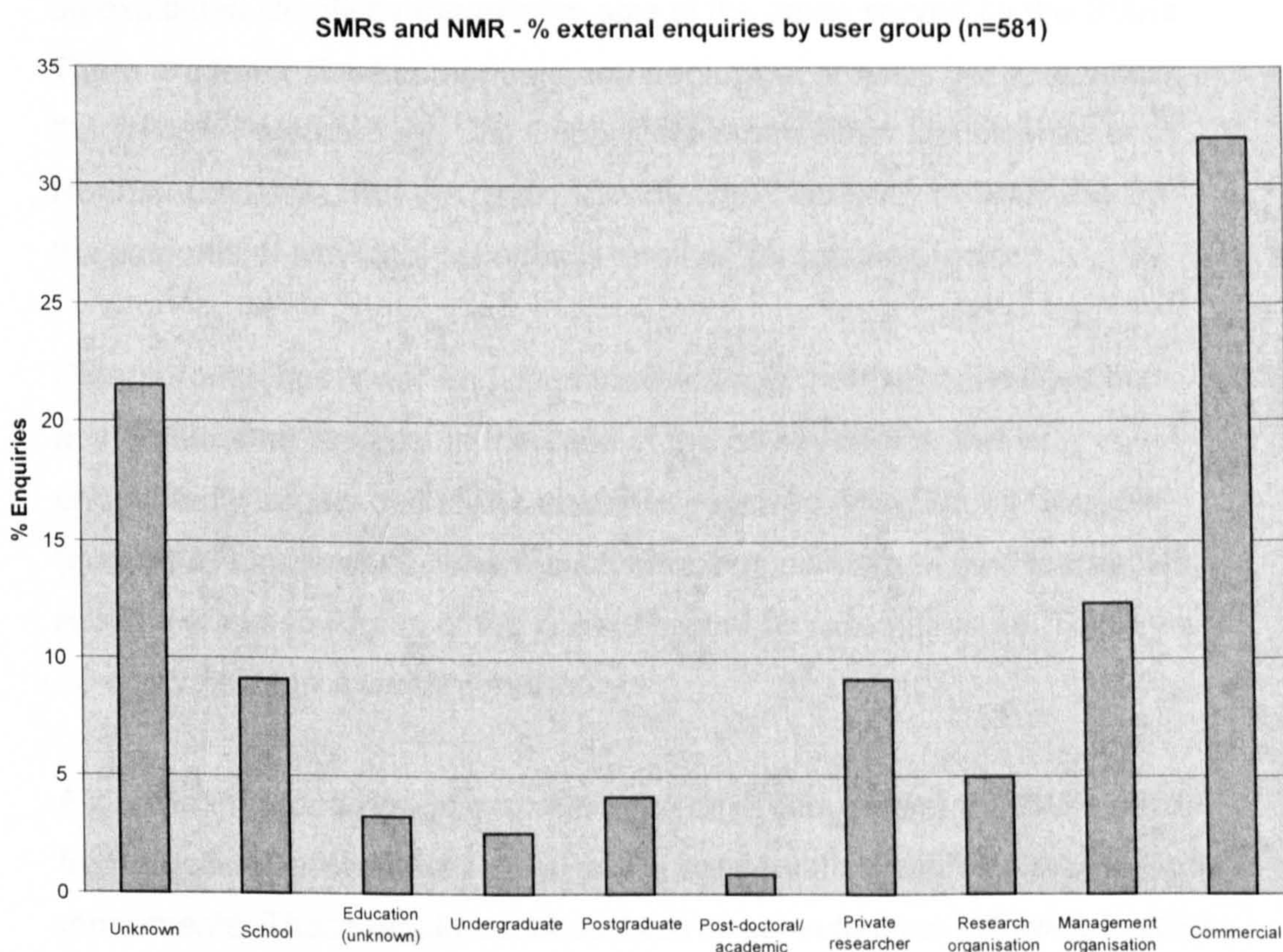


Figure 10. User groups at the SMRs and NMR.

At the NMR (Appendix 1, Figure 50), however, the percentage of commercial users (25%) did not differ significantly from those involved with

education (24.2%). The variance with the SMR trend in this respect may be largely explained by the promotion of the NMR as an educational resource for the nation. There is also evidence, however, that commercial archaeologists do not rely so heavily upon the NMR as they do their local SMRs (Donnie Mackay pers. comm.). Developers and their non-archaeological agents are likely to be more familiar with resources allied to their local planning authorities, than those available at a national level. When asking for information about the presence of archaeological interest at a development site, developers are often really trying to gauge the likely response of a planning authority to planning applications. As such, they are more likely to seek out local archaeological advice allied to that planning authority, rather than rely on basic information from a national agency.

A less pronounced difference between *commercial* and *education* enquiry volumes at Peterborough SMR (Appendix 1, Figure 47) than at either Northamptonshire or Lincolnshire (Appendix 1, Figure 46; Figure 48), could be explained simply by the relative size of the areas served by the SMRs. There are fewer development-led archaeological projects per year within the smaller Peterborough City Council area than either Lincolnshire or Northamptonshire. But the proportionally high frequency of SMR use by the students of two local colleges is another contributing factor.

Peterborough has fewer enquiries from *management* organisations than any of the other records. In the case of the county SMRs, this is undoubtedly largely due to the enquiries received from District Councils (notably at Lincolnshire, where such enquiries concerned the Hedgerows Act and works to Rights of Way) which count as external users. There are no equivalents in a Unitary Authority.

A significant proportion of *management-type* enquiries at the NMR were from English Heritage staff undertaking conservation appraisals for specific monuments. These would count as internal consultations following English Heritage's absorption of the National Monuments Record.

Lincolnshire SMR's relatively lower proportion of 'remote' enquiries connected with *education* and *independent research* (Appendix 1, Figure 48), is likely to be connected to the size of the county in proportion to the

number of local courses dealing with archaeology and local history, and the service coverage provided by the county's other archaeological organisations. The local presence of Community Archaeologists working within Heritage Lincolnshire (an independent Trust), and at the museums across the county, undoubtedly diverts some general interest and education questions that would otherwise find their way to the SMR. Nevertheless, the figures for visitors to this SMR do redress the perceived imbalance somewhat. They also hint at the encouragement given to visit the Lincolnshire SMR, rather than to rely on remote searches, so that users who are typically less familiar with its holdings may receive some guidance from knowledgeable SMR staff.

I suspect that the proportionally fewer numbers of *independent research* enquiries at the NMR is exacerbated by the presence of a large number of such users amongst those who have not declared an affiliation to any of the categories. This is certainly suggested by the NMR's 'Archaeology User' figures for 1998/99 (supplied by Donnie Mackay), which include a high proportion of 'general public' users.

None of the surveyed SMRs (or NMR) routinely record use by staff within their own organisations, but all record information about external enquiries to varying degrees of complexity. This made the survey challenging, but as original correspondence was used and undeclared affiliations were recorded as a separate ('individual unknown') category, the validity of the results has not been unduly affected.

Users tend not to declare an affiliation in detail unless asked to do so. To help provide a mechanism for the periodic national assessment of HER use (and to avoid the problems encountered by the Baker survey), it would be highly desirable for HERs to adopt a standard enquiry record form. This should contain a careful selection of user categories covering both internal and external use. It should include either or both the user's background and the purpose of their enquiry, but should not mix the two in a single list of categories. Such an enquiry record would not only help to demonstrate the character and extent of use of the service provided by each HER, but would also help to identify national trends in HER use. See Appendix 6 for a suggested HER enquiry record.

The evidence for SMR use across the range of defined user groups provided by this survey is very encouraging. SMRs can be said to have gained a foothold within most sectors of archaeological practice (including education and research sectors) and some related environmental disciplines, even though their full potential might not be exploited evenly across those sectors. The challenge for the promotion of greater research use is to increase the volumes of academic users, private researchers, and those doing research from a commercial perspective without detriment to the service offered for planning and conservation advice. In fact, any steps taken towards making HERs more research-friendly ideally should also seek to contribute to their efficacy as planning tools.

2.6 Some observations regarding enquiry types

All of the defined enquiry types were represented at one or other of the records (Figure 11; Appendix 1), which indicates the considerable range of questions asked of them. In fact, taking in to account the wide variation in the character of questions and the subjects within the defined categories and the amount of questions that had to be assigned to the 'other' category, an astonishing range of enquiries is presented to these HEIRs.

Area enquiry types, those based on a search for "all" or "any" information within a defined search area, formed 43.8% of all enquiries at the SMRs and NMR. They were a dramatically dominant enquiry type at each of the SMRs, but at the NMR (35%), they were nearly matched by enquiries concerning specific monuments (31.8%; Appendix 1, Figure 50). NMR search request forms emphatically encourage national grid-based *area* searches. Many users, especially those in the non-commercial or management categories, however, by-passed this facility with direct correspondence. It is clear from this correspondence that first-time users generate a significant proportion of enquiries at the NMR.

The delivery of information to satisfy an *area* enquiry, although apparently straightforward, hides much complexity. Users (other than those using the 'Arcsearch' interface to the ADS catalogue) seldom in fact receive *all* available archaeological information for a particular area. Some form of selection or filtering process is usually undertaken by SMR staff on the

user's behalf. Abbreviated records or simple lists may be provided instead of full database records, and certain categories of information may be withheld. Issues regarding the representation of the depth of archaeological information for a particular geographic area, will become more prominent as the HER remit broadens. Does a user who is trying to obtain a general feel for the archaeological background of a particular area need to see all landscape characterisation data and place-name evidence alongside that of historic buildings (including recent military remains), the more traditional 'monument' records, portable antiquities records, palaeoenvironmental records, and management designations? How should this information be depicted, and what relative prominence should be given to each information group? These are questions that only the user can answer based on an assessment of their own needs, and a good knowledge of the availability and qualities of each data set.

Monument specific enquiries, those concerning specific named individual monuments, formed the next most frequent enquiry type (16.5%; Figure 11; Appendix 1), although this figure is skewed by the NMR results. They formed 12% on average of all enquiries at the SMRs (Appendix 1; Figure 46; Figure 47; Figure 48).

Management specific enquiries formed 7.1% of all enquiries (8.1% of the SMRs' enquiries). In accordance with a greater enquiry rate from management organisations, *management specific* enquiries, were proportionally more significant at Lincolnshire and Northamptonshire, than at Peterborough (Appendix 1, Figure 46; Figure 47; Figure 48).

Monument type enquiries formed 5.2% of all enquiries, and 5.4% of enquiries presented to the SMRs. Of the remainder of enquiry types, enquires about specific buildings were reasonably high at Northamptonshire (Appendix 1, Figure 46), and at the NMR (Appendix 1, Figure 50), despite the availability of alternative dedicated facilities for enquiries about historic buildings at the NMR. *Building specific* enquiries amounted to 4.8% of all enquiries. *Events specific* (4.5%), *thematic* (3.6%), *period based* (3.5%) and *finds* (3.3%) enquiries on average formed the next most frequent enquiry types. Consistently very low amongst all records were enquiries concerning *building types* (a request for all records of a particular building type), specific *features* of monuments or buildings,

people (*person-specific*), and those regarding material or document archives (Figure 11; Appendix 1).

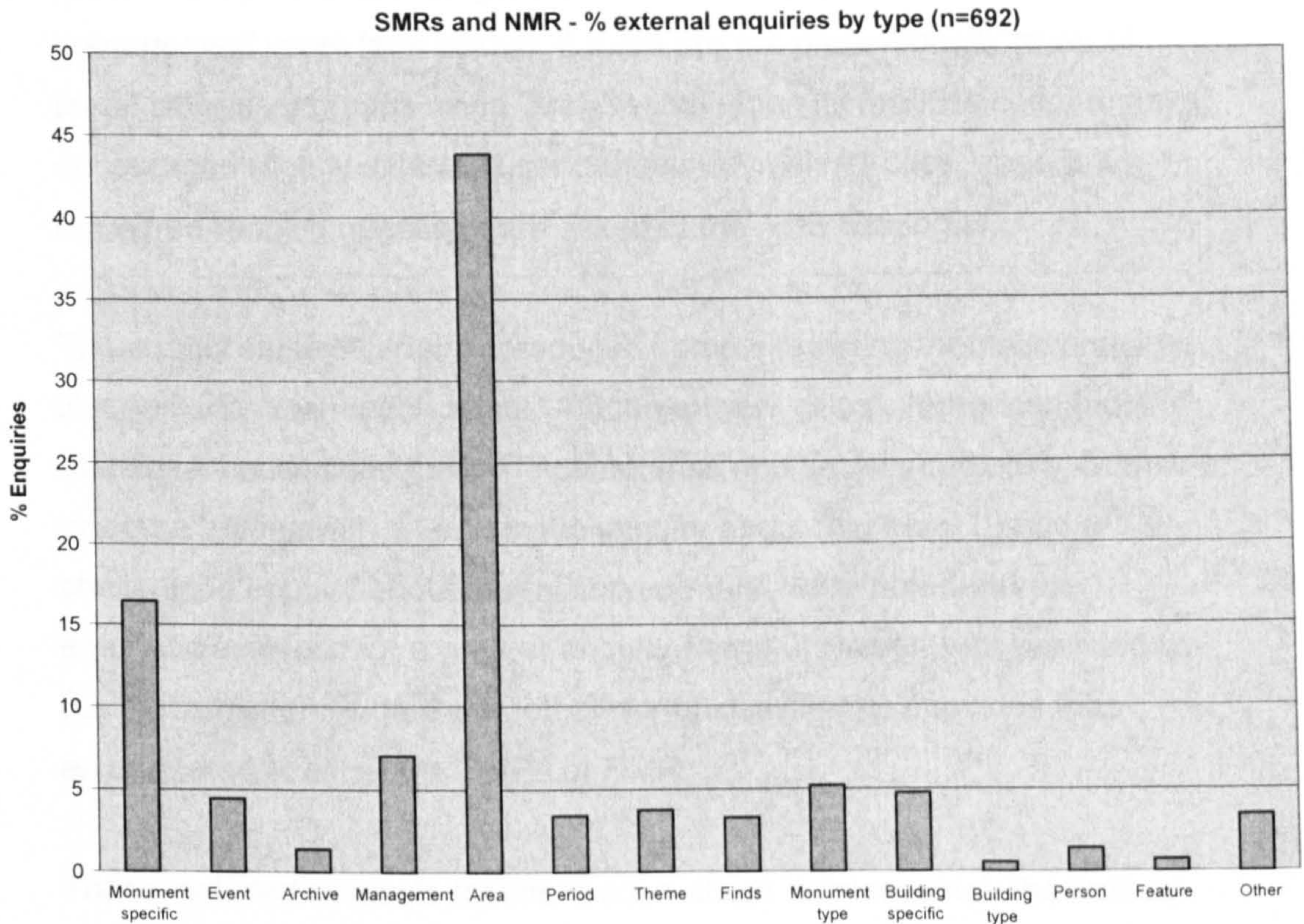


Figure 11. SMR and NMR enquiry types.

Are there any differences in enquiry trends between the hybrid manual-digital services offered by the SMRs and NMR, and the fully digital online facility provided by the Archaeology Data Service?

Despite sign-posting various enquiry routes ('who', 'what', 'where', etc.), *area* enquiries based on keyword place-names (street names, villages, towns, countries, counties, etc.) outstripped all other search approaches through 'ArchSearch' at the ADS (Appendix 1, Figure 51). It is important to note that enquiries through the 'clickable' map-based search facility were not assessed as part of this survey. Their inclusion would greatly increase the dominance of the *area* search type.

It was notable, however, that *finds*, *thematic*, and *monument type* enquiries were relatively more abundant at the ADS than at the SMRs and NMR. These types of enquiry are indicative of the more wide-ranging questions often asked by *education* and *independent research* users, than the more restrictive type of searches generally carried out by *commercial* and *management* users (see below). If there are not proportionally fewer of these latter user groups using 'ArchSearch', then its facilities seem to have encouraged slightly different user behaviour. In either case, apparently more free-ranging questions are asked of the ADS catalogue.

The survey sample certainly produced some interesting thematic enquiries. Requests for information about "African ancient cities", "American Indians", "medieval house construction", "cemeteries and social structure", "Cornwall Iron Age", along with an enigmatic enquiry about "big men" (!) and a challenging enquiry about the "history of man", were noted. Further emphatic evidence for a greater enquiry range, however, was provided by the much higher incidence of 'other' (or unclassifiable) enquiries than encountered at either the SMRs or NMR.

These included requests for information about "adolescents", the "critical evaluation of voluntary organisations", the "future of underwater archaeology", "draughting paper", the "Oak Island mystery", "spaceimagine" (!?) along with requests for information about archaeology courses or fieldwork opportunities of the type that are occasionally also directed at SMR staff. Among the enquiries were many examples of typing errors. Such enquiries, which may be intercepted and re-directed, clarified, or interpreted by SMR and NMR staff, are an inevitable consequence of Web access.

The much reduced incidence of *compound* enquiries recorded amongst the 'ArchSearch' sample indicates that, despite an invitation to enter enquiries as phrases as well as single words or word lists, users were much more terse when confronted with a fully digital interface. This apparent conservatism in online searches is further confirmed by the impression given by the HEIRNET User Survey 2005. Few of whose respondents took advantage of the advanced search mechanisms available to them (Brewer & Kilbride 2006, section 3.2.8). It is a general

characteristic of Internet search engine use that most users prefer to use only one or two keywords (Adiuri Systems Ltd 2005, 2).

Many of the less standard enquiries presented to the Archaeology Data Service via 'ArchSearch' keyword searches are likely to have delivered unexpected, misleading, or disappointing data. The role of SMR and NMR staff in helping to frame the enquiries of 'naive' users undoubtedly has been under-represented in this survey. The question first posed by a user sometimes is not the one that they would choose to ask if they were more familiar with the records. A formal request for information which leaves its mark in the administration files often belies the refinement or modification of the enquiry that takes place once the records are being perused by the user. SMR and NMR staff are often able to warn users that their enquiry is likely to result in too much data, too little information, or could be phrased in a more effective way. Of course, they can do this only with an understanding of the user's purpose. Mitigating the loss of this type of user 'coaching' by HER is a very important consideration for the development of online HER facilities.

2.7 The relationships between user groups and enquiry types

Area enquiries are the favoured enquiry method of all enquiry groups with the exception of those deriving from *management organisations* (Appendix 1, Figure 53; Figure 54; Figure 55). In this group, *monument specific* (31.6%) and *management specific* enquiries (22.1%) lead *area* enquiries (20%). *Monument type* enquiries (6.3%) and *building specific* enquiries (7.4%) are also significant to *management organisation* users (Appendix 1, Figure 53). The emphasis on management type information, either for a specific monument or building, or as part of an assessment of monuments of a particular type is clear. As a group, *management organisation* users tend to be interested either in detailed management information about monuments (their state of preservation, their extent, their relative importance within a group of similar monuments), or alternatively, the presence or absence of significant legally protected or vulnerable monuments, or those suitable for amenity purposes.

Most of the *area*-based enquiries lodged by *management organisations* derive from non-archaeological organisations, but organisations which nevertheless encompass archaeological resources within their wider conservation and management remits (for example, natural environment and wildlife organisations, groups who manage rural public amenities such as footpaths and nature reserves). Organisations with stronger archaeology-specific remits for particular monuments (such as English Heritage) are generally less interested in *area* enquiries.

The information that management organisations hope to get from an SMR search tends to differ from that required by *commercial* (archaeological contractors, consultants, etc.) users in several respects (Figure 12; Appendix 1, Figure 53).

Commercial users (archaeological contractors, consultants, etc.) tend to be overwhelmingly interested in all information about archaeology recorded within a discrete area of landscape. *Area* enquiries amount to 79.3% of all enquiries by this group. At its simplest level, this is purely for purposes of archaeological hazard assessment in advance of purchasing a plot of land, or as part of implementing a planning application. This group's interest in management information (7.2% of enquiries) generally is related to the legal status of monuments or sometimes the state of preservation of archaeological remains, both of which could have a major bearing on the viability of proposed development schemes.

At a more sophisticated level, archaeological contractors and consultants may carry out an *area* search in order to provide background information for commercially commissioned project reports or to provide comparative information for investigation analysis. However, the low incidence of *period* (1%), *theme* (1%), and *monument type* (1%) enquiries amongst this group (Figure 12) suggests that more sophisticated types of research are secondary to general searches for appraisal purposes.

Discussion of the exact format and detail of information required by a user in this group has to consider the group's generally greater familiarity with the nature of SMRs. It was notable (and not unexpected) that the same users cropped up repeatedly with requests for searches in the different SMRs. Many contractors and consultants are frequent users who have

long since obtained an idea of what they can expect from their requests, or have previously specified their routine requirements to SMR staff.

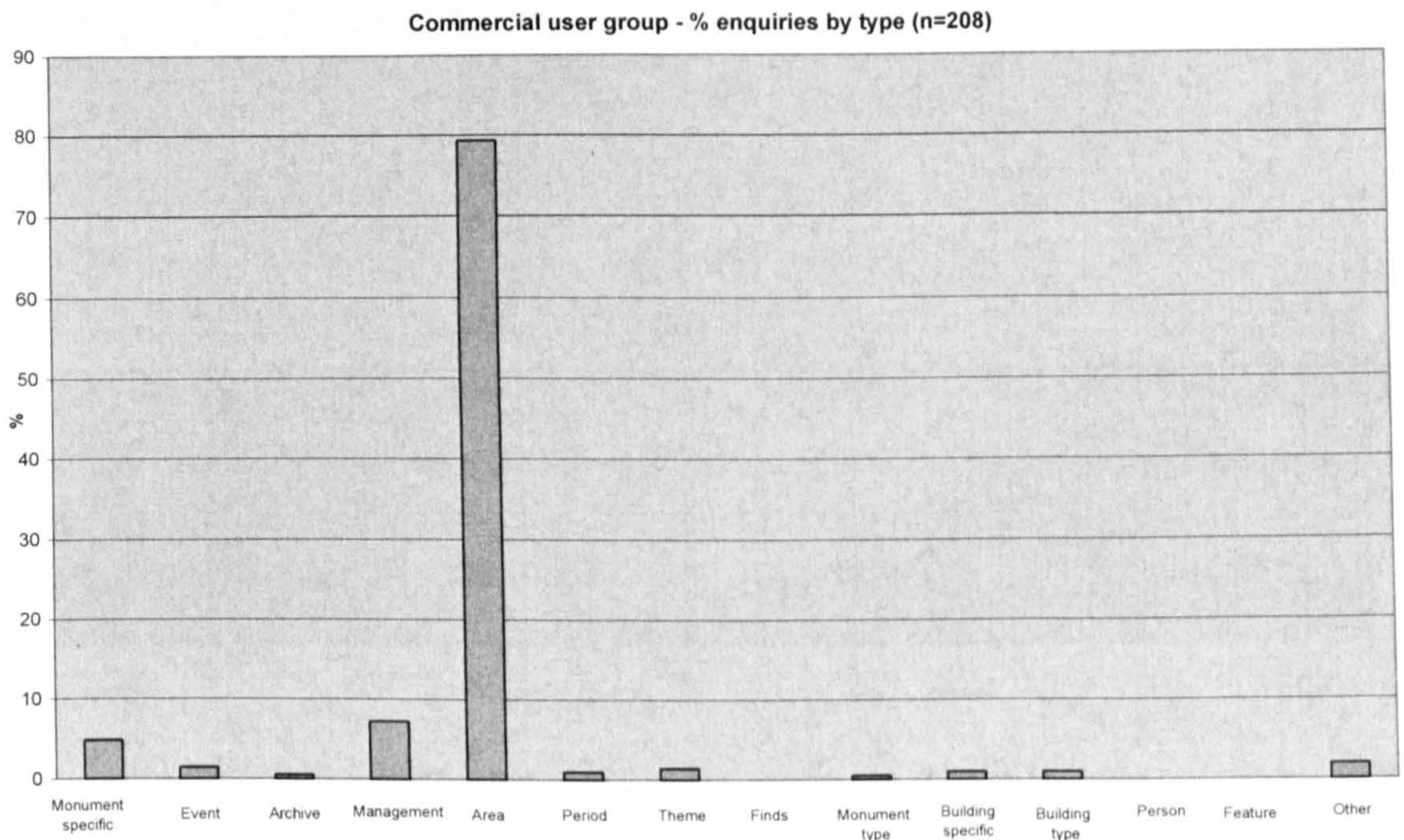


Figure 12. Commercial users' enquiry types.

A much more even spread of enquiry types has been recorded for *independent researchers* (Figure 13; Appendix 1, Figure 54), most of whom are trying to gather information for personal studies or work connected with a research or local interest group. Second to *area* enquiries (28.6%), come requests for information about *monument specific* enquiries (20.4%), and with the exception of *archive specific*, *building type*, and *feature specific* enquiries (around 1% and less), the remainder of enquiry types are of similar frequency (around 5%).

Independent researchers also provided a relatively high number of compound enquiries (17.3%), whereas only 5.4% of *commercial user* enquiries were classified as *compound* enquiries. This is an indication of the relative sophistication of some of their questions. The high figure for *compound* enquiries by *management* users (29.2%), can be explained by requests regarding a specific monument combined with a specific request for management-type information (for example, "any" information about this hedgerow and specifically whether it sits within a Scheduled area").

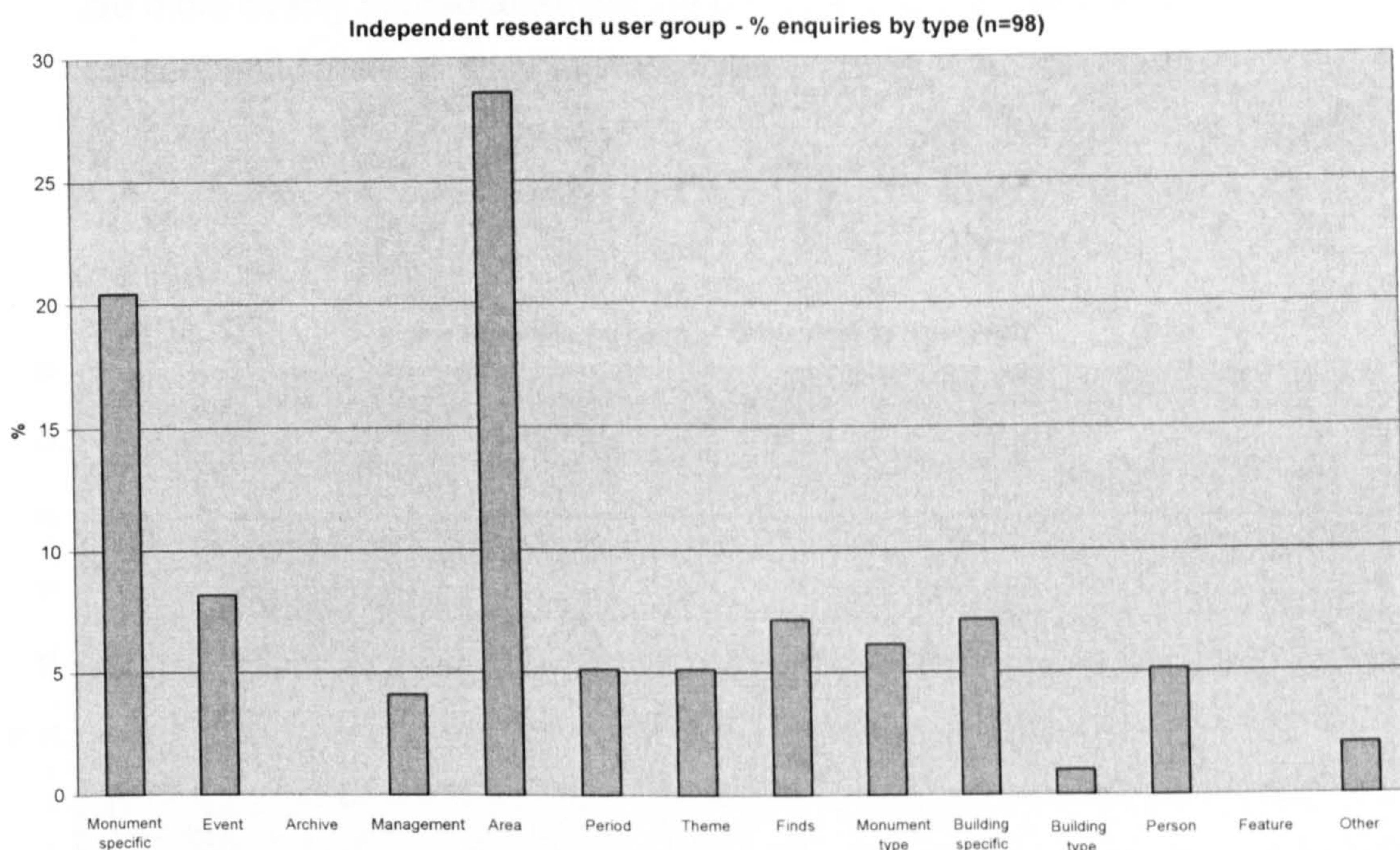


Figure 13. Independent researchers' enquiry types.

Users from the education sector also have a markedly different enquiry profile (Appendix 1, Figure 54). *Area* (25.9%) and *monument specific* (14%) enquiries lead, but there are also significant numbers of *thematic* (9.1%) and *monument type* (11.2%) enquiries. This trend is even more marked amongst users belonging to the *Higher Education* sector (Figure 14; Appendix 1). For these users *area* enquiries (17.7%) are not significantly more abundant than *thematic* enquiries (16.1%). *Monument specific* enquiries (11.3%), *monument type* enquiries (11.3%), *event specific* (9.7%) and *finds* (9.7%) enquiries are not far behind. The next most frequent enquiry type is general *period* enquiries (6.5%).

Again, the incidence of *compound* enquiries provides another indicator of the relative sophistication of enquiries from education sector users. 17.2% of education-related enquiries could be classified as *compound* in nature. When only *Higher Education* users are considered, this figure rises to 29.6% (Figure 14).

This survey suggests that *Higher Education* users approach requests for SMR information in a generally more demanding way than other user

groups. Their enquiries span almost the full range of enquiry types; they are more evenly spread amongst the principal enquiry types, and consequently are less easy to stereotype.

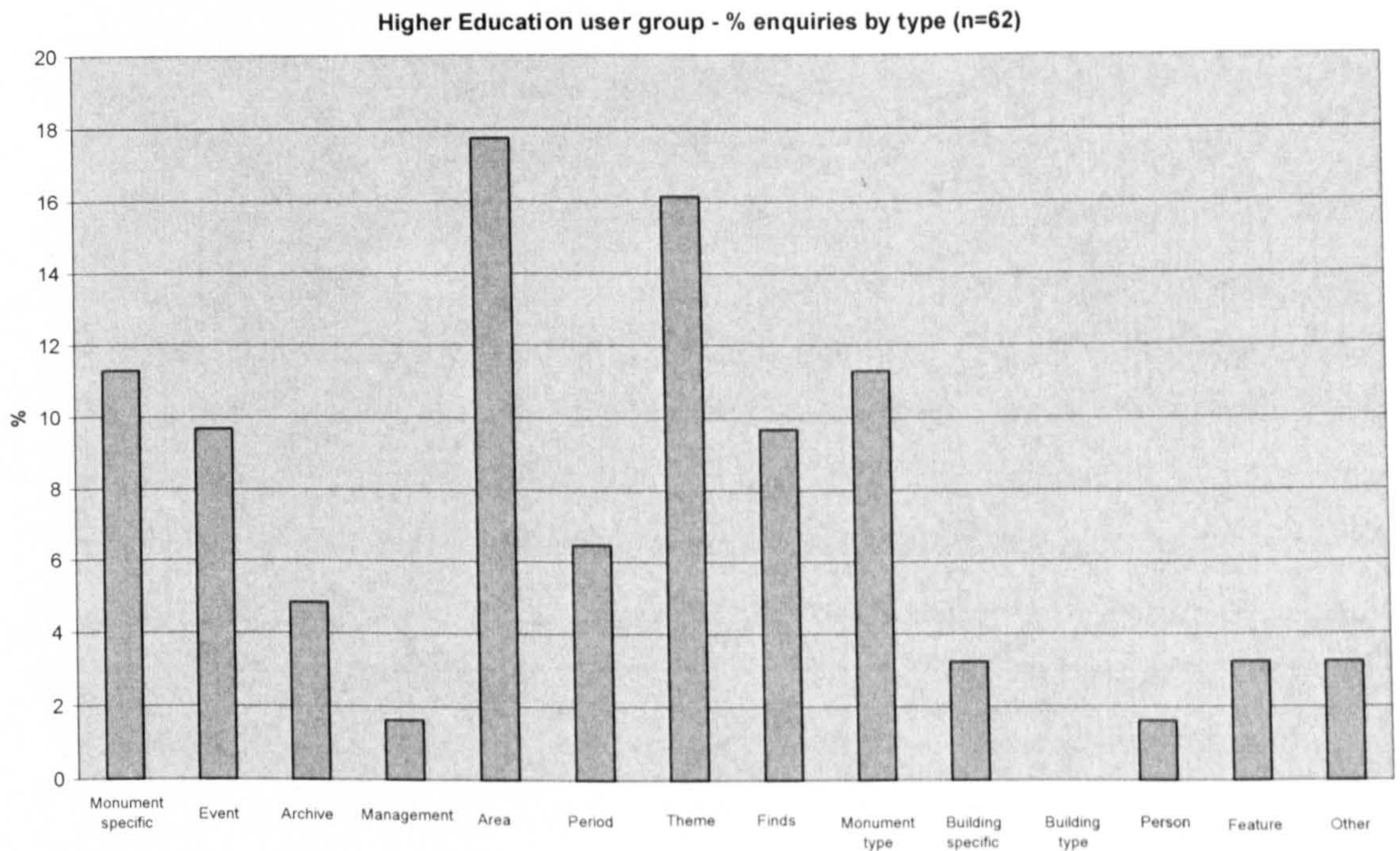


Figure 14. Enquiry types from Higher Education users. Compare with the pattern of commercial user enquiries (Figure 12).

Users within the *Higher Education* sector are more likely to approach an enquiry from the perspective of a research theme or study topic than other user groups. They do not necessarily want to express their search in terms of a narrow set of parameters, nor do they tend to seek all available archaeological information relating to a broad period. They often declare a specific research interest within their enquiry, and so invite HEIR personnel to act empathetically by considering, on their behalf, a wide range of information in a focused and intuitive way. It is an enquiry strategy designed to engage the services of another knowledgeable thought process in the selection of HEIR data. Often their requests may be summarised by the phrase “I am carrying out research on...please supply all information of this type, and any other information that you think will assist me in my research”.

Having investigated aspects of the enquiry and data gathering strategies of various user groups, the following chapter will examine approaches to the actual use of HER type information by researchers and students.

CHAPTER 3 – SMR USE IN RESEARCH AND EDUCATION

The paucity of formal studies of the actual use of SMR information (Grant 2002; Brewer & Kilbride 2006, 1.1.2; Chapter 1, section 1.4.2), particularly regarding SMRs' use for academic study, has hindered proper understanding of user group needs. Statements regarding the use of SMR information for research and steps taken towards SMRs' informational and technical development, have drawn mostly upon the impressions of the suppliers of the data rather than its users. The views of SMR officers in this regard, of course, are important. After all, they are in direct communication with users and have accumulated feedback informally. They have then made day-to-day decisions about the development of their SMR services that pay greater or lesser attention to the needs of research users as they perceive them. The problem with such an ad hoc approach is that impressionistic and anecdotal information does not provide a clear objective picture of the whole SMR and HER community's success (or lack of success), in meeting a research and education support role. It does not help to measure the efficacy of collective steps taken to improve the quality and usefulness of HER information.

In this chapter an attempt will be made to characterise the research and education use of SMR and HER information through both quantitative and qualitative means. An emphasis will be placed on its use by student researchers in formal education programmes.

3.1 A survey of SMR use within published research

The first survey, described below, is an attempt to chart the extent and character of research use of SMR information over a twenty-five year period in a structured manner. The survey introduces quantitative indicators that may be used in the future to measure the success of initiatives to promote the greater use of HERs within the research community. This survey of research output complements the survey of SMR enquiry strategies described in Chapter 2.

The survey quantifies the incidence of references to SMR use as expressed in articles within journals published between 1980 and 2005. The use of SMR information within the articles has been analysed and compared with the incidence of evidence of use of the National Monument Records and the use of the Royal Commission's published inventory series (Chapter 1, section 1.1) over the same period. This period avoids the inception and early establishment of many SMRs, a time when the amount of available data and facilities generally available would have struggled to support serious widespread research use. But it covers the formative years of consolidation and computerisation and the later years of data enhancement. The key questions are whether research use has grown with the technical development of SMRs and their extraordinary data accumulation over this period, and whether any growing preference for SMR use over the traditional archaeological inventories may be detected? Are researchers becoming more receptive to the possibilities offered by SMR and HER information? Are there any distinctive patterns in the use of SMR information that require further examination in order to assist HER development?

The journals *Britannia* and *Medieval Archaeology* have been selected as representative of the higher level of nationally published academic output within period-theme studies. *Internet Archaeology* has been chosen to represent a new, alternative, type of publication - a refereed online journal. *Northamptonshire Archaeology* has been used to compare the products of local research effort with those intended for a national audience.

For the purposes of this survey, the main text, tables, figures, bibliographic references and footnotes of each eligible article in the journals were scanned for mentions of SMRs (and HERs), the NMRs, and the Royal Commission Inventory volumes. English, Scottish, and Welsh examples were all recorded, but analysis has focused on the English monument inventories. Results are reproduced below, and in Appendix 2.

Note has been made of the character of references to SMR information in order to assess differences in approach. For example, it has been noted whether references to SMRs and the NMR were embodied in the main text, within tables, within bibliographic references or footnotes, as figures, as acknowledgements, or mentioned in relation to archive deposition. The

precise form of references has been noted also, in order to assist the definition of an appropriate standard method to cite source SMR and HER information. Finally, articles that made use of SMR information have been read in detail in order to examine more closely exactly how the information has been used. 1,204 articles were scrutinised for this survey.

3.1.1 Britannia

Britannia, a “journal of Romano-British and kindred studies”, began in 1969. It is published annually by the Society for the Promotion of Roman Studies, the UK’s “leading organisation in the United Kingdom for those interested in the study of Rome and the Roman Empire”. The Society has a wide remit, concerning itself with Roman history, archaeology, literature and art (*Britannia*, Volume XXVII 1996, inside front cover). This remit is reflected in *Britannia*, contributions to which sometimes principally discuss subjects drawn from well beyond the British Isles.

Typically, *Britannia* comprises nine main sections: an editorial (which includes notes for contributors and often an obituary), the main papers, a ‘notes’ section, a section dedicated to brief fieldwork reports of the preceding year and inscription discoveries (“Roman Britain in 1990”, etc.), review articles, shorter reviews, the Society’s proceedings, indexes, and plates at the rear.

For the purposes of this survey, the main papers and notes (with accompanying plates) were examined, as these are the principal academic content of the volumes. These sections provided between 11 and 33 papers per volume. *Britannia* papers incorporate footnotes and, since 1997, ‘Bibliography’ sections have been allowed for each paper.

A graph and table showing the incidence of SMR, NMR, and Royal Commission volume references each year are reproduced below (Figure 15; Appendix 2). 563 papers were examined in 26 volumes, of which 24 (4.3%) refer to SMR use. English SMRs are cited by 21 (3.7%) papers. The respective NMRs are mentioned by 28 papers (5%). And 23 of these papers (4.1%) specifically refer to the English National Monuments Record. The Royal Commission published inventory volumes are

mentioned in 69 papers (12.3%), and 52 papers (9.2%) use information within the English Royal Commission inventory volumes.

Marginally more papers refer to the English NMR than English SMRs, but it is worth examining further the nature of these references. References simply to the deposition of the author's project archives at the NMR or SMRs, indicate awareness and acceptance of these records as research repositories. Archive deposition alone, however, cannot be considered as evidence of the author's research use of the NMR/SMR information in its strictest sense. It may well be that the author had in fact also consulted the NMR or SMRs as part of their research, but where no other reference exists this cannot be proven.

Around 45% of references to the English NMR simply concern the NMR as the eventual resting place of the author's project archive. By comparison, only around 8% of references to separate English SMRs mention that the project archive would be deposited at the SMR. The remainder of references concern SMRs as a source of information for the respective projects. The majority of these references are either embedded in the main text, or appear as footnotes, or are reproduced in tables. A few references to SMR use appear in 'acknowledgements' statements.

In summary, *Britannia* contributors between 1980 to 2005 have shown a clear preference for the use of the published Royal Commission inventory volumes as sources of archaeological sites and monuments information. This is remarkable given their limited number, the incomplete coverage of Britain that they provide, and the ever-decreasing currency of the information they contain. However, it testifies to the respect accorded to them as reliable and authoritative sources of information.

While authors seem to have preferred the English NMR as a final resting place for project archives, it seems to have been less popular than SMRs as a source of research information.

There is evidence for an increase in both SMR use and NMR use by *Britannia* contributors, particularly from 1996 to 2005 (Figure 15; Appendix 2). Typically, contributors have made use of a single SMR, which hints at reluctance to use several SMRs to compile regional and national

information sets. Authors are keener to use multiple volumes of the published Royal Commission inventories in a single article. Many counties, however, are served by a set of published inventory volumes (one for each district), so this need not imply that their users necessarily throw the net wider than the area covered by a single SMR.

Some examples of SMR use are worthy of mention. Davies and Gregory (Davies & Gregory 1991, 65-101) make heavy use of the Norfolk Sites and Monuments Record, alongside excavation archives and information about hoards, to discuss Roman coins and their relationship to the *Civitas Icenorum*. Exceptionally, one *Britannia* article made use of information supplied by at least 13 SMRs and acknowledged the assistance of others who provided confirmation that no similar information was held in their records (Taylor 1993, 209). Confirming and quantifying absence of evidence is an important aspect of research. The use of only one SMR, and references to a single SMR entry or handful entries, often to help define local context of the site under discussion, is much more common (for example, Foster 1989, 147; Penny & Shotter 1996, 360).

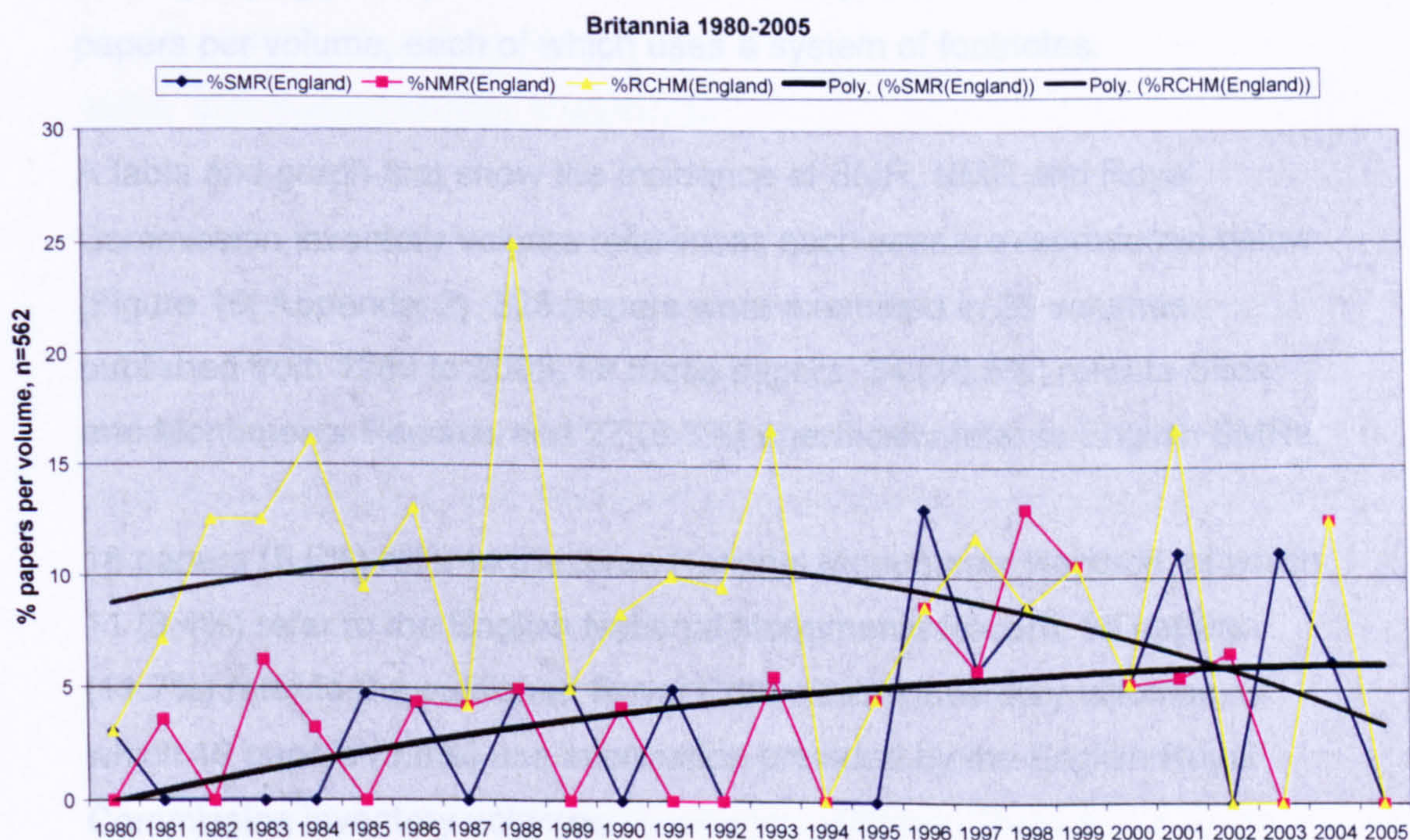


Figure 15. The incidence of references to English Sites and Monuments Records, Royal Commission inventory volumes and the NMR in Britannia. The polynomial trend lines suggest a slight upward trend in SMR use, and a downward trend in the use of Royal Commission volumes. Original in colour.

3.1.2 Medieval Archaeology

Medieval Archaeology is the journal of the Society for Medieval Archaeology. The Society aims “to further the study of the period from the 5th century to 16th century AD by publishing a journal of international standing dealing primarily with the archaeological evidence, and by other means such as by holding regular meetings and arranging conferences” (*Medieval Archaeology*, Volume XLIII, 1999, inside front cover).

Published annually since 1957, *Medieval Archaeology* principally is concerned with the medieval archaeology of Britain and Ireland, but occasionally includes papers whose subjects are drawn from further afield. Typically *Medieval Archaeology* comprises seven sections: the main papers, shorter papers ('Notes and News'), a round-up of fieldwork during the preceding year ('Medieval Britain and Ireland in...'), 'Reviews', 'Short reviews', Society business, and plates at the rear. Indexes to the volumes are published separately.

For the purposes of this survey, the main papers and notes (with accompanying plates) were examined. These provided between 10 and 17 papers per volume, each of which uses a system of footnotes.

A table and graph that show the incidence of SMR, NMR and Royal Commission inventory volume references each year are reproduced below (Figure 16; Appendix 2). 325 papers were examined in 26 volumes, published from 1980 to 2005. Of these papers, 34 (10.5%) refer to Sites and Monuments Records and 27 (8.3%) specifically refer to English SMRs.

18 papers (5.5%) refer to the three National Monuments Records, of which 11 (3.4%) refer to the English National Monuments Record. 38 papers (11.7%) refer to the published Royal Commission inventory volumes, of which 19 papers (5.8%) use information provided by the English Royal Commission inventory volumes.

Medieval Archaeology contributors between 1980 and 2005 show a marginal preference for the use of the Royal Commission Inventory volumes over Sites and Monuments Records. However, references to English Sites and Monuments Records are more frequent than references

to English Royal Commission Inventory volumes. References to the three National Monuments Records are not as frequent as either of the other monument information sources.

There is evidence for a strong increase in English SMR use from 1980 to 2005, and evidence that the use of Royal Commission Inventory is levelling off (as illustrated by the respective polynomial trend lines; Figure 16). This is entirely in accordance with their loss of currency and comprehensiveness with each passing year. The relative paucity of NMR references over that time is surprising.

The apparent preference for SMRs is further exaggerated when we consider only those references to the use of information, and exclude references that only concern the deposition of the author's project archive.

Only around 7% of references to individual English SMRs concerned archive deposition. By comparison, 75% of the references to the English NMR concern deposition of the author's project archive.

The majority of references to SMR information are to be found in the main text, or within footnotes, or tables. There are a few mentions of SMR use within 'acknowledgements' statements.

Typical references to SMR information within *Medieval Archaeology* articles involved its use in introductory or concluding contextual discussion. Haslam (1980, 67), for example, invites readers to examine volumes of the Victoria County History for Wiltshire (published 1957) for a description of local Roman remains, and the Wiltshire Sites and Monuments Record "for later discoveries". References to single 'sites' or monuments (Ayers, Smith & Tillyard, 1988, 184) and artefacts (Blackburn & Rogerson 1993, 222) also occur. Richards, Jecock, et al (1995, 68) acknowledge information provided by the Derbyshire Sites and Monuments Record in their discussion of the Viking barrow cemetery at Ingleby. There was a single reference to an Urban Archaeology Database (the City of Lincoln; *Medieval Archaeology* Volume XLI, 223). No contributors appear to have used more than one SMR in the preparation of their articles.

Some impression of the perceived value of SMRs to medieval studies was gained in a different kind of article. In their recommendations to the Historic Buildings and Monuments Commission (English Heritage), the Society for *Medieval Archaeology* (1987, 7) included the significant statement that: "A high priority should be given to survey work (including that carried out by the Royal Commission on the Historical Monuments of England) and to the enhancement of county Sites and Monuments Records" (Society for *Medieval Archaeology* 1987, 7).

I am reluctant to suggest that medievalists tend to be more adventurous in their data gathering, and more receptive to newer sources of information than Romanists. The proportionally greater use of SMR information by *Medieval Archaeology* contributors in comparison with *Britannia* contributors could be explained simply by the slightly wider scope of the latter publication. *Britannia* is less exclusively dedicated to archaeological evidence; articles frequently primarily consider written evidence and art history subjects.

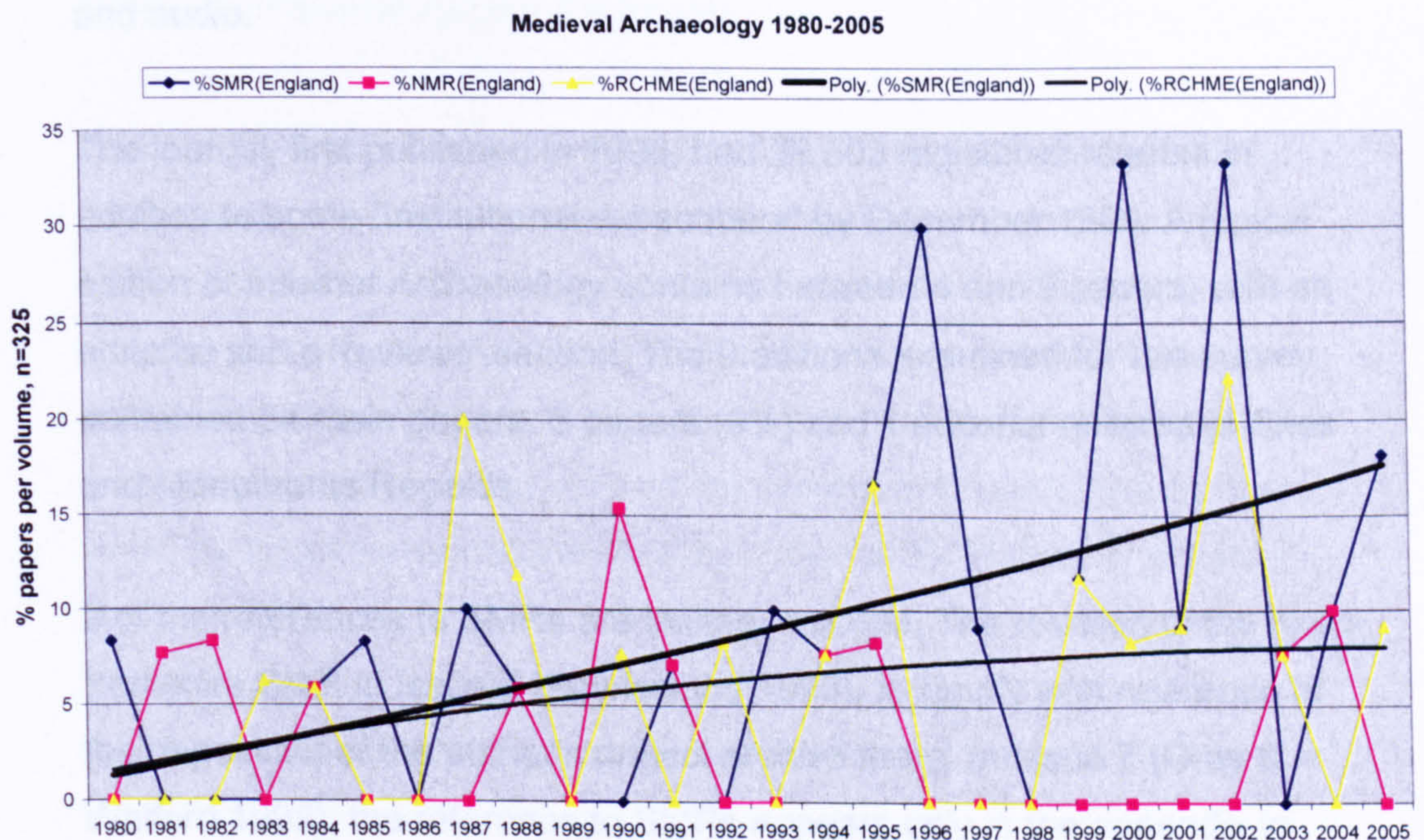


Figure 16. The incidence of references to English Sites and Monuments Records, Royal Commission inventory volumes and the NMR in *Medieval Archaeology*. The upward trend of SMR references is notable. Original in colour.

3.1.3 Internet Archaeology

Internet Archaeology is the first fully refereed online archaeological journal. It is published twice a year under the management of the British Academy, Council for British Archaeology, and the Universities of Durham, Glasgow, Oxford, Southampton and York. It is hosted by the Department of Archaeology at the University of York.

Internet Archaeology has a very wide remit. Papers may consider virtually any archaeological subject in any part of the world, and theoretically may be presented in any World Wide Web-transmittable language. The emphasis, however, is on papers of high academic content (albeit without excluding wider public interest), and particularly papers that make use of digital and Web-supported features that cannot be achieved in traditional publication. Contributors are asked to make databases of primary data available for analysis, and are encouraged to embed multimedia features within articles, such as links to other Web sites, Geographic Information Systems or Computer Aided Design maps and diagrams, or even video and audio.

The journal, first published in 1996, had 26,603 registered readers in addition to some “institutional subscribers” by December 1999. A typical edition of *Internet Archaeology* contains between 4 and 9 papers, with an editorial and a ‘reviews’ section. The 9 editions examined for this survey contained 54 main papers. 5 papers (9%) and 1 editorial referred to Sites and Monuments Records.

2 of the references to SMRs are limited in scope. The mention of the North Yorkshire SMR in Issue 5 (Powlesland 1998), is simply with reference to the deposition of the author’s project archive there. In Issue 7 (Gray & Walford 1999), the reference to SMRs appears only in the appendix in relation to the development of the ExeGesIS SDM HBSMR software. Gaffney and Exon (1999), however, refer to the creation of a networked collaboration between Birmingham University Archaeological Field Unit and both Shropshire SMR and the City of Birmingham SMR.

An article by Powlesland et al (1997) wholly concerns the ways in which a variety of remote sensing techniques employed for the West Heslerton

parish survey have been used to enhance the holdings of North Yorkshire Sites and Monuments Record.

Hunter-Mann et al (2000) employ edited SMR information on a 'clickable' distribution map in order to discuss the local context to archaeological excavations at the walled Roman settlement at Brough-on-Humber. Clicking on an SMR point on the map locates a brief text description with accompanying SMR reference, which itself is hyper-linked to the article's glossary. Here the term 'SMR' is explained by the authors and contact details for the East Riding SMR are displayed.

It is very encouraging to see references to SMRs and information held by them taking a notable place within a new publishing initiative. Although it must be acknowledged that many papers in *Internet Archaeology* primarily concern UK subjects, it is nevertheless reassuring that notice of SMR use is reaching an international audience.

3.1.4 Northamptonshire Archaeology

Northamptonshire Archaeology is published by the Northamptonshire Archaeology Society, which was founded in 1974 from the Northamptonshire Federation of Archaeological Societies. The Society "aims to promote an informed appreciation of the county's rich archaeological heritage through lectures and field visits, and to seek to provide an effective public voice in the interest of the archaeology of the area" (*Northamptonshire Archaeology*, Volume 28, 1998-9, inside front cover).

All 19 volumes of *Northamptonshire Archaeology* published between 1980 and 2005 were examined for the purposes of this survey. A typical volume comprises the main papers, a 'Notes' section, and a summary of fieldwork during the preceding year ('Archaeology in Northamptonshire...'). The latter was excluded from the survey to enable valid comparison of content with the national journals examined above. Between 4 and 20 eligible papers were contained within each of the volumes examined, providing a total of 200 papers (Figure 17; Appendix 2).

42 papers (21%) make reference to the Northamptonshire SMR. The only reference to another English SMR is a single mention of the Nene Valley Research Committee SMR, which formerly overlapped with part of the area covered by Northamptonshire SMR. 17 papers (8.5%) refer to the English National Monuments Record. These references predominantly are in relation only to the deposition of the project archive at the NMR (around 72%). Only around 15% of the recorded Northamptonshire SMR references pertain to the deposition of the project archive at the SMR. *Northamptonshire Archaeology* does not use a footnotes system and there are no bibliographic references to the SMR. The majority of the SMR references are contained within the main body of the text, and some are contained within tables. A few mentions of the SMR are contained within 'acknowledgements' statements.

Contributors to *Northamptonshire Archaeology* not only refer to single sites or monuments recorded by the SMR (for example, Shaw 1984, 74; Brown & Meadows 1997, 186), but often provide a contextual background using a range of SMR information from the environs of the site (or sites) under discussion. Occasionally this information is represented by multi-period distribution maps (for example, Hall 1980, figure 1; Ford 1995, figure 1). Gibson and McCormick (1985, Figure 26) use SMR information to analyse the distribution of prehistoric ritual/communal and funerary monuments along the Nene Valley. An examination of early iron smelting in the county also drew heavily on SMR information (Bellamy, Jackson & Johnston 2001, 103-124)

This type of heavy reliance on SMR information as the primary material for analysis was not frequent in the national journals.

The higher rate of SMR use by contributors to *Northamptonshire Archaeology* than is evident in the national journals, is worthy of comment. A considerable percentage of the contributions to *Northamptonshire Archaeology* are written by archaeologists who have undertaken a lot of work within the county. Some of these are employed by the County Council, and therefore might be expected to have greater appreciation of the SMR as an essential source of local information. Many of the articles concern development-led archaeological work instigated by Northamptonshire's curatorial archaeologists.

The SMR use rate is encouragingly high despite the availability of relatively recent (published during the 1980s) Royal Commission inventory volumes for the county. These have been copiously referenced over the years (80 papers, 40%) although, in contrast with the significant upward trend in the use of SMR information, there is evidence for a downturn in their use (Figure 17; Appendix 2).

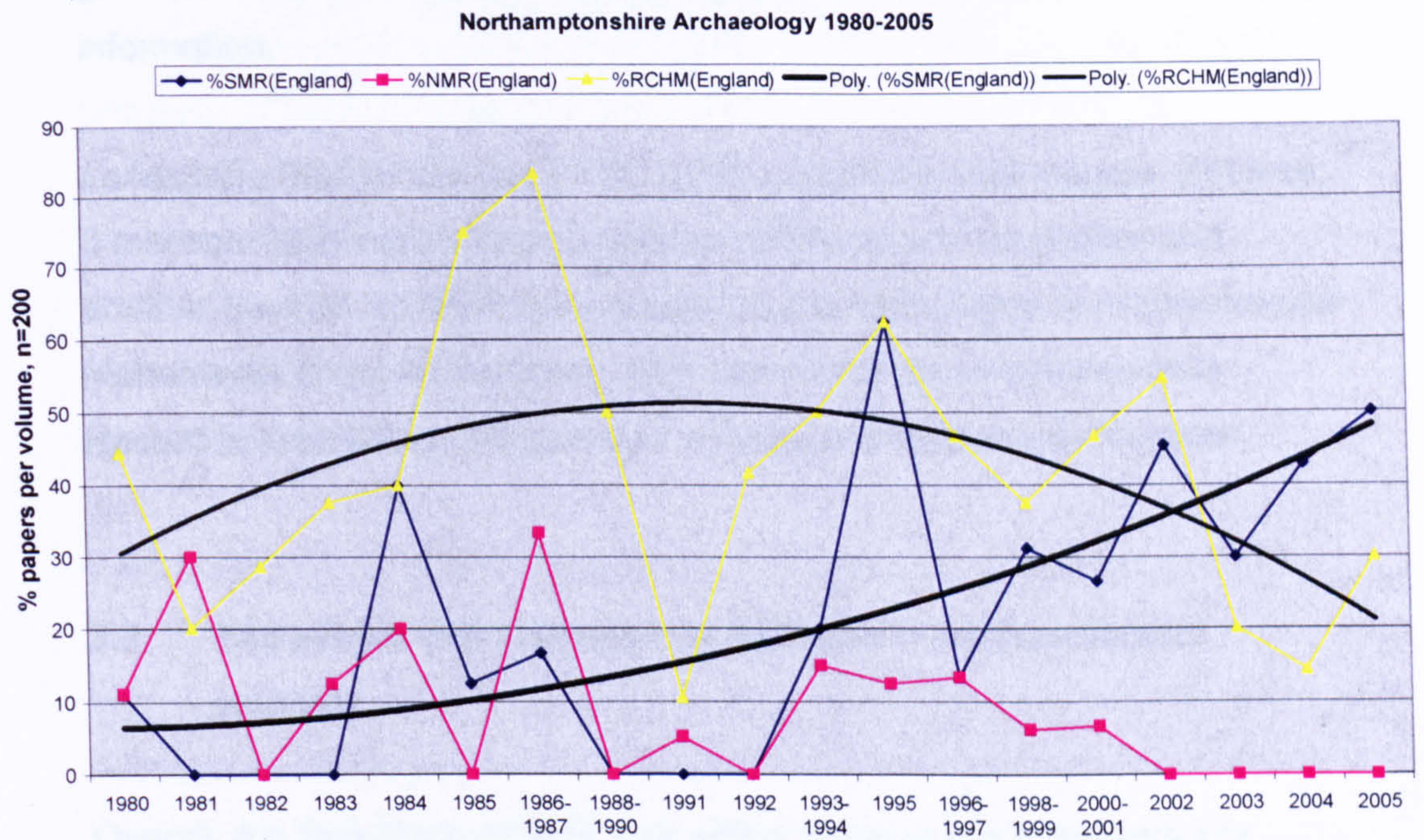


Figure 17. The incidence of references to English Sites and Monuments Records, Royal Commission inventory volumes and the NMR in Northamptonshire Archaeology. Original in colour

3.1.5 Other journals

By way of comparison, recent editions of 5 more journals were examined. The *Proceedings of the Prehistoric Society* volume 71 (2005) contains 13 relevant papers, one of which drew on SMR/NMR type information (the Isle of Man National Monuments Record). Three papers reference Royal Commission inventory volumes.

The 2 volumes of *Landscapes* published in 2005 contain 11 main papers, 2 of which cite Royal Commission volumes. One paper mentions a 'Historic Environment Record' (Northamptonshire).

The *Medieval Settlement Research Group Annual Report* for 2005 contains 4 papers (from 14) that mention SMR and HER information. There is 1 reference to the use of NMR information and no references to Royal Commission volumes. 3 of the papers (2 of which concerned post-graduate research) imply comparatively heavy use of SMR or HER information.

Landscape History Volume 27 for 2005, contains 6 main papers. Of these, 3 mention SMR information (2 mention HERs as well as SMRs) and another mention an NMR-type resource - the official Map of Archaeological Monuments of the Netherlands. One use of a Sites and Monuments Record is erroneously attributed to a 'Sites and Monuments Register'.

3.2 The extent and character of SMR use in archaeological journals

Overall, the frequency of SMR use within these journals appears low. However, the journals cover a wide range of topics. SMR information varies between potentially highly relevant and irrelevant across this topic range. Furthermore, there is no doubt that the number and character of references to SMRs in the published articles somewhat under-represents the actual contribution that SMR information has made to this kind of research output. There is good reason to believe that authors have made greater use of SMR services, either directly or indirectly, than has been acknowledged formally.

Many of the journal articles are a result of development-led fieldwork, much of which was inspired by archaeological planning advice, based primarily on the appraisal of SMR information. The role of SMR information in the initial appraisal of the archaeological potential of sites is very seldom acknowledged, however, in the finished articles. 'Curatorial' archaeologists and SMR information may have inspired the fieldwork, but this kind of

implementation work was not part of the project for which the articles' authors themselves had responsibility.

This is well illustrated by one *Medieval Archaeology* article concerning a Viking burial discovered during the course of sewer works. The authors state that "an initial environmental screening report for the sewer development area identified archaeology as an environmental issue likely to be affected by the scheme". They go on to state that "a programme of mitigation for the sewer pipeline was agreed with South Yorkshire Archaeology Service" (Speed et al 2004, 51-52). Both the initial screening process and subsequent definition of a mitigation strategy must have involved scrutiny of the Sites and Monuments Record and/or the National Monuments Record. And yet their use is not mentioned anywhere in the article. Many articles that mention the role of Northamptonshire's curatorial archaeologists, for example, in setting briefs, monitoring fieldwork and providing information and advice, make no specific mention of the SMR.

There are well-established methods for implementing archaeological projects (including final publication in one form or another) through the planning process, and in response to other potential threats (Chapter 1, section 1.2). An increasing volume of threat-led projects culminate in a note or article within national and regional publications. There must now be a case for making sure that the contribution of the relevant curatorial archaeologist and SMR/HER to the success of a project is properly acknowledged in final publications, even if this contribution took place only at the early implementation stages.

Proper recognition of HERs and curatorial services generally could be encouraged through the established approval mechanisms centred on the Written Scheme of Investigation (WSI), which is submitted towards the discharge of *PPG16* planning conditions and Section 106 agreements (Department of the Environment 1990, para. 30). WSIs could contain publication stipulations that require specific acknowledgement of these services. These stipulations would then be enforceable under English planning law, albeit as one of the smaller components of developers' archaeological obligations. Non-compliance with such stipulations is not likely to bring about planning enforcement action, but the potential threat of

enforcement, or non-discharge of planning conditions, is often enough to bring about compliance.

There is also reason to believe that the use of the SMR as an index to publications and grey literature cited by authors, is not at all well reflected in published articles. Authors naturally choose to cite the primary source of information in preference to the inventory that led them to the primary source. SMRs have been treated in much the same way as a library catalogue – a mere source of references, mention of which is considered irrelevant to the final report. Similarly, there were very few references to SMRs' role in establishing evidence of absence or absence of evidence when discussing contextual and comparative sites.

The wider recognition of the SMR as a research tool has been inhibited by its transparency as an enabling resource and a path to more comprehensive information. The greater use of conditional licenses for the release of SMR/HER information to users might be one further mechanism to promote greater awareness of their research role. License clauses that require researchers to acknowledge the use of SMR/HER services in their publications will increase references to them, and should help to improve perceptions of their value among the research community. Of course, strict enforcement of such license clauses is likely to be very difficult to achieve in practice. Future denial of information on the grounds of a user's previous failure to properly acknowledge the source of information is not likely to be justifiable under Local Authority information access policies. In any case, such a step would be counter productive. Nevertheless, the suitable prominence of such license clauses should encourage some compliance.

The uneven status of SMRs as repositories for project archives is well reflected in the paucity of references to this SMR function in the journal articles read during this survey. Some SMRs accept project archives (paper and/or digital copies), but most usually limit their holdings to copies of external organisations' project reports, or correspondence, notes and photographs, etc. deriving from their own activities (Baker 1999, 16). Established guidance generally discourages SMRs from accepting materials, paper or digital archives unless allied with the facilities to curate them properly (Ferne & Gilman 2000, B.4.1; *ibid*, B.11). Instead, it encourages deposition with other suitable repositories (English Heritage &

Association of Local Government Archaeological Officers 2002, section 2.3). Facilities such as registered museums and archive centres ought to be better equipped to deal with the long-term curation of such archives. References to archive deposition at HERs may well decline in future years as a result of this guidance. However, this is hardly likely to affect the total number of references to HER use found in future journal articles, as their use as information sources continues to rise.

One more factor that is likely to have caused the under-representation of the research use of Sites and Monuments Records is the time-lag between fieldwork implementation and the production of a report in a refereed journal. Many of the articles published in the 1980s (even into the 1990s), for example, concern projects undertaken long before the effective implementation of many SMRs. Many articles have been written by a generation of archaeologists who have not habitually worked with SMR information. Articles published in the first five years of the twenty-first century often reflect work undertaken in the previous decade. The time-lag issue is exemplified by the very few mentions of the term 'Historic Environment Record', all of which occur in 2005 editions, despite the fact a growing number of SMRs have changed their names since 2002.

This survey, therefore, may have produced a slight impression of conservatism in both the quality and quantity of SMR research use in recent years. Future surveys of SMR and HER use contained within post-2005 publications will help to address this issue.

Given the factors described above, the increasing volume of SMR references in publications over the last twenty-five years is all the more impressive. Both the traditional national journals and local proceedings demonstrate a marked upward trend in SMR use by researchers. By contrast, there is evidence for some levelling off in the use of Royal Commission area-based inventory volumes in both national journals and a downward trend in Northamptonshire (Figure 15; Figure 16; Figure 17; Appendix 2). This must reflect the increasing obsolescence of their information content, although the continuing preference for these works (over both the NMR and SMRs) by many authors is a tribute to their enduring quality, accessibility and general credibility as research tools.

Although not recorded formally as part of this study, the popularity of non-Royal Commission gazetteers, the Victoria County History volumes, local journal articles, and the Ordnance Survey period maps was noted. Sometimes such sources were preferred to NMR and SMR references, even though these should have been able to provide far more up-to-date and comprehensive information.

A few notable examples of the non-use of SMR information are worth mentioning. An article in the *Medieval Archaeology* volume for 1997 that dealt with the reuse of prehistoric and Roman monuments in early Anglo-Saxon burial practice, contained the declaration that it was based upon “a thorough review of national and county journals”. The author acknowledged that “Many of the older sites are to be found in Audrey Meaney’s gazetteer [of early Anglo-Saxon burial sites, published in 1964] but numerous new cases of the practice have been identified in the last 35 years...” (Williams 1997, 28). A set of distribution maps based on this information was published. The article does not appear to draw upon either SMRs or the NMR, both of which might be expected to provide much more up-to-date information.

Another article in the same volume presents “A Map of Mottes in the British Isles”, and includes the statement that “no distribution map, particularly of monuments over a wide area, can ever be considered complete, even if the lists for each region were all totally reliable”. This is perfectly true, but some distribution maps are more complete than others. This article does not apparently make use of either SMRs or the NMRs, both of which ought to be able to supply up-to-date and reliable information for a substantial portion of the British Isles.

Dark’s (1992) consideration of the evidence for a “sub-Roman re-defence of Hadrian’s Wall” makes no use of the NMR or SMRs in a study that also includes an appraisal of 5th and 6th century activity at Roman forts throughout the north of England and Wales.

Authors who might have used SMR or NMR information, but who did not do so, are not necessarily to blame or negligent of course. There may be perfectly sound reasons for preferring other choices in each case. The lack of appropriate resources provided for researchers by SMRs and the lack of

completeness of SMR holdings, particularly during the first twenty years, have provided justifiable grounds for avoiding multiple SMR searches (Chapter 1). It will become increasingly difficult to defend the lack of use of HER information for such studies in the future.

Very few authors who have made use of SMR information seem to make use of more than one SMR at a time. None of the articles in *Northamptonshire Archaeology*, for example, refer to neighbouring SMRs, with the exception of one that mentions the overlapping (former) Nene Valley Research Committee SMR. Other sources tend to be preferred for comparative evidence when this is drawn from further afield than the 'home' SMR coverage. This suggests that even where SMRs are well appreciated as a parochial source of information, they are not necessarily readily used as part of a network of relevant regional information. Again, no great blame for this may be apportioned to researchers who have been confronted with the complexities of variable service delivery and information content described in Chapter 1. The non-use of SMR information in research that could clearly benefit from it is extremely disappointing nonetheless.

The Hunter-Mann et al (2000) article for *Internet Archaeology* represents an important step in the research use of SMR and HER information. Copious use of SMR information is made to provide a contextual framework for the study. More importantly, the information is available in a digital and interactive form that facilitates its closer scrutiny and re-evaluation by the reader.

In conclusion, this survey has demonstrated an awareness of SMRs at a high level of archaeological research endeavour. It has encountered some good examples of the meaningful use of SMR information and good evidence for the increasing use of SMRs by publishing researchers over a twenty-five year period. The extent of SMR use is much lower than is desirable, however, and there remains obvious scope for greater and more creative use of HER information among publishing researchers in the future. Nevertheless, SMRs have gained a significant foothold at a high level of archaeological research, from which more ambitious steps may be taken in their transformation to HERs.

Finally, the relative ease with which a targeted literature survey of this kind could be undertaken in the future is worthy of comment. Papers and articles in any digital form capable of supporting keyword searches allow a plethora of simple enquiries and self-indexing to be efficiently and accurately implemented by the reader. Digital papers produced in indexed and tagged mark-up languages (Chapter 5) allow authors and editors to offer pointers to important references and source data which can then be almost instantly re-assessed by the reader (Richards 2006, 971-975).

At the time of this survey, none of the journals (with the exception of *Internet Archaeology*) were Web browseable. Since then *Britannia* volumes from 1970 to 2003 have become available via subscription to JSTOR, a not-for-profit online repository for academic journals (<http://uk.jstor.org/about/desc.html>). Reading the journals for this survey produced many interesting and enjoyable diversions and much information which is useful for other purposes, but it took a very long time.

3.3 A survey of SMR use in studies towards academic qualifications

This sample survey of student dissertations and project essays has been undertaken in order to gain an impression of SMR use within formal post-graduate, undergraduate, and sub-degree level ('A' level and University Board of Continuing Education certificate) courses. The purpose of the survey was not to analyse the frequency of SMR use amongst students over a period of time, but rather to obtain an impression of the use to which SMR information was put whenever it formed an acknowledged part of a student's work towards their qualifications. The secondary purpose of the survey was to examine differences between student SMR use and its use by more established professionals and academics for the production of articles in period and regional interest archaeological journals (section 3.2). The results, like those of the preceding survey, will help to inform proposals for the development of Historic Environment Record services.

All of the examined student dissertations and theses were visually scan-read for occurrences of the words 'Sites and Monuments Record' (and 'SMR'), 'National Monuments Record' (and 'NMR'), 'Royal Commission'

(and 'RCHM'), 'Victoria County History' ('VCH'), etc. using the same method employed for the journal survey described above. The term 'Historic Environment Record' was not in use before the survey period. Particular emphasis was placed on the examination of 'acknowledgements', 'bibliography', 'references', 'sources', sections, and methods statements and figures – particularly distribution maps. All the dissertations that were examined are cited in Appendix 3.

3.3.1 Sub-degree level qualifications

A small selection of student projects, comprising 'A' Level projects and extra-mural University archaeology certificate courses, were examined for their use of SMRs. All had been submitted to the holdings of Peterborough City Council SMR or Cambridgeshire County Council SMR by their authors. As such, they are of course a biased sample in that the authors clearly have an awareness of SMR services. As stated above, however, the purpose of the study was not to measure the awareness of SMR services among this user group, but rather to examine how the SMR information had been used where it formed an acknowledged part of students' research efforts.

The students' works derived from two principal sources: full and part-time courses in 'A' level archaeology run by the Peterborough Regional College and archaeology certificate courses run by the Cambridge University Board of Continuing Education.

Archaeology courses offered by the Cambridge University Board of Continuing Education operate within the national Higher Education Credit Accumulation and Transfer Scheme. Credits awarded for a course may be earned towards Certificates, diplomas, undergraduate degrees and Master's Degrees. All the following information derives from the *University of Cambridge Continuing Education Tutor Manual* (Public Programmes Division 1997).

Study under this scheme is expected to involve (among other things), "identification and use of key texts and up-to-date sources of information". Courses may require the submission of one or more written assignments

as a means of assessing student progress, although it is noted that for adult students other forms of assessment (such as specific problem-solving tasks integrated with class sessions or field trips) are often better than home-based study. Written projects typically are of 1,500-2,000 words in length for 10 credits, and 4,000-5,000 words for 20 credits. The first year of undergraduate study is considered to be worth around 120 credits. Acceptable themes for the written assignments are set by the tutor (i.e. the tutor provides a choice of titles, or general subject areas), but this usually still leaves the student flexibility in defining suitable specific subjects for discussion and choice in the sources used.

Subject-specific assessment criteria for archaeology includes investigating students' "ability to set the chosen topic within its broader context and provide comparison with other places, periods, or methods; ability to initiate further inquiries on the topic and to locate, interpret and evaluate practical archaeological methods, site reports, theories, artefacts, maps, plans, etc."

Marking guidance requires Distinction-level work to display (among other things) "appropriate and perceptive reference to relevant academic sources", and pass level requires "reference to a reasonable range of relevant academic sources". The use of SMR-derived information easily qualifies as a relevant source of archaeological information for the purposes of assessment.

The nature and extent of SMR use for each student project examined as part of this survey is summarised in Appendix 3, where a Bibliography of student work referenced in this section may be found.

All the projects, by definition, made use of SMR information, but none used more than one SMR. The preferred way of referencing SMR use is via acknowledgements to SMR staff or SMR services within an 'acknowledgements' section, rather than citing sources within 'references', 'sources' or 'bibliography' sections. Most quote the SMR primary record numbers, and SMR derived information often appears in tables (or as full as partial extracts) and on distribution maps. The students have tended to make some methodological statements about their SMR use in order to

demonstrate their research techniques to their assessors. Some specific examples of SMR use are worthy of more detailed description.

In the consideration of the archaeology of an entire parish submitted for towards an 'A' Level archaeology qualification, for example, a student declares that the SMR information was used "as a starting point, and...the basis of this work". He goes on to state that "the [SMR] printouts, distillation of earlier work, give an excellent indication as to the nature and interpretation of sites and artefacts. In addition, they have acted as an indicator for the author's further research both in the field and with documents" (Fleet 1992, 5). The SMR appears in the bibliography, and there are frequent references to SMR recorded sites in the text – although no SMR reference numbers are quoted. Period-theme parish maps ('prehistoric', 'Roman', 'medieval') produced by the student, draw heavily on SMR site information, but do not incorporate SMR reference numbers.

The study of an earthwork site and its landscape context submitted for a Cambridge University Board of Continuing Education Certificate Course, quotes SMR reference numbers within descriptions of sites and mentions the relevant SMR within the 'abbreviations' section, but not 'bibliography' sections. A single SMR is used, and other sources are preferred to obtain examples of comparable monuments from further afield (Weald 2000).

A churchyard gravestone survey (submitted for an 'A' Level qualification) mentions SMR use under a section describing survey methods, acknowledges the assistance of SMR staff, and reproduces SMR summary records as an appendix (Baruah undat). A fieldwalking project (also submitted for an 'A' Level qualification) follows a similar pattern of SMR reference. SMR information has been used (along with information from an RCHME inventory volume) to provide a local context for the retrieved remains. A visit to the SMR is mentioned in the introduction to the work, the assistance of staff is acknowledged, and SMR reference numbers are quoted throughout the text (Baruah 1999).

Finally, one submission illustrates the potential pitfalls of study when SMR representation of the subject matter is incomplete.

A written submission for a Cambridge University Board of Continuing Education Certificate in Archaeology (credits from which form part of the Credit Accumulation and Transfer scheme, and which therefore count towards undergraduate degrees), examines a recently discovered Fenland earthwork site thought to be a possible Roman port (Davies 2001). The author cites two authoritative published surveys (Phillips 1970; Hall 1987) as the principal sources for the local archaeological context of the earthwork site. The assistance of staff who work with Sites and Monuments Records is acknowledged, but the only specific reference to an SMR occurs within the bibliographic reference to an unpublished 'A' Level manuscript held by Cambridgeshire SMR. It is not clear, therefore, whether an SMR database search was actually carried out.

The earthwork site falls near the border of two SMR regions, and both SMRs hold a considerable amount of information pertaining to the archaeology of the site environs. Both are more up-to-date than the inventories contained within the published survey volumes that were used for the study. Both SMRs could have been used to search for local examples of comparable sites, particularly through comparison of aerial photograph plots. Indeed, a prime objective of the study was to define the monument's type in order to help provide justification for Scheduled status.

The student's interpretations of the function of the site in question are considered conscientiously in relationship to the history of an adjacent relict river channel ('roddon') and local fen environmental changes throughout time, both of which are represented admirably (both graphically and in narrative) in Hall (1987). Was this watercourse active in Roman times? Was it brackish and tidal or a freshwater stream? Was the site itself on dry land or under marsh or lagoon conditions at this time? All of these questions are crucial to the interpretation of the site.

However, the traditional monument-based structure of Sites and Monuments Records does not lend itself to recording this type of information. There are no SMR recording standards for ancient environment interpretations. Consequently neither of the SMRs adequately represented these aspects of the ancient environment and landscape (for example, compare Figure 38 and Figure 40) . Indirect links to the crucial sources of information are supplied only via SMR entry references to those

archaeological sites located during the Fenland Project survey (Hall 1987). There are no specific references dedicated to the sources of mapped palaeoenvironmental information alone, or entries that deal specifically with these interpretations. Therefore, without the advice of suitably knowledgeable SMR staff, or a lucky encounter with the correct literature at a local studies library, the necessary information easily could have been missed by many students.

In my experience, archaeological contractors and consultants who have no background of research in the region, tend to neglect the Fenland Project palaeoenvironment maps, even after having been supplied with SMR records pointing to this vital source, unless I draw specific attention to them. It is simply not possible to understand and interpret the distribution of site information in this region for any purpose without at least some idea of the extent of the wet and dry parts of the fen at various times in history, and an understanding of how blanketing peat and alluvial deposits may have masked remains (Chapter 7; Figures 35-40).

The student in this case was much better informed and more knowledgeable than many. He had already made copious use of SMR information for an earlier ('A' Level) study that considered the archaeology of a whole parish. The comparison of site data produced by a past landscape survey (the Fenland Project), and that held by the local Sites and Monuments Record, formed a key part of the project aims (Appendix 3; Davies 1999, 4). A section describing data collection methods notes that Cambridgeshire SMR staff "could not have been more helpful". SMR numbers are quoted in text descriptions of site evidence, and an extract from an SMR base map is reproduced as a figure. There is a figure labelled "SMR User's Guide" (Davies 1999, 4) and SMR entries, along with a Scheduled Monument record, are reproduced in full.

3.3.2 Undergraduate SMR use

The output of postgraduate and undergraduate students, from a variety of study programmes offered by the University of York's Department of Archaeology, was assessed for the second case study (Appendix 3).

The Department of Archaeology is well-established, and at the time of the survey had recently achieved a perfect score in its Quality Assurance Agency subject teaching review. Archaeological study at York focuses on the archaeology of the last 2,000 years, archaeological science, and archaeological heritage management. The following information regarding study programmes and assessment methods is drawn from the Department of Archaeology's web pages (<http://www.york.ac.uk/depts/arch/>).

The department offers four undergraduate archaeology courses (BSc Archaeology, BA Archaeology, Archaeology with Education, and a combined Archaeology/History degree). The Archaeology BA and BSc courses include core course elements such as studies of the 'City of York', 'An Introduction to British Archaeology', 'Field Research Procedures', 'Introduction to Archaeological Science', 'Modern Archaeological Interpretation', 'Settlement and Economy' and 'Death and Burial'. Thereafter, the courses diverge to include relevant specialist themes, such as industrial archaeology, medieval archaeology, urbanism in Britain, or analysis of human and animal remains.

Undergraduate study programmes within the Department of Archaeology aim to equip students with, among other things, "an ability to analyse, question and criticise"; "skills in literature searches and use of library resources"; "facility in the use of Information Technology, including information retrieval from electronic resources". The use of SMR and HER services has an obvious relevance to the acquisition of these skills.

A dissertation that counts towards 15% of the total marks for the degree award is submitted in the final year. This should be a "substantial piece of independent research of the [student's] own choosing". The dissertation may consider broad theoretical themes, take a regional emphasis, or may focus on a single site, or building, or include the scientific analysis of excavated material, etc. Guidance notes for grading degree dissertations as 'first class' declare that "contextual and site specific evidence will be deployed in order to support and develop the writer's argument, and will be deployed with a vigorous sense of relevance". The attainment of lower grades still requires the deployment of some source data. The use of SMR and HER information, therefore, is suited to the fulfilment of dissertation

requirements, and to support other tasks throughout the course of study, such as assessed lectures, seminars, and essays.

For the purposes of this case study, dissertations produced for undergraduate study during 2001 were obtained from the collection retained at the Department of Archaeology. All dissertations from all archaeology degree programmes were examined for evidence of SMR or NMR use. The use of other inventories, such as the various published Royal Commission inventory volumes, was also noted.

The 31 dissertations produced during 2001 were examined (Appendix 3). Of these, 29 made no apparent use of SMR information. But with such a broad range of potential topics available to the students, it is perhaps not surprising that the frequency of SMR and NMR use is low. 8 of the dissertations that made no apparent use of SMR or NMR information comprised the scientific analysis (or review of scientific analysis) of environmental evidence or faunal remains assemblages. While SMRs or NMRs may have been used to search for 'sites' or 'events' that might have produced comparative evidence for the studies, students were clearly able to satisfy the need to provide contextual information by direct reference to other published sources. Presumably dissertation supervisors, library catalogues, or Internet searches, directed the students to these sources.

6 dissertations considered archaeological theoretical standpoints as their primary subject (portrayals of medieval childhood, feminist archaeology, structuralism, archaeology and the media, etc.), and as such were probably naturally less reliant on the gathering and analysis of primary site or monument data. None of these dissertations cited any archaeological monument inventories.

3 more dissertations that made no apparent use of SMRs or NMRs were focused on the study of buildings (features within parish churches, castles, and collegiate buildings). For these studies, sources such as the Royal Commission volumes, Victoria County Histories, and Pevsner ('Buildings of England' series) were preferred.

Similarly, another dissertation concerning medieval funerary effigies used Pevsner to obtain a representative sample rather than SMRs or the NMR.

And another that investigated symbolism in grave designs in a small sample of churchyards, did not draw on any monument inventories.

The absence of SMR or NMR use in studies concerning the distribution of two types of well known stone monuments is more striking. Both studies relied on previously published catalogues and distribution maps. Similarly, secondary sources were preferred for 2 dissertations that discussed and produced catalogues of specific artefact types. Also notable was the lack of SMR or NMR use within studies that examined a specific monument within its local archaeological context. One concerned settlement patterns in a defined geographic area (an historic atlas, Ordnance Survey maps and Royal Commission volumes were referenced instead). Another that examined the growth of a modern industry within a well researched historic industrial area. This latter, however, did acknowledge the assistance of the staff of local archaeological services, who drew the author's attention to unpublished archaeological investigations etc. This is the sort of evidence that could easily have been obtained from a formal search of the SMR holdings, as well as through the helpful intervention of staff with detailed knowledge of local discoveries.

2 dissertations made substantial use of SMR and NMR information (Appendix 3). Both of these may be described as studies that considered a range of multi-period archaeological evidence within a defined geographic area. The information they used conforms to the popular catch-all 'area' SMR search strategy described in Chapter 2.

One of the authors acknowledges the assistance of SMR and NMR staff. Both produced distribution maps using SMR or NMR data, but neither reproduce the SMR primary reference numbers on these maps. Indeed, only one study uses the NMR/SMR primary record numbers in text, tables or catalogues. Both students describe something of the search methods they employed to gather the information. One includes a reference to both the English NMR and one English SMR in a bibliography/reference section.

One of the students obtained site information via the Archaeology Data Service's online 'ArchSearch' facility (Chapter 5). Some apparent confusion in the origin of the information is revealed by the different ways

that the student references the records. The acknowledgement statement refers to the “National Monuments Archive”. “National Monuments Records” appears in text describing methods, and there are further references to “National Sites and Monuments Record number...”, “National Monuments Record number...”, “Scheduled National Monument number..”, and “Scheduled National Monument Record number...”. In fact, examination of the quoted reference numbers within the ADS catalogue reveals that the most of the information derived from the Northumberland Sites and Monuments Record.

To increase the study sample, 4 more undergraduate dissertations were selected from the collection held at the Department of Archaeology on the basis of their use of SMR or NMR information. These did not date to 2001. They appear in the summary table (Appendix 3). All the dissertations primarily consider a specific monument type or form of archaeological evidence within a defined geographical area.

All students acknowledge the assistance of SMR or NMR staff, but none of the dissertations contain references to the inventories in the bibliography or references sections of the dissertations. All authors use only one SMR or NMR service, and most quote original primary reference numbers. SMR information tends to appear in summary tables or catalogues, although one author reproduces an extract from an SMR entry. Distribution maps that make use of SMR information figure in two of the studies.

One author includes a very comprehensive discussion of the potential bias inherent in the SMR information. Although this is exceptional in terms of its level of detail, most of the undergraduate students have some sort of methodological statement regarding SMR use. In its simplest (and most usual) form, this states only that a search of the SMR was undertaken without elaboration of how the enquiry was actually framed.

3.3.3 Post-graduate SMR use

York has one of the largest postgraduate archaeology schools in the country. At any time there are around 60 post-graduate students supported by around 20 staff. There are taught MSc and MA programmes in

'Archaeological Information Systems', 'Zooarchaeology', 'Archaeological Research', 'Archaeological Heritage Management', 'Archaeology of Buildings', 'Historic Landscape Studies', 'Field Archaeology', 'Historical Archaeology' and 'Medieval Archaeology'.

A dissertation of not more than 20,000 words is submitted towards 50% of the taught Masters degree course marks. The dissertation should be a piece of independent work that "may involve an original contribution to knowledge". It should "display intellectual enterprise, critical judgement, and an understanding of primary and secondary sources". Passes require "competent coverage of topic, with appropriate data and criticism" and Distinctions require "confident, detailed and critical analyses of topic with an original component in the line of argument and data presented".

MPhil and DPhil qualifications demand greater originality in research. The University Regulations require that a PhD thesis should contain "an original contribution to knowledge or understanding". An MPhil "...is a degree of considerable distinction in its own right. It is obtained by research, and an MPhil thesis is expected to display: a good general knowledge of the field of study; and a comprehensively particular knowledge of some part or aspect of the field of study; and some original contribution to knowledge or understanding."

Advice given by the Department on undertaking research for assessed work states that the observation and recording of data is the largest single component of thesis writing. It goes on to stress the importance of choosing good data sources that are available within the time schedule for study. Clearly, these considerations are significant factors in the student's choice to use SMR or NMR-derived information as a key source of data.

For the purposes of this study, the catalogue of the main library at the University of York (J.B. Morrell Library) was searched for dissertation titles that indicated the greatest potential for evidence of the use of SMR information, or similar sources such as the NMR or Royal Commission inventory volumes. All submitted post-graduate dissertations are accessioned to the library.

Of the 216 items recorded by the library catalogue, 22 post-graduate dissertations were selected for assessment (Appendix 3). Unfortunately, library rules dictated that it was possible only to examine 5 dissertations at a time, and that these had to be booked out well in advance. This presented a significant hindrance to making a rapid selection of relevant dissertations for this study. The accessioning of digital versions would greatly assist future studies of this kind, and would increase access to student work generally.

The dissertations selected for this study cover post-graduate submissions dating from 1985 to 2000, although the majority are products of MA programmes during the second half of the 1990s. No statistical significance may be attached to my selection of only 22 potentially promising dissertations from the total of 216. It may well be that other works did in fact make use of SMR information, despite apparently unpromising descriptions in the library catalogue. Nevertheless, it is noteworthy that of the 22 promising titles selected, only 13 in fact make any reference to SMR use (Appendix 3).

Before attempting to characterise the use of SMR information by these post-graduate students, it is worth looking at those dissertations that did not apparently make use of SMR information. Of these, there are 4 whose principal subject is a specific building or building type. Preferred sources of information for these authors included RCHME inventory volumes and regional office survey records, inventories maintained by special interest societies (Yorkshire Vernacular Buildings Study Group, North Yorkshire and Cleveland Vernacular Buildings Study Group), and the Department of Environment inventories of Listed Buildings (popularly known as 'Greenbacks').

Similarly, no SMR use is evident in studies concerning Viking sculpture in the British Isles; the burghal economy of late Saxon England; early medieval grave goods in England; the archaeology of a medieval religious order in England and Wales; and human remains in Roman York.

The latter cites two RCHME inventory volumes, and uses information from evaluation reports, but does not cite the City of York SMR/UAD in its 'Bibliography', 'Database Sources' or 'Other [sources]' sections.

Evaluation reports usually can be obtained either directly from the archaeological contractor or from SMR libraries. SMR libraries, of course, usually contain the work of a greater range of organisations ('grey literature') than most archaeological contractors' libraries. In this case, however, the majority of archaeological work in the City of York has been undertaken by the York Archaeological Trust, so their library of reports should have provided a sufficiently representative sample of work.

The examination of the archaeology of a specific medieval religious order made use of an RCHME inventory volume for Northamptonshire, in apparent preference to the admirably comprehensive Northamptonshire Sites and Monuments Record. The study of early medieval grave goods made use of a huge number of local journals, Victoria County History volumes, authoritative inventories (such as Meaney 1964), but no references to SMR information appear as sources for the abstracts for the huge number of cemetery/burial sites listed.

Two of the dissertations (one for a taught MA and the other for a DPhil), focus on SMR theory and practice, and related issues, rather than drawing upon specific sites and monument data sets. They have been included in this study as an important indicator of the recognition of SMRs within academic study, rather than as a means to understanding student use of SMR derived data.

The assistance of SMR staff (UAD staff or equivalent staff) is acknowledged in 10 of the 13 studies that make use of SMR information. Acknowledgement to 5 different SMRs in one dissertation provides an incredibly rare, but heartening, example of multiple SMR use. Another dissertation also acknowledges the assistance of more than one SMR ("holders of various Sites and Monuments Records"), but also highlights the informal way that the use of SMR information is often documented in the dissertations. Only 2 of the dissertations include SMRs within formal 'bibliography' or 'references' sections, though SMR use often is acknowledged as a significant source of information in 'methods' statements. One author, for example, mentions an SMR as a major source of data for their study, but the SMR does not appear in the bibliography or 'works consulted' sections of their dissertation.

In fact, whilst most of the dissertations that make reference to SMRs also make some mention of SMR use within methods statements, the actual search methods employed are seldom discussed in any detail.

Exceptionally, one author does go into some detail about the NMR and SMR search methods employed in order to help explain the extent of data coverage available for their study (Duffy 1998). In this case their NMR search was limited by NMR staff to a 25 square kilometre area centred on the area of study, for which a summary list of NMR entries was then obtained. On request, more detailed records were then obtained on certain entries selected from the summary list. The SMR search comprised a trawl through 'grey literature' fieldwork reports held by the SMR library.

In one case, 'SMR' appears in the list of abbreviations used in a dissertation. The character of both SMRs and UADs are discussed in some detail by this author, although record data is not cited in any formal way.

Original SMR/NMR primary reference numbers are quoted by only 3 of the 13 authors. Another author renumbered SMR-derived point data in order to produce a distribution map, in preference to using existing SMR primary record numbers.

3.4 Characterising students' use of SMR information

Clearly, a lack of SMR consultation may not necessarily affect the integrity of student research where the subject matter is covered by better or equally appropriate sources. However, only one of the students expressed his opinion of the paucity of SMR coverage for his area of interest. None of the other students who could have made some use of SMR resources, but did not do so, provided any justification for their lack of SMR consultation.

Studies concerning intra-site analysis, or the analysis of assemblages of faunal remains or palaeoenvironmental evidence, for example, do not tend to draw on SMR information. A low frequency of SMR use for this type of study is not surprising, perhaps, given that the student could usually expect to obtain information direct from primary sources or secondary sources. Nevertheless, SMR use might have been helpful in the initial

selection of sites for study, or vital in providing up-to-date and comprehensive site context information. There have been recent moves to develop Historic Environment Record data standards for scientific and environmental data (de Moulins 2004, 8-11; Chapter 1, section 1.6). The greater structured incorporation of such data into HERs should make them more attractive sources of information for these types of study.

Another area of study where SMR use is naturally low is that which primarily considers theoretical approaches, or examines the discipline of archaeology in relation to other social, political, or historical issues. It is perhaps this kind of study that best illustrates the gaps between the informational needs of higher-levels of archaeological research, and the content and structure of SMRs. There is very little place in current SMR and HER recording practice for the capture and explicit representation of theoretical standpoints or research themes. This is a major shortcoming that has to be addressed if future HERs are to increase their engagement with archaeological research.

There is worrying evidence of a lack of SMR use for studies concerning historic buildings (a specific building, type of building, building features, etc.). In order to investigate this issue further, 2 more non-York MA studies were examined. One of these was a dissertation submitted for a History of Architecture MA at the Courtauld Institute of Art, the other for an MA in Historical Studies at the University of Leicester. Both focus on churches, although each includes discussion of the respective buildings' environs, and their development through time. Both authors reference traditional sources of information such as Victoria County History volumes. One principally draws on local archaeological societies' journals for archaeological context. The other does not reference any archaeological sources, despite beginning the narrative from the Middle Saxon period, but uses documentary history alone to provide context for the study. In fact, one of the authors did go on to make extensive use of SMR information for DPhil study (PCC SMR consultation file for the year 2000). This author had been unaware of the sort of information that SMRs could provide, but was then introduced to the new local SMR service during the course of a museum enquiry.

The apparent low recognition of SMRs as a useful source of information for buildings related information conforms to the picture provided by the preceding survey of SMR enquiries (Chapter 2). SMRs are not yet widely recognised as authoritative sources of historic buildings information.

This can be partly explained by the historically poor SMR coverage of historic buildings information noted by Baker (1999, 78). At that time only around 27% of SMRs considered that they captured all Listed historic buildings basic information, and only 7% considered that they captured all “important unlisted buildings” basic information (Baker 1999, 78). An academic perception of SMR incompleteness in regard to the archaeology of buildings, therefore, is reasonable.

The ‘Greenbacks’ (with occasional updates) provide definitive inventories of the Listed Buildings within specific administrative areas. Nevertheless, any SMR entries associated with these buildings may include references to significant ‘events’ (excavations, surveys, etc.), or ‘sources’ that will not appear in outdated ‘Greenbacks’, which in any case only ever provide a very brief description of each building. The same is generally true of RCHME inventory volumes. For this reason studies into the historic buildings of specific regions would be well advised to draw on a basic SMR search, unless the SMR concerned has declared that it does not attempt to capture such information at all.

It is somewhat reassuring, however, that one building study within the group of dissertations acknowledges the assistance of SMR and NMR staff, even if the author goes on to note the “low esteem” paid by both record systems to the particular subject of his study – football stadiums (Smith 1995). The more comprehensive assimilation and organisation of historic buildings information is likely to accompany the continuing transition from SMRs to HERs (Chapter 1) and should in turn encourage greater recognition of HERs as a research resource for buildings studies.

The studies that make good use of SMR information tend to be those that consider all the archaeology (or a general archaeological theme) within a defined geographic study area, or studies that focus on a field monument in its landscape context, or a field monument type. Again, this conforms to the relative popularity of these enquiry types (*area-based* enquiry,

monument specific enquiry, monument type enquiry, etc.) encountered in Chapter 2.

It is notable that the pattern of predominantly single SMR use observed in the journal authors' output (section 3.2) seems to apply equally to the students (Appendix 3). The use of only one SMR is perhaps natural for sub-Degree level courses. These students can probably demonstrate sufficient understanding of a topic by considering more parochial themes. Students at higher levels of study might be expected to be more adventurous in their use of SMRs. Most of the undergraduates and post-graduates who make use of SMR information, however, consult only one SMR. Many of their research themes are focused on a discrete geographic area that is conveniently served by one SMR. However, the lack of multiple SMR use for those research themes that span many SMR-holding administrative areas is notable.

Students participating in archaeology courses at Peterborough Regional College (full and part-time 'A' Level and 'AS' level, and now a BA degree in Archaeology and Landscape History) are given an introduction to the local SMR. This includes a practical search exercise in order to gain familiarity with the service and to get a feel for the range of SMR information available to them. Students on the certificate courses run by the Board of Continuing Education at the University of Cambridge undergo a similar exercise.

It is notable that there is a high proportion of studies focused on themes within York, Yorkshire, and the north of England generally within the output of the Department of Archaeology at the University of York. Some students prefer to make use of the North Yorkshire Sites and Monuments Record.

I suspect that where students consider SMR use at all, familiarity with particular SMR services, the proximity to subject areas, and the relative ease of access to SMR services are significant influences on a student's choice of research topic and the format of their research. I also suspect that the relative inconvenience of obtaining information from a variety of SMRs has tended to rule out reliance on multiple SMR information, in preference to more readily accessible sources.

It appears that only 2 students (both post-graduate students) made use of more than 1 SMR. 4 others, however, used both NMR and SMR information together. One student made use of the Archaeology Data Service online catalogue, which comprises records that derive from many different SMR databases. The ability to remotely access combined SMR/HER data sets removes many of the logistical barriers presented to student users. Their increased availability should encourage much more adventurous use of the data.

The Royal Commission inventory volumes and other published catalogues are referenced formally by students, but the use of SMR information is often personalised to the acknowledgement of staff assistance in preference to formal bibliographic-type references. This at least guarantees the prominence of a mention of the SMR within the dissertation. Drawing attention to the helpful assistance provided by SMR staff may encourage others to draw on SMR services. Nevertheless, the lack of formal standard methods to reference SMR-derived information has significant implications for academic perceptions of its usefulness. This type of casual reference, though welcome, is almost anecdotal, and tends to emphasise the informal nature of consultation, rather than recording a robust enquiry of an authoritative source of information.

Many students prefer not to cite SMR primary reference numbers when using SMR-derived information, but often re-number record extracts for distribution map or catalogue purposes. Again, this tends to weaken the links between the original SMR data and its use for academic study. It can be immensely difficult to reappraise the research work, or follow changes to the original SMR entry, if the principal link to the original information is missing.

Given the students' generally informal way of referencing SMR use, there is some danger that recognition of its use will be further diluted as the use of online data increases and the process of consultation is de-personalised. This may be particularly true in those cases where the SMR search did not supply the principal source of data, or indeed provided no hard data that eventually found its way into the dissertation ('negative evidence').

The students perhaps tend to place greater emphasis on descriptions of their research methods than the journal article authors, since they have to demonstrate academic rigour to their assessors in order to gain full credit for their work. Though many students who used SMR information mention SMR searches within methods statements, only rarely are the search methods described in any detail. This makes it extremely difficult to assess the integrity of the data used for the survey. There are many ways to make use of SMR holdings. Individual SMRs have varying relative strengths and weaknesses in data coverage (Baker 1999; Newman 2002c; Chapter 1) which must be properly understood and accommodated. There were no statements to justify why SMR or NMR information had not been used in those studies that might have benefited from its use.

The example of one student's project concerning Fenland archaeology, illustrates important issues about the representation of the historic environment and landscape setting of sites and monuments in standard SMR coverage. Knowledgeable users and staff can bridge these gaps and make intuitive choices about which indirect references may be particularly important.

However, the absence of strong links to important sources of associated information within SMRs (and the lack of assimilation of abstracted information from such sources), greatly threatens the integrity of research for less knowledgeable users, and those using resources (such as online facilities) without the benefit of knowledgeable assistance.

The threat is twofold. Firstly, and most obviously, the researcher who relies on an SMR search for a comprehensive overview of the archaeology in question, is denied the opportunity to assess and use or dismiss as they see fit, potentially crucial associated non 'site', 'monument' or 'event', information. The example concerning Fenland environmental characteristics is equally applicable to many different landscapes (urban and rural), and many other influential variables which do not conform to standard SMR recording practice.

Secondly, researchers' perceptions of SMR incompleteness in one regard (in this example, the absence of environmental and landscape detail) endangers its perception as an authoritative source in other regards. The

danger is that the SMR is perceived as a poor reflection of the historic environment, that it is not seen as pivotal to research, and therefore it is ignored or used ineffectively for future research.

It is perhaps not sufficient merely to incorporate links and references to important sources of information within existing SMR/HER entries. Certain types of information deserve more prominence. Furthermore, the *relative importance* of the linked sources to the end user's research aims should be highlighted in the search results. This can be achieved intuitively and through dialogue with SMR staff who intervene between the user and the SMR search process, but is much more difficult in remote access online facilities.

Many of the online search facilities currently available tend to supply a 'flat' representation of the search results in response to keyword searches, without highlighting or ranking information priorities deriving from the user's research theme (Chapter 5; Appendix 8). This could be perceived as an advantage to research. The student has to make an objective selection based on their own perception of the significance of the data, without the influence of another party. However, this presupposes that the ways in which the sources are represented to the student are sufficiently comprehensive and detailed for informed selections to be made.

Clearly, student researchers would benefit from tuition in the appropriate use of SMR and HER information. This would increase the use of monument inventories, and could help to ensure that the information obtained is scrutinised correctly. The PATOIS (Publications and Archives in Teaching Online Information Resources) project, administered by the Archaeology Data Service, has an excellent tutorial for the use of online monument inventories (<http://ads.ahds.ac.uk/project/patois/>). However, coaching, tuition, and assistance, at the point of search are also important.

CHAPTER 4 – RESEARCH USER PERSPECTIVES

Having looked at the general types of enquiry presented to SMRs by researchers (Chapter 2), and the nature of SMR use as expressed in the written output of researchers (Chapter 3), it is now necessary to look more closely at SMR use as perceived by research users themselves.

As noted previously, formal studies of user needs have not been a major feature of the development of SMR services (Chapter 1, section 1.4; Chapter 2). Those SMR and HERs that have applied for Heritage Lottery Fund projects have been encouraged to justify their applications with broad surveys of potential audiences. These have tended to focus on general public interest and basic educational use, and on the question of likely demand for the new facilities, rather than matters of specific interest to academic research (Chapter 1; Grant 2002, 3). One or two surveys have, however, provided some useful insights into the requirements of specialist users.

An SMR assessment project undertaken by North Yorkshire County Council, for example, contains a rare example of a detailed formal external user survey to help inform the development of the SMR service, and specifically to inform the format of data provided to users. The questionnaire sought opinion on access to SMR search facilities, the speed and cost of the service, and information levels and quality. The SMR in question used an 'Access'-based database and 'MapInfo' GIS, alongside a manual index card system. At the time of the survey around 16,250 records of a total 55,000 records had been accessioned to the SMR database (Bullen Consultants 1999, 1). There were 24 responses to the user questionnaire, of which the majority were from archaeological contractors.

The questionnaire revealed that there was general satisfaction with the service being offered, and that it compared well with other SMR services used by the respondents. Users drew attention to the desirability of direct access (including remote access) to a comprehensive SMR database and selective digital output, although users also wished to retain the option of using paper sources. A desire for the integration of SMR information with

Listed Buildings and other heritage information databases within Geographic Information Systems, was also expressed (Bullen Consultants 1999, 2).

The questionnaire then attempted to gauge the relevance to the external user group of all current and proposed SMR database fields, and produced rankings of data field 'popularity' (Bullen Consultants 1999, 5-8). The ranking table for current record fields was headed by 'grid reference', 'description', 'site name', and closely followed by 'period', and 'excavated by'. 77% of users made use of both 'class' and 'type classification' fields, though apparently only 59% were interested in the 'form' (of evidence). Topographic information, such as altitude and proximity to water, were among the least used fields. Of the suggested standard MIDAS fields (RCHME 1998a), the 'evidence of monument' field (43%), 'scientific date method' field (43%), and 'event date range qualifier' (19%) surprisingly were undesired (Bullen Consultants 1999, 5-8).

The latter field is simply a character that specifies whether activity occurred continuously within a specified date range, or at some time within a given date range (RCHME 1998a, 78). Whilst it is not an exciting piece of information, its use is necessary in order to understand the 'minimum date' and 'maximum date' information given for an investigative 'event'. It is odd that over half the responding users of the SMR felt that both the nature of the evidence for the presence of a monument and the means of its dating were not required information. The users' apparent lack of interest in the form of evidence for a monument could be explained by the potentially confusing presence of another field to describe the monument 'form'.

This survey draws attention to an interesting paradox for SMR information delivery. Users, whose informational needs should determine the search process, are not always well enough informed to define exactly what information they actually need in order to use the data correctly. SMR and HER services have an obligation to provide information that is capable of being interpreted appropriately.

Whilst not specifically concerned with Historic Environment Records alone, but instead considering a wide range of archaeological information, the *Strategies for Digital Data Survey* (Condon et al 1999), nevertheless

provided some interesting pointers for HER information delivery based on very wide consultation. The survey was carried out by the Archaeology Data Service at the University of York on behalf of English Heritage and the Royal Commission on the Historical Monuments of England, and the equivalent organisations in Scotland, Wales, Northern Ireland and the Republic of Ireland. Three thousand questionnaires were sent to archaeologists, followed by a smaller number of telephone interviews.

The survey demonstrated considerable demand for a wide range of archaeological information in digital form, although it found that users preferred not to pay for such information. Popular information types included written reports, papers, other publications, and archives; mapping data (including Ordnance Survey data); SMR/NMR/UAD records; historic building indices; bibliographies; project archives; teaching material; images (including satellite and aerial photographs). An overwhelming desire for SMR and NMR Internet access, with a few caveats, was also expressed by survey respondents (Condrón et al 1999, 57-58). Such a shopping list of digital data might appear daunting to many SMRs and HERs given their current state of development. Nevertheless, it has to be said that the survey respondents' ambitions for digital data do not extend greatly beyond information already routinely available in paper form at most SMRs and HERs.

A further important insight into HEIR research user needs has been supplied by a focus group study undertaken by the Archaeology Data Service in June 2001. The focus group comprised 10 people from the ADS's priority user constituency - namely 3 members of academic staff, 2 undergraduate students, 2 members of library/archive staff, 2 contract research staff and 1 post-graduate research student. Only 3 of this group had previously *not* used the online ADS catalogue and 'ArchSearch' (Chapter 5). The group were set a series of three tasks primarily designed to explore the ease of use of the catalogue. Discussions based on a set of questions, followed by open discussion, completed the focus group session (Kilbride 2001).

Significantly, those who already had some previous experience of the ADS catalogue reported that it could be useful for their own research objectives (Kilbride 2001, 4). Interestingly, the exercises exposed difficulties that even

more knowledgeable users have in selecting appropriate search options (Kilbride 2001, 5) and in interpreting the results of their search. None of the focus group, for example, apparently could distinguish whether a search using the keyword term 'peel tower' had produced records pertaining to peel tower monuments, or whether some search returns were less relevant (Kilbride 2001, 3). For example, the words 'peel tower' appearing only as part of a place-name or in a free-text description for a different kind of monument, rather than as an index term for a monument of that type. This is an important consideration for the remote provision of HEIR information. What information and instruction do users need to confidently ask the right questions of the data set, and correctly interpret the results they receive?

Focus group members suggested an improvement to the event-monument-source data model, whereby multiple events and sources are assimilated into monument records (Kilbride 2001, 7). Although the event-monument-source structure is entirely logical and acceptable to record compilers, some users evidently feel that it does not improve the legibility and assimilation of the information.

With regard to the 'ArchSearch' facilities, users expressed a desire to further refine searches within the results sets they had obtained through their initial searches (Kilbride 2001, 5); to search across different fields simultaneously using Boolean operators (Kilbride 2001, 6); to select the data sets and data fields they required, and to download results (Kilbride 2001, 7). Important issues were also raised about a lack of expression of the quality of the data (Kilbride 2001, 6). The uniform presentation of the data made it difficult to assess variations in its origins and quality. The focus group felt that the map-based search should not be the default option, but all expressed a desire for map plots of their search results (Kilbride 2001, 5). A facility for period-based searching was also requested. In summary, the study showed that users wanted clarity in both presentation and data content, and also demanded powerful, user-defined searches.

An interesting exercise in examining the usability of online HER resources has been carried out at the University of Southampton. As part of their final year 'Heritage Management' module, 36 undergraduate archaeology students were asked to review a selection of six online HERs (Schofield

2004, 11). The assessed assignment was split into two main parts. Students were asked to provide a brief critique of three HERs, noting aspects such as user-friendliness, the range of information available, its detail, and ease of comparison with other data sources. They were then asked to select one HER and one monument type to examine in detail, discussing its distribution throughout the subject county, its states of preservation and diversity of form, etc. Finally, the students were asked to provide a brief appraisal of the usefulness of HERs for research, and specifically the production of undergraduate dissertations.

The considerable variations in approach to information presentation adopted by each HER, was duly noted by the students. There were obvious preferences for the most user-friendly systems, and also for those with the greatest range of integrated data. The ability to view several information types together (for example, aerial photographs in combination with early maps and site information), was especially appreciated by the students. So too was the presence of historic landscape character information, which was recognised as providing a more holistic context for the interpretation of the historic environment. Most of the students considered that HERs provided a valuable starting point for undergraduate dissertations and other project work.

The Historic Environment Information Resources Network (HEIRNET; Chapter 1, section 1.5; Chapter 5, section 5.4; Appendix 8) undertook a survey of users of online Historic Environment Information Resources in 2005. The purpose of the survey was to gather more information about online HEIR users and how they used the services, and to gain an understanding of their wants and needs. There were 741 responses, which were partly encouraged by the prospect of winning a hand-held computer (Brewer & Kilbride 2006; <http://www.britarch.ac.uk/HEIRNET/survey>).

The survey determined that there is a well-developed community of online HEIR users, and that each of the HEIRs represented in the survey had a dedicated group of frequent users. While users' information needs reflected their wide range of interests and the diversity of the HEIRs available to them, preferences for general types of information were readily identifiable – journals and reports, images and maps, that could be downloaded. It was noted that “large indices and area searches are

considered less useful for finding information than their smaller counterparts” (Brewer & Kilbride 2006, 3.2.10), which further confirms the need for greater assistance for users in the discrimination and selection of data.

Segments of the user community showed greater familiarity with particular resources. Students, for example, were more familiar with the Archaeology Data Service facilities, than were private researchers, who showed a preference for the facilities provided by the national agencies. Users expressed a desire to learn more about the range of resources available to them, which demonstrated not only a capacity for increased demand among the existing community, but also hinted at the frustration that some users feel in coming to terms with the increasing range of complementary and overlapping online HEIRs.

Importantly, the HEIRNET survey again highlighted serious shortcomings in our understanding of how segments of the user community wished to use archaeological and historic environment information. It was also recommended that future surveys should more tightly define user group categories, so that more specific informational needs could be better researched.

The various previous survey findings described above include many useful observations regarding general patterns in the use of HEIR information, and how HEIRs might develop to better accommodate user expectations. They demonstrate that there is a strong demand for online HEIR data and provide crucial evidence to support the future development of HEIR services.

None of the surveys, however, specifically address the use of SMRs/HERs by higher level researchers. I decided, therefore, to approach researchers directly in order to examine in detail the mechanics of their research use of SMR information, and to explore the future needs of this user group more fully.

4.1 Academic researcher focus group

For the purposes of this survey, a focus group of higher-level researchers based within academic institutions was selected on the basis of their known use of SMRs, either in on-going projects or in the not-too-distant past. After an explanation of the purpose of the survey, each member of the focus group was asked the same set of questions (Appendix 4). The questions were often framed within the context of a one-to-one discussion of SMR use, but time constraints and physical distance meant that the questionnaire was usually completed and returned by the respondent at a later date.

The questionnaire was designed to determine the general level of satisfaction with SMR information and services, and to reveal any disparities between the questions currently asked of SMRs and those that the researcher would ideally like to pose to future HER services. There were questions designed to ascertain the preferred level of detail and form of HER output, and to gain an impression of the perceived relevance to their research interests of well-known (to the HER community) data structures and standards. Importantly, an attempt was made to gauge recognition and use of the event-monument- source model, the Monument Inventory Data Standard (MIDAS) and the English Heritage National Monuments Record (NMR) Monument Type Thesaurus, which form the main structural platform for current HER development.

The questionnaire also included questions that were designed to provide an opportunity for a more free-ranging discussion about the delivery of SMR information for research purposes (questions 9 and 19). One respondent preferred not to answer the set questions, but nevertheless provided some very useful general comments about their experience of SMR use. The questionnaire responses are reproduced in full in Appendix 4.

The focus group comprised 10 members. Of these, 7 were engaged in MPhil or DPhil research, and 3 were members of academic staff. The universities of Wales (1 respondent), Reading (3 respondents), Cambridge (1), East Anglia (1), York (1), Bournemouth (1), Durham (1), and Cardiff

(1), were represented. They are identified only as Researcher A, Researcher, B, etc. for the purpose of this discussion

By definition, all the respondents had used 1 or more SMRs during the course of their research careers. Four had used between 2 and 5 SMRs. Two had used between 6 and 10 SMRs and 3 had used more than 10 SMRs during the course of their research. In fact, 2 of these were engaged in projects that required national coverage, and so had drawn on information from many more than 10 SMRs.

Collectively, focus group members were involved in projects that spanned a wide range of archaeological themes. The interests they declared included: research into Bronze Age structured landscapes, prehistoric land divisions, the characteristics of neolithic and early Bronze Age pits, neolithic and Bronze Age mobility within river valleys, the publication of investigations concerning British prehistory across the country, middle Iron Age warfare, villas and the Roman road system, medieval mottes, and pillow mounds associated with historic rabbit rearing.

In answer to the question of their general level of satisfaction with SMR outputs, 3 of the focus group replied 'very good', and 5 replied 'good'. This is encouraging given the uneven SMR user services reported by Baker (1999). One member of the focus group responded that the service they had received was 'adequate', but further qualified this by explaining that he preferred to ask field staff for information, rather than consult SMRs. Researcher I reported that while 8 of the 12 SMRs he had consulted exceeded expectations and another was good, 1 was only "adequate", 1 "poor", and 1 was "useless" (Appendix 4).

4.2 Awareness of data structure and the use of data standards

6 of the respondents declared some awareness of the Monument Inventory Data Standard (MIDAS) and 3 were completely unaware of its existence. None described themselves as 'fully familiar' with MIDAS. The actual level of the respondents' awareness of the data scheme was examined further by a question regarding the event-monument-source data model, a key component of MIDAS.

Only 3 of the researchers showed reasonable or good awareness of the event- monument-source model as applied to monument inventory data structures. 2 of these considered the model, respectively, 'essential' and 'relevant' to their research. A third respondent considered the model 'relevant', but their explanation of the model suggested that they had limited understanding of its provisions. These answers suggest that 3 of the 6 respondents with some awareness of MIDAS, in fact, have limited knowledge of its application.

The other replies regarding awareness of the meaning of the event- monument-source model ranged from the emphatically honest "have no idea", "haven't a clue" and "nothing", to obvious misunderstandings of the term 'event' in the context of HERs. In response to the question of whether this data model was relevant to these respondents' research, the answers "don't know", "not relevant", "not applicable", naturally followed. One respondent expressed the view that the "model works against research".

Four of the respondents did not make intentional use of the monument or class terms defined in the English Heritage NMR Monument Type Thesaurus in framing their enquiries to SMRs, or in the preparation of data sets produced by their own research. Two used the Thesaurus both in framing enquiries and when compiling their own data sets. Two more used the Thesaurus in framing enquiries only: Researcher B used the Thesaurus in compiling his own data sets, but not for SMR enquiries. This anomaly is explained by this researcher's particular SMR search requirements, which were based on a search for archaeological 'grey literature' relevant to prehistoric evidence (i.e. a general 'period' based search and 'event' searches), rather than a search for monument information.

The respondents, with one exception, made no deliberate use of any other thesauri (such as the MDA Archaeological Objects Thesaurus or other thesauri and wordlists contained in the 'Inscription' set) in their research. The exception used an unidentified thesaurus both in framing SMR enquiries and in compiling their own data sets.

Another indication of the respondents' perception of the importance of common information standards to their research was provided by the ranking scores given in response to question 12. The respondents were asked to rank (between 1 and 4; 1 being most important) the relative importance of, respectively, SMRs' adherence to national terminology control standards (option a); the provision of interpretative statements provided by authoritative sources to support SMR entries (option b); locally derived classification and terminology control for SMRs (option c), and ability to use SMR information to create self determined data classifications (option d).

Options 'a' and 'd' scored most favourably, both with average place scores of 2.11. Option 'a', ranked first 4 times, was ranked first even by 1 respondent who declared no use of the named national archaeological thesauri. Two respondents, however, ranked option 'a' least desirable, one declaring a distrust of rigid terminology and classifications. Option 'd' was ranked first 3 times and second 3 times, indicating a desire to be able to manipulate and customise classifications to make them compatible with research aims. Option 'b' was only marginally less desirable. Adherence only to local standards, option 'c', was markedly less attractive to the researchers (ranked fourth 5 times; average place score 3.33).

Finally, some useful supplementary comments on the merits of data standards were provided by respondents in order to qualify the responses provided to the structured questions. Researcher C noted that SMR entries were "subjective" because they were only summaries of a mass of information. They also noted the difficulty in matching forms of evidence across SMR administrative boundaries, due to different recording practices.

Researcher B noted that "many of the prehistoric monuments do not fit the current typology/terminology as set out in the English Heritage thesaurus". In their experience searches of computer databases had not retrieved everything of relevance to their research. Consequently, they had decided to resort to manual trawls through the libraries of 'grey literature' held by SMRs. Rigour was especially required by this researcher, because their survey was an attempt to compile a comprehensive national list, rather than merely a relevant sample. It was, they said, a "catch 22" situation -

“without types and terms how can the data be classified, stored, and accessed?”. Researcher J echoed these concerns: “whilst classification of sites is essential for SMRs, in my own research I feel that classifications/types etc. can be somewhat misleading and generalising”. Researcher J considered current digital records to be a “bit too inflexible – you are at the mercy of [the person] who has entered the data. This can be rigidly classified so that not all [relevant] records can be found”.

Another respondent clearly wanted increased classification and definition of certain monument types. Researcher E would have found it helpful for further categorisation of the ‘ditch’ monument type. Information such as length, form (whether it was a multiple ditch system, presence of a bank, etc.) and association with other features (such as field system, enclosures, etc.). Recording monument dimensions (except perhaps the monument’s total area) is not a required part of the MIDAS scheme, although sometimes is recorded in SMR free text description fields. ‘Banks’ and multiple ditch types, in fact, are valid English Heritage NMR Monument Type Thesaurus terms. Association between monuments can be recorded under the MIDAS scheme (‘Internal Cross-reference Qualifier’ and ‘Internal Cross-reference Primary Reference Number’ are the relevant data fields). Clearly the SMRs that this researcher had consulted had not made full use of the range of accepted terminology in this regard.

Researcher A found that a simple search for the monument category ‘pit’ (combined with a general period) generally did not produce comprehensive results. The search had to be widened to all excavations with a component of neolithic or Bronze Age evidence, from which potentially relevant sites were then selected and reports read manually, in order to be sure of obtaining comprehensive results. The term ‘pit’ is a valid monument type, but again, a type that is vulnerable to ‘lumping’ (Chapter 1, section 1.3) by SMR staff under broader monument definitions (for example, ‘pit alignment’, ‘settlement’, etc.) when compiling a database entry. Again, the inadequacy of this search term in this case is due to variation in individual SMR recording practice, not deviation from the accepted monument recording standards.

In fact, Researcher A really wanted to focus on those sites with a large number of excavated pits (for example, more than 25). It is inconceivable

that any SMR would record each pit on such a site as an individual monument. However, under the MIDAS definition of core data units there is of course no means to ascribe a quantity of 'monuments' to a single 'monument character' information scheme (RCHME 1998a, 41-43). The quantity of pit features might be recorded on a discretionary basis within a supporting 'free text' description field of an SMR database entry, though these fields are by definition difficult to search in a structured way.

The only satisfactory solution was for the researcher to examine a far wider range of SMR entries than desired, and then to make a manual selection of relevant or possibly relevant entries. Finally, 'grey' literature or publications referenced as source materials could be examined to make the final selection of relevant sites. Obviously this method could be time-consuming if a very large number of potentially relevant records was involved. Nevertheless, this kind of SMR search still promises a more efficient process and comprehensive results than scrutiny of a selection of publications, or reliance only on published gazetteers and library catalogues.

In summary, it is clear from this survey that awareness of current SMR/HER data standards has filtered through into higher levels of research. The criticism that conformity to standard thesauri stifles creativity in interpretation and provides only a clumsy description of the monuments in question, was voiced by two researchers. Both of these researchers also accepted the need for some common consistency in terminology in order to retrieve comparable data successfully. The other researchers generally endorsed the need for national terminology sets, albeit alongside a facility to allow reinterpretation of the evidence collated by SMR/HER compilers.

The lack of awareness of the common SMR/HER data standards on the part of some of the researchers, however, is concerning. It has implications for the successful expression of research enquiries to SMR and HERs and researchers' assessment of the integrity of the information that has been supplied to them. This survey suggests that much more work must be done to raise awareness of the structure and character of Historic Environment Record data and the language that encodes monument descriptions. Projects such as PATOIS (Chapter 3, section 3.4) and introductions to HER use as part of general research training have an

obvious role to play, but more information should be provided at the point of the delivery of HER information.

More serious still is the comment from one researcher that SMRs are “site/find specific” and “work poorly on landscapes – and especially those regimented land blocks straddling county borders”. This is an issue that has to be resolved if HERs are to develop to become more representative of the historic environment and landscapes, rather than just record discrete sites and monuments.

Another researcher urged better conformity across the SMR/HER community – “they should talk to each other and try to share experience and standards”. Clearly, the SMR community has been doing this in one form or another for many years, but the fact that a measure of cohesion is not obvious to this researcher indicates that past practice has not been effective enough.

Other pertinent comments regarding the standard of SMR information were made in relation to its integrity as a comprehensive up-to-date resource. Researcher C preferred to consult field staff because data entry backlogs meant that recent and on-going work typically was not well represented. Another researcher, frustrated by data-input backlogs, stated that he found the situation “unacceptable”, noting that “it's all too easy for people to make excuses”. The excuses are rehearsed in Chapter 1.

Two respondents were critical of out-of-date interpretations and descriptions of the data held by SMRs. One specifically noted the hand-me-down nature of many of the entries captured by SMRs, and wondered how often entries originating from past research are reviewed, reinterpreted and reclassified using modern standards. Another member of the focus group was keen to see that the main basis for the interpretation of the monument was recorded adequately (the ‘events’ that have taken place to help form the interpretation), and that some indication of the degree of confidence of interpretation was also provided. Such qualifications are not a formal part of the MIDAS scheme. Qualifying statements such as question marks and the words ‘possible’, ‘probable’ etc. are discouraged as accompaniments to monument thesaurus terms (RCHME 1998a, 41-43). Nevertheless, a free text description field is part

of the MIDAS scheme and many SMRs include descriptive qualifications for the selected thesaurus terms within this type of information field.

Data input and revision backlogs are an acknowledged serious problem for SMR and HER services (Baker 1999; Newman 2002c; Baker et al 2004) and a factor that inhibits their capacity to support research and resource management functions adequately.

Nevertheless, this fundamental quality issue has been given a curious lack of prominence and urgency in the national HER benchmarks (English Heritage & Association of Local Government Archaeological Officers 2002) and management guidance (Fernie & Gilman 2000). This is possibly related to the unwillingness of the main grant-aiding bodies (Heritage Lottery Fund, English Heritage) to support backlog projects, in preference to outreach projects that widen access to SMR information. Desires to broaden SMR content and develop new user interfaces seem more exciting and manageable ambitions than worthy but dull strategies for dealing with vast information backlogs.

4.3 The preferred scope of SMR data and information outputs

Questions 10 and 11 (Appendix 4) were designed to gauge opinion of the precise role that HER information should play in facilitating research. Is it more important to researchers that HERs provide a comprehensive basic index to other information sources, or that they act as a definitive source of information in their own right? There was overwhelming support for the latter objective (ranked first 8 times). Clearly, researchers think it is important that source materials (reports, 'grey literature', photographs, etc.) are readily available for consultation alongside the SMR records that point to them. This is entirely accordance with the findings of the HEIRNET survey (Brewer & Kilbride 2006, 1.1.4).

Question 11 implied that future HER development, which is not likely to be blessed with unlimited resources, may have to focus on a limited set of objectives. Therefore, do researchers wish HERs to develop coverage of a wide range of historic environment themes (albeit in a relatively shallow fashion – option 11a), or to focus at greater depth on a narrower range of

historic environment themes (option 11b)? Alternatively, should HERs maintain extensive coverage, but focus on a select range of historic environment themes at a greater depth (option 11c)? In other words, are researchers happy with the concept of HERs with systemic uneven data coverage across their holdings as long as this is properly defined?

There was very little to choose between the options, although a marginal preference for option 11c (ranked first 5 times) was evident. Extensive, shallow, coverage (option 11a) was marginally the next most favoured option (ranked first 3 times). It may be significant that 3 of the 4 respondents who favoured the 'extensive and selective' option were engaged in research that required a national overview. In all, it appears that this focus group saw HER coverage of an extensive range of historic environment themes as important, even though their own research may focus on a very narrow specialist theme.

One respondent noted that individual SMR data output provided in response to their national survey was very variable. "Some SMRs provided only very basic data – others full printouts, some even relevant articles from local journals". Question 17 further examined the researchers' requirements with regard to the format and completeness of the textual information they would like to receive. Will a summary list of evidence or an index to further published sources suffice, or are full records and copies of fieldwork reports preferred?

Respondents were asked to score the various options between 0 (irrelevant) and 3 (important). No strong trends were apparent in the average scores, except that there was little desire for the half-way-house output of 'partial' records that are neither summary lists of relevant records or complete records (option 17b). This option scored 0 twice, and 3 twice (average score 1.5). The other output options, from summary lists of records to copies of fieldwork reports, were given maximum points by either 5 or 6 respondents.

Question 18 examined the respondents' requirements for graphic output and mapping. Again, there were few very distinctive trends. There was notably less desire, however, for simple symbol-encoded distribution plots that were not supported by text records (option 18b) when compared to

distribution plots supported by text records. Option 18d (full feature plans) and option 18g (output comprising raw data plots of geophysical data or height data etc.) also had limited popularity.

Researcher I noted the inability of 6 of the 12 SMRs that he had consulted to produce a simple GIS generated map that included Roman roads along with Roman villa sites. The researcher resorted to paying a technician to digitise the course of Roman roads. Many SMRs and HERs have digitised in polygon or line form only a small proportion of the spatial monument data that they record (Bell & Bevan 2004, 14-15). The courses of Roman roads are not well represented by the point data that still forms the most common spatial representation of monuments in SMR/HER GIS applications.

Researcher J commented on the difficulty of interpreting site distribution plots on a computer screen, without complementary paper printouts.

Further comments regarding the scope of HER information included a desire for HERs to include associated environmental information such as “landscape character” and soils data generated by the former Ministry of Agriculture Fisheries and Food. Another respondent expressed a desire for views of sites from different “vantage points” and for diagrammatic representations of the discontinuity in landscape features between periods.

Researcher I noted that only 1 SMR (of 12 consulted) provided a simple local overview of the period relevant to their research theme that could be used as a starting point for a research enquiry or as a contextual guide for the data they had received. Researcher J also commented on the desirability of presenting queries on a ‘thematic’ basis, rather than simply searching for monuments or events. He drew attention to the difficulty of constructing thematic searches using present search tools. The desire among researchers for a thematic dialogue with HERs is also suggested by the results of the enquiry survey described in Chapter 2.

4.4 The accessibility of SMR information

A direct question regarding the desirability of remote online access to HERs was not included as part of this survey. This question already has been explored satisfactorily in other surveys (for example, Condrón et al 1999; Grant 2002, 3). Nevertheless, in accordance with the findings of those surveys, the desire for remote access to HER information was mentioned several times, without prompting.

One respondent suggested that their use of SMRs would increase significantly if they had “direct access to the PC screen to instigate [their] own interrogation”, “time to dwell over plotted SMR overlays” and “unhurried access to delve into printed extracts of SMR entries”. This respondent had noted an inconvenient “time delay” in receiving SMR information by post.

Another considered that a brief guide on using SMR software should be supplied when booking SMR appointments. This, they said, would help by cutting down on ad hoc training time that SMR staff had to give to researchers. One researcher described the variability of software systems employed by different SMRs as “simply daft”.

Researcher B drew attention to the benefits of less travelling in order to access “centralised records” (as represented, for example, by the National Monuments Records), but also acknowledged the consequent problems of access to SMRs for local people and the potential “loss of local expertise and knowledge”. The helpful role of SMR staff in the enquiry process was acknowledged by 2 more researchers. One reported that most SMR staff had provided information “professionally, efficiently, cheerfully, graciously”, and another said that he had “always found the staff who administer the SMRs helpful”. The importance of human intervention in the successful delivery of research information in SMR services should not be underestimated. Researcher I raised the issue of customer care training within SMRs service development, and also the value of proper methods of evaluating the success of information delivery.

The great variation in accessibility and service charges across the SMR community was also noted by one respondent who considered that more standardisation in these respects would be helpful.

4.5 Answering research enquiries

In conjunction with the above study, I was personally able to deal with most of the focus group's SMR enquiries as presented to Peterborough SMR. This gave an opportunity to gain further insights into how their research questions could be translated into SMR and HER searches. Two examples will serve to illuminate the process and some of the relevant issues.

Researcher C had already used various SMR services (between 5 and 10) for information to assist their DPhil research on Bronze Age structured landscapes by the time that they approached Peterborough Sites and Monuments Record in 2001. The research required a comprehensive national picture of evidence for the character of the Bronze Age enclosure of the landscape.

The request was received initially by PCC SMR by email, which briefly explained the purpose of study and asked for information on SMR access policy, such as whether a visit was required or information could be supplied by other means. A return email was made to suggest that the search could be carried out on the user's behalf and results forwarded by post, provided that the researcher could give more details about the nature of the information that they required. The researcher replied that all examples of Bronze Age field systems and probable field systems within the SMR were required along with as much supporting information as possible (site reports, plans, air photo plots etc.).

Therefore, I carried out a search of the SMR database using Boolean searches for 'Bronze Age' ('Period field') and 'field system' or 'enclosure' ('Monument Type' field). The search produced a simple list of relevant records. In addition, I realised that information from two highly relevant recently submitted development-led excavation interim reports had not yet

been captured by the SMR database. These were added to the search results as notes.

While copying aerial photograph plots (captured on transparent overlays at a scale of 1:10,000), I wondered whether 'enclosures' defined by crop marks could possibly be fragments of extended field systems. I also noted that several hitherto undated field systems and enclosures might also fit the emerging Bronze Age pattern. In fact, one highly likely candidate had been assigned an emphatic Romano-British date (and had been Scheduled as such) on the basis of earlier interpretation and morphological comparison, but not on the basis of excavated evidence. Needless to say, this 'monument' was not retrieved by the Boolean search described above. I drew Researcher C's attention to these possibilities.

The researcher received by post all potentially relevant SMR database records in the 'medium' format, which includes location information, monument and evidence type, full text description and references, but no management assessment or geological data. They also received extracts from relevant 'grey literature' sources, potentially relevant cropmark plot extracts, some advice on the progress of relevant on-going excavations in the area, and contact details for the organisations involved.

The posted information was used as a starting point for a visit to the SMR at a later date, where photographs and reports etc. were examined in more detail. The initial SMR search and administration took approximately 45 minutes. The subsequent visit took approximately 2 hours, but did not require intensive supervision.

It has been pointed out to me by one HER professional that this is a greater level of research support than could be expected of most specialist librarians or record office assistants. It also has to be acknowledged that the Peterborough SMR holdings are small compared to most SMRs. Consequently searching beyond the database records returned by the Boolean search and copying extracts of supporting information was not unduly onerous. Furthermore, the number of enquiries received from postgraduate researchers was not huge at that time (see Appendix 1, Figure 47) and it was a service aim to try and develop this 'audience' for the SMR.

The researcher was invited to contribute a paper to a local mini-conference on Bronze Age landscapes organised by myself and the Council for British Archaeology regional group later that year. We had one or two informal telephone conversations about the nature of the local evidence during the following year. In 2003, the researcher sent a draft extract from their thesis discussing the local evidence and requesting information on any additions to the hitherto gathered evidence.

In response to my questionnaire, Researcher C had noted that SMRs were “site/find” specific and that they worked “...poorly on landscapes – and especially those regimented land blocks straddling county borders”. Landscape scale features such as this he argued were “...not easily caught in the SMRs”. It is certainly true that the extraction of relevant information took time and creativity in searching the SMR database and associated SMR holdings.

Nevertheless, the information provided by the SMR was well appreciated by the researcher and fed into their research project. The SMR enquiry led to other significant benefits. The SMR service benefited from dialogue with a researcher who was engaged in a wide ranging survey of Bronze Age field systems. The researcher raised important questions about the nature of the local data and its recording. They were able to make an immediate and tangible contribution to the discussion of the region's archaeology, together with the relevant local practitioners. As an SMR manager, I was stimulated into thinking more about the links between the various forms of ‘field system’ evidence recorded by the SMR. This in turn informed my input (as ‘curatorial’ advisor) to strategies that were applied to on-going fieldwork, notably within three very large open area quarry excavations.

This SMR enquiry contributed significantly, therefore, to the relationship between applied research (being carried out by the curatorial advisor and archaeological contractors working on development-led projects) and pure research underway as part of a formal research programme within a university. The SMR enquiry was framed by good dialogue and was highly rewarding.

Though ultimately successful, the technical methods for the delivery of SMR information described above were flawed in several respects. The reliance on manual handling paper output and the postal system was absurd given the extent to which the paper output is generated digitally in the first place. The SMR subsequently was modified to allow database GIS search output as Excel and CSV files that can be emailed. Further improvements, not least an increase in the Council's permitted email attachment size and the wider use of broad-band Internet services by researchers, mean that SMR entry distribution plots, vector aerial photograph plots, raster vertical aerial photo coverage, raster historic Ordnance Survey map bases, etc. that have been generated by the SMR GIS application are now routinely emailed to users.

Researcher J's enquiry drew on some of these enhanced facilities. The researcher wanted to focus on evidence for neolithic and Bronze Age activity within a rectangular box defined by grid coordinates, several kilometres in length and width, that straddled the Welland Valley and Peterborough-Lincolnshire border. It was a simple matter to draw the search area on the GIS, select all archaeological records within the area, and then refine the selection with the GIS's Boolean search facility for all records indexed under the broad period terms 'neolithic' or 'Bronze Age'. These records were exported in table format as a CSV file using a standard function of the GIS application. I edited the CSV file to remove irrelevant data fields (mostly administrative and management information), and emailed it as an attachment to the researcher. The whole process took fewer than 15 minutes.

Researcher J had booked an appointment to visit the SMR in order to examine 'grey literature' fieldwork reports referenced by several of the SMR records, and plots of aerial photograph evidence. During the course of two days at the SMR the researcher was able to consult sources and copy sources with minimal assistance. Several useful discussions about the nature of the evidence took place during this time.

A supplementary request for information on possible votive neolithic and Bronze Age finds and sites that had yielded Grooved Ware in both the Nene and Welland valleys (beyond the confines of the original search area), was also raised during the time of the visit by the researcher. It was

agreed that the best way to get comprehensive results was to allow the researcher to copy the entire range of the neolithic and Bronze Age evidence for the area, and then define their own criteria at their leisure. The relevant SMR information (around 200 records) was exported as an edited CSV file to floppy disk.

The researcher was able to integrate complete cropmark overlays exported as DXF files from the SMRs GIS with their own laptop-based GIS application (ArcView) during the time of their visit. They also generated GIS point data for their own system from the exported SMR CSV files. Clearly the greater functionality of the upgraded SMR GIS improved the flow of information and helped greatly during the initial data gathering stage. It helped greatly that the researcher was proficient in GIS use and could also draw on some university technical support.

Core SMR information, therefore, was provided in a relatively efficient way. Nevertheless, too much supporting information remains in paper form at the SMR and must be photocopied and posted, or viewed in person at Peterborough. The process of answering enquiries would be much more efficient if 'grey literature' was available in digital form, and this along with other basic SMR information, was retrievable via the Internet.

This basic sketch of the steps taken to answer research enquiry is complemented by a more detailed case study presented in Appendix 5. The case study was designed to be similar in scope to the type of enquiry raised by Researcher C. It investigates the implications of obtaining comparable information from across SMR/HER administrative boundaries. It also sheds more light on the use of available data and search mechanisms to secure the information necessary to answer landscape-scale questions.

4.6 Conclusions

The spectrum of attitudes to SMR services among the focus group members is expressed in the following statements. One researcher reported that SMRs had "never been my main means of research. Field staff are better [sources of information]". Another researcher, however,

was “already convinced they [SMRs] are essential to thorough research”. One respondent went further by saying that “SMRs are not just a repository of data; they are the face of archaeology for the county”. SMRs, they argued, should be “the gateway to the archaeology in their respective regions”.

Both of these researchers commented that SMRs need to give themselves a higher profile and demonstrate their usefulness to research more emphatically. One suggested a range of promotional activities that SMRs should engage in – virtual newsletters, links with local events (such as National Archaeology Day), and creating a network of key local contacts who would be prepared to answer email enquiries regarding aspects local archaeology. This has been recommended before (Baker 1999, 5), and is probably informally already provided by many SMRs. However, formalising the local networks of expertise (contact details, Internet links, subject areas) would, I am sure, be a significant way of helping to maintain information currency and improving user services.

There is a clear need to better promote the use of SMRs/HERs within university departments (Chapter 3, section 3.4), and among the wider research community. The value of presentations to local university departments, or group visits to HER facilities, should not be underestimated. But the best form of promotion, perhaps, is to offer something that can be explored easily. The mere presence of a working online HER facility should encourage greater use of HER information.

There is an obvious demand for SMR/HER information for serious research purposes, and the services currently offered are well appreciated by researchers. Nevertheless, there is much scope for the improvement of user services in this regard.

There is anecdotal evidence within the profession that SMR staff often find requests from student researchers challenging and difficult to accommodate (Chapter 1, section 1.4.2). Staffing levels and the imperative of development-led enquiries have a bearing on the ability of SMR staff to prioritise such enquiries (Baker 1999, 69).

Answering a student's enquiry, however tight their dissertation deadline appears to be, may not seem the highest priority to SMR staff who have planning permission consultations and weekly planning lists to scrutinise, fee paying developers waiting for site appraisals, fee paying farmers asking for agri-environment scheme information, conservation colleagues wanting information to guide conservation area appraisals, planning colleagues asking for information and advice to inform pre-application discussions, policy makers asking for information to support the Local Development Framework process, archaeological colleagues waiting for information central to their grant aided archaeological survey projects, and contractors and consultants waiting for information to support desk top studies, the completion of written schemes of investigation and grey literature reports, etc. Meanwhile, the backlogs of grey literature and survey data waiting to be accessioned continue to grow.

To the logistical considerations of fitting in research enquiries around this kind of routine workload, we may now add the evidence that enquiries from the research community are more likely to be more complex than those generated for simple resource management or development control purposes (Chapter 2, section 2.7; Appendix 1). The latter often require simply all SMR information with a defined geographic area (*area-based enquiry*) or information about a specific monument (*monument specific enquiry*). Research and education users tend to generate enquiries more evenly across the full range of enquiry types (Chapter 2, section 2.7; Appendix 1). Research enquiries from the higher education sector can be especially complicated. They often approached from a *thematic* standpoint and are more likely to be *compound* in nature than enquiries generated by most other users (Chapter 2; section 2.7; Figure 14; Appendix 1). These enquiries have to be translated into Boolean searches to interrogate databases. In many cases Boolean searches only generate approximations of the intended spirit of the enquiry. The case studies above and in Appendix 5 illustrate the effort required to obtain comprehensive and meaningful results.

In summary, when using an SMR or HER, the user must accurately employ a wide range of search terms and strategies to ensure that they receive comprehensive results. Ideally the search should not only identify specific examples of the evidence required, but should also allow for the

consideration of fragmentary evidence and evidence not previously interpreted as emphatically associated with the topic in question. It is this kind of archaeological interpretation that pushes archaeological research forward, rather than simply repeating commonly held assumptions.

Unlike many archaeological contractors and consultants who consult SMR/HER services routinely, students and other researchers are less likely to be familiar with the nature of the services on offer. They are likely to need more assistance from SMR staff in framing their enquiries (Ferne & Gilman 2000, E.2.6). It cannot be assumed, for example, that research users are familiar enough with record structures and terminology sets in order to search for and retrieve all the information they might require unaided. In fact, it should be assumed that users have a generally low level of understanding of record structures and monument terminology.

The attractions to researchers of developing HERs as 'one-stop-shops' for comprehensive historic environment information are obvious in the questionnaire answers. The lack of strong general preferences for the form of information output indicates the variety of individual preference even within this small focus group. Researchers obviously want information that will help them in specialist areas of study. By definition, areas of specialist study are varied, complex, and do not conform to any single research enquiry profile. This leads me to wonder whether any general rules can be applied to satisfying research users HER enquiries. In fact, however, there are some common approaches that are relevant to any research enquiries directed at HERs. Appendix 6 describes a stepped approach to answering research enquiries for the type of hybrid computer-paper record systems that comprise most SMRs/HERs (Chapter 1, section 1.3; section 1.6).

Among the most significant current deficiencies identified by the focus group is the poor representation that SMRs give of landscape-scale features, as opposed to 'monument' scale features. This is a worrying prospect for the transformation of SMRs to Historic Environment Records, a term which suggests a landscape approach to recording. It has to be noted that the monument-centred recording practice evident in the earliest field archaeology inventories (Chapter 1) still informs our principal HER data standards – MIDAS and the NMR Monument Type Thesaurus. Much more work needs to be carried out on both data structures and standards if

Historic Environment Records are to live up to their promise to represent past landscapes.

I cannot pretend that every research enquiry received by my own SMR has been as successfully dealt with or as rewarding as some of examples given above. Nevertheless, similarly positive experiences are shared by SMR and HER services and researchers all over the country on a daily basis. Research enquiries are demanding, but they are also often the most rewarding enquiries. They can stimulate alternative perceptions of the information recorded by the SMR/HER and can contribute significantly to forming new questions for development-led investigations. They reinforce the links between archaeological management practice and academic endeavour; between applied and pure research. These are the kind of outcomes to which HER services should aspire.

Unfortunately, the manual effort and supervision required to answer many more of these types of enquiries in their most rewarding form is clearly not sustainable for SMR/HER services which find it difficult to secure satisfactory provisions to meet the range of demands placed upon them (Chapter 1). The greater digitisation of resources and remote accessibility to HER data offers the only practical solution to widening the use of HER information for research and other purposes. The following chapter examines some of the mechanisms currently available to achieve this.

CHAPTER 5 - SHARING DIGITAL HISTORIC ENVIRONMENT INFORMATION

Previous chapters have considered the growth of SMR and HER services, the range of enquiries directed to them and the ways in which they have satisfied those enquiries using hybrid computer-manual facilities. Research users in the past were either sent SMR information by post, or encouraged to make a visit to SMR offices, or both. In recent years, SMR and HER services have been increasingly able to supply users with digital data, either as email attachments or CDs. They also still tend to rely heavily on paper, post and supervised visits (Chapter 1, section 1.4.2; Chapter 4)

One possible mechanism to increase access to core information and reduce the levels of user supervision required, is to supply complete data sets (and perhaps licensed copies of application software) to certain user groups. Field units, universities, and colleges, which frequently make use of SMR and HER services, would be obvious places to target. This kind of facility, however, would require careful management, such as regularly supplying the corporate users with data updates and upgrades and intermittent troubleshooting. It could not accommodate much non-digitised information or entirely obviate the need for follow-up visits in person. Furthermore, the more ambitious and successful the facility became, the more burdensome it would become to manage successfully. Nor would this method necessarily assist the process of cross-searching different SMR/HERs for regional or national scale projects. It only really represents a stopgap measure, rather than a real solution to the widespread dissemination of HER information.

Theoretically, the creation of a single national Historic Environment Record could replace the present NMR and the plethora of SMR and HER services that make up the current national 'network'. National data sets that use common data structures, that are accessible from a standard interface under uniform service standards, seem an attractive and obvious ambition.

However, given the number of English SMRs involved, this would require massive re-allocation of resources over many years. Furthermore, it would threaten the relationships between the local ownership of archaeological

advice, and local planning control and conservation mechanisms. While the attractions to some researchers of a single source of information are obvious, researchers and other users with more localised interests might not necessarily benefit from a single centralised service. Presently there is no professional or political will to develop a single English national Historic Environment Record, but instead a strong desire to formalise and strengthen the links between the NMR and the network of local HERs (Chapter 1, section 1.5).

There is a widespread belief within the profession and among users that the Internet and World Wide Web offer the best platform for the future networking and widespread dissemination of HER information to a growing number of users (Ferne & Gilman 2000, A.7.6). Before reviewing some of the online HEIR facilities already available, it is necessary to explore some of the available data standards and technical mechanisms behind their implementation.

5.1 The Internet and World Wide Web

The first truly successful attempts at the remote digital delivery of heritage information databases have made use of the established frameworks provided by the Internet and World Wide Web.

The Internet is a system of common computer communication protocols that make use of a vast number of various physical communications networks throughout the world, in order to allow communication between computer systems. The Internet allows data transfer between very remotely situated computer systems, to achieve file transfers, the exchange of electronic mail, and remote systems control functions. The Internet is the mechanism through which the World Wide Web is distributed.

The World Wide Web is now so embedded in popular culture that it is difficult to believe just how short its history is, and how its initial development was driven by academic endeavour, rather than leisure and commercial pursuits. It is acknowledged generally that the World Wide

Web (hereafter Web) owes its birth to a CERN (European Organisation for Nuclear Research) scientist, Tim Berners-Lee and his colleagues.

Development of this facility expanded well beyond CERN's remit during the early 1990s. New browser software (such as 'Mosaic', developed at the US National Center for Supercomputing Applications) provided a user-friendly interface for a variety of computer platforms and greatly accelerated the participation of servers and Web use around the world. In 1993 there were at least 500 participating servers; in 1994 there were around 10,000 (and around 10 million users); in 1997, there were more than 650,000 servers. It is now almost impossible to quantify Web use, but in 2002 it was estimated that there were over 9,000,000 unique Web sites (<http://wcp.oclc.org/>).

Two important principles are fundamental to the development of the Web. The first is that, at its core, the Web makes use of open standards (available to all on a non-commercial basis) rather than relying on proprietary standards, owned by commercial corporations. The second is that no single organisation controls the Web, despite the early intervention and developmental support of weighty bodies such as the European Union and huge commercial interests. The Web uses its own data transfer protocol (HTTP – Hyper Text Transfer Protocol) and makes use of others such as Gopher, ftp and telnet, etc. It also has dedicated document structure languages (HTML – Hyper Text Mark-up Language; XML - eXtensible Markup Language, etc.) that are used to configure Web pages (Bride 1998; Goldfarb & Prescod 2001).

Navigation throughout the Web can be achieved by activating network links ('hyperlinks') embedded within hypertext pages (Bride 1998, 67-84). This can provide the user with an almost seamless transfer to information pages from any other server in the world. In practice, of course, it is not always so straightforward. Links may become severed and servers may be invisible to each other. Similar technology may be used, of course, for more localised networks. 'Intranet' systems confine access to the bounds of a single building or organisation.

Clearly, the versatility of the various data handling protocols, and the physical capacity and the speed of the communications networks between computer systems, present some potential constraints to the Web-based

delivery of historic environment information. Nevertheless, the range of information types routinely delivered by the Web (video clips, sound, text, images, etc.), exceeds the range of digital information types generally supplied by hybrid computer-manual Historic Environment Records.

In addition to delivering text and images, the Web may be manipulated to provide hypertext interfaces to databases in order to allow Web-based searches of large data sets.

XML offers particularly important advantages over HTML in this regard. HTML provides a suite of mark-up codes (or 'tags') which define the appearance and structure of information items (or 'elements').

In the following example, the start and end tags instruct an HTML browser to place the word 'Keep' on the screen as a 12 point heading.

```
<H4> Keep </H4>
```

XML is much more flexible, because the user defines the 'tags' which define how the elements appear. The user-defined tags can also be used to ascribe meaning to an element type.

Here, the element 'Keep' has been identified as a monument type.

```
<monument type> Keep </monument type>
```

Put simply, "HTML tells you how the data should look, but XML tells you what it means" (Goldfarb & Prescod 2001, xlix). Having built a useful degree of meaning into the information content of a document, programs can be constructed that interpret XML documents in order to extract the desired information items.

The inherent flexibility of XML means that is possible for such programs to assimilate information items ('elements') from separate datasets. It does not matter if the source datasets and information items are different, as long as they can be mapped to a common XML schema.

5.2 Information standards, word lists, and thesauri

Shared communication protocols and data format standards allow widely distributed diverse computer systems to understand each other over a loose, dispersed, physical network of cables and radio waves. Information standards aid communication between information resources. They provide common languages that may be used by information compilers and retrievers in order to increase the efficiency and integrity of information exchange. They help input and retrieval episodes to occur across information sources without fear of inconsistent or unreliable results.

There are practical hindrances to the widespread agreement and application of rigid information standards for HEIRs. These are due, in large part, to the historic legacy of record compilation in a given area, variations in the personal and organisational philosophies of inventory compilers, and localised logistic and resource issues (Chapter 1). For some, information standards and terminology control for historic environment inventories pose a threat to accuracy of expression and creativity in interpretation of evidence. Many people enjoy the flexibility of the English language and treasure its synonyms, its rich vocabulary of precisely descriptive words, expressions, and colloquialisms. The heritage field has developed its own extensive language, incorporating many obscure ancient terms and regional variations. These are appreciated as heritage in their own right.

One alternative to insisting on rigid adherence to terminology standards, is to create mechanisms that permit searches across a range of information sources by interpreting the terminology used for the search and anticipating the range of terms that might be used to describe the same item. We all do this on a daily basis by understanding that 'car', 'automobile', 'vehicle', 'motor', and even 'wheels', etc. can all mean the same thing. In fact, there are nuances in these terms that convey messages about the values of the speaker and their subject.

Automating the process of interpreting synonyms, however, can be clumsy and inefficient, particularly where complex searches and dynamic vocabularies are concerned.

There are huge benefits in ensuring compatibility in structure and language across HEIR databases in order to minimise misunderstanding, reduce the need for interpretation and retrieve relevant records effectively.

MIDAS (Monument Inventory Data Standard) is the principal data standard for HERs. On its own, the widespread adoption of MIDAS would ensure the close correlation of the informational structure of HER databases seeking to record monument information, but would not necessarily ensure the compatibility or consistency of their information content. However, MIDAS encourages the use of recognised wordlists and thesauri to index monuments, events, periods, etc.

Simple wordlists comprise a simple list of terms with no overlap between the definition of terms or any defined relationships between the use of terms. A 'hierarchical' wordlist is organised in layers of definition to allow the use of both 'broad' terms and 'narrow' terms, that provide a more specific definition within the meaning of the 'broad' term (RCHME 1998a, Appendix One). For example, the terms 'Neolithic', 'Bronze Age', 'Iron Age', etc. could be defined as 'narrow' terms within the broad term 'Prehistoric'. The terms 'late Neolithic', 'early Bronze Age', etc. could form another tier of narrow terms.

An inventory thesaurus differs from a wordlist in that the terms are defined, and relationships between the terms are expressed. A thesaurus should include 'scope notes' that help to define the appropriate use of the preferred term. A thesaurus is indexed on 'preferred terms', although alternative terminology (such as regional or colloquial terms, alternative spellings, etc.), 'non-preferred terms', will be listed with pointers towards the appropriate 'preferred term' (RCHME 1998a, Appendix One). For example, in the current English Heritage NMR Monument Type Thesaurus, 'barrow' is a preferred term for the non-preferred terms 'tumulus' and 'burial mound'.

Preferred terms should be hierarchically grouped into 'broad' and 'narrow' terms, perhaps under umbrella 'class' terms that may be used to assist thematic searches. Within the current English Heritage NMR Monument Type Thesaurus, current 'class terms' for monument types include: 'religious, ritual and funerary' (for monuments such as barrows,

cemeteries, churches, henges, etc.), 'agriculture and subsistence' (for ridge and furrow, field boundaries, barns, etc.), and 'transport' (for roads, bridges, railway sheds, etc.). The terms 'long barrow', 'pond barrow', 'bowl barrow', etc., are defined as narrow terms beneath the broad term 'barrow'. The terms used to index monuments within an inventory indicate something about the current level of knowledge about its character. The use of the narrowest possible term is encouraged where it is supported by emphatic interpretation.

Terms may also be associated as 'related terms'. This guides the user towards, for example, monument definitions that are not subsets of each other, but that nevertheless may be closely related forms of evidence. For example, the term 'motte' could be related to the term 'keep'.

Much useful work in the development of terminology control for heritage inventories is being undertaken by the Forum for Information Standards in Heritage (FISH-<http://www.mda.org.uk/fish/>). FISH draws on a very wide consultation group to help define, test, and expand sets of wordlists and thesauri, which are then published within the INSCRIPTION set (<http://www.mda.org.uk/fish/inscript.htm>). The development of the INSCRIPTION set is further helped by the English Heritage Data Services Unit, who work closely with FISH and create their own dynamic thesauri. These are published in a variety of forms for use by inventory creators (on line versions - http://www.rchme.gov.uk/thesaurus/thes_splash.htm).

5.3 Metadata, interoperability and open archives

If all monument inventories had the same structure and used the same terminology, searching across databases and obtaining consistent results would be simple. However, as we have seen, even databases that were set up to record similar information types, using appropriate guidance, may vary considerably in their actual structure and content (Chapter 1; Chapter 4). The problem becomes more acute when trying to retrieve data from databases that have been compiled for different reasons but that nevertheless contain potentially complementary data – for example, a monument database and a database that records only portable antiquities.

The task of searching for relevant information from differently configured databases can be made easier by creating common shorthand descriptions of the content of each database, so that comparable information from each can be assimilated and retrieved.

'Metadata' (information about information) helps to describe information sources in a structured, standardised way. Metadata allows potential users to make a rapid assessment of the relevance of an information source. It also facilitates comparison between data sources in order to determine their compatibility and relationships with each other.

The 'Dublin Core' metadata standard is particularly appropriate for describing humanities information resources, and is the metadata standard recommended for text SMR/HER information (Ferne & Gilman 2000, B.10.3), though not for its spatial (GIS) components. An alternative (though Dublin Core compatible) metadata standard produced by the National Geospatial Data Framework has been recommended for spatial data (Ferne & Gilman 2000, B.10.3). It is recommended that metadata is recorded for each SMR/HER component, such as databases, text files, spreadsheets, CAD files and GIS (Ferne & Gilman 2000, B.10.3). The 'Dublin Core' metadata scheme is reproduced in Appendix 7.

The individual information elements of the Dublin Core may be repeated as many times as necessary in order to address the occurrence of multiple valid data items of the same type within the same information field. For example, a record pertaining to a named monument may have several equally valid alternative names for that monument, so the 'Title' element of the Dublin Core description could be repeated to cover each of these names. Similarly, the information source may have several contributing 'Creators', necessitating the repetition of this field.

A unique 'identifier' is required for each metadata record, but information items (other than the unique identifier) may be repeated in different Dublin Core records. Clearly, a database of such metadata records is not a 'relational' record structure, whereby data tables link to avoid repetition in recorded information, but is more like a flat file database.

The Dublin Core and other metadata schemes provide a basic common structure to describe the content of information resources, but they rely on the compiler's interpretation of exactly what should be recorded in each field for their efficacy. The compilers' decisions about 'lumping' or 'splitting' (Chapter 1, section 1.3) information are important. Similarly, without some agreement on the terminology that should be used in each information field, the selection of comparable data from different information sources is still difficult even if they share the same metadata structure.

One solution to online database enquiry interoperability has been found in the Z39.50 protocol developed by an informal working group (ZIG) within the Z39.50 Maintenance Agency, hosted by the United States' Library of Congress. Z39.50, whose full title is: North American standard *ANSI/NISO Z39.50-1995, Information Retrieval (Z39.50): Application Service Definition and Protocol Specification*; or international standard *ISO 23950:1998, Information and documentation — Information retrieval (Z39.50) — Application service definition and protocol specification*, owed its development to the problem of simultaneous searches of separate library catalogues, but has wider applications.

Z39.50 is versatile. It can be implemented on any computer system and does not require the modification of the source database. Instead it sits between the source database (the 'server' or 'target') and the user (the 'client' or 'origin') providing a common framework for communication in order that a search generated by the user retrieves similar types of information, regardless of differences in the organisation of source databases.

Z39.50 is organised into structured procedural blocks, which in turn make contact with the source database, determine the protocols for data exchange, submit searches to the source database, and control the methods and formats through which the search results are returned to the user.

The search process relies on setting up relationships between the information fields in the origin and 'target systems' so that source data (perhaps from diverse sources) may be mapped on to a common

presentation of results. Z39.50 permits the return of information to the user in several common data formats, including XML.

The use of Z39.50 alone is not the final word in interoperability. Z39.50 'Profiles' that specify particular sets of attributes and data formats for use by information resources or interest groups operating within a specific theme or interest sector, have been defined. There are special profiles for government information, geospatial data, and the heritage sector. *The Bath Profile: An International Z39.50 Specification for Library Applications and Resource Discovery* is one such profile. It is suitable both for library and various non-library applications.

To achieve interoperability with Z39.50 requires that appropriate software to handle communications under the Z39.50 regime is installed on both origin and target systems. This is a task for ICT specialists who are well versed in communications software and Web servers. The task of ensuring that the data within the source databases is mapped onto accepted metadata standards, such as the 'Dublin Core', 'Bath Profile', etc., is best accomplished by those with knowledge of the meaning of the data. The implementation of Z39.50 interoperability, therefore, requires significant technical expertise and good theoretical understanding of data compatibility issues, allied to thorough understanding of the data sets in question. It is not something that could be accomplished by most SMR and HER managers without considerable technical support.

HEIRPORT (below) employs Z39.50 protocols to provide a common portal to several different HER databases maintained by various organisations.

The 'Open Archives Initiative' (<http://www.openarchives.org>) is another important step towards the development of tools to support cross database searches for heritage disciplines. The OAI's mission is to develop and promote "interoperability standards that aim to facilitate the efficient dissemination of content". It comprises a steering committee, executive committee and technical committee, funded by the American based Digital Library Federation, the Coalition for Networked Information, and the National Science Foundation.

Specifically, OAI originated with a desire to increase access to 'e-print' archives for scholars. Its work, however, is applicable to a wide range of digital information resources, including heritage information databases. OAI's principal product is its 'Protocol for Metadata Harvesting' (OAI-PMH). The OAI-PMH defines a mechanism for 'harvesting' XML-formatted metadata from a variety of database sources. Use of the Dublin Core metadata set is mandatory within the OAI-PMH, although it does not exclude the use of alternatives. OAI-PMH does not specifically include a facility to harvest any source data that is not encoded in XML, it is set up only to retrieve the XML metadata that describes source data. Source data may be accessed, however, through the 'identifier' link to data content.

OAI-PMH requires that the 'data providers' (repositories for XML metadata) are based on network accessible servers that can process the six key OAI-PMH 'requests'. These are procedural blocks similar to those employed by Z39.50. The 'requests' are generated by a 'harvester', or application operated by a service provider in order to retrieve metadata. A 'harvester', for example, may be a Web-based application designed to provide joint access to the information holdings of several server-based HEIRs. Each server-based HEIR must house the OAI-PMH compatible elements and metadata necessary to facilitate a 'harvest' by the Web-based application.

OAI-PMH has been designed to be simpler to implement than protocols such as Z39.50 in order to encourage its widespread use. It is claimed that configuring a Web server for OAI-PMH should take a suitably experienced ICT specialist less than a day. The time and expense required to configure appropriate metadata, a task for the HEIR manager, is not included in this estimate. This 'low barrier' philosophy comes at the expense of some functionality, but it is clear that OAI-PMH potentially offers a viable alternative to Z39.50 for heritage information applications (Perkins 2001). The Fitzwilliam Museum's gateway to various numismatic databases (Appendix 8, section A.8.9) is one example of an OAI-PMH application.

Unlike Z39.50, OAI-PMH operates by pre-harvesting metadata, which then sits on the 'harvester' (or gateway's) server. This should ensure the user relatively fast metadata searches, since unlike Z39.50 applications the search does not prompt 'real-time' individual access to each of the source databases. However, pre-harvesting does require that a potentially vast

amount of metadata has to be stored in one place. It requires one authority to maintain the 'harvested' data and to set up agreements and programmes for harvesting. It also implies a separation of the user from the source data. Pre-harvested metadata is not as current as the data held by the source databases. The longer the gaps between 'harvests', the more likely it is that a search will generate out-of date information.

Traditionally, SMRs have found it difficult to keep pace with routine data entry and many have substantial 'backlogs' of information representing years worth of information gathering (Chapter 1; Baker et al 2004). In comparison, days or weeks between metadata harvests may not be seen as too much of a concern. Nevertheless, users may have an expectation that they are receiving data that is as up-to-date as the source database.

5.4 A survey of online Historic Environment Information Resources

This sample of on-line heritage information systems has been chosen to represent:

- 1) both national and local resources developed by a single database maintainer;
- 2) national information resources and gateways that allow access to database information from many origins;
- 3) services that provide primarily text data, and those that also incorporate a spatial search interface.
- 4) services designed for novice and general interest users and those designed for knowledgeable and expert users.

All the facilities, described in full in Appendix 8, offer users the opportunity to retrieve large quantities of historic environment information. They represent the first manifestations of online HEIR services that will be demanded by most users in a very few years time, rather than just welcome but novel complements to more traditional data retrieval

methods. The information already available online through these and similar facilities constitutes a research resource that is unparalleled in the history of archaeology in terms of its magnitude ease of access.

Access through the Archaeology Data Service catalogue provides one model for the Web delivery of individual HER database information (Figure 18; Appendix 8, section A.8.4). It requires relatively little developmental effort or expertise on behalf of SMR/HER staff, other than in cleaning and preparing their data for a common metadata format. The integration of several SMR datasets with and other data sources allows cross regional searches. It also helps to expose SMR data to users who might not have otherwise chosen to search SMRs specifically.

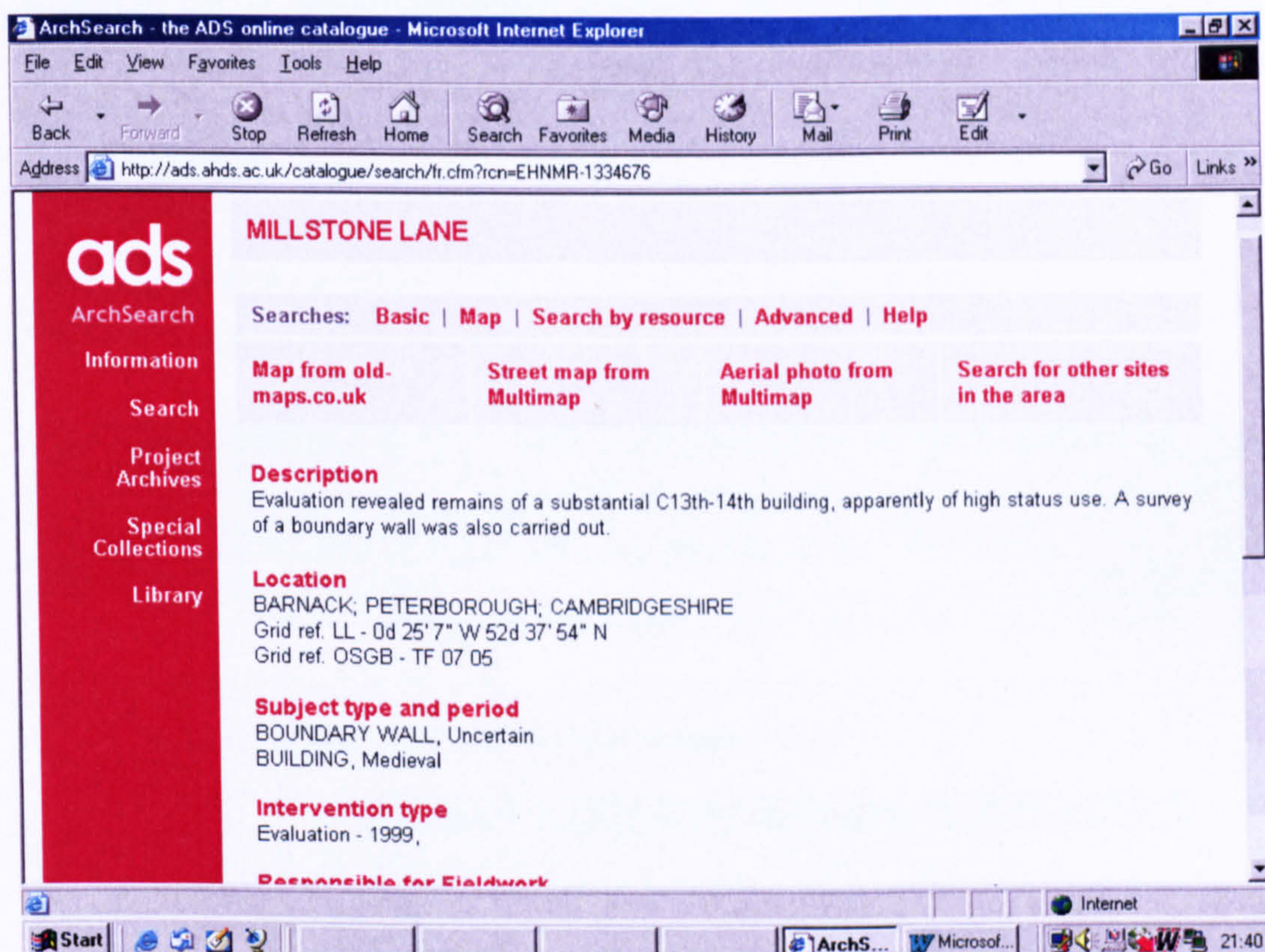


Figure 18. An excavation metadata record retrieved from the ADS catalogue. Original in colour.

An alternative model is provided by 'Unlocking Essex's Past' (Figure 19; Appendix 8, section A.8.6). Here the SMR data set stands alone and is managed by the parent authority, so it benefits from total proprietary control over content, updates and terminology. However, networking many such systems through a single search portal poses potential

interoperability problems. These have been largely overcome in 'HEIRPORT', which successfully harvests data from different, but complementary sources, and makes them available through one search interface (Figure 20; Appendix 8, section A.8.3).

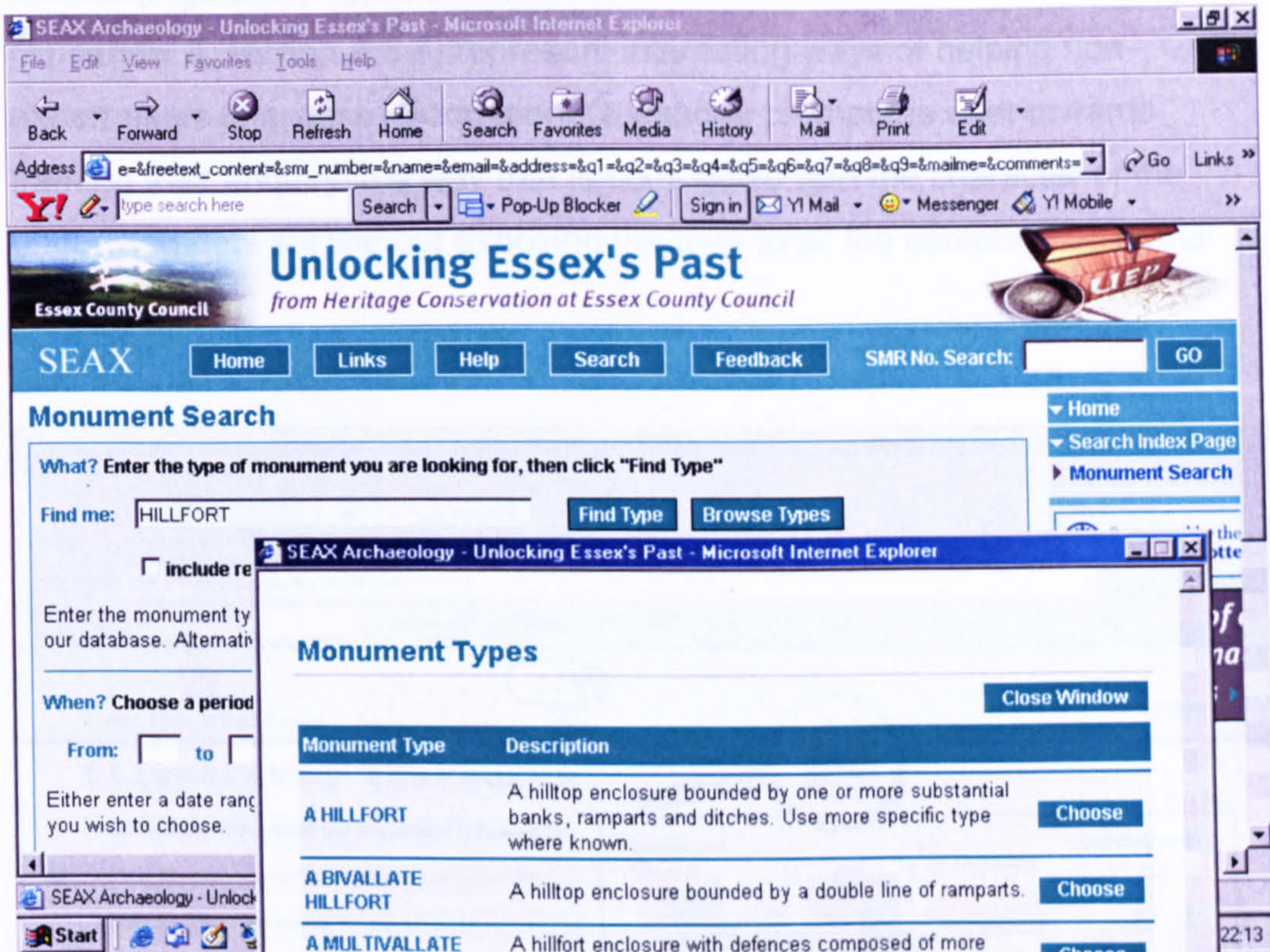


Figure 19. Unlocking Essex's Past. Scope notes help users to select relevant monument types. Original in colour.

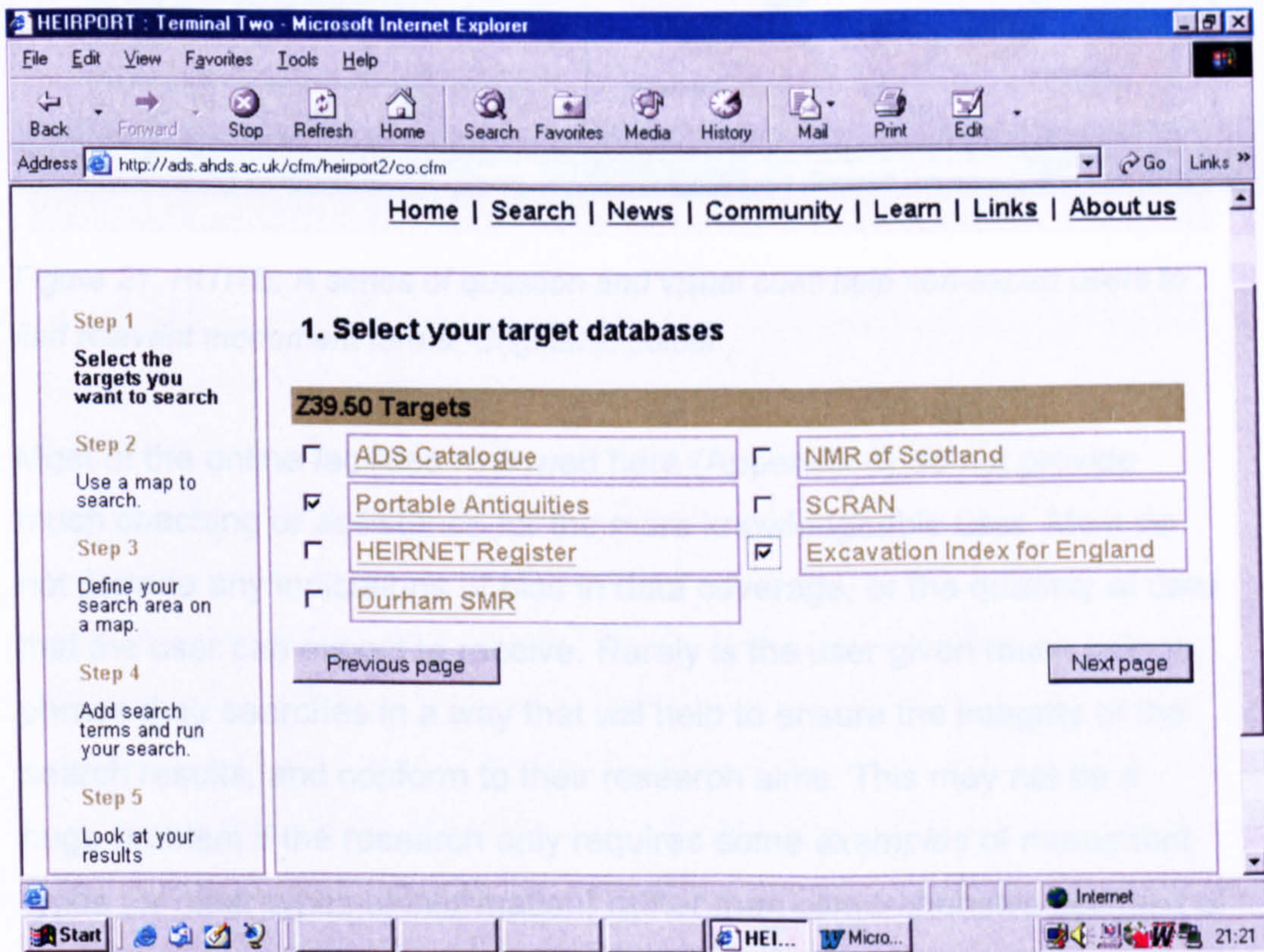


Figure 20. HEIRPORT. The portal allows single searches across several HEIRs. Original in colour.

HITITE (Figure 21; Appendix 8, section A.8.7) and PASTSCAPE (Appendix 8, section A.8.8) represent interesting ways of helping non-expert users to access information. Questions prompt the user towards framing their enquiry in a way that is compatible with the character of the underlying data set without exposing the user to all the complexities of that data set.

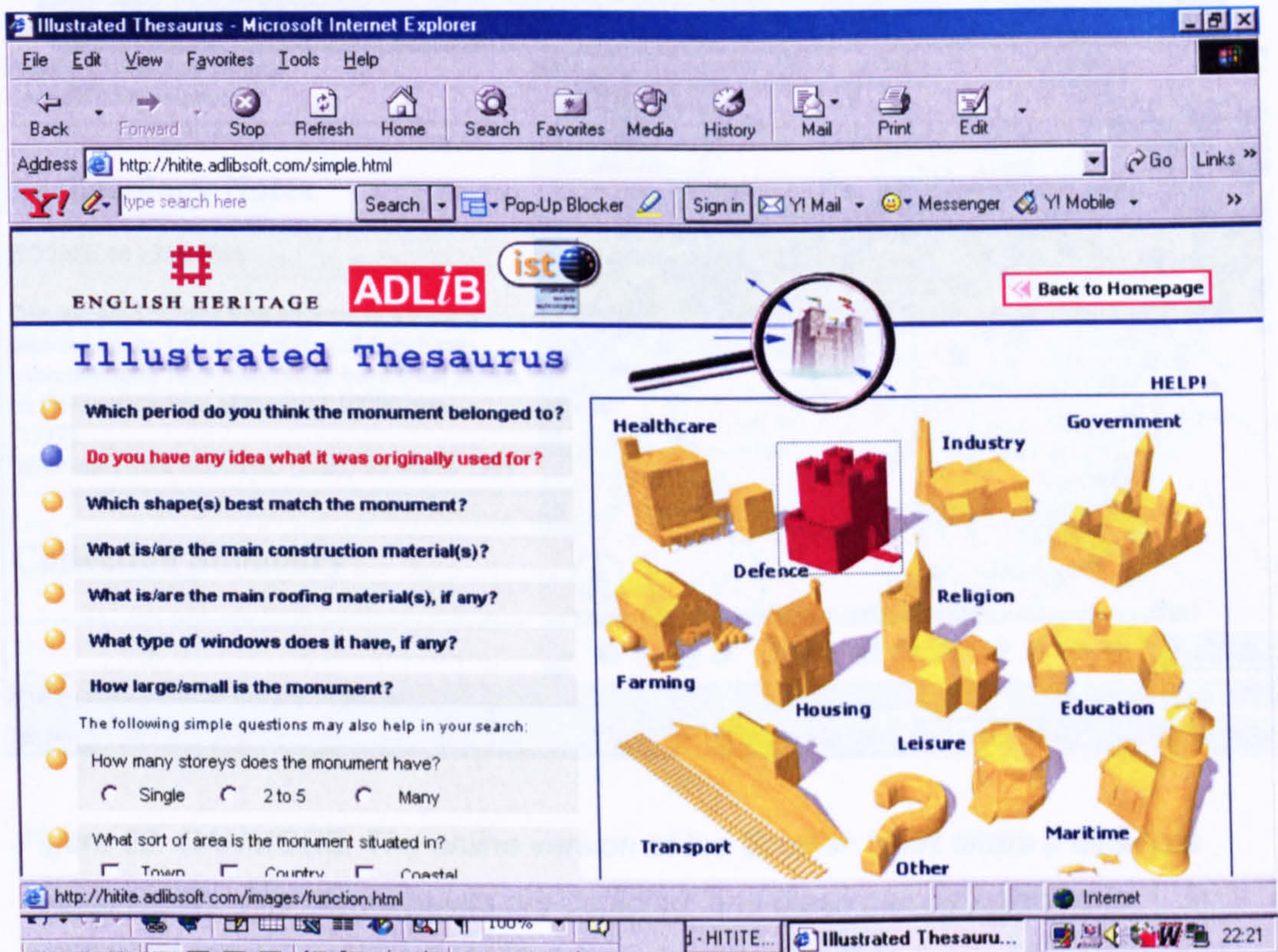
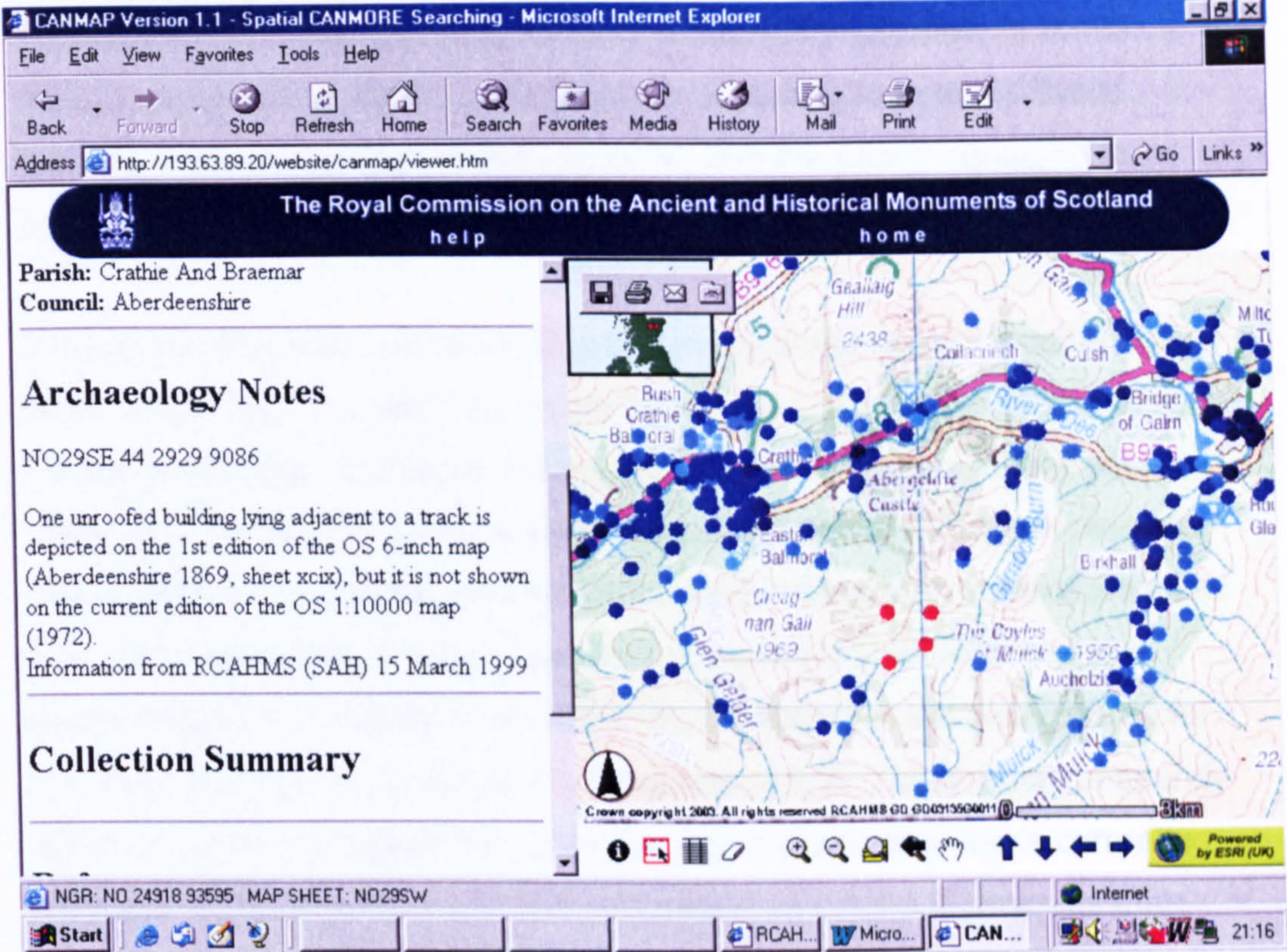


Figure 21. HITITE. A series of question and visual cues help non-expert users to find relevant monument terms. Original in colour.

Most of the online facilities reviewed here (Appendix 8) do not provide much coaching or assistance for the more knowledgeable user. Most do not provide any indications of bias in data coverage, or the quantity of data that the user can expect to receive. Rarely is the user given much help to phrase their searches in a way that will help to ensure the integrity of the search results, and conform to their research aims. This may not be a huge problem if the research only requires some *examples* of monument types (or other types of information) rather than comprehensive *samples* of data. Some researchers may be content to browse rapidly through the equivalent of thousands of 'cabinets of curiosities' and pluck out relevant information. Others require complete or representative information. In these cases the descriptive information regarding the data sets must be

robust enough to allow the researcher to identify potential bias and to judge the character of the search results.



The screenshot displays a web browser window titled "CANMAP Version 1.1 - Spatial CANMORE Searching - Microsoft Internet Explorer". The address bar shows the URL: <http://193.63.89.20/website/canmap/viewer.htm>. The page header identifies the organization as "The Royal Commission on the Ancient and Historical Monuments of Scotland" with links for "help" and "home".

On the left side, the following information is displayed:

- Parish:** Crathie And Braemar
- Council:** Aberdeenshire
- Archaeology Notes**
NO29SE 44 2929 9086
One unroofed building lying adjacent to a track is depicted on the 1st edition of the OS 6-inch map (Aberdeenshire 1869, sheet xcix), but it is not shown on the current edition of the OS 1:10000 map (1972).
Information from RCAHMS (SAH) 15 March 1999
- Collection Summary**

The main content area features a GIS map of the region, overlaid with numerous blue circular site centre points. Some points are highlighted in red. The map includes geographical labels such as "Crathie", "Aberfeldie Castle", "Glen Gelder", and "The Coyles Muck". A scale bar at the bottom right of the map indicates 3km. The map is powered by ESRI (UK).

The browser's taskbar at the bottom shows the Start button and several open applications, including "RCAH...", "Micro...", and "CAN...". The system clock displays "21:16".

Figure 22. CANMORE. The online version of the Scottish NMR offers a GIS-type search facility. Site centre points are depicted, and these can be selected to retrieve record details. Original in colour.

The online search mechanisms also tend to lack other important forms of helpful, intuitive and intelligent assistance that are often provided during staff-supervised SMR and HER searches (Chapter 4, section 4.5; Appendix 5). They often permit reasonably sophisticated searches of datasets, but they do not tend to provide information in ways that could help to inspire greater creativity in search techniques or research strategies. An understanding of the thematic and contextual links between data items is crucial for successful higher-level research. Encouraging researchers to explore potential relationships between data items beyond those that are inherent within the structure of the data set is also important. So too is suggesting other related avenues for research that may be worthy of exploration. Potentially crucial contextual information may not be picked up, even by well-formed search strategies.

Higher level researchers may start with a good understanding of their respective subject areas and their context, but even they do not necessarily hold sufficient skills to obtain appropriate results from specialist HER systems. Kilbride (2005b) cautions us with regard to the higher education sector that “for many online resources the promise of access is illusory” because “students are not able to articulate the sophisticated questions required to exploit the resource, and are poorly equipped to evaluate the resource available”.

Despite the flexibility and ease of use of many online search mechanisms, most require that the user has a very good knowledge of the language and architecture of the databases concerned in order to get the most from the datasets. The present online search mechanisms seem to reflect resource management and general interest users’ preferred search techniques quite well. Basic geographic (*area*) searches, monument type searches and period searches (Chapter 2, section 2.3), for example, are well catered for (for example, Figure 22; Appendix 8, section A.8.2). These types of search are often useful to researcher users too, but the online systems currently available seem to place much less emphasis on search techniques that are specifically geared toward research-user interests.

Many researchers, especially those engaged in higher level research, like to approach their enquiries from a thematic perspective (Chapter 2, section 2.7). Research users must engineer appropriate searches to approximate their research aims from the tools provided. In most cases this has to be done with only partial knowledge of the character and extent of the available information. The problem becomes more acute with ambitious research themes and complex enquiries. In these cases the researcher may need to apply some tortuous logic and parallel thinking in order to design searches that will extract all the available and relevant information.

It is straightforward to design HEIR search mechanisms that can support keyword searches on specific data fields and searches that allow strings of search criteria to be constructed from simple Boolean logic. The applicability and ultimate success of this type of search relies on the user’s familiarity with the structure of the database, and the thesaurus terms employed by the HEIR. For example, an apparently straightforward search of an HER dataset for all Anglo-Saxon period burial sites in support of

research into the changing nature of early medieval burial practice might be phrased: General Period = 'Anglo-Saxon' AND Monument Type = 'burial'.

In theory, the archaeological broad period terms 'Anglo-Saxon', 'early Middle Ages', 'Migration period', 'post-Roman period', 'Anglo-Scandinavian period', or 'pre-Conquest medieval period', 'Dark Age', etc., could be used by an English HER to describe the information pertaining to the post-Roman and pre-Conquest period. The term 'Early Medieval' is the one preferred by the MIDAS data standard (RCHME 1998a, 103).

In fact, many of the online systems currently available do not enable the user to enter long strings of logic as a basis for searches. For those that do, it cannot be assumed that archaeological researchers are sufficiently conversant with logic as expressed in computer systems to make appropriate use of the tools available. Keyword-based searches and searches that require users to integrate terms within Boolean logic strings can be 'hit or miss' affairs.

Directing the user to select the appropriate (HER recognised) search term for the period of time that interests them can be achieved by simply providing drop down lists, or instructions about which thesaurus terms will be recognised by the HER. Similarly, the search mechanism can encourage or insist that users select standard monument terms ('barrow' instead of 'tumulus', 'inhumation' instead of 'skeleton', etc.). Unlocking Essex's Past, for example, provides pick lists of monument types recorded by the Essex Historic Environment Record and monument definitions to help the user decide which to use (Appendix 8, section A.8. 6).

There is widespread consensus that HER datasets should use established common thesauri terms where possible. It is reasonable to expect users to use these terms, rather than to design systems that can cater for all possible variations and colloquialisms for monument terms. Nevertheless, users still face considerable choices in their selection of appropriate terms to satisfy the aims of their enquiry.

For example, if a user's intention is to gather information about all known burial sites of the Anglo-Saxon period, they also need to run searches for

the Monument Types 'cemetery', 'barrow', 'inhumation' and 'cremation', 'human remains', etc. If their research aims to be truly comprehensive and to identify all possible examples of Anglo-Saxon burial places, they might also need to consider evidence such as single and clustered finds of jewellery and dress items and weapons, etc. In the absence of more emphatic excavated evidence, these types of remains often strongly suggest the presence of burials rather than settlement, and merit serious discussion as plausible cemetery sites. What about clusters of settlement for which no related cemeteries have yet been discovered? Surely these should be considered as possible burial sites? Even negative evidence, especially those cases where an unsuccessful attempt was made to investigate or locate Anglo-Saxon burial evidence (for example, an unsuccessful metal detector survey carried out over a reported find spot) may be of interest to the researcher. HER records that derive from such events are not at all likely to be indexed under terms that relate to Anglo-Saxon burials.

Similarly, the character of the local environment in Anglo-Saxon times might be a factor in the distribution of burial sites – was it too wet, too wooded, or the underlying geology not suitable for burial? How might subsequent land use have influenced our view of burial site distribution and frequency? HER records that point to information about the physical characteristics of the contemporary landscape could be very important to this kind of research. Landscape information, rather than monument information, provides the contextual framework for many research questions directed at HEIRs.

Finally, it may greatly help the user if they are offered other (non-monument and non-event) information that pertains to previous academic consideration of Anglo-Saxon burial sites, such as local evidence surveys, resource frameworks and research agendas, published articles, or sources about landscape and settlement characteristics during the Anglo-Saxon period. These are the kinds of resources that many HER staff would be inclined to draw to the attention of researchers when faced with such an enquiry (Chapter 3; Chapter 4; Appendix 5).

Poorly formed HER searches can provide overwhelming quantities of information, or very narrow selections of data, or wholly misleading and

irrelevant information (Kilbride 2005b). Such searches do not just represent lost opportunities to gather knowledge. They can seriously undermine the integrity of research and can greatly discourage users in the process.

5.5 Conclusions

Clearly, proactive HER research skills training has a large role to play in ensuring that researchers are equipped to deal with HER information, and that their search results maintain integrity. Researchers, and those that teach them, should take some responsibility to acquire the skills necessary to get the most from these increasingly important online information resources. Useful steps are being taken in this regard (for example, <http://ads.ahds.ac.uk/project/patois/> ; Kilbride 2005b).

The incorporation of some intuitive and intelligent assistance at the point of search, however, could both enrich users' experiences of online HER use and would help to ensure the integrity of their searches. At its best, it may replicate some of the most rewarding aspects of an assisted manual SMR search (Figure 23; Chapter 4, section 4.5; Appendix 5; Appendix 6). It may promote exploration into avenues of research that were not foreseen by the user or HER compilers.

This kind of assistance should also help to encourage greater HER use among those who are reluctant to engage with Information Technology by displaying a greater empathy with research aims and appearing generally more 'user friendly' to researchers, without risk of condescension. Replicating aspects of intuitive human assistance in the development of online HER search facilities is likely to result in more responsive HER systems that are more able to support research.

In order to promote greater research interest in HER information, online facilities should signal clearly their empathy with research objectives by incorporating mechanisms for thematic approaches to searches, rather than just supporting searches that focus on elemental data units such as monument entities and events.

The thematic mini essays about various periods and subjects presented in *Unlocking Essex's Past* (Appendix 8, section A.8.6), for example, can provide useful starting points for searches, and lend context to results. The ExeGesIS HMBSMR application (Chapter 1, section 1.3) now has a module that allows database managers to write themes, and embed hyperlinks to relevant monuments, events and sources records (www.esdm.co.uk).

However, none of the online systems currently available greatly encourage the sort of dialogue and feedback that occurs in the better staff supervised HERs. The researcher approaches the database, makes their enquiry, and then goes without leaving much of a trace. Their research and experience make no impact on the record, unless their publications are presented and assimilated as new records at some later date.

To become a real focus for research effort and repositories for multi-faceted interpretations of the historic environment, HERs ideally should be user-extensible and encourage contributions to knowledge. They should be able to capture new approaches to research and learn from these to create new search strategies that can be exploited by other users. HERs should capture models and interpretations that extend the core record and provide alternative ways of interpreting data items and the relationships between them. HERs should be able to capture the dialogue of historic environment research as dynamically as they capture new monument or event information.

Figure 23 (below) presents models for HER information exchange. Searching an HER database should be an iterative process, whereby the research user is assisted to translate their research question into a valid search strategy. They should then be able to review the search results and refine their search strategy as necessary, with greater awareness of its implications. The HER and its subsequent users should benefit from any data generated by new research. In the enhanced model (lower diagram), the researcher is not only provided with HER data, but also with potentially relevant concepts and themes that provide contexts for their search results. These may help to suggest new research aims. In this model, the HER not only accrues new data from users, but also assimilates new concepts that suggest new meanings for HER data.

The HER becomes not just a repository for data, but also a focal point for ideas and research ambition: a user-extensible information exchange.

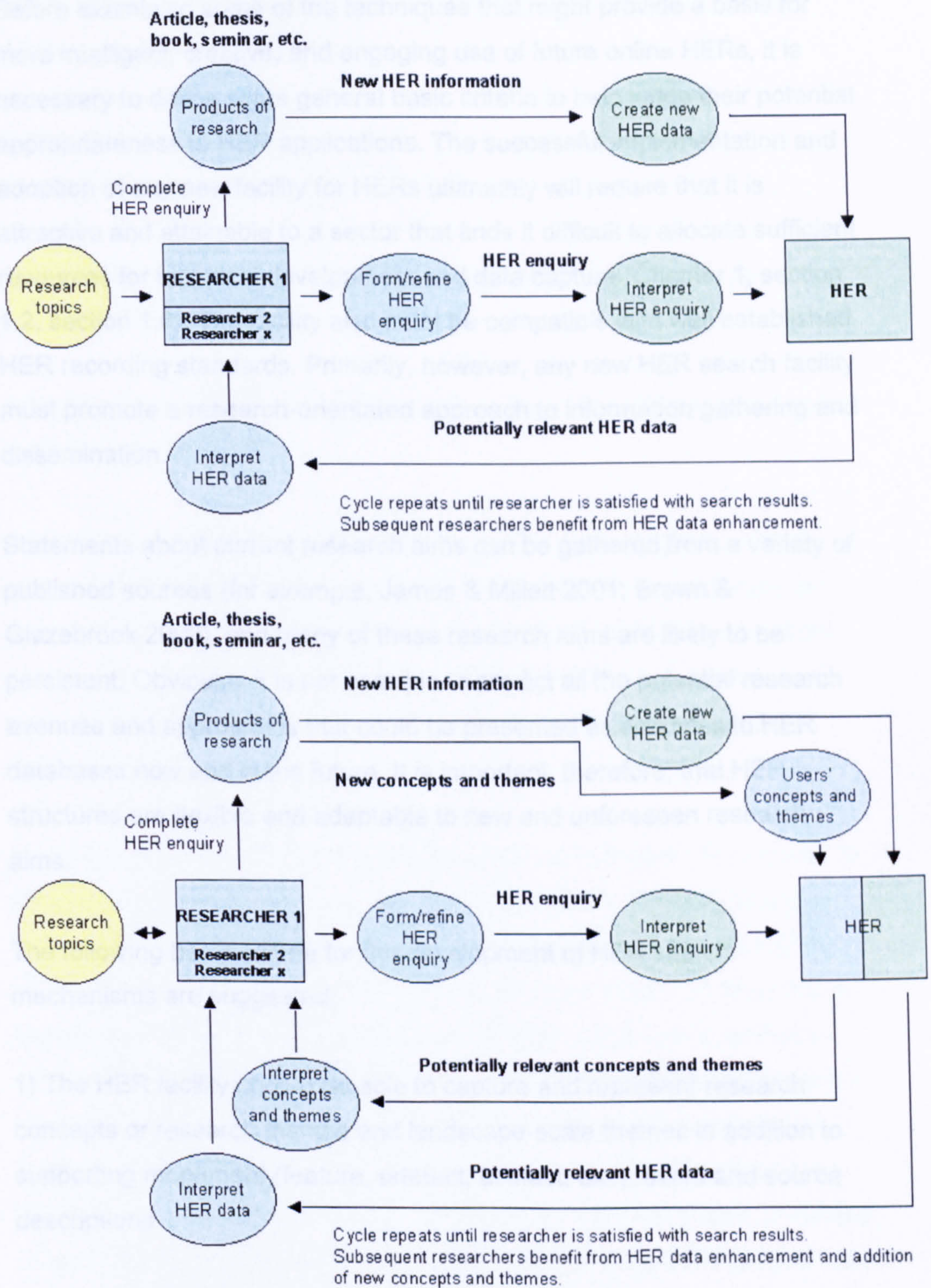


Figure 23. Models for HER information capture and dissemination. Processes and products owned by the user are coloured blue. Those owned by the HER are coloured green. Original in colour.

CHAPTER 6 - A REVIEW OF METHODS THAT COULD PROVIDE A BASIS FOR INTELLIGENT HER SEARCH ASSISTANCE

Before examining some of the techniques that might provide a basis for more intelligent, creative, and engaging use of future online HERs, it is necessary to define some general basic criteria to help judge their potential appropriateness to HER applications. The successful implementation and adoption of any new facility for HERs ultimately will require that it is attractive and attainable to a sector that finds it difficult to allocate sufficient resources for technical development and data capture (Chapter 1, section 1.2; section 1.6). The facility also must be compatible with well established HER recording standards. Primarily, however, any new HER search facility must promote a research-orientated approach to information gathering and dissemination.

Statements about current research aims can be gathered from a variety of published sources (for example, James & Millett 2001; Brown & Glazebrook 2000), and many of these research aims are likely to be persistent. Obviously it is not possible to predict all the potential research avenues and approaches that could be presented as enquiries to HER databases now and in the future. It is important, therefore, that HER structures are flexible and adaptable to new and unforeseen research aims.

The following basic criteria for the development of HER search mechanisms are suggested:

- 1) The HER facility should be able to capture and represent research concepts or research themes and landscape-scale themes in addition to supporting monument (feature, artefact, ecofact, etc.), event and source descriptions.
- 2) The facility should be adaptable to new approaches to research and assimilate interpretations derived from research.
- 3) The facility should be fully MIDAS compatible.

- 4) The facility should support use of the English Heritage Thesaurus of Monument Types and other standard thesauri.
- 5) The facility should be capable of supporting cross-HER searches and should adhere to a recognised shared metadata schema, such as the Dublin Core.
- 6) The facility should be inexpensive to develop and maintain, both in terms of financial cost and HER staff time.
- 7) The facility should be compatible with present technology employed for online HEIRs.
- 8) The concepts underpinning the system should be easily understandable to HER staff and users.

It is necessary to stress that the main objective is to provide a facility for more intelligent searches across HER datasets, rather than a facility to provide searches across disparate datasets. Planning for interoperability, however, is of course highly desirable. Some technical approaches to interoperability and practical examples are described in Chapter 5 and Appendix 8.

In reviewing intuitive search techniques, it will be necessary to consider to what extent the techniques should sit entirely outside the HER structure (i.e. an external query application that harvests and re-interprets HER data) or are inherent within the HER data structure itself. The latter might take the form of an extended thesaurus and data structure, or perhaps involve the development of a separate formal ontology for records of the historic environment. An ontology, unlike a simple word list, is a formal language (or set of rules and vocabulary) that systematically defines the relationships that link terms or concepts within a specific domain or dataset (Cripps et al 2004, 3). Ontologies are not intrinsically hierarchical and can allow multi-dimensional relationships to be defined across data sets. They are explored further below.

Search mechanisms are designed by database designers and managers, but is it possible for a system to learn automatically how to approach thematic research enquiries?

6.1 Artificial Intelligence techniques

The term 'Artificial Intelligence (AI)' defines a suite of computer techniques that attempt to replicate aspects of human intelligence. AI systems are not merely computational engines that process data items. They are expected also to learn and to apply new rules in order to suggest solutions to problems without direct human intervention.

The use of logical rules to govern the way data should be analysed and to initiate automatic procedures, defines computing since its earliest days. The creation of 'Expert Systems' formed the basis of AI as it developed as a significant sub-discipline of computer science during the 1970s and 1980s. Expert Systems made use of decision tables, which attempted to break down relatively complex human thought processes into sets of conditions, inferences and actions that could be replicated in computer systems. At the time, it was widely expected that the developing AI techniques could be applied "to all human fields of knowledge without exception" (Wilcock 1985, 139).

The power of Expert Systems was considered to be their ability to describe precisely the conditions and processes through which interpretations are arrived at ('reasoning strategies'); the assistance they could offer in the development of structured techniques for handling uncertainty in the decision making process, and their synergistic behaviour. Expert Systems were said to hold potential to develop new knowledge in the form of "rules, models, relationships and consequences, or to discover gaps in knowledge" (Wilcock 1985, 139) that had not been foreseen by human experts. By the mid 1980s, 'Expert Shells' (ready-made 'inference engines' for Expert Systems) were available. These could be customised for a variety of applications, such as medical analysis, geographical analysis, etc. Despite their high cost and significant shortcomings in their ease of use, partly attributed to poor documentation and user support, they were applied to some analytical archaeological applications.

Interest in Artificial Intelligence for archaeological applications coincided with archaeology's concern with the definition of systems and processes underlying and reflecting human behaviour, that had long been established by the 'New Archaeology' movement. 'New Archaeology' was characterised by positivist assumptions that correct definitive interpretations of the past could be arrived at with sufficient analysis of the available evidence. The assumption was galvanised by the idea that human behaviour was dictated by systems (economic, religious, social, agrarian, etc.), that gave rise to processes that could be identified in the archaeological record. 'New Archaeology' encouraged the scientific measurement and numerical analysis of archaeological evidence.

Patel and Strutt (1989, 339) considered that AI could be of most use to archaeology by assisting specific analytical techniques: the classification of artefacts, the interpretation of archaeological data, and the modelling of archaeological reasoning.

The starting point for the design of early Expert Systems for archaeology was a consideration of the nature of human knowledge, and the character of archaeological reasoning. Ennals and Brough (1982) quoting Hawkins (1981), considered an expert to be "someone who can negotiate an agreed interpretation of a subject with the help of special knowledge and user opinions". An expert, however, was not to be considered the sole source of appropriate interpretation, but rather an "analytical tool, helping the users make well-informed decisions without forcing them to accept any particular interpretation or procedure". Ozawa (1989, 375) described human expertise and knowledge as a "large continuous body". This diffuse knowledge resource had to be segmented into "unit rules" in order to be expressed within an Expert System.

These broad definitions served as guiding principles for one early prototype archaeological Expert System application that modelled field monument identification rules (Ennals & Brough 1982). Simple rules of the type "if the earthwork is rounded, it is probably a barrow" had been pre-defined by a popular archaeological field guide publication. The Expert System allowed users, simply by answering a series of questions, to interpret what they had observed in the field. In doing so, the system

foreshadowed some of the principles and techniques employed by the much more comprehensive 'Hitite' and 'Pastscape' systems developed twenty years later (Chapter 5; Appendix 8). Using similar techniques, Ozawa (1989) attempted to model the interpretation rules used to help date certain artefacts, with some success.

Greater success was achieved in the development of an Expert System to age domestic animals from an analysis of their teeth (Brough & Parfitt 1984). And another early in-road in archaeological analysis was made by a project to assist the classification of Beaker pottery (Bishop & Thomas 1984). It was acknowledged generally that the most successful archaeological applications of Artificial Intelligence concerned only small well structured areas of the discipline that benefited from an existing good understanding of a limited set of scientific variables (Wilcock 1985, 142; Brough & Parfitt 1984, 51; Ozawa 1989).

There was some optimism, however, that further developments in computer science would allow a far greater range of more testing archaeological applications. Expert Systems, it was suggested, could be used to improve archaeological deductive reasoning by simulating ancient cognitive processes – literally modelling the non-observable aspects of archaeology and testing these models against the available physical evidence (Biskowski 1990, 32-35). Indeed, the sheer quantity of archaeological information that was being generated at the time led many to think that comprehensive analysis and interpretation of very large data sets was unmanageable without the assistance of automated reasoning. Exponents considered that Artificial Intelligence techniques offered the only realistic solution to the future meaningful interpretation of the archaeological record (Wilcock 1985, 142; Brough & Parfitt 1984, 55; Bishop & Thomas 1984; Ennals & Brough 1982; Patel & Stutt 1989, 346; Vitali 1991, 209; Bisowski 1990, 23-33).

Despite early promise, wider ambitions to capture and model the many different kinds of archaeological knowledge that were routinely employed for archaeological interpretation, continued to elude the developers of Expert System applications. The elusive nature of the task of replicating human thought, especially archaeological thought, within a computer system is exemplified in the work of Arthur Stutt (1989).

Within the confines of the limited technical prowess of the computer systems of the time, Stutt was able to create an application that generated simple interactive computer graphic diagrams to represent the flow of arguments produced by the user and the application. In reviewing the success and efficacy of his system, however, he noted the difficulties in obtaining adequate models of areas of archaeological expertise (Stutt 1989, 198-200). He also noted the general inability of computer systems to capture “all the background necessary for arguing” (Stutt 1989, 203-204). This may be described as all the knowledge that provides the unspoken context for the discussion of a particular topic – values, ideas, knowledge, and experience that humans bring to discussion. Superficially, much of this may seem unrelated to the topic in hand, but it is this contextual knowledge which helps to sustain arguments and generate solutions. Most archaeological thought was not as driven by ‘rules’ as it need be for easy translation into Expert Systems. The capture and management of immense quantities of contextual information was beyond the capabilities of such systems. As Wilcock (1999, 38) put it, Expert Systems were not able to accommodate “the extremely diffuse nature of the archaeological situation”. Just as crucially, Artificial Intelligence was still noted to be poor in handling complex logic and incomplete and uncertain information (Vitali 1991, 209).

Stutt therefore considered the chief benefits of his system not as a facility to replicate human argument, but rather as a means of providing a method of argument analysis and a ‘language’ for arguing (Stutt 1989, 197). So the problem was almost turned on its head. If archaeological thought could not be modelled adequately by Artificial Intelligence techniques, archaeologists at least could be encouraged to think in more structured ways that were more compatible with Artificial Intelligence systems.

Stutt’s suggested future developments focused on the use of computer applications to support and model arguments provided by users, to communicate knowledge, and to provide “the interface between the user and archaeological knowledge stored in an electronic form” by providing “reasoned positions about the contents of its knowledge” (Stutt 1989, 218). He also envisaged sending the application “off in a search through a given database (or set of databases) in an attempt to find supporting or

conflicting evidence” (Stutt 1989, 219). The application was to become not the method of analysis, but rather “an intelligent (and argumentative) guide through a hypertext system” (Stutt 1989, 220-221). In these respects, Stutt suggests developments that foreshadow some aspects of the Semantic Web (below).

Stutt later developed some of these ideas in the WORSAAE (WORKbench Supporting Archaeological Argument Exploration) project. The aim of the project was to create an AI based application that acted as an aid for the production and evaluation of archaeological arguments or academic interpretations and debate (Stutt & Shennan 1990, 54-55). He concluded that simple Expert Systems were not well suited to the task because of their reliance on formal systems and logic. Arguments, he suggested were not only a set of structured propositions, but rather dialogues or conversational exchanges. They must incorporate some shared beliefs and knowledge about the context and situation of the argument and its protagonists. They also benefit from shared beliefs about what constitute “good moves in an argument”, and even what “constitutes a good argument” (Stutt & Shennan 1990, 59-60). The role of AI applications now was not to provide definitive answers to problems of archaeological interpretation, but rather to store and test complex arguments in order to “stimulate archaeologists to produce new ones” (Stutt & Shennan 1990, 69). Stutt and Shennan’s 1990 thoughts on the future directions of archaeological Expert Systems signal the end of the initial positivist phase of archaeological Artificial Intelligence development.

The history of work on archaeological AI applications reflects the general shift in archaeological theory away from the certainties of processes and systems, to the more equivocal world of Post-Processual thought. Specifically, that the definition and expression of argument, and the generation of multi-faceted explanations, are more worthy and realistic aims than attempting to reveal absolute truths about the past.

It is notable that few of the Artificial Intelligence applications that were introduced by contributors to archaeological computing forums during the 1980s and 1990s, had progressed beyond planning, prototype, or demonstration stages (for example, Lagrange & Vitali 1989; Stutt & Shennan 1990; Biskowski 1990). At the end of the century, Irwin Scollar

(1999, 8) reported that “Artificial Intelligence methods enjoyed a mild boom during the 1980s, but interest died out almost completely afterward...AI techniques have not met with acceptance in the archaeological community as a whole, and this resistance is probably the reason for the abandonment of such techniques”. In a detailed analysis of the topics covered in the twenty-five years of *Computer Applications in Archaeology* (later renamed *Computer Applications and Quantitative Methods in Archaeology*) conferences and proceedings publications, simulation and Artificial Intelligence accounted for only 6% of all papers. At the time of Scollar’s study, only ‘pattern recognition’ (4% of papers) apparently had received less attention from contributors. Statistics and database subjects each accounted for 23% of papers (Scollar 1999, 7). The number of papers relating to GIS subjects (9% of papers) was set to mirror the dramatic increase in interest in archaeological GIS applications over the next five years. Some further confirmation of the poor progress made by Artificial Intelligence in the discipline, was obtained from respondents to Scollar’s complementary survey regarding the strengths and weaknesses of the development of computer applications in archaeology. The survey was small, but it is significant that progress in the field of AI was among the few areas described as “unacceptable” by survey respondents (Scollar 1999, 9).

Though it has long been accepted that it is difficult to capture archaeological reasoning as a set of Expert System rules, Artificial Intelligence has developed new methods that are less rule-driven and rigid. They include approaches that are based on observations of human thought and the analysis of patterns formed by the interactions between separate information components. Neural networks are able to learn by example, and by their own failure, and then apply their new-won knowledge to new problems. They are also able to cope with ambiguity by estimating and attempting to extend their reasoning beyond their secure knowledge base (Lock 2003, 142).

There have been some valuable analytical successes in archaeology, particularly in spatial pattern recognition applications (Lock 2003, 150-151). Present evidence suggests, however, that AI techniques are still best applied to well-defined discrete archaeological problems, such as modelling crowd movement in Roman amphitheatres (Gutierrez et al 2005,

39) or assisting predictive prospecting (Botica, et al 2005, 75), rather than acting as general archaeological interpretation tools. The AI “virtual archaeologist” or even the AI tool to untangle archaeological reasoning (Barcelo 2005, 73-74), still seems a very long way off. Papers touching on Artificial Intelligence applications are still all but absent from *Computer Applications and Quantitative Methods in Archaeology* proceedings in the new millennium (www.caaconference.org).

It seems unlikely that Artificial Intelligence techniques could form the basis of intelligent HER enquiry facilities for the foreseeable future. Although HER data sets are now set within a rational framework provided by (for example) MIDAS and Inscription terminology control, they nevertheless represent a very wide range of archaeological phenomena that can be interpreted in a huge variety of ways. The enquiries that researchers bring to HERs are of varying complexity and span the full range of archaeological evidence recorded by HERs (Chapter 2; Chapter 3; Chapter 4). Historic environment research is boundless. Only a subset of this research considers the sort of numerical and spatial problems that could be assisted by Artificial Intelligence techniques.

Artificial Intelligence is complex and experimental. It seems unlikely that there would be sufficient support to develop meaningful Historic Environment Record search AI applications within a sector of the discipline that finds it difficult to meet existing data capture and developmental needs.

Realistically, the task for intelligent assistance in a HER search interface is not to act as a tool to suggest interpretations of the evidence recorded by the HER, but rather to point the user towards information that is likely to be relevant to their research aims.

6.2 Using the NMR Monument Thesaurus structure to its full potential

Is it possible to use inherent features of the existing English Heritage NMR Monument Type Thesaurus structure as a basis for more intuitive and intelligent searches?

The English Heritage NMR Monument Type Thesaurus (<http://thesaurus.english-heritage.org.uk>) is structured in a hierarchical way: monument type terms are listed below their relevant 'Monument Class' categories. There are 'Broad Terms', under which a list of 'Narrow Terms' is defined. The term definitions often also include a 'Related Term' section that lists other thesaurus terms that may define associated monument types (Chapter 5, section 5.2). There are no formal definitions of these associations, and no degrees of relatedness are expressed.

Taking the example of a research enquiry centred on gaining a comprehensive list of Anglo-Saxon burial sites, it is apparent that an attempted 'catch all' HER search based on the terms 'Early Medieval' and the Monument Class 'Religious, Ritual and Funerary' would produce a far too broad range of evidence. This monument class currently comprises around 415 terms. The 'Early Medieval' period qualification would automatically discriminate most of these terms from the results, such as those monument forms associated specifically with prehistory or the Roman period, for example.

Nevertheless, the simple search string may still return examples of monument types such as 'cross', 'hermitage', 'hill figure', 'holy well', 'inscribed stone', 'monastic precinct', 'place of worship', 'religious house', 'rune stone', 'sheila na gig', etc., and many associated narrow terms that are not at all likely to be relevant to the research aims. Searches of large data sets would result in unmanageable quantities of irrelevant data.

The opposite problem would occur if the search were limited to the term 'burial'. If the search mechanism allowed for the term 'burial' to be found in a longer term (i.e. if the 'like' or 'contains' qualifier commonly found in database search options was employed), the search theoretically could also automatically pick up many of the narrow terms of 'burial': 'animal burial', 'bed burial', 'bog burial', 'cart burial', 'casket burial', 'charcoal burial', 'gypsum burial', 'ship burial', 'tile burial', etc. But it would not, for example, return monuments linked under the narrow terms 'cremation' and 'inhumation', or for that matter the related term 'ossuary'.

If HER staff consistently followed the Thesaurus's suggestion under the term 'burial' to use the term "...*funerary site* for optimum retrieval in searches", this should offer the prospect of more comprehensive retrieval of relevant evidence in this type of search. This approach would suit the 'lumpers' (Chapter 1, section 1.3) but it would also be contrary to the general advice to "use specific [monument] type where known" (also given by the Thesaurus under the term 'burial' and elsewhere), readily accepted by the HER 'splitters'. It would not help those users who are really only interested in cremations or ossuaries.

One way of introducing intuitive assistance into keyword enquiries would be for the HER system to interpret the search keyword, and to automatically present the user with the option to select the broadest term possible (but not 'monument class'). The HER search interface would automatically generate a search that drew on the full power of the hierarchical structure of the thesaurus. In effect, a wider search would be instigated automatically on the user's behalf. This could draw on all levels of narrow terms and related terms associated with the broader term. In the above example, the search mechanism would accept the term 'burial', provide all records indexed under that term, but also automatically provide an option to view all records indexed under related terms and all other narrow terms organised under the broader term 'funerary site' within the thesaurus structure.

Searching for Bronze Age structured landscapes and their association with funerary monuments provides another example (Appendix 5).

The term 'barrow' (which belongs to the subset of the broad term 'funerary site'), encompasses the narrow monument terms 'bank barrow', 'chambered barrow', 'long barrow', 'round barrow', 'pond barrow', 'ring barrow', etc. The Thesaurus also draws attention to the related terms 'barrow cemetery', 'burial cairn', 'mortuary enclosure', 'mortuary house', and 'mound'.

The term 'barrow', its parent broad term and its narrow terms, all belong to the 'religious ritual and funerary' monument class, which covers monuments as diverse as Wesleyan Reform Union Chapels to fogous. But

the term 'ring ditch', under which many probable barrows are likely to be indexed, does not of course appear within this monument class.

The term 'field system' falls within the 'Agricultural and Subsistence' monument class. This class contains around 250 terms. As with the 'religious ritual and funerary' class, only a small subset of these terms is of possible relevance to the Bronze Age research enquiry posed above. Monuments such as 'donkey house', 'piggery', 'cheese loft', 'fruit growing wall', etc., for example, are not at all relevant.

The 'narrow' and 'related' terms of 'field system' include potentially more useful terms such as 'aggregate field system', 'celtic field system', 'centuriated area', 'coaxial field system', 'enclosed field system', 'field', 'cairnfield', 'cultivation terrace' and 'cultivation marks'. But they also include some terms that are unlikely to be helpful, such as 'open field system', 'lazy beds', and 'water meadow'.

Terms such as 'enclosure', 'ditched enclosure', 'trackway', 'ditch', 'drove', that may help the user to identify elements of hitherto unrecognised Bronze Age field systems, do not belong to the 'Agriculture and Subsistence' class.

In conclusion, the Monument Thesaurus effectively encodes simple relationships between monument entities within its structure: 'Y' is a narrow term for 'X' and is related to terms 'W' and 'Z'. Theoretically, these could be used to suggest alternatives and additions to the search term entered by the user. However, a large number of irrelevant options would be returned in most cases, serving only to confuse the user.

Perhaps the introduction of a period qualifier for each Thesaurus term, in order to define the time span for which the term is relevant, would introduce another set of helpful relationships into the Thesaurus ontology. Exploiting these relationships would assist the automatic discrimination of irrelevant options from the search suggestions.

The task of representing to the user the possible relationships between Thesaurus monument terms *within the context of their research theme*, is not straightforward. Neither is the task of suggesting other potentially

relevant information. The MIDAS structure and Monument Thesaurus are not well adapted to pointing the user towards important information items that are not tied directly to specific monument entities or recording events.

The arrays of basic recording units captured by HERs are, of course, underpinned by concepts of interpretation and value judgements made by those who gathered the evidence in the first place. These interpretations are themselves reviewed and re-interpreted by HER staff who have to translate the information into forms of data that are acceptable within the HER structure (Figure 24). Current HER structures actually encourage sophisticated interpretations, which perhaps explore multiple models of explanation and link many types of monument within complex patterns of relationships, to be disassembled and broken down into simple discrete monument-scale descriptions. In the process of disassembly and translation into HER format, the broader concepts linking monument entities, and the theoretical models used by the source archaeologists to interpret the evidence, are usually greatly diluted or entirely lost.

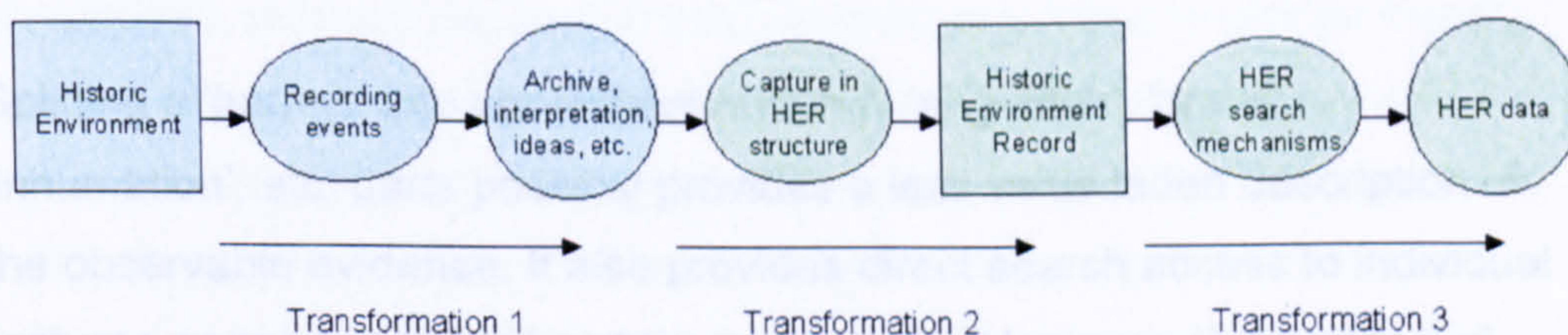


Figure 24. The transformation of historic environment information. Interpretations of the historic environment go through stages of transformation between field investigation and dissemination to HER users. Those mostly owned by the fieldwork originator are shaded blue, those owned by HER professionals are shaded green. The character and severity of the transformations are determined by recording structures, cost and time constraints, staff judgement and ideology, processing capabilities, etc. Original in colour.

There is no formal way within the MIDAS recording units or the English Heritage Thesaurus of Monument Types, to represent interpretation that encompasses a range of monument evidence linked by multi-dimensional relationships. Links to research interpretations, landscape-scale observations, thoughts, frameworks and agendas, are not incorporated into MIDAS HER data structures as indexing units.

The process of creating a simple database of standard monument types from complex readings of the real archaeological world is one that worries some academics. It leads to accusations of rigidity in interpretation and classification that are said to stifle research (Chapter 4, section 4.2; Appendix 4). Seen as inevitably 'dumbing down' interpretation, and recording only approximations of archaeological evidence, HERs can be perceived as very blunt tools for supporting serious research. Their lack of ability to capture archaeological reasoning in anything other than very simplified forms, gives the general impression of apathy towards the process of archaeological thought. This does little to encourage the appreciation of HERs as research resources among the academic community.

Perhaps the effects of the transformations inherent in the HER data capture processes can be mitigated by reducing monument elements into smaller descriptive units?

Splitting a 'barrow' into constituent 'mound', 'ring ditch', 'grave', 'inhumation', etc. parts possibly provides a less value laden description of the observable evidence. It also provides direct search access to individual features or components of certain monuments. However, this method of recording further separates the interpretative process from the broader monument entity - in this case, the interpretation that the constituent parts are considered to add up to a barrow. It makes the researcher's task of selecting appropriate search terms much more difficult, by introducing the necessity for many more keyword permutations into search strategies.

HER search applications that are based around the Monument Thesaurus and MIDAS have the potential to offer the user a choice of reasonably sophisticated search strategies. These established standards provide a good basis for the organisation and retrieval of sets of logically constrained

monument data. However, there are inherent limitations in addressing archaeological research enquiries within monument-based record structure that is inhibited by limited hierarchical relationships.

6.3 World Wide Web search techniques and Semantic Web developments

The concepts underpinning the structure of the World Wide Web have been described in basic terms in Chapter 5. As the content of the Web continues to increase in accordance with its unconstrained principles, much recent thought has been given to the problems that users face in obtaining relevant information from searches that can generate tens of thousands of miscellaneous relevant, potentially relevant and totally irrelevant results (Berners-Lee, Hendler & Lassila 2001; Miller 2004). Users are often swamped by information and, therefore, are not able to make the most effective use of the full range of sources that are potentially available to them. Clearly, this is very much akin to the problem faced by users of large HEIR data sets. Do established Web search techniques or Semantic Web principles, therefore, provide useful models for HER search interfaces?

The challenge faced by Web search engines is to pick out, from millions of possibilities, relevant pages that contain information that conforms closely with the user's search aims. They must do so with limited information regarding the purpose of the user's search – usually solely from a keyword or short phrase entered by the user. They must interrogate Web pages built and maintained by a vast number of organisations and individuals, who have used a vast variety of formats, and which contain varying amounts of authoritative, poorly-informed, and downright misleading information. It is perhaps surprising that Web search engines manage to return any useful results at all.

'Google', which handles enquiries from 380 million different users per month (as at December 2005; <http://www.google.com/corporate/facts.html>), is widely acknowledged as one of the premier Web search engines. It employs a tool named 'PageRank' to scan the content of the World Wide Web and to automatically rank Web sites on the basis of links to them from

other Web sites. The Google system assumes that the more links pointing to a Web site there are, the more authoritative and useful it is likely to be. It is a system that is based on recommendation or citation, whose integrity is claimed to increase as the World Wide Web grows. Obviously, it is also vulnerable to deliberately introduced bias and ignorant perpetuation of popular, rather than authoritative information.

Like other search engines, Google's main user interface comprises a keyword entry system. Entering several keywords invokes an automatic Boolean logic 'AND' in which all keywords must be present in the entered order for a Web document to be considered most relevant to the search. The order of the keywords in the document matters to Google's appraisal of its relevance. Users also can invoke a logic 'OR' string of keywords, or can search for specific phrases of words by placing them within quotation marks.

A 'NOT' operator, which will return documents that do not contain the chosen keywords, is available. Other search qualifiers include the ability to specify the language and file formats of the documents, qualifiers to ensure that documents are up-to-date, based on when they were last updated. Users can also search for documents that contain numbers within specified ranges.

Keyword searches often are assisted by the automatic stemming employed by Google, which ensures that the search takes similar words into account (such as archaeology, archaeological, archaeologist, etc.). Users may specify a search for synonyms of their chosen keyword by placing a '~' symbol in front of the keyword. Another tool can help (to a limited extent) to overcome the problem of using keywords with multiple meanings. A '-' symbol will exclude a word from a search. For example, "bass -music" will tend to return documents containing non-musical occurrences of the word 'bass', such as those associated with the fish of that name (<http://www.google.com/help/basics.html#keywords>). Google provides other tools that allows users to avoid 'adult' content Web sites, to search only for sites within specific domains, and to search for services and products within certain (American) towns and postal areas.

I suspect, however, that a high proportion of users do not use Google to its

full potential, but confine their search strategies to single keywords and simple phrases and expect good results from those. The pitfalls and frustrations of the Google search, with regard to specialist subject areas like archaeology, have been discussed by Richards (2006, 970). A simple search using the term 'barrow', for example, produces an overwhelming quantity of irrelevant information.

Google's co-founder, Larry Page, has stated that "The perfect search engine would understand exactly what you mean and give back exactly what you want" (<http://www.google.com/corporate/facts.html>). In order to do so, however, the search engine also would have to understand what the content of Web documents actually means, rather than simply pick out occurrences of words and phrases.

XML allows some meaning to be ascribed to the structure of Web documents. Its use alone, however, is not enough to help Web programs to make automatic reasoned choices about how items should be retrieved in order to satisfy user requirements (Broughton 2002).

The development of a 'Semantic Web' has been proposed as one means to increase the intelligence and power of Web searching (Berners-Lee, Hendler & Lassila 2001).

The Semantic Web is not envisaged as an alternative to the Web, but as an extension to existing standard Web provisions. The Semantic Web, therefore, has to share certain important basic Web principles. It should not to rely on central control, and must allow unconstrained growth.

The Semantic Web's anticipated power, however, lies in its ability to create a framework whereby rules and inferences can be used automatically, in order to provide more creative and relevant answers to questions posed of Web-accessible information. To do this, a language is required that expresses "both data and rules for reasoning about the data" and furthermore that allows "rules from any existing knowledge based system to be exported onto the Web" (Berners-Lee, Hendler & Lassila 2001).

Such languages, or ontologies, would need to be created for millions of domains (or subject areas) if the Semantic Web was to meet its potential.

The developing Semantic Web, like the present Web, would still require tolerance of imperfection, but would gradually allow much more focused searches within subject areas.

In fact, ontologies for some heritage subjects are already in place.

6.4 The CIDOC Conceptual Reference Model

The CIDOC Conceptual Reference Model (CRM) has been developed as a tool to enable information exchange and integration between different heritage information resources (Crofts et al 2003a). It is a formal ontology that creates a framework for the definition of collections of heritage information. This enables either the pooling of resources from several institutions via the Internet, or the integration of information resources held within a single institution.

The development of the CRM grew from a failure to develop a single detailed comprehensive relational data model that could be applied to different databases that covered the full range of museum collection categories. In attempting to define sufficient suitably detailed and descriptive data fields and the relationships between them, the model grew into a massive and unwieldy schema. It neither fulfilled basic criteria for user-friendliness, nor truly represented the depth and range of collections information for many specialised subject areas. In its final form in 1995, the model contained 430 entities and was considered to be beyond further manageable development (Crofts et al 2003a). At the time of its inception, it was assumed that common data schemas had to be adhered to if data exchange and cross database searches were to be achieved. The ongoing development of mediation systems that were designed to manage data from different and varied sources (for example, Chapter 5), however, led to the realisation that it may be possible to link the contents of different databases using higher-level concepts, rather than shared, rigidly defined entities. Accordingly, though drawing on a heritage of initiatives extending back sixteen years, the first version of the CRM, in development between 1996 and 1998, marks a significant departure from the former CIDOC relational model (Crofts et al 2003a). The CRM has undergone several amendments since its first release and has been accepted by the

International Standards Organisation draft documentation standard (Crofts et al 2003b, Appendix).

The CRM is a high level ontology. It is concerned only with the semantics of database structures. It does not define what should be recorded with specific databases, or dictate the terminology that should be employed. Furthermore, it is extensible in that users are “encouraged to create extensions for the needs of more specialised communities and applications”. It is adaptable, so that for reasons of economy, or the particular requirements of data sharing in specific applications, only parts of the CRM data structure need be adopted by record systems (Crofts et al 2003b, i-ii).

Rather than providing an all-embracing data structure that must be applied in full without variation, the CRM promotes the cohesion of databases by seeking to represent the underlying logical character of their structure and what they document, thus enabling “semantic interoperability” (Crofts et al 2003b, i).

The CRM is intended to accommodate the quality and depth of information designed to support serious academic research. As such, it potentially offers a more attractive route into HER information for higher level researchers than the classification tools developed for the Pastscape and Hitite systems (Chapter 5; Appendix 8), for example.

The CRM defines sets of object "Classes" (or global concepts) and "Properties" (roles and relationships between classes). Classes are denoted by an 'E' prefix and a number. Properties are denoted by the letter 'P' (Crofts et al 2003b).

So for example, the fact that *someone* has measured *something*, could be expressed by the following text formula:

<<E16 Measurement Event >>-<<P14 Carried out by (performed)-<<E21 Person>>

The intension is that these formulas will be understandable to documentation managers and systems analysts alike, and will be readily

converted to computer-readable formats such as RDF Schema and XML, etc. (Crofts et al 2003b, iii)

The CRM has been designed to accommodate all aspects of the documentation of museum collections. The definition of museum collections proposed by the International Council of Museums (ICOM), also embraces "sites and monuments" (Crofts et al 2003b, ii). In fact, because of the variety of classes and properties defined by the CRM, it is theoretically applicable to a wider range of tasks.

The different systems for different specialist areas employed by the English Heritage Centre for Archaeology, for example, have been mapped to the CRM. So too has MIDAS (Cripps et al 2004; May 2005, 7-8). However, the CIDOC CRM has not yet been used widely in HEIR dataset applications.

The CIDOC CRM database creators' need to model the relationships between types and elements of the subject matter within their databases, is reminiscent of the interpretative rule sets employed by Expert Systems. While structural definition is obviously necessary for targeted data retrieval, it is already well-known that imposed formal data structures can only represent a small proportion of the concepts that surround archaeological interpretation. There are already some suggestions that high level formal ontologies like CIDOC CRM would be best applied to relatively small and well-structured areas of the discipline (Richards 2006, 976-977).

Do other techniques offer the possibility of mating core structural conformity with a more democratic, and a less constrained, approach to the expression of historic environment concepts?

6.5 Wikipedia - a user-defined information resource

Wikipedia is a free online encyclopedia. It embodies much of the spirit inherent in the World Wide Web - unconstrained growth, free, participatory, and lightly regulated. Begun in 2001, and administered by the Wikipedia Foundation (a not-for-profit organisation), in early 2007 it comprised over 6

million articles, written in 250 different languages. It is now among the 12 most visited Websites. (<http://en.wikipedia.org/wiki/Wikipedia>).

Anyone can write or edit a Wikipedia article, and there are policies, guidelines and tutorials to assist users to do so. There is no formal editing process. Vetting is achieved by consensus and ongoing revision by others, although voting and sometimes veto by the Wikipedia Foundation are used to judge the appropriateness of controversial content.

New entries and edits are instantly added to Wikipedia, which employs a custom-made content management system and mark-up language for the purpose. Authors are encouraged to make liberal use of hyperlinks between articles and, if necessary, to external sites. This has resulted in a vast array of contextual links and connections within and between subject areas.

The online editing process means that it can instantly accrue new definitions, perhaps in response to unfolding current events, in a way that is impossible in traditional and non-online digital encyclopedias.

Wikipedia's promotion of "consensus over credentials" has been criticised. Wikipedia does not use as many references and citations as traditional publications. It is vulnerable to subversion and vandalism, and suffers from uneven coverage and bias in certain subject areas. Nevertheless, Wikipedia is claimed to have achieved acceptable levels of accuracy, that are often comparable to traditional encyclopaedias (<http://en.wikipedia.org/wiki/Wikipedia>).

Unlike the unassisted Google search reported by Richards (2006), entering the word 'barrow' into the Wikipedia search engine results in a list of suggestions about its possible meaning. So although subjects as diverse as Clyde Barrow (of Bonnie and Clyde fame), Barrow Crater (on the Moon), and castrated pigs, are offered, it is easy to identify and select the one associated with the definition of a 'tumulus'.

Selecting the tumulus link brings forth a brief explanatory paragraph, and sections describing various examples around the world, some of which are accompanied by photographs. There is a small references section, and

links to definitions of British barrow types: long barrow, round barrow, pond barrow, etc.

The organic growth of Wikipedia, and the lack of an editorial policy, shows in the quality and emphasis of certain aspects of this article. Nevertheless, with one or two exceptions, it serves as a reliable general introduction to the subject. This is of course the limit of most general encyclopedias' ambitions. Specialist interest encyclopedias, working on the same principles for specific subject domains (like archaeology), would undoubtedly develop more authoritative and finely-tuned articles.

The entirely collaborative construction of Wikipedia has its drawbacks, but it also suggests ways in which Historic Environment Records could engage and collaborate more closely with ongoing archaeological research dialogue.

6.6 Armadillo - creating structure using natural language processing

Manually tagging (or marking-up) text to identify index information items, or to create links between items, allows data managers to introduce easily navigable structure into documents. Applied structures can be designed to assist different user needs (Richards 2006, 975-976).

Manual tagging is time-consuming and subjective, but techniques have been developed to automate the process. The Armadillo Historical Data Mining project ([http:// www.hrionline.ac.uk/armadillo/](http://www.hrionline.ac.uk/armadillo/)), for example, is of potential relevance to the organisation of unstructured (or partially structured) historic environment information.

The project has been set up by University of Sheffield Natural Language Processing Group. Its purpose is to investigate the automated creation of machine-readable content (mark-up) for the Semantic Web, from less structured documents and sources.

For the purposes of experimentation, the Armadillo project uses a set of digital and online resources pertaining to eighteenth century London, in

order to test applicability to other arts and humanities applications. The resources include The Old Bailey court proceedings, the Westminster Historical Database (poll books and Parish rate books), historic gazetteers of London street and place names, fire insurance policies, etc.

Armadillo retrieves information items using pre-defined ontologies. For the Historical Data Mining Project, the ontology is centred around dates, names, and places.

Using the ontology rules, a particular item of information, such as a person's name, can be traced through the range of source documents. The resulting index could be used, for example, to build up a profile of their lifestyle and activities. Personal names may be thoroughly indexed by some inventories, but perhaps only occur incidentally in others. In fact, The Old Bailey database already allows sophisticated text searches on many indexed fields. However, there is plenty of scope for Armadillo to mine research information that is not indexed, such as stolen items (Mark Greengrass, Armadillo Historical Data Mining Project pers. comm.)

It would be a massive task to manually trawl through all the sources to build up a comprehensive set of references. But it is also not straightforward to automate the process. The data mining tool must consider variations in spelling, formatting and context, in order to correlate potentially similar information items. There are many ways, for example, that the personal name Jonathan Peter Smith could be recorded in eighteenth century documents (J.Smith, J.P.S, John Smith, John P.Smith, Jonathan Smith, etc.). How does Armadillo obtain confidence that we have an occurrence of the right John Smith, and not another, or an unrelated company of that name?

This parsing process is helped by using a statistical basis to describe probable variations of the sought term, and then determining which combinations of words are most likely to correlate and amount to the same piece of information.

The process cannot be perfect, and requires some manual verification, but it offers the possibility of a more comprehensive and objective search than could be achieved manually. The Historical Data Mining Project has yet to

be fully evaluated. Versions of the application, however, have already proved worthwhile in other fields, notably in lending structure to engineering and computer science documentation (<http://www.hrionline.ac.uk/armadillo/>).

It is estimated that 80-85% of the knowledge resource of any organisation is held in non-structured forms (Mark Greengrass pers. comm.). Natural language processing holds the potential to create order from disorganised information. Even in structured datasets, such as HER databases, natural language processing still offers the possibility of retrieving information in new ways, and opening it to new forms of scrutiny. The problem is that to be successful, robust ontologies have to be defined.

6.7 The ADS Common Information Environment demonstrator

The Archaeology Data Service Common Information Environment demonstrator has been developed to explore enhanced search mechanisms that can work across different heritage information resources.

It aims to provide a user-friendly, thematic approach to searches, and to provide users with instant cues regarding the efficacy and relevance of their search strategies.

The system is based on Adiuri's 'Waypoint' software. It uses a hybrid keyword entry and browseable tree search system built using methods drawn from faceted classification retrieval techniques. Adiuri are one of a number of companies who have employed faceted classification techniques for online data search applications.

Faceted classification originates in the work of S.R. Ranganathan during the 1930s in developing indexes for libraries of printed matter. The term 'facet' refers to the different sides or approaches to an information resource that are visible within the classification system. It is an alternative to hierarchical classification systems, whereby the user navigates through the system seeing only single-dimensional links between items. Ranganathan, following earlier and similar approaches to library classification and indexing, developed a 'colon classification' system. This

'analytico-synthetic' technique required each main subject class to be broken down into basic concepts that were then grouped using 'facets' or common attributes. The compiler of an index or catalogue used a classification language comprising punctuation marks and alphanumeric codes that represented the relevant sub-classes and facets, to describe the content of each information resource.

Raganathan's work was developed further in the post-war era, notably by the UK Classification Research Group, and was found to be very well suited to the organisation and retrieval of compound and complex subjects in printed technical, scientific, and social science fields.

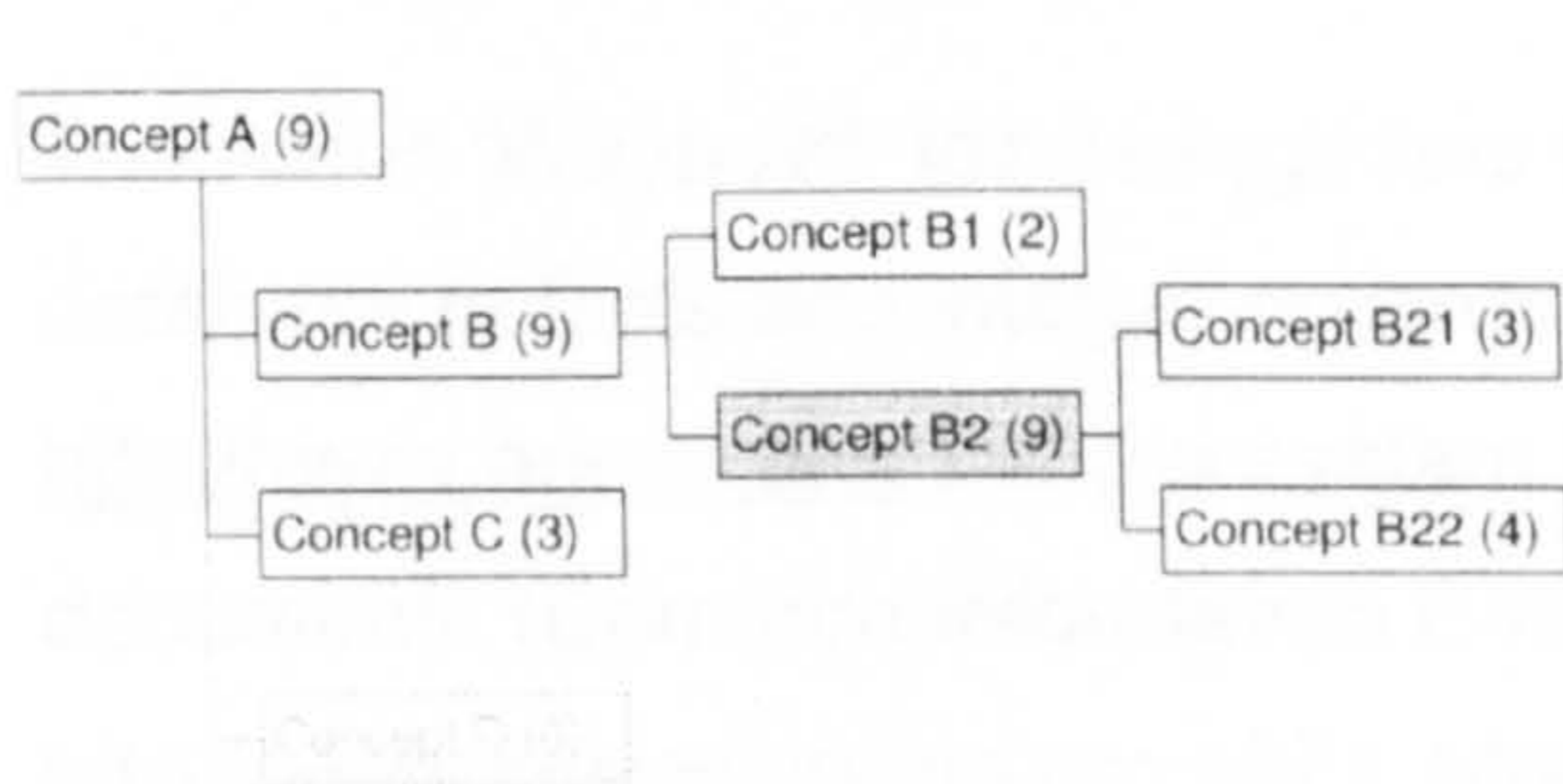
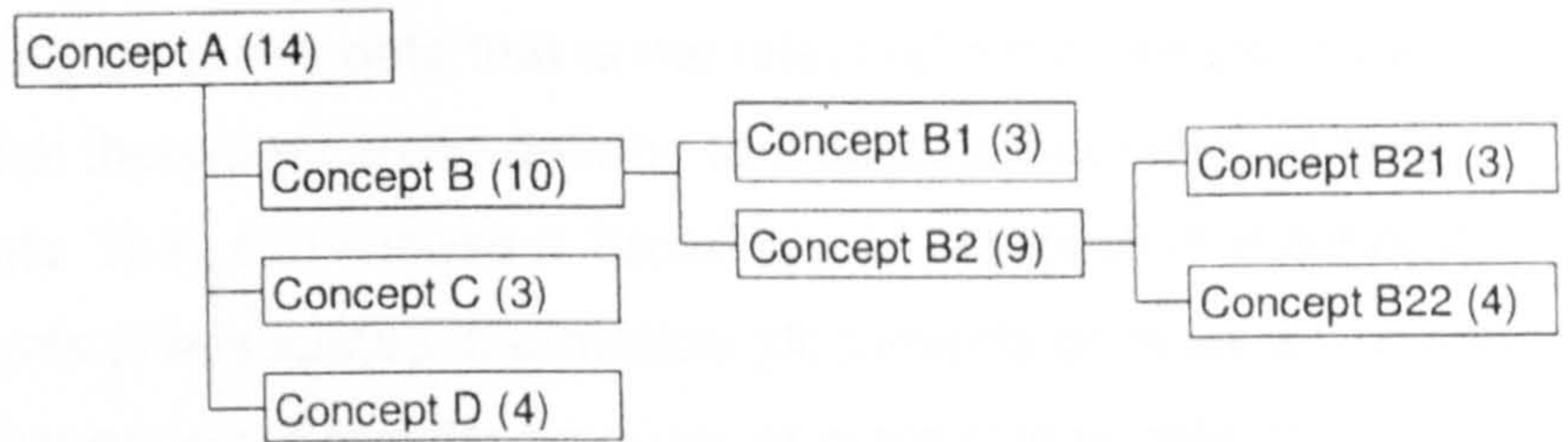
The power of a faceted classification system lies in its ability to allow users to approach information collection from many different perspectives, not solely from one path created by the data compilers' perception of how users should use the data. It gives the user a better chance of adopting a search strategy that matches their requirements.

The potential of faceted classification techniques to extend beyond the classification of printed material to electronic information resources has been recognised for a long time. The suggested use of facet analysis to assist searches of the World Wide Web, however, has had to wait for the recent development of suitable tools (Berners-Lee, Hendler & Lassila 2001; Broughton 2002). The task of manually classifying documents against concepts from many facets, for example, has proved too immense. But it is now feasible to automate aspects of the classification process (Adiuri Systems Ltd 2005, 3).

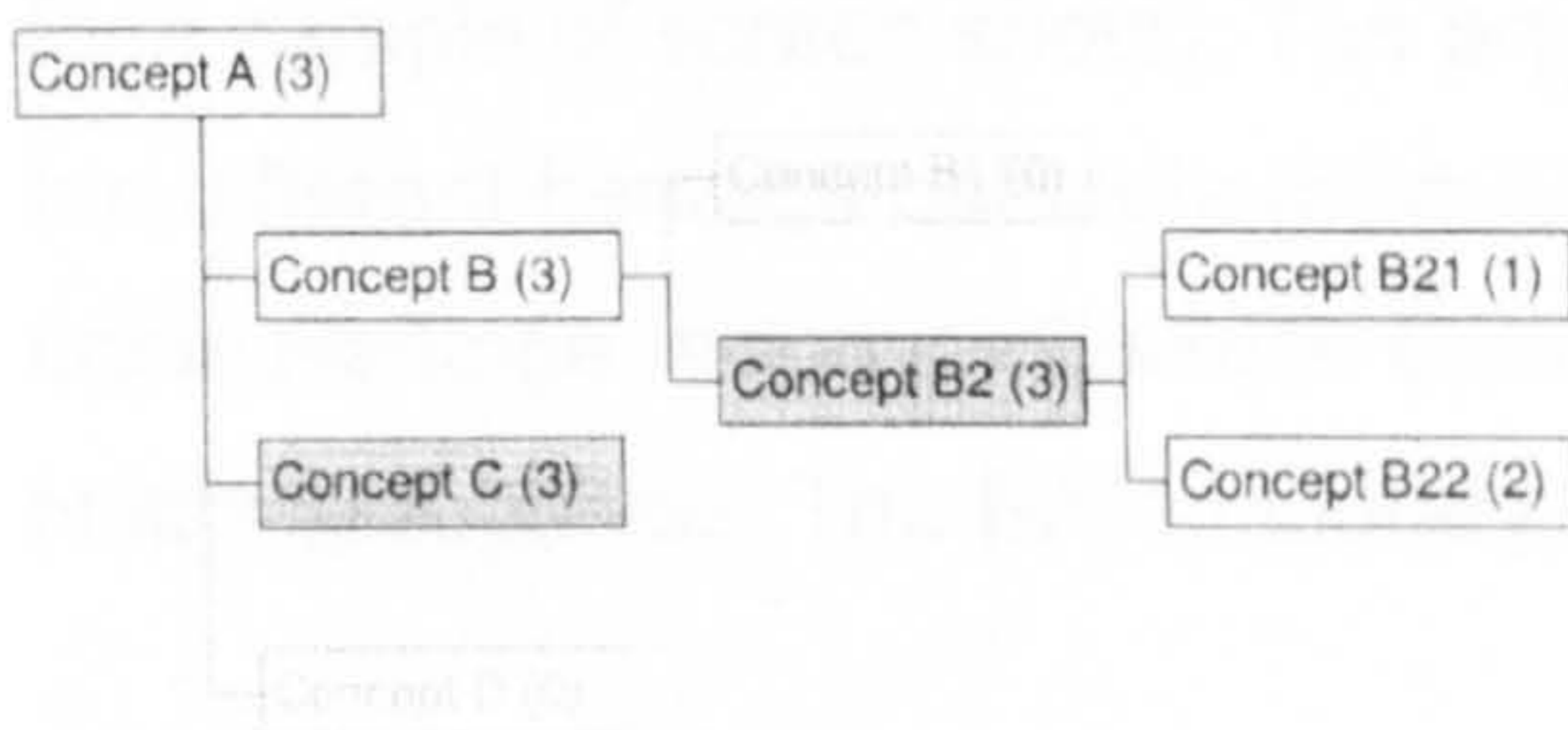
Adiuri Systems, a company that specialises in information retrieval, has developed Internet search interfaces that make use of faceted classification techniques. Its 'Waypoint' software employs automated classification by examining the contents of source documents (or database records) within a reference framework provided by a concept map. A series of constraints or inferences such as "*if document 'x' contains 'y' it is likely to be about concept 'A'*" (Adiuri Systems Ltd 2005, 4), defines how the source document correlates with particular concepts, and the nature or degree of its correlation.

Faceted classification systems that comprise large numbers of concepts quickly create potentially huge numbers of possible search combinations. Many of these will provide no meaningful information from the source or sources that are being searched. Adiuri Systems, therefore, have developed a technique called 'Adaptive Concept Matching'. The automatic classification process generates a concept table that shows which documents have been tagged against which concepts. The contents of the concept table can be represented to the user in visual form as a concept hierarchy, which shows the subdivisions of concepts, and the numbers of documents (or database records) associated with each concept.

Users can browse the concept hierarchy and select or un-select concepts. As the user makes selections the hierarchy tree is automatically 'pruned' to show only those remaining concepts and sub-concepts that are relevant to the user's selection (Adiuri Systems Ltd 2005, 5). At the same time it updates the counts of documents tagged against each concept. Concepts that have no documents tagged against them can be excluded from the hierarchy.



| Concept | Documents No.: | | | | | | | | | | | | | |
|---------|----------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 | D12 | D13 | D14 |
| B | | | | | | | | | | | | | | |
| B1 | | y | y | | | | | | | | | | | |
| B2 | | y | y | | y | | y | | | | | | | |
| B21 | | | | y | | | y | | | y | | | | |
| B22 | | | | | y | | | y | | | y | | | y |
| C | | | | | y | | | y | | y | | | | |



| Concept | Documents No.: | | | | | | | | | | | | | |
|---------|----------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 | D12 | D13 | D14 |
| B | | | | | | | | | | | | | | |
| B1 | | | | | | | | | | | | | | |
| B2 | | | | | y | | | | | | | | | |
| B21 | | | | | | | | | | y | | | | |
| B22 | | | | | y | | | y | | | | | | |
| C | | | | | y | | | y | | y | | | | |

Figure 25. Adaptive Concept Matching. Each concept is accompanied by the total number of relevant documents (or records) that would be found if that concept was selected. Selecting a concept modifies the concept map to show how many documents are tagged against that concept and its descendants. Selecting another concept shows how many documents are relevant to both concepts. After Adiuri Systems Ltd, 2005.

The user can select a path through the available concepts and systematically disqualify data that is not relevant to their search aims. The user's search therefore can be defined to a degree that matches their requirements. They can choose a 'broad brush' approach that generates large amounts of associated information (documents or records), or narrow searches that generate smaller amounts of more closely related information. The system provides degrees of search choice that are either not available, or not readily apparent, to keyword-based Web search engine users.

The Adiuri 'Waypoint' technology has been applied to a system to search a database of facts and images regarding world wildlife ('Arkive', <http://www.arkive.org/>) and a system to aid the retrieval of medical documents (Common Information Environment Health Demonstrator, <http://www.common-info.org.uk/>). More recently, work has taken place on developing an application to search heritage datasets.

The Archaeology Data Service (ADS) CIE demonstrator has been built using the techniques described above (see Figures 26-28 and Appendix 9 for a sample of screen shots). The project has required the integration of ten different heritage datasets (from English Heritage, the ADS catalogue, Local Heritage Initiative, Scottish Cultural Resources Network, The National Archives, The British Library, etc.) within a single XML schema.

The XML schema incorporates four main facets that can be exploited by the structured search mechanism: 'Where' (the geographical location of the resource's subjects, expressed as an administrative area address or Ordnance Survey grid reference); 'What' (the principal subjects of the resource expressed as thesaurus or word list terms), and 'When' (the period associated with the subjects). The fourth facet ('Media') describes the form that the resource takes.

The 'What' concepts are derived from the English Heritage Thesaurus of Monument Types - its monument terms and the broad class terms (Chapter 5). For practical purposes, a decision was taken to leave out the 'Industrial' class in the demonstrator. This class was found to be very cumbersome, containing a large number of monument definitions, and it

was difficult to break down into meaningful sub-classes or topics within the terms of the project (Stewart Waller pers. comm).

The creation of topics or sub-classes was an innovation introduced to make the search mechanism more manageable and easier for the user to navigate. The sub-classes provide a more tightly defined bridging tier of concepts between broad monument classes and the monument terms.

The 'Defence' class of monuments with the NMR Thesaurus, for example, includes monuments as diverse as Saxon shore forts and nuclear bunkers. While these are all components of a military landscape, as defined in its broadest possible sense, they are unlikely to be often studied together as part of the same research topic. The ADS CIE demonstrator, in emphasising sub-classifications based on broad terms ('Anti-Aircraft Defences', 'Coastal Defences') and introducing mid-range sub-classifications ('Castles and fortified sites', 'protective features', etc.) more closely matches concepts and themes that are likely to be of relevance to researchers.

The 'Agriculture and Subsistence' monument class, for example, has been further broken down by the ADS CIE Demonstrator into the sub-classes 'agricultural buildings', 'land use', 'gardens and horticulture', 'hunting and fishing', 'animal enclosures', 'cultivation marks', and 'other'. Metadata records indexed under relevant monument terms are retrieved using these sub-classes or concepts.

The structure created for the ADS demonstrator, therefore, is merely an extension of the Monument Thesaurus structure already used by most Historic Environment Records.

The text search interface to the ADS CIE demonstrator allows the user to enter a keyword as a basis for the search (Figure 26; Appendix 9, Figure 77), or to begin the search by selecting the 'What', 'Where', 'When', or 'Media' roots to the concept hierarchy. In the former case, the search proceeds like a simple Web search engine scan of the text contained within the data sets.

In the latter case, users are presented with the next tier of concepts. Selecting one or many of these produces the next tier of concepts, and so on, to build up a visual (tree-like) representation of concepts that are relevant to the search. The possible concept refinements, or branches, of the on-going search are depicted along with the number of records that the search would retrieve (Figure 27; Appendix 9, Figure 78, Figure 79). These figures are automatically updated as branches are selected by the user. The user can therefore make selections that define their search strategy in full knowledge of the magnitude of the search return. They can narrow or broaden the search according to their information needs.

At any stage the user can enter a keyword. This will modify the concept hierarchy tree to show the concepts that most closely match the keyword. The selection of further concepts can proceed by selecting or un-selecting concept branches (Appendix 9, Figure 81).

This search method is a major advance from the unaided keyword-based searches, or keyword pick lists, currently commonly employed by search engines (Chapter 5; Appendix 8). It widens the possibilities of users' searches to show paths to information that may be of value, but which users may not have considered when initially forming their searches. At the same time it allows users to narrow their search choices to produce relevant and manageable quantities of information in full knowledge of the types of information they are discriminating in doing so.

A map based search method is also provided. This uses the 'Where' facet to provide a distribution map (by region, county, and 10km grid square on a 1:250,000 map base) of the numbers of relevant records selected by the user. The map can be switched on at any point within the text-based searches to produce a geographic distribution of numbers of relevant records (Figure 28; Appendix 9, Figure 82, Figure 83).

Thematic approaches to enquiries are accessible from mini essays called 'CIE trails' (Appendix 9, Figure 84). The demonstrator includes trials named 'War and Remembrance', 'Landscapes of Salvation', 'Learning and Labour' and 'Ages of Migration'. These have been written by staff of the 24hour Museum and are sprinkled with hyperlinked terms to external sites, or to searches within the CIE demonstrator.

Another experimental search interface has been developed that allows users to access pre-selected or user-selected search profiles. These comprise a list of concept selections that may be stored and updated for repeated later use by individual users. Users were able to create their own links between search items, and therefore re-engineer thematic concepts for their own purposes.

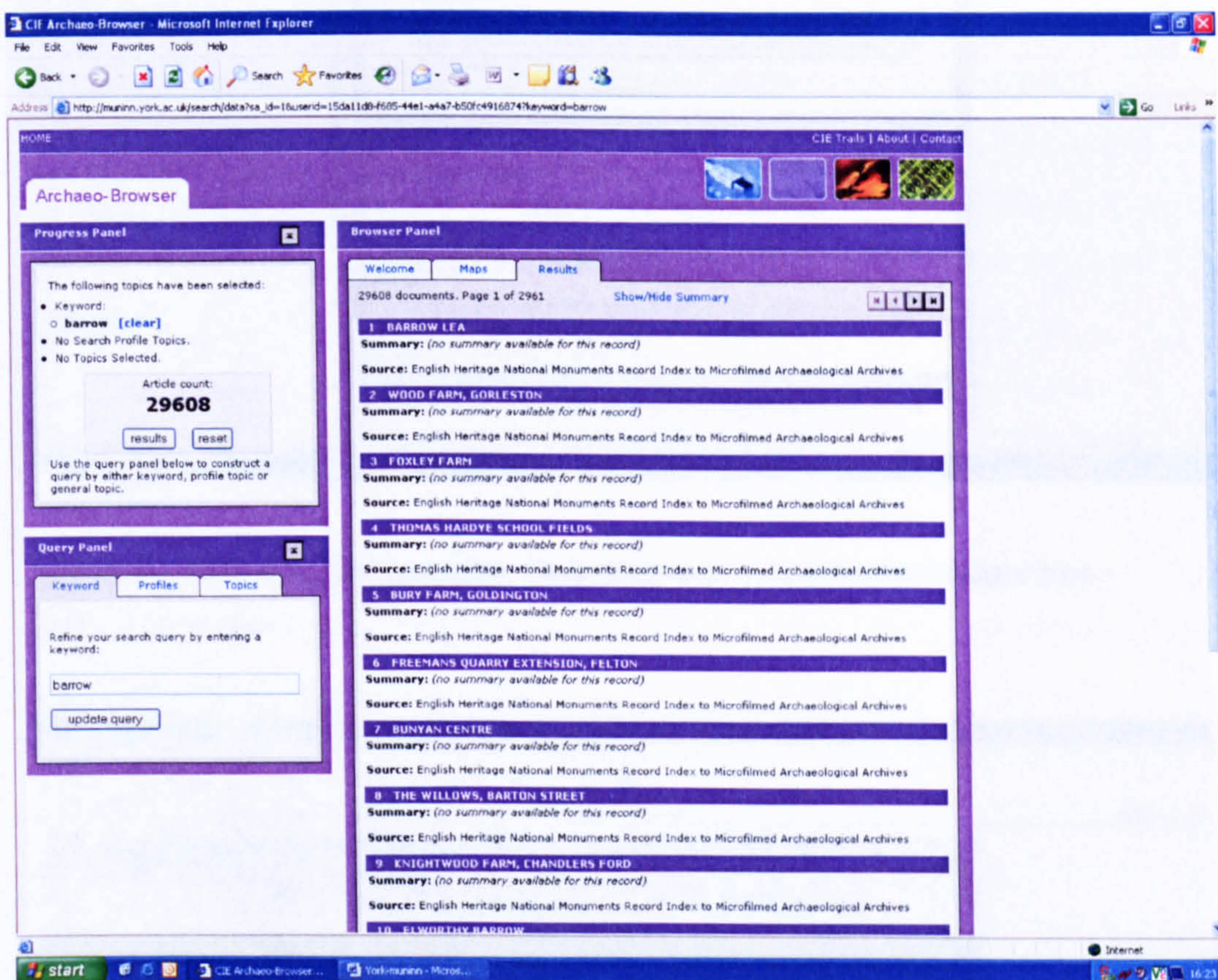


Figure 26. The ADS CIE demonstrator. Simple keyword search. Original in colour.

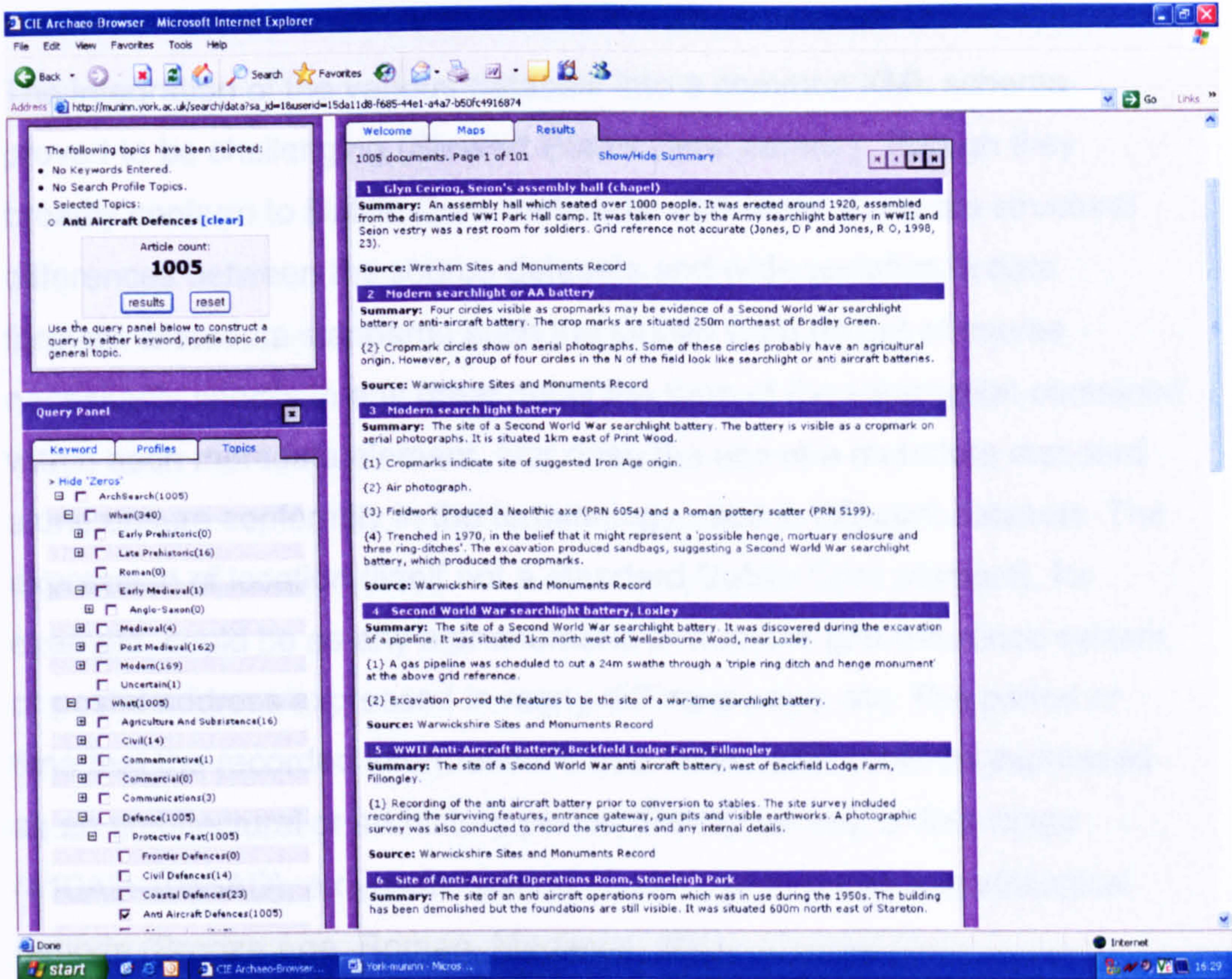


Figure 27. ADS CIE demonstrator. Selecting records using the concept tree. Original in colour.

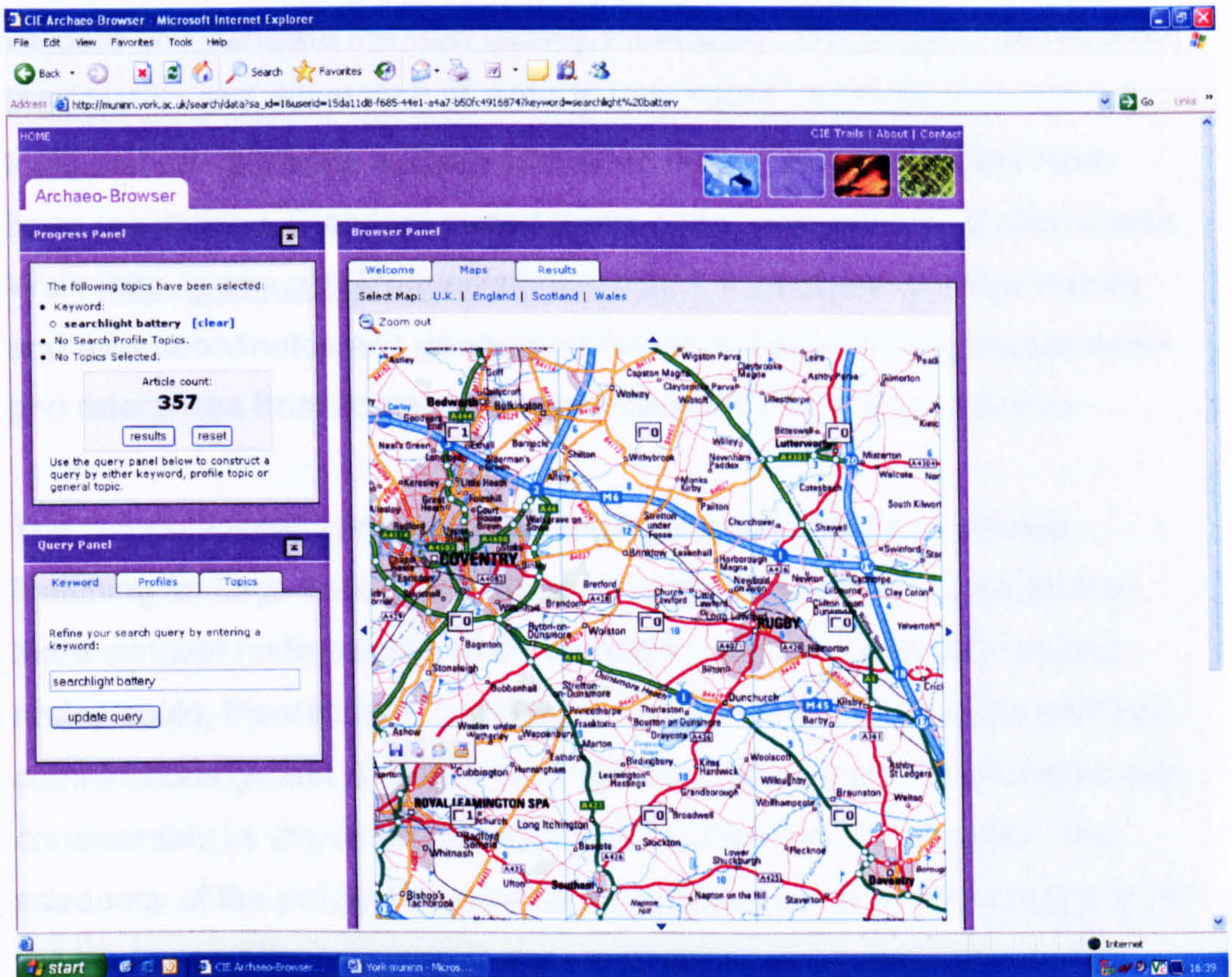


Figure 28. ADS CIE demonstrator. Mapped search results. Original in colour.

The integration of the various datasets into a common XML schema proved to be challenging (Stewart Waller pers. comm.). Though they broadly conform to Dublin Core metadata standards, there are structural differences between the source datasets and wide variation in data formats. Metadata standards such the Dublin Core do not of course necessarily specify in any great detail the form of the information contained within each metadata element. Nor does the use of a metadata standard alone ensure conformity in the terminology used in different datasets. The expression of location (itself not a standard Dublin Core element), for example, could be as any alphanumeric or numeric grid reference system, or postal address expressed in many different ways, etc. The period of time that the recorded information is associated with could be expressed as an architectural or art history period (Renaissance), a date range (410AD-1066AD), a dynastic period (Tudor), or in broad archaeological periods (Bronze Age, Roman, Medieval, etc.).

Correlating the ten metadata schemas, parsing the contents of the datasets and translating them into a common format within a single metadata schema was not straightforward. It has not been possible to validate and translate the vast datasets manually. The project has required the creation and adaptation of various automated information conversion tools that can generate suitably formatted data. Postal addresses have been regularised. Standard period terms have been generated. Geo-Cross Walk (<http://edina.ac.uk/projects/geoxwalk/>), a database of place names and their coordinates and geographic footprint, has been used to generate grid references from postal addresses (Stewart Waller pers. comm.).

The computational workload required to generate Adaptive Concept Matching for large data sets is heavy. For example, Adiuri calculate that three concept node selections on a dataset comprising 38,000 concept nodes could, theoretically, generate 9,144, 611,346,000 possible selection combinations (Adiuri Systems Ltd 2005, 4). Clearly this is ameliorated very considerably by the user's dynamic input to the selection process. The adequacy of the processor remains a significant consideration, however, in the implementation of concept and information heavy applications. The quantity of facets, concepts, and records, used in the ADS trial, for

example, severely tested the computer memory and processing power available to the project (Stewart Waller pers. comm.).

Nevertheless, the ADS CIE demonstrator provides a much more responsive, adaptive, and thematic approach to searches of large data sets than offered by other systems. Users are provided with information to help them to manage and control their searches at the point of search. Importantly, the search mechanisms reveal aspects of the organisation of the data, and relationships between data items, that enhance users' contextual view of the data.

The ADS CIE demonstrator involved the creation of sub-classes of concepts or topics that align more closely with specific subject areas than the broad Monument Thesaurus monument class categories. They reflect more closely some of the conceptual and contextual links between monuments that exist in the real world. As such, a monument is more readily appreciated as belonging to 'landscape' comprising the same type of feature, closely-related features, and features with which it shares some broader functional association.

The tools developed for the ADS Common Information Environment demonstrator allow users to see various contextual expressions of the content of their search results. They gain an appreciation of their distribution and abundance within the corpus of available data, and, if they wish, an idea of their geographical distribution. Importantly, they also gain an understanding of the place of the search results within the wider data framework. They are able to see how search terms (and therefore data items) relate to each other, and to the adopted classification hierarchy. The branches of the tree make visible some of the alternative search choices and avenues that users may wish to explore.

A tree-like structure is not, of course, the only way to represent the relationships between groups of information items. Other techniques can be used to help users to visualise links between the results of their search terms, and the available related information. Two alternative examples are presented in Appendix 10.

6.8 Conclusions

There is a tension between facilitating freedom and creativity in information organisation and retrieval, and providing robust enough frameworks to ensure integrity in its assimilation and dissemination.

The Web, search engines like Google, and resources like Wikipedia, represent one end of the scale. Formal, imposed data structures like MIDAS and the Thesaurus of Monument Types, represent the other. Tools like natural language processing offer the prospect of allying the inherent strengths of formal data structures, with the inherent flexibility of unstructured information. But they rely on the creation of acceptable ontologies (Richards 2006, 977), which are in effect imposed models of interpretation. They, like earlier Expert System inference engines, are best applied to discrete problems and areas of the discipline, rather than attempts to create global holistic definitions of the historic environment.

The ADS CIE demonstrator appears to offer a very versatile approach to the interrogation of HER information. It provides users with multi-dimensional views of the available data, and is capable of representing conceptual links between data items that reflect some of the relationships that are to be found in established archaeological reasoning.

It borrows certain techniques from faceted classification. This is attractive because of the common origins in document and textual organisation that faceted classification shares with other techniques that are often applied to HEIR applications (humanities metadata schemas, thesauri, etc.). Whereas Artificial Intelligence techniques are rooted in numerical classification and logic (hard science), these techniques seem spiritually closer to the looser conceptual and reasoning methods that are already well ingrained in (non-scientific) archaeological interpretation.

The problems of structural and content conformity between disparate datasets that had to be overcome by the ADS CIE demonstrator, should be less acute for Historic Environment Record datasets that are built around core MIDAS principles and standard thesauri.

The ADS CIE demonstrator appears, therefore, to offer the most practical and capable response to the parameters for an enhanced HER, that were set out at the beginning of this chapter. However, to what extent are the mechanisms employed by the ADS CIE demonstrator able to accommodate other important historic environment concepts, and to assimilate new models presented by users themselves?

In Chapter 7 the historic environment of the Fenland region of eastern England is used as a case study, to explore some of these issues.

CHAPTER 7 – TOWARDS A RESEARCH-ORIENTATED HER FOR FENLAND

7.1 . An introduction to the Fenland region

The Fenland region of eastern England comprises a vast low-lying basin, some 4000 square kilometres in area, that fringes the Wash (Waller 1994, 1). It extends north from Cambridge, almost to Lincoln (around 120km), and from Peterborough in the west to Kings Lynn in the east (around 50km). This region, much of which lies at or just above sea level, is a product of the exposure and subsequent erosion of relatively soft Upper Jurassic clays (Oxford Clay, Kimmeridge Clay and Ampthill Clay). Geologically, the Fenland basin is actually the southern extension of the large clay vale, occupied by the Ancholme Valley, that extends south from the Humber.

Five main river systems drain from the midlands seaward through the fen basin - the Witham, the Welland, the Nene, the Ouse, and the Cam. Generally smaller river systems (the Lark, Wissey, Nar, etc.) drain into the basin from Suffolk and Norfolk.

The distinctive character of the Fenland region derives from its vulnerability to the influences of the sea and the rivers that meander into the basin. Over the last ten thousand years marine incursions have created lagoons, salt marsh, and tidal creek systems that extended far inland, depositing metres of silt and clay. Freshwater run-off from the surrounding higher land that became trapped in the basin resulted in meres and marshes that deposited marls and deep rich organic peat beds. The larger undulations in the underlying pre-Flandrian geology that remained above the wet fen floor, formed islands of firm ground.

Minor differences in sea levels, the formation of low barriers created by deposited silt, and changes in the courses of rivers, could have major effects on the character of the environment. Sequences of peat, clay, mud, and silt deposits provide records of changing environmental conditions over time and across areas. Described as formerly the largest inland

wetland in England, Fenland has never been a single homogenous wetland landscape, but rather a dynamic mosaic of different wetland and dry land environments.

Large-scale reclamation and drainage programmes from the seventeenth century onwards gradually turned the region into one of the most productive agricultural landscapes in Europe. The delicate balance between preventing wetland regression and retaining sufficient water for crop production is maintained by a huge network of main drainage channels, lesser ditches, and barrier banks. These features, invariably straight or enclosing rectangular blocks of fields, characterise today's instantly recognisable ruthlessly tessellated arable landscape (Figure 29). Critical nodes in the drainage system are marked by sluices and pumping stations.

The Fens have often been perceived as a distinctive whole, though there are differences in land form character, agricultural practices, and even accents and dialect cross the region. The region has never been a single administrative unit. Large parts of it fall within Lincolnshire and Cambridgeshire and smaller parts fall within Norfolk and Suffolk. A small area of Fenland, part of the former Soke of Peterborough, fell within Northamptonshire prior to twentieth century local government reorganisation. Both the Soke of Peterborough and the Isle of Ely were based on ancient monastic liberties and though within Northamptonshire and Cambridgeshire respectively, they maintained administrative distinctiveness into modern times. The Fens are often divided, on broad physical grounds, into two areas. The flatter, sandy coloured fens bordering the Wash (in the north and east of the region), are known as 'silt fen'. The island studded black 'peat fen' is found around the inland fen edge, mostly in the south and west of the region.

The evidence of human activity over the last eight thousand years is interwoven with pre-fen terrain and buried soils, fen silts, clays and peat. The long term effects of Fenland drainage and cultivation include the wastage of peat deposits through moisture loss, the biological decay of organic matter, and accelerated wind erosion. In many parts of the region, the upper fen strata have already disappeared and lower strata are now disappearing to expose hitherto deeply buried archaeological remains

(Figure 30). Elsewhere, sites remain very well buried and wet, retaining exceptional organic remains (Figures 32-34).

The earliest human activity in the Fenland basin preceded the on-set of widespread wetland conditions. The archaeology of the palaeolithic periods in the Fenland region seems to differ little from that of surrounding areas. It is characterised by the occurrence of single tool finds and find scatters, which have often been brought to light by quarrying or drainage works. There is some evidence that very early *in situ* occupation surfaces survive within the region, for example a collection of 200 axes from a quarry near Feltwell (Hall & Coles 1994, 26; Silvester 1991, 62). *In situ* palaeolithic remains have been excavated in neighbouring areas, notably at Thetford and at Cromer. There have been no controlled excavations of such sites, however, within the Fenland region itself. The usual difficulties of recognising palaeolithic sites locked within river terrace deposits are compounded in many areas of Fenland by the overlying presence of deep post-glacial peat, silt and clay deposits. The channel edges and backwaters that seem to preserve good evidence of palaeolithic and early mesolithic activity in other regions, undoubtedly exist across the Fenland region. But in most cases they are deeply buried and remain uncharted and unexplored.

The later mesolithic period saw the onset of the wetland conditions that would characterise Fenland development until post-medieval times. A basal peat began to form in the lowest lying areas towards the Wash and within the deeper river valleys along the western margins of the basin. The pre-Flandrian surfaces closest to the Wash were then swamped by marine incursions, which also penetrated and enveloped the most vulnerable areas of earlier peat development (Waller 1994, 61-66). The known mesolithic and earlier neolithic sites, almost by definition, are exposed or partially exposed and dry (for example, French & Pryor 1993, 33-51). It is likely that there are very many more better preserved sites under blanketing later deposits, but a Fenland Star Carr has so far proved elusive.

It was at this time of increasing wetness that much of the low-lying woodland was overwhelmed, producing the 'bog oaks' (large tree trunks of various species) that create ploughing hazards in many parts of the Fens.

The marine incursions continued to swamp low-lying basins during the later neolithic and Bronze Age (Waller 1994, 66-74). The development of peat fen, however, inhibited the landward thrust of the marine environment, and at times overwhelmed the estuarine clays it had left behind.

Large numbers of round barrows were constructed in cemetery clusters on the fen margins and on low-lying islands (Figure 30; Hall & Coles 1994, 65-91). Many of these, along with marginal settlement sites, have only been exposed in modern times. One site in the southern peat fens represents the pinnacle of preservation encountered in a fenland barrow. Ian Hodder's excavation of a regionally rare example of a long barrow revealed a well-preserved roofed wooden mortuary chamber (Hodder & Shand 1988, 349-353). Exceptional preservation was also encountered at the neolithic causewayed enclosure at Etton in the Lower Welland valley, where woodworking debris and wooden artefacts were recorded in features sealed by alluvium (Pryor 1998).

Buried earthwork sites such as burnt flint mounds, raised banks, gravel and turf barrow mounds; have been increasingly identified and recorded along the fen margins in large open area excavations, along with buried soil horizons and metalled surfaces (for example, Beadsmoore 2006; Evans et al 2005). Wooden causeways, timber alignments and platforms and wooden boats have been revealed in deeper fen deposits over many years (For example, Hall & Coles 1994, 65-91; Pryor 2001a). Even on the dry fen edge, where overlying fen deposits have long been eroded away and water tables are now well below feature bases, large pits have been found to retain reasonable organic palaeoenvironmental remains and wooden artefacts (for example, McFadyen 2000; Network Archaeology 2002; Phoenix Consulting Archaeology & Network Archaeology 2003).



Figure 29. Silt fen landscape. Often described as featureless and uninspiring, the region actually retains a wealth of archaeological landscapes. Original in colour.



Figure 30. A barrow cemetery exposed by the loss of overlying fen soils. Original in colour.



Figure 33. The excavation of vessels complete with contents within a matrix of organic debris. A combination of charring caused by a catastrophic fire and the subsequent burial of the site by waterlogged silts, clays and peat, has led to the survival of an astonishing array of palaeoenvironmental and cultural organic remains. Original in colour.



Figure 34. A hurdle or fish trap. Original in colour.

The Iron Age generally saw increased wetness. The extensive development of freshwater fen across the inland fen margins and over the areas of former marine incursion towards the Wash was followed by extensive new marine incursions (Waller 1994, 75-76). Settlement, which occurred both in open clusters of houses, small enclosed sites, and occasionally in large low-lying hillfort-like earthworks, was concentrated on the fen margins and low islands.

Despite their proximity to the wetland environment and its margins, no sites have shown a heavy reliance on wild plants, wildfowl, fish, or deer (Evans 2003, 137). Wild species are present at these sites and these obviously supported the staples, but site economies were firmly based on sheep, cattle and pig husbandry. In the Lincolnshire fens, exceptional settlements associated with salt making were perched on the slightly raised silt banks of tidal watercourses (Hall & Coles 1994, 92).

The Fenland region, in itself comprising much marginal land, seems also to have been marginal in late Iron Age political terms. The territories of the Icenii (central, eastern), Corieltauvi (north), Trinovantes (south) and Catuvellauni (south, west) all probably extended into the region (Malim 2005, 39-40). The area is not without the trappings of late prehistoric material wealth and wider cultural contacts, although there is some evidence for conservatism and a definite lack of emphatic receptivity to Roman culture until the second century AD (Hall & Coles 1994, 92-104; Evans 2003, 270-272).

Two Icenian rebellions (47 AD, 60/61 AD) necessitated a military presence in the area. There are forts at Longthorpe and at Water Newton, just off the western fen margins, and others further afield in Norfolk and Suffolk. But apart from occasional finds of military equipment, the only evidence within Fenland proper is a two phase fort in the central fens at Grandford (Potter & Robinson 2000, 31-32).

Many of the settlements established during the middle and later Iron Age continued to develop during the Roman period. A general drop in water levels also allowed previously marginal land on the silt fens to be colonised (Hall & Coles 1994, 105-106). Settlements in this area were surrounded

and linked by extensive networks of ditched fields and tracks. Salt making, whose origins stretched back to the Bronze Age in the region, was carried out on a massive scale across the silt fens during the Roman period.

The principal fen route, the Fen Causeway, provided a short cut from East Anglia to the midlands and the north by running across the central fens between Downham Market and Peterborough (Figure 31). It was not a single uniform road, but a system of canals, canal side roads, and raised causeways, that hopped from island to island. Lesser roads, causeways and canals were constructed throughout the region (Hall & Coles 1994, 105-109).

Although all these works amounted to a very considerable engineering effort, the persistent legend that the Romans were first to drain the Fens is not accurate. There is a possibility, however, that the colonisation and development of the region was promoted by direct Imperial control. Car Dyke, the largest of the Fen canals, is not fully explainable as either a drainage work or transport canal. It skirts the western fen edge and has been interpreted as part of an Imperial boundary system that also included inscribed markers (Mackreth 1996, 233-235).

Furthermore, despite abundant and large-scale settlements, villas, those indicators of private wealth throughout lowland England, are all but absent from the Fen proper. Instead there are two unusual stone structures that seem to hint at state control. A massive tower structure surrounded by a grid-planned village has been excavated at Stonea (Jackson & Potter 1996). Originally interpreted as an administrative building, recently it has been alternatively interpreted as a temple (Michael Green in Malim 2005, 130-132). Another large and intriguing stone building recently has been identified near Chatteris (Evans 1995, 3-11)

It is probable that water levels did not rise significantly again until the early medieval period. Nevertheless, protective silt and peat has covered many areas of Roman settlement and a few pockets of visible earthworks in pasture survive in various locations.

In addition to some probable settlement continuity on the fen islands and fen edge, early and middle Saxon period settlements were also

established on the exposed silt banks fringing the Wash. Some sites are artificially mounded. Stock rearing on the water meadows created by natural flooding appears to be the primary motivation for these settlements, although salt tolerant barley and oat crops were also grown (Hall & Coles 1994, 126).

The 'Wal' element of the place names Walsoken, Walton and Walpole, has been associated both with the Anglo-Saxon name for 'Welshman' or 'Briton' and with the Sea Bank (Hall & Coles 1994, 126; Reaney 1943, 206-207). This large earth bank, once thought to be Roman, originates in the pre-Conquest period and fringes the Wash, protecting silt fen and its settlements from marine incursions.

The late pre-Conquest period saw the growth of the monastic houses that were to shape the development of the Fenland region throughout the medieval period. The abbeys at Ely, Peterborough, Ramsey, Crowland and Thorney, along with many smaller houses, held considerable land in the region. They inspired drainage and infrastructure works and exerted legal and economic control over large areas (Darby 1974). The main abbeys became market centres, which in the case of Ely and Peterborough developed into cathedral cities. The Fenland seaports of Kings Lynn, Wisbech, and Boston, were complemented by inland ports such as Ely, Cambridge, Peterborough, Lincoln and Spalding, and a host of hythes elsewhere.

There were several disastrous flooding episodes during the medieval period, which claimed lives and destroyed buildings in the silt land settlements in particular, but there were no sustained periods of marine incursion. Wetland growth, which chiefly comprised inland freshwater marsh development, was checked by drainage and assarting.

Nevertheless, the rivers and meres were appreciated as significant resources. The former extent of these extensive shallow inland lakes (once among the largest bodies of fresh water in England) are marked by light coloured shell marls that contrast with surrounding black peaty soil.

While the post-Roman fen deposits have suffered severe erosion, and rural archaeological sites of these periods are now generally dry, exceptional preservation of medieval deposits has been recorded in the

Fenland towns (for example, Cessford et al 2006; Hinman *forthcoming*).

The region suffered decline with the suppression of the monasteries, but began a new chapter in the succeeding century with the beginnings of the massive drainage schemes that would eventually transform the patchwork of wet, marginal, arable, and wooded land into one of Europe's most productive arable landscapes. It took three centuries before this was fully achieved, but even the seminal seventeenth century reclamation works had a dramatic effect on the character of the region and the livelihoods of its people.

The main elements of the medieval and post-medieval drainage infrastructure are readily apparent in today's landscape. Rivers, drains, and banks continue to fulfil the roles intended for them when first constructed, albeit in deepened, widened and strengthened forms. Many pumping engine building complexes display the progression from steam, to diesel, and electric power.

The main businesses of the region in modern times, arable agriculture and horticulture and allied industries (transport, food processing, agricultural engineering, etc.), have not been complemented by a huge diversity of other industries that have left a significant heritage. Brick making, however, grew into a major industry on former islands and the fen edge near Peterborough during the late nineteenth century. The industry bloomed through the combination of the special firing qualities of Oxford Clay deposits in the area, the introduction of efficient kiln technology, and railway links. The term 'Fletton' that describes a common brick type, derives from the place of that name south of Peterborough. Only two brick works now remain open, and the others have been re-developed or raised pending re-development. Service and distribution industries are now important in this area. Further south, the cluster of science and technology-based industries extending from their epicentre at Cambridge has given rise to the (slightly satirical) name 'Silicon Fen'.

The region, exposed to the North Sea and facing north-west Europe, has a significant recent military heritage. Second World War coastal defences fringe the Wash, and further inland anti-invasion fortification 'stop lines' make use of drains and banks, and crossing points. Many airfields were

constructed on the firm ground of the fen edge and fen islands, mostly for Bomber Command use. A handful of these were retained throughout the Cold-War era as bases for Britain's nuclear strike force (such as Thor ballistic missiles) and for the United States Air Force. Only a few specialised military airfields for lighter aircraft were constructed on fen soils during both World Wars. Aviation archaeologists have recovered many well preserved aircraft from fen crash sites.

7.2 A background to Fenland archaeological research

The Fenland region of the east of England provides a convenient test bed for exploring the relationships between different aspects of our record of the historic environment. Fenland retains a broad range of archaeological remains preserved under diverse conditions. These remains reflect a long and interesting history of human activity. Over the last 8,000 years in particular, human activity has interwoven with relatively rapid changes in the natural environment. The changing environment, however, has not been simply a backdrop against which human occupation took place, but to varying degrees has been partly a product of human intervention. In Fenland archaeology, environment and society are linked inextricably. It is a landscape that emphasises the importance of studying culture within its environmental context, and environment within its cultural context.

There is a significant history of academic interest in Fenland. Research carried out over many years has generated an extensive, though variable and dispersed, archaeological record. The archaeological record, along with the related natural environment record and a detailed cartographic record stretching back to the 16th century, represent a rich resource for future research.

Opportunities for archaeological research in the Fenland region today are almost entirely presented by development-led work. But they are numerous and in the case of quarry developments, offer extensive excavation possibilities. Very many archaeological research avenues that are specific to the history of the region remain open, and there are considerable opportunities for Fenland archaeology to contribute to research of national, and indeed international, significance. A brief sketch

of the history of topographic study in the Fenland region will provide a context for the later examination of its archaeological research potential.

7.2.1 Early topographic observations

Several Roman writers mention watery and marshy places in Britain. The Britons were said to be able to endure the hardships of surviving in such places; wading and swimming and hiding for days with only their heads poking out of the water. Several commentators report that Roman military expeditions met with disaster in the swamps. Severus, for example, is noted to have sought to subdue the twin threats of the wetland environment and his enemies by building military causeways (Darby 1974, 20). None of these references specifically identify the Fenland of the east of England, though as the largest inland area of wetland in the province, the region is likely to have informed Roman writers' general observations of Britain.

Stonea Camp, a complex of earthwork enclosures on a low island in the central fens, is often identified with Tacitus's description of the battle that ended the Iceni's revolt of AD 47. He reported that it took place at "a rustic earthwork, with an approach too narrow to give access to cavalry" (Grant 1996, 265; Salway 1981, 100-102; 189). The Roman towns of the fen margins – *Duroliponte* (Cambridge), *Durovigium* (Godmanchester), *Durobrivae* (Chesterton, west of Peterborough), etc. – are identified by sources such as the *Ravenna Cosmography* and *Antonine Itinerary* and by inscriptions (Rivet 1970, 34-82; Wachter 1995). There are no other emphatic Roman references to places or events within the Fenland region to match the extensive and varied Roman archaeological record. Recognition of Roman culture in the Fens, however, goes right back to our earliest English literary sources.

Descriptions of ancient Fenland first entered the written historic record in the early medieval period. Ecclesiastical histories, notably those of the monasteries of Peterborough and Ely (post-Conquest in their final form) provide important early sketches of the character of Fenland at this time. The first written record of Roman remains in the region is provided by Bede in the eighth century. Describing the earliest years of abbey at Ely

around 660 AD, Bede records that the lack of suitable stone in the marsh encircled Isle of Ely necessitated an expedition to a nearby “small ruined city” (‘Grantchester’ - Cambridge) to find a coffin for the translation of St Etheldreda’s remains. A “white marble sarcophagus of very beautiful workmanship” with matching lid was found close to the town walls (Sherley-Price 1965, 234).

Written about the same time, the hagiography of St Guthlac by a monk named Felix contains an intriguing sketch of the character of the deep fen of the time. It also contains what is almost certainly the first written reference to a prehistoric monument in the region. Felix describes the fens between Cambridge and the Wash as “...a very long tract, now consisting of marshes, now of bogs, sometimes of black waters overhung by fog, sometimes studded with wooded islands and traversed by the windings of tortuous streams” (Colgrave 1985, 87). He notes the presence of a “mound built of clods of earth” (probably a Bronze Age barrow) at the island of Crowland in Lincolnshire. Felix thought that the mound had been disturbed by treasure hunters (“greedy visitors to the waste”) who had exposed a “sort of cistern”. It was this hollow in the side of the monument that Guthlac made into his home (Colgrave 1985, 94-95).

Guthlac, in the manner of many of the early pioneer saints (Meaney 2001), survived all sorts of deprivations caused by the apparent hostility of the local environment and his chosen ascetic path. He also endured the goading of bog dwelling demons, one group of whom he identified as Britons. This persistently has been taken literally to mean that an enclave of British culture survived in the isolated Fens well into Anglo-Saxon times (Darby 1974, 9). An alternative interpretation is that Guthlac was suffering a form of post-traumatic stress from his memory of earlier (historically attested) British incursions into his former homeland in west Mercia (Meaney 2001, 40-41).

The Fenland region was inhabited by the Gyrwe, literally the ‘marsh dwellers’ (Mellows 1980, 2). They are identified by the *Tribal Hideage* and are subdivided into the North Gyrwe and South Gyrwe. The former occupied parts of south Lincolnshire fens, and north Cambridgeshire fens. The latter lived in parts of central and south Cambridgeshire fens, the

Huntingdonshire fens, and perhaps parts of Norfolk and Suffolk fens (Stafford 1985, 29-32).

The impression of the wild inhospitable Fenland provided by Felix is challenged by the chronicler of Peterborough Abbey, Hugh Candidus, and others. Candidus, writing in the 12th century, praises the 7th century founders of Peterborough Abbey for their well chosen location: "This same [fen] is very valuable to men because there are obtained in abundance all things needful for them that dwell thereby, logs and stubble for kindling, hay for the feeding of their beasts, thatch for the roofing of their houses, and many other things of use and profit, and moreover it is very full of fish and fowl. There are divers rivers and many other waters there, and moreover great fishponds. In all these things that district is very rich. So this Burch is built in a fair spot" (Mellows 1980, 2). Similarly enthusiastic descriptions of the environs of the Fenland abbeys at Thorney and Ramsey were written by William of Malmesbury and Abbo of Fleury respectively (Darby 1974, 53-54). Among the former writer's favourable observations of the riches of the fen is the remark that "here is such plenty of fish as to cause astonishment in strangers, while the natives laugh at their surprise" (quoted by Camden in Gough 1789, 126).

The anonymous monk of Ely who compiled *Liber Elensis* declared himself well aware of the bias inherent in his position and dangers of hyperbole, but also could not resist outpourings of praise for the beauty and bountifulness of his surroundings (Fairweather 2005, 2-3). He, Candidus and fellow chroniclers may have had the political incentive to sing the virtues of the abbeys' lands. They, like Matthew Paris writing in the 13th century (Darby 1974, 52), were also aware of the benefits that centuries of monastic effort and improvement had brought about. Equally, Felix embellished the hostile character of the fens in order to magnify St Guthlac's achievements.

Several years after the Conquest, Ely became the naturally fortified base of the disaffected English earls and their fickle Danish allies. The surrounding marshland was the theatre for guerrilla warfare - a refuge to the defenders and impenetrably dangerous to William's attacking troops (Rex 2005). Again, however, the picture painted of the fens by medieval writers is clouded by the romance of their chief subject - Hereward's

heroics. The dichotomies of the fens as remote and challenging and yet immensely productive, as hostile and threatening, and yet sheltering and nurturing, persist to this day.

Whatever the perceptions of Fenland might have been in the medieval period, it is absolutely clear that Fenland land holdings and resources were significant economic assets to the region's major abbeys (King 1973; Miller 1951). Fenland provided both a vital source of provisions and commodities, and an area into which the monastic estates could expand. The ancestor of the much larger scale widespread post-medieval reclamation and agricultural colonisation is to be found in much earlier, more piecemeal, monastic assarting, ditch digging and bank making. While not concerned with studying Fenland for its own sake, the surviving Royal records and monastic records paint a vivid picture of the medieval management of the region. They catalogue the catastrophic effects of nature on hard won arable land, pasture and settlement; the consequences of poor maintenance of the drainage system, disputes over navigation rights and customary privileges, and the abundant produce of fisheries and orchards (Darby 1974).

Camden provides some early post-medieval observations of the Fenland region within his national topographic study. The description of the silt fens and Wash environs within Lincolnshire includes the remark that: "the country produces but little corn but is covered with grass and breeds plenty of fish and waterfowl. The soil is so soft that the horses wear no shoes, nor can you find a single stone unless accidentally brought in, though it has churches built in a most beautiful manner of hewn stone" (Gough 1789, 223). The legend of Canute's near drowning in Whittlesey Mere, the largest of Fenland's freshwater lakes, and the subsequent division of its ample resources among the neighbouring communities, is recalled by Camden in the Huntingdonshire chapter. In the preceding Cambridgeshire chapter he provides a general sketch of the Fenland region and writes that the "fenmen [are] a set of people rough and uncultivated as the soil itself, envious of others whom they called Upland-men, devoted to feeding cattle, fishing and fowling and usually going marching about on a sort of stilts like giants" (Gough 1789, 126). Camden's original work and later embellished editions of *Britannia* mention various archaeological objects found throughout the region.

The Spalding Gentlemen's Society, founded in 1712 as one of the first provincial literary, scientific, and antiquarian societies, did much to promote study of the local fens. William Stukeley, friend of its founder and native of nearby Holbeach, recorded Roman remains in the locality. Notably he interpreted Car Dyke, a network of channels running along the west edge of the fen region, as a canal that had been used to take supplies to the Roman armies in northern Britain. He was also the first to suggest that Fenland, lacking in villas, was developed as an Imperial estate (Currie & Lewis 1997, 247; Hall & Coles 1994, 105; *ibid* 121).

The first attempt at a comprehensive study of the contemporary character and history of the Fenland Region was undertaken by Miller and Skertchly in *The Fenland Past and Present* published in 1878. Chapters describing the region's fauna and flora, climate, and sanitary conditions, were complemented by chapters concerning its geology, prehistoric and Roman settlement, the medieval period, its religious houses, and antiquities. A list of "Fenland Tumuli" was reproduced as an appendix and some notable monuments and artefacts were illustrated.

Miller and Skertchly witnessed some of the effects that the increasing industrialisation of Fenland agriculture and drainage had on the wetland environment. Their work, and the work of their successors, was partly inspired by the radical changes that were taking place in this landscape and a desire to record its disappearing features. Increasingly effective drainage measures and the consequent shrinkage, and loss of peat cover in particular, brought forth many new discoveries and good opportunities for the investigation of hitherto buried features.

7.2.2 Modern archaeology in the Fenland region

Cyril Fox's seminal landscape archaeology study, the *Archaeology of the Cambridge Region* (1923) covered a portion of the southern fens. Fox's principal achievement was to relate the distribution of archaeological monuments and finds belonging to various general periods to an interpretation of the land form and environment during those periods. The development of settlement and various other forms of activity over time

then could be examined in the context of the landscape they occupied. Fox's work inspired similar approaches elsewhere in the country over the following decades.

The true origins of the multi-disciplinary scientific approach to the study of Fenland archaeology, and the foundations of palaeoenvironmental archaeology as an integrated component of modern landscape archaeology throughout Britain, are to be found in the Fenland Research Committee of the 1930s.

The formation of the Fenland Research Committee (FRC) in 1932 finally brought together many individuals and research interests that had worked in relative isolation since the end of the First World War. Major Gordon Fowler, transport manager at the Ely Sugar Beet factory, had long taken an interest in ancient trees and artefacts reported by his farming clients. He was especially interested in the pattern of ancient creeks and rivers as revealed in the raised silt 'roddons' of the peat lands. During the late 1920s Crawford's collection of RAF aerial photographs were made available to archaeologists, who were astounded to see the vast extent and complexity of crop-marked Roman settlement in the silt fens (Phillips 1987, 38). At around the same time Harry and Margaret Godwin were employing the imported techniques of pollen analysis to archaeological work for the first time in this country, using Fenland sites. The geologist W.A. Macfadyen was undertaking pioneering foraminifera research using the ancient river systems of the region.

The Fenland Research Committee was intimately connected with Cambridge University, but also included researchers from further afield. Among its members were several who were involved in the transformation of the Ipswich based Prehistoric Society of East Anglia, with its antiquarian pre-occupations, into the nationally influential Prehistoric Society. Charles Phillips and Grahame Clark, who were to become so important to the development of archaeology after the war, cut their teeth on the problems of Fenland archaeology, together with local researchers such as Fowler, nationally renowned archaeologists like O.G.S. Crawford, and eminent geologists and botanists. By the time of its premature demise in 1940, forty-two specialists were involved in the work of the Fenland Research Committee (Hall & Coles 1994, 6). Excavations such as that at Shippea

Hill in the southern Fens, which revealed a very deep sequence of different fen environments all neatly dated by artefact finds (Clark, Godwin & Clifford 1935), had by then set a benchmark for the integrated analysis of the natural environmental and human activity. The Fenland Research Committee had effectively established environmental archaeology as an important part of the modern discipline.

At around the same time, another Cambridge Scholar, H.C. Darby (1974), was tackling the history of the medieval Fens from an economic and administrative history perspective. His work was not carried out under the auspices of the FRC, but Darby nevertheless drew on the work of its members in completing (during 1940) the first edition of *The Medieval Fenland*.

The death of prominent members, the disruption of the Second World War, and the dispersal of other members' interests post-war, meant that the FRC did not re-convene after 1945. Nevertheless, unpublished pre-war work on the exploration of the Roman Fenland eventually was picked up again under the auspices of the Ordnance Survey and Royal Geographic Society. Charles Phillips, recently retired as the Ordnance Survey's Archaeology Officer, oversaw the publication of the *Fenland in Roman Times* (Phillips 1970) the result of a project managed by Dr Peter Salway to bring to fruition one important aspect of pre-war Fenland research. The study included a very comprehensive appraisal and plotting of aerial photographic evidence by Sylvia Hallam - the continuation of a pre-war PhD project into Roman settlement in the vicinity of her Spalding home. The published volume also contained a comprehensive gazetteer of all known Roman sites in the region and a series of distribution maps (Phillips 1987, 152-153).

Fieldwork in the fens was not entirely dormant after 1945. Notable excavations focused on Roman archaeology were carried out by the Potters of March from the 1960s. Tim Potter, the son of the headmaster of March Grammar school, went on to become keeper of Roman Antiquities at the British Museum. During the 1970s and 1980s he directed excavations at several large Roman settlement sites, notably the proto-town and unique multi-storey building at Stonea in central Fenland (Jackson & Potter 1996).

The long awaited publication of the *Fenland in Roman Times* in 1970 kept alive the memory of the considerable, but prematurely truncated, success of the Fenland Research Committee, and amply demonstrated the future promise of Fenland archaeology. The recent decades of arable improvement, and the consequent on-going attrition to archaeological sites, served as further incentive to reinvigorate a coordinated survey campaign.

The (Council for British Archaeology's) Area Advisory Committee for Cambridgeshire, Essex and Hertfordshire agreed to create the post of Fenland Field Officer, and David Hall was duly appointed in 1976. A successful pilot fieldwalking project was undertaken that revealed extensive hitherto unidentified prehistoric sites partially buried by fen deposits in various areas of the region. Following this work, the Department of Environment was approached to fund a more extensive Fenland Project under the chairmanship of John Coles (Hall & Coles 1994, 7). The Fenland Project became the second of the country's large-scale wetland archaeology surveys, following work in the Somerset Levels. Surveys of the North-West wetlands and Humber Levels, also funded by central Government through English Heritage, came later.

The primary aim of the new Fenland Project was to carry out survey work in the Fenland of Cambridgeshire, Lincolnshire and Norfolk. Independent study of the smaller area of the Suffolk fens, already underway, was to be incorporated. A series of detailed reports was to be published, and simple databases of site information and copies of the annotated fieldwork base maps were given to the relevant Sites and Monuments Records.

The Fenland Project survey was a monumental piece of archaeological work. The fieldwork largely comprised 'walkover', or rapid fieldwalking, surveys carried out on a field-by-field, parish-by-parish basis. Where field conditions were suitable, fieldwalking transects spaced 30m apart were employed. It was a technique pioneered by David Hall in his survey of the Soke of Peterborough during the 1970s, and was designed to rapidly investigate large areas of landscape in sufficient detail to characterise and map the extent of sites. By the close of the survey phase of the project in 1988, around 250,000 hectares (well over half a million acres) of Fenland

in three counties had been fieldwalked, and over 2,000 significant new sites had been identified (Hall & Coles 1994, 8). It is the largest such survey ever undertaken in this country.

The survey phase of the Fenland Project also saw the appraisal and plotting of some areas of crop-marked archaeology, and the mapping of extensive roddon systems, the fen edge, and fen islands. The reports, published in the East Anglian Archaeology monograph series, comprised general introductions and conclusions that sandwiched a series of parish essays. The parish essays were sub-divided into general period sections (neolithic, Bronze Age, Iron Age etc.) and sketches of geological background and environmental change.

A programme of scientific palaeoenvironmental sampling analysis was carried out alongside the fieldwalking and mapping programme. The aim of this work was to “place the archaeological sites discovered by the field survey within their contemporary landscape” (Waller 1994, xii). The emphasis, therefore, was firmly on the Flandrian (Holocene) deposits.

The work sought to establish the lithostratigraphic (physical sediment properties), biostratigraphic (fossil plant and animal remains locked within the deposits), and chronostratigraphic (dating of deposit units) characteristics of the whole fen basin. Radiocarbon dating and pollen analysis, supported by the field recording of deposit character, and supplemented by the analysis of diatoms, were the main techniques used in the palaeoenvironmental survey (Waller 1994, 3; 26).

A striking feature of the survey was the publication of base maps that sought to represent the character of the environment during various general periods. Archaeological sites of the relevant period were plotted on these base maps. The periods represented for each parish varied depending on the quality of data in each case. Composite maps, covering large areas of Fenland were drawn up from the parish maps. It is an approach to visualising ancient landscapes that follows the spirit of Fox's early model, albeit with a much more scientific and methodical basis. Fox would have been astounded by the detail that has been achieved.

The following sequence of characterisations of the ancient Fenland

environment (Figures 35-39, after Hall 1987, 48-54) are based on field observations, palaeoenvironmental analysis, and aerial photograph interpretation. The maps show the north-east corner of Thorney parish, an area of around 11km by 8km, and illustrate the complexity of the ancient environment. They are informed interpretations and convey a sense of the dynamics of the changing landscape, but are of course open to re-interpretation and refinement.



Figure 35. The neolithic fen landscape at Thorney. The neolithic landscape is largely masked by later deposits, but low islands and major watercourses have been identified.

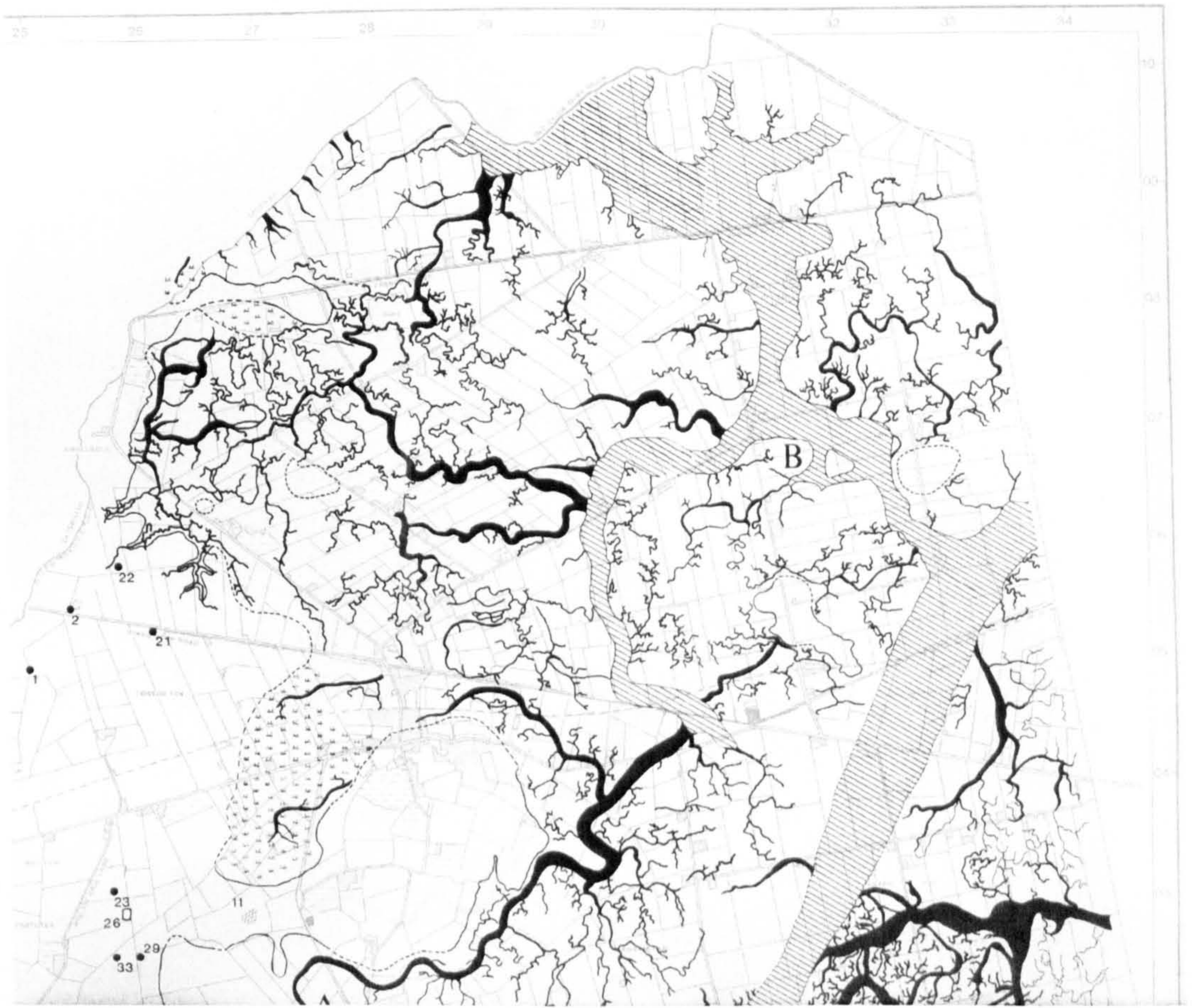


Figure 36. The Bronze Age fen landscape at Thorney. The area was dominated by a dendritic tidal river system. Small areas of peat fen developed on the fen edge.

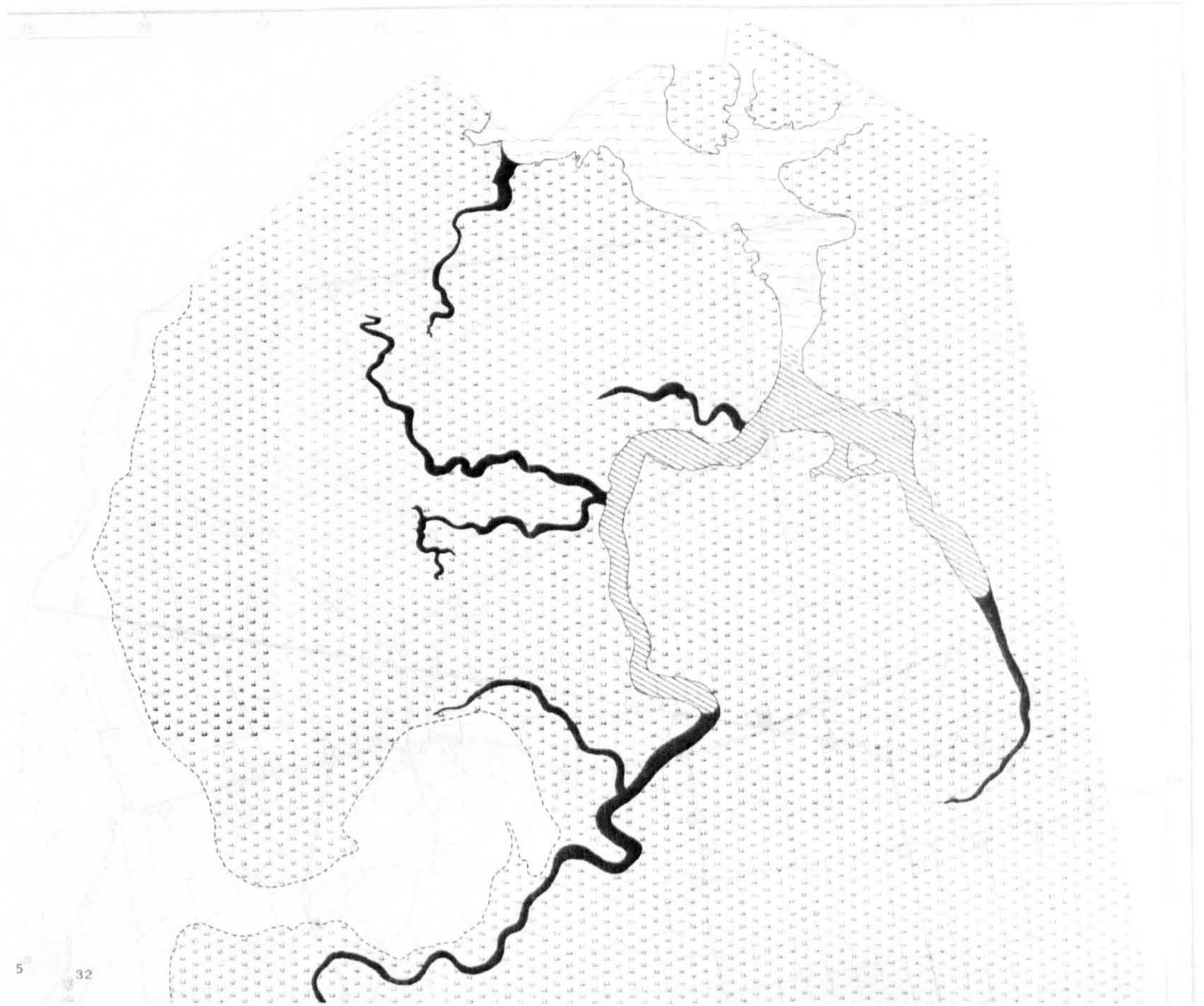


Figure 37. The Iron Age fen landscape at Thorney. Peat fen developed over much of the former river system, but major tidally-influenced channels remain active.

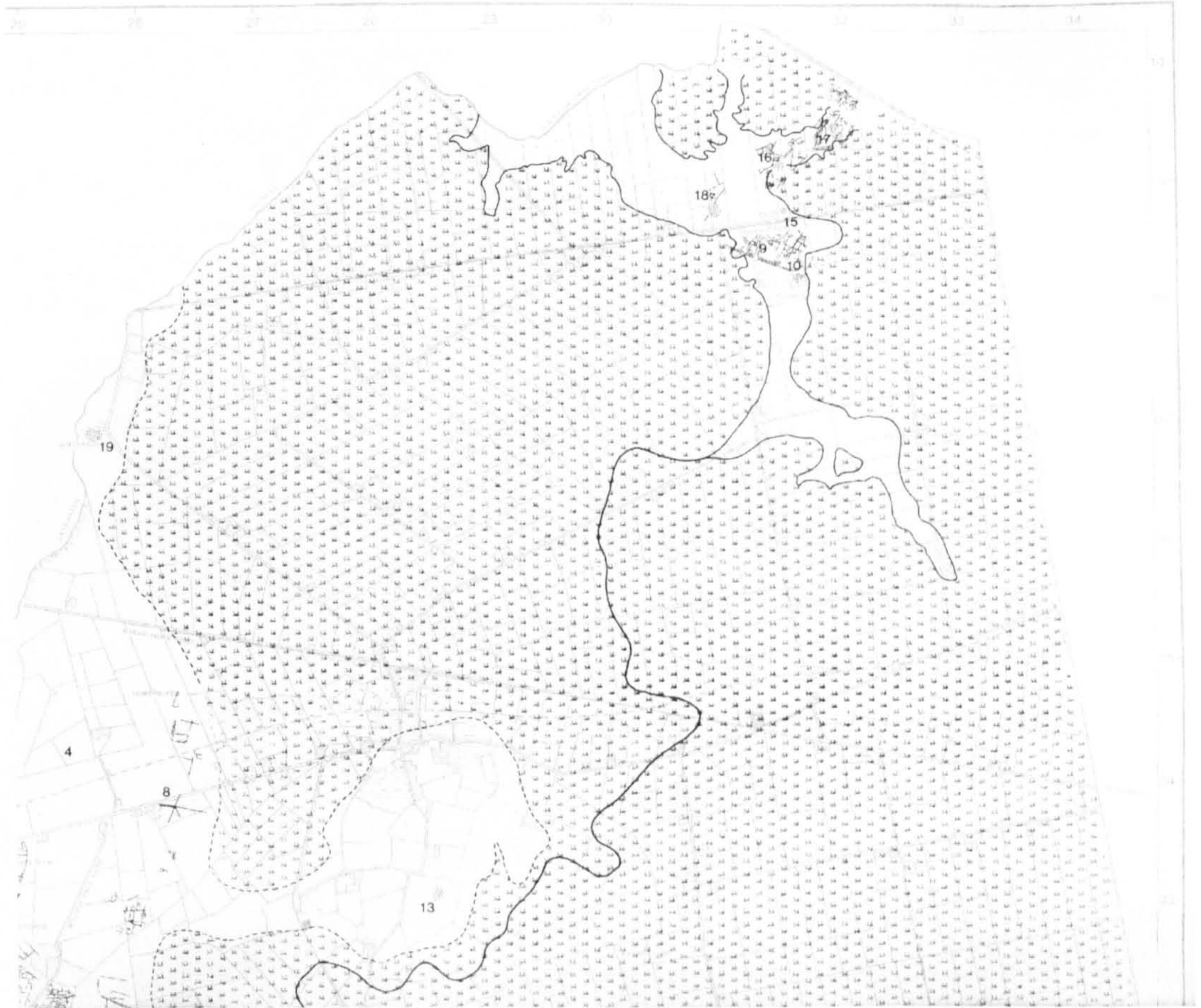


Figure 38. The Roman fen landscape at Thorney. Drier conditions allowed the colonisation of the silt banks left by the prehistoric rivers ('roddons').



Figure 39. The medieval fen landscape at Thorney. The maximum growth of peat fen occurred during the medieval period. Thorney has become an island surrounded by fen. Smaller islands in the fen that were known to support buildings in later medieval times are not shown.

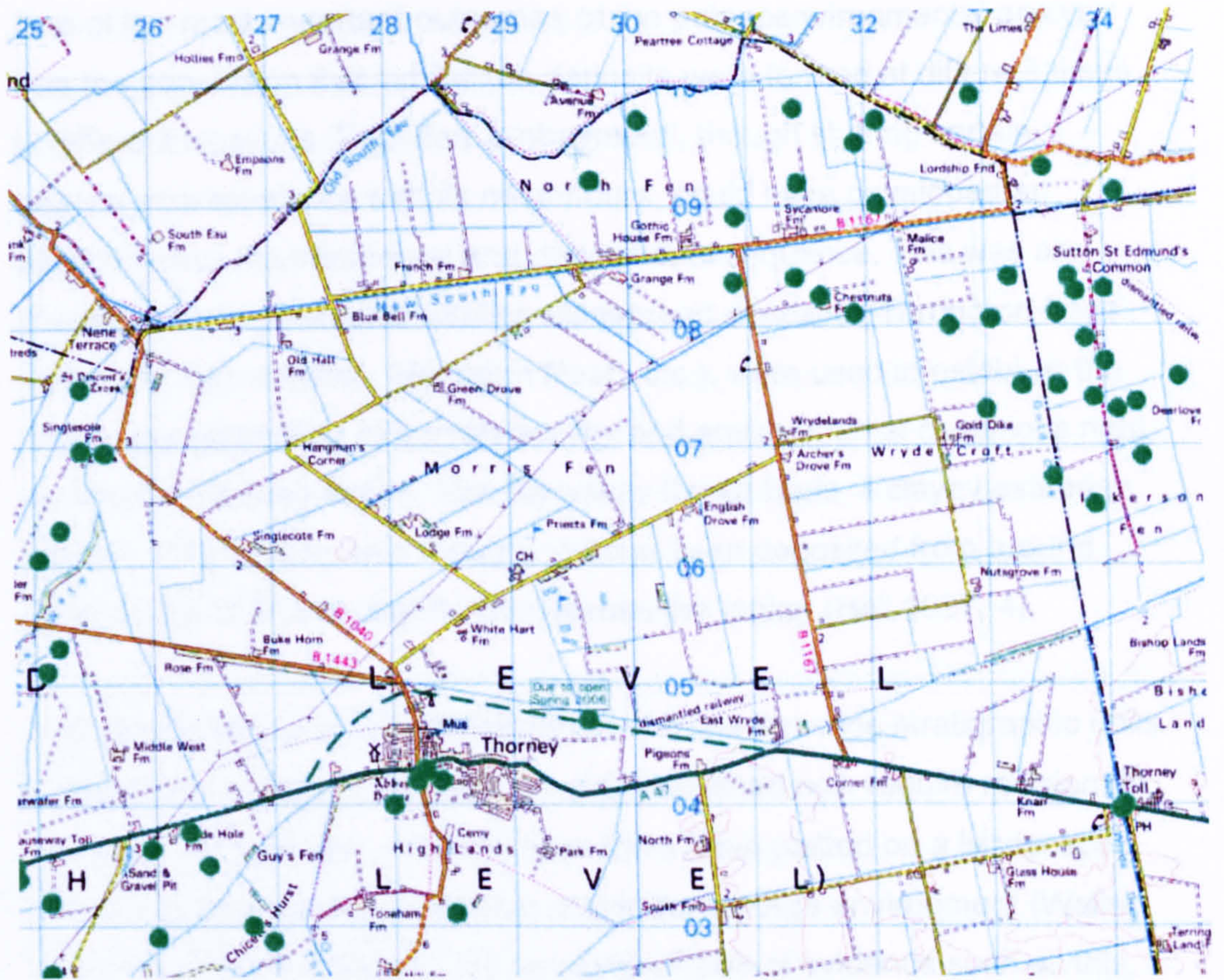


Figure 40. The modern fen landscape and Roman sites at Thorney. The distribution of Roman site centre points in the same area, as recorded by the SMR. The archaeological evidence cannot be understood without reference to the reconstructed landscapes. Original in colour.

One of the most important outcomes of the palaeoenvironmental analysis was the conclusion that similar fen deposits were formed at different times in different locations. Each fen 'embayment', though sharing certain general characteristics with its neighbours, could have developed an asynchronous environmental and depositional sequence. This was an important finding. Hitherto, similar widespread deposits ('Terrington Beds', 'Barroway Drove Beds', 'Nordelph Peat', etc.), were used to establish the dating and correlation of human activity and environmental conditions right across the Fenland region. The Barroway Drove Beds, a clayey estuarine deposit, for example, was thought to have been deposited from around 3,000 to 2,000 BC, or slightly later across the region (Hall 1987, 4).

One consequence of the disintegration of these fen-wide stratigraphic units is that some of the period maps already published now require revision. In one case, for example, neolithic sites have been plotted on a landscape that is in fact more representative of the Bronze Age environment (Waller 1994, 15). Readily allowing the re-interpretation of evidence such as this, and inviting the exploration of alternative relationships between data items, should be an important facet of any Fenland research database.

Following the bulk of the Fenland Project survey work and a short phase of rapid evaluations, excavations were undertaken during 1991-1995 to further investigate the character and condition of 41 representative or key sites (Crowson, Lane & Reeve 2000). This work, named the Fenland Management Project, was undertaken by a handful of the region's archaeological units (Cambridge Archaeological Unit, Heritage Lincolnshire, Norfolk Archaeological Unit, Fenland Archaeological Trust), who often managed to keep the same core fieldwork team for each site that they investigated (Crowson, Lane & Reeve 2000, viii-ix).

Much of this work has been published in established regional monographs (for example, Evans 2003; French 1994). A series of interim reports was published in a short occasional monograph series called Fenland Research. These publications also incorporated archaeological investigations that were carried out under different auspices to the Fenland Project, but that nevertheless were complementary to its aims (for example, James 1992a; Malim & McKenna 1994).

The completion of the fieldwork phases of the English Heritage funded Fenland Project was marked by the publication of a summary monograph and a small book aimed at the general reader (Hall & Coles 1994; Coles & Hall 1998).

The end of the Fenland Project, however, did not signal the end of large-scale archaeological investigations in the fens. Despite the rural and generally sparsely populated nature of the region, there are still significant development pressures. Gravel and clay extraction, irrigation lake excavation, business and industrial estate development, road and pipeline construction, and housing development at allocated growth centres, present the most serious threats to archaeology, alongside the drying and wastage of fen soils.

The adoption of *PPG16* (Department of the Environment 1990) principles by Local Authorities within the Fenland region, has led to a greater incidence of development-led archaeological investigations. Development-led excavations are now routinely undertaken by all but one of the units that participated in the Fenland Management Project excavations, and by many other commercial field units from well beyond the region. The intermittent long running excavation campaigns at Flag Fen near Peterborough are among the very few research and training excavations that have taken place within Fenland over the last 15 years. Cambridge University last undertook a few seasons of research and training excavations at Fenland sites during the 1980s. A handful of excavations inspired or supported by television companies have been carried out in recent years.

The completion of the English Heritage funded projects and the dispersal of archaeological work among a much greater number of units has led to a fragmentation of research effort across the Fenland region. The occasional seminars and conferences that punctuated the Fenland Project years no longer take place, and there is no single publication vehicle for interim reports that cover Fenland issues. The *East Anglian Archaeology* and *Lincolnshire Archaeology* monograph series, however, publish major reports of Fenland-related work (for example Mortimer, Regan & Lucy 2005; French & Pryor 2005) among its wider remit. Important large-scale

excavation programmes, such as those at the Eton causewayed enclosure and at Flag Fen, have been published in the English Heritage archaeological reports series (Pryor 1998; Pryor 2001a). The respective county journals, the *Proceedings of the Cambridge Antiquarian Society*, *Norfolk Archaeology*, and *Lincolnshire Archaeology and History*, publish Fenland relevant investigations among their wider county areas of interest.

A few books aimed at the general reader, notably Francis Pryor's recent *Seahenge, Britain BC*, and *Flag Fen: Life and Death of a Prehistoric Landscape*, also contain much original interpretation and theory pertaining to Fenland archaeology (Pryor 2001b; Pryor 2004; Pryor 2005).

A huge amount of grey literature resulting from development-led fieldwork is generated annually. This, along with information about casual finds, non-intrusive survey work, etc. is accessioned by the five Sites and Monuments Records/Historic Environment Records that cover the Fenland region (Cambridgeshire, Lincolnshire, Norfolk, Suffolk and Peterborough). As the most intensive records of the historic environment of the Fenland region, the five SMRs/HERs represent an important research resource, and a resource that should form a focal point for future research effort. It is a resource that should become even more important as the database grows, as centrally coordinated research effort disappears, and a wider variety of potential participants are encouraged to appear on the scene.

The future direction of research effort, by its nature, is difficult to predict. Obviously it is impossible to implement a Historic Environment Record system that is capable of accommodating all current and future research ambitions, even if these were restricted to monument and landscape issues. It should be possible, however, to plan an HER system that can assist with declared current research ambitions and to make an attempt at identifying research themes that are likely to arise or remain relevant in the not-too-distant future. The following section will seek to draw out research themes that are applicable to Fenland archaeology from published research statements.

7.3 Fenland research themes in national research agendas

Research frameworks are well-established archaeological management tools. They often comprise two main parts: an assessment of the available physical remains and current state of knowledge ('resource assessment'), followed by some suggestions for research themes that address significant gaps in knowledge or encourage exploration of hitherto unexamined issues ('research agenda'). Finally, 'strategy' statements describe how the agenda might be achieved (Glazebrook 1997, 1; Nixon, et al 2002, 3-4).

Research frameworks have sometimes received criticism for their lack of comprehensiveness, their conservatism and their uneven coverage of subjects. They are sometimes seen as too prescriptive, and therefore actually discouraging of creative research (Glazebrook 1997, 1).

Nevertheless, they have also been widely accepted as useful syntheses and appraisals of research effort by authoritative researchers. Research frameworks are considered to have an important role in encouraging research direction, particularly for investigative projects arising from non-research circumstances, such as development-led and management-driven archaeological work. Research frameworks also are used to assist funding bodies and national agencies to express where their resources are most likely to be directed. As such they are proving to be influential in shaping archaeological project designs (English Heritage 1997, 12).

Whatever the inherent shortcomings of published research agendas, they at least describe legitimate research themes that have been formed on the basis of some professional and academic consensus. They distil opinions and suggest research avenues that otherwise would remain unexpressed or hidden within the pages of a plethora of publications.

Exploring Our Past – strategies for the archaeology of England (English Heritage 1991b), set out a list of research priorities under period and thematic headings. The *Draft English Heritage Archaeology Division Research Agenda* (English Heritage 1997) was distributed for consultation among the archaeological profession in 1997. It was intended to replace *Exploring Our Past*, and it expanded upon the list of research priorities outlined in 1991 (English Heritage 1997, 40-65). Section 3 of this document introduces a series of research themes under the headings "The

Meaning of Change (Transitions)", "Chronological Periods", "Themes", and "Landscapes", along with some resource management initiatives under separate headings. The general period themes in particular were informed by research statements produced by the Prehistoric Society, the Society for Medieval Archaeology, the Society for Post-Medieval Archaeology, etc. (English Heritage 1997, 46).

The suggested research themes include subjects such as "Change and diversification in farming communities (c. 3,000-2,000BC)", "Communal monuments into settlement and field landscapes (c. 2,000-300 BC)", "Transition from medieval to post-medieval traditions (c. 1,300-1,700)", "Mesolithic in the North of England", "The origins and development of the medieval small town and rural markets", "Settlement hierarchies and interaction", "Industrial archaeology", "Cognitive landscapes", "Gardens", etc.

Fenland is mentioned by name with regard to the success of the Fenland Survey Project in identifying hitherto unknown sites (English Heritage 1997, 19). The types of archaeological and environmental remains found in the Fenland region are well equipped to contribute to many of the research themes suggested by the Draft English Heritage Archaeology Division Research Agenda.

It encourages, for example, the examination of Late Bronze Age and Iron Age landscapes: "Changes in the landscape over this period have often been associated with theories of population pressures. However, it is difficult to examine the basis of such theories due to the paucity of well-dated settlement sites, particularly from the early Iron Age, and the lack of information regarding the development of field systems and land boundaries...A priority for investigation must be colluvial and alluvial sequences, which offer the potential of stratified sequences over this period, complemented by information drawn from broader environmental work, such as that derived from the pollen record" (English Heritage 1997, 47-48).

This statement suggests that the most important components of late Bronze and Early Iron Age landscapes to address this research avenue are field systems, boundaries and settlements. For this specific research purpose the following NMR Thesaurus monument types could be said to

be the most relevant:

settlement; unenclosed settlement; enclosed settlement; round house (domestic); occupation site; field system; aggregate field system; celtic field system; coaxial field system; enclosed field system; boundary; boundary bank; boundary ditch; field boundary.

These terms are scattered throughout the 'Domestic' and 'Agriculture and Subsistence' monument classes.

The *Implementation Plan for Exploring Our Past 1998* (Williams 2003), a document drawn up from consultation on the Research Agenda and the subsequent *Exploring Our Past 1998* document (never published), is also of relevance to Fenland research. Marsh and fen edge landscapes are mentioned among those landscape types that are particularly rewarding for understanding the relationships between different activities and monument types (Williams 2003, Section 1.7). Wet and waterlogged areas, and alluvial and colluvial zones are defined as particular targets for the promotion of “under-studied or vulnerable areas” (Williams 2003, Section 2.0).

English Heritage have recently sought to rationalise their corporate research effort by seeking consultation on a revised research strategy – *Discovering the Past, Shaping the Future: Research Strategy 2005-2010* (English Heritage 2005a). The introduction to the research strategy declares that “Research is the key to understanding the historic environment: its scope, value, and condition, and the threats and opportunities that confront it”. The benefits that research brings to public access, appreciation, and enjoyment of the historic environment is also mentioned (English Heritage 2005a, 1).

The document introduces seven general themes ('A' to 'G') that will structure English Heritage's future approach to research. Of these only 'A' and 'E' ('Discovering, studying and defining historic assets and their significance'; 'Studying historic assets and improving their presentation and interpretation'; English Heritage 2005a, 12) address directly the advancement of academic knowledge about the historic environment. The other themes are orientated towards resource management and concern

subjects such as increasing public participation, understanding the socio-economic context of heritage assets, studying the risks to historic assets, and information management.

Nevertheless, it is noted that 6% of English Heritage's £165 million annual budget is spent on "all forms of research, development and innovation" (English Heritage 2005a, 6). Of this 66% was directed to themes 'A' and 'E' during 2005/2006 (English Heritage 2005b, 4). This is a significant sum in the context of applied historic environment research, particularly if added to the partnerships that English Heritage forges with a wide variety of external organisations and funding sources. The Aggregates Levy Sustainability Fund, for example, that is administered through the English Heritage Historic Environment Enabling Programme, has brought £5-6 million annually to research and management projects concerned with the effects of aggregates extraction.

Research Agendas that provide detailed consideration of the seven research themes are to be published annually. *English Heritage Research Agenda: An Introduction to English Heritage's Research Themes and Programmes* (English Heritage 2005b) provides the first detailed discussion, with examples of projects already underway.

English Heritage's new strategy and agenda do not define specific archaeological research themes in the manner of *Exploring Our Past*. There are no specific references to research issues within the Fenland region for example. However, they do not invalidate these earlier assessments of potentially fruitful avenues for archaeological research. Instead they signal continuing support for original research that can be integrated with wider resource management issues.

In addition to those research frameworks and agendas that take a multi-period, multi-theme approach to the whole country or to specific regions, there are examples of widely circulated agendas that concern broad period studies. *Britons and Romans: advancing an archaeological agenda* (James & Millett 2001), for example, arose from a session within the Roman Archaeology Conference at Durham in 1999. The majority of the contributors are from university departments throughout the country. The contrasting style of this publication with those produced by heritage

management professionals is notable. There is more emphasis on pure research questions and less on resource management issues. The potentially fruitful integration of research effort within development-led archaeological work, however, is a key theme of the publication and is mentioned by most contributors (James & Millett 2001, 1-3). *Britons and Romans* comprises essays on the Iron Age-Roman transition, gender and class, material culture and identity, rural society, urbanism, the interaction between civilians and the military, and the end of Roman Britain.

Notable regional mentions in *Britons and Romans* concern the recent widening of archaeological excavation programmes to investigate field systems and the organisation of wider agricultural landscapes, a hitherto under-researched subject. A call for the need to examine the evidence for centralisation of water management on floodplains and wetland, cites recent work on the Car Dyke Roman canal in the southern Cambridgeshire fens. Examination of the different nature of material wealth notes the paucity of coinage but occurrence of hoards of high status metalwork on Fenland region sites (James & Millett 2001, 53; 55; 56). Greenfield and waterlogged sites, such as those like Water Newton (*Durobrivae*) on the edge of the Fenland Region, are noted as especially important targets for urban research (James & Millett 2001, 62-63; 76).

7.4 Fenland research themes in regional research agendas

The anticipated publication of the fiftieth monograph of the East Anglian Archaeology series during more than twenty years of its existence, was the catalyst for a conference held in 1989 named 'Flatlands and Wetlands: current themes in East Anglian Archaeology'. The conference was well supported by the region's long-standing practitioners, by academic views, and by some input from outside the region.

Papers from the conference, revised and complemented by further submissions, formed the basis of contributions to the fiftieth edition of *East Anglian Archaeology* in 1993. The review of achievements and research issues across the region in 1989 was considered timely. Many of the larger projects that had characterised regional studies over several years were drawing to a close. It was recognised that *PPG16* would usher in changes

to working practice that were likely to have a profound effect on the ways that applied archaeological research was undertaken across the region (Gardiner 1993, 1-4).

Flatlands and Wetlands is not a full research framework in the accepted modern sense, but it comprises in large part a 'resource assessment' for significant aspects of the region's archaeology. There are papers that consider Fenland archaeological themes, East Anglia's principal medieval towns, and fieldwork and research in advance of major airport development at Stansted. The contributors take the opportunity to raise questions and issues for future fieldwork and research. While these are not organised into a shopping list or research agenda, there is nevertheless much in this monograph for researchers to pick out and expand upon.

Three papers, notably by contributors based within universities, address and pose questions of regional identity in prehistory (Bradley 1993, 5-13), in post-Roman times (Hills 1993, 14-23), and across the breadth of human history and archaeological remains represented in the region (Gardiner & Williamson 1993, 171-181).

Some of those involved with *Flatlands and Wetlands* were able later to take a leading role in producing the region's first formal research framework.

The development of regional frameworks is defined as a key programme within the *Exploring our Past 1998 Implementation Plan* (Williams 2003, Section 8). The resource assessment for the East Anglian research framework was the first such published in the country (ibid, Section 8.1; Glazebrook 1997). This has now been joined by a research agenda (Brown & Glazebrook 2000).

The research agenda discusses research issues for the East of England region in sections dedicated to broad conventional periods ("Palaeolithic and Mesolithic", "The Iron Age", "Anglo-Saxon and Medieval [Rural]", etc.). Each section includes sub-sections that cover "Gaps in Knowledge", "Potential of resource", and "Research topics".

There is also a section dedicated to cross period research themes (Brown & Glazebrook 2000, 44-48).

The final section of the regional research agenda comprises strategy statements that set out how the research might be secured. The strategy noted that most of the projects currently underway within the region were concerned with the management of archaeological resources, rather than academic questions or gaps in knowledge. Those projects not undertaken by Local Government archaeologists (often supported by English Heritage funding) typically are low budget, and draw on student and volunteer support (Brown & Glazebrook 2000, 50). It was noted that development-led projects, secured through *PPG15* and *PPG16* provisions, would continue to provide the source of most research opportunities across the region for the foreseeable future (Brown & Glazebrook 2000, 53).

As may be expected, mentions of Fenland archaeology and research issues relevant to the Fens are to be found throughout both documents that comprise the research framework for the Eastern Counties. While Fenland-specific topics are not as prominent as they might have been in each of the author's essays, there are many research avenues that Fenland archaeology has the capacity to address.

The research agenda statements for the palaeolithic and mesolithic periods, for example, are largely concerned with resource mapping issues, but identify "sealed/waterlogged fen edge deposits" as areas that should be surveyed as a priority (Brown & Glazebrook 2000, 7). Neolithic and Bronze Age themes include the big questions regarding the introduction and character of early agriculture. Here the example of a suitable research landscape is given as the Essex/Suffolk Stour Valley, but the areas of highest potential implicitly include the Fenland region (Brown & Glazebrook 2000, 12-13). Indeed, Stewart Bryant draws attention to the importance of the alluvium and peat covered Iron Age sites of the fens in tackling palaeoenvironmental questions and their tendency to better represent a fuller range of settlement evidence than plough damaged sites elsewhere across the Eastern region (Brown & Glazebrook 2000, 14-15).

Brian Ayers draws attention to the paucity of excavation of Fenland's primary coastal and inland ports: Kings Lynn, Wisbech, Ely, and

Peterborough, etc. (Brown & Glazebrook 2000, 27-32). The archaeological remains of these places are not only very well preserved, but also have much to contribute to an understanding of the region's economy and the economic and cultural relationships with the rest of the UK and with Europe.

After addressing the research topics that are relevant to general periods of the region's archaeology, the research agenda suggests several cross-period themes. Examinations of the character of the "Mesolithic/Neolithic transition", the "development of a fully agricultural economy during the Neolithic and Bronze Age", "Agricultural developments during the Iron Age", "The origins and development of field systems; their change and continuity", among other themes, are suggested under the general heading of "Origins and development of the agrarian economy" (Brown & Glazebrook 2000, 44-45).

The general research theme entitled "Urban development", includes themes focused on exploring urban origins and the role of towns in technological, economic, cultural and political developments across the region.

Other general research themes are headed "Find Studies" (which comprises, the "development of artefacts within the Neolithic and Bronze Age", "production and exchange in the Iron Age, Roman and Anglo-Saxon periods", etc.), "Human Remains", and "Selective survey". The latter draws attention to the research value of buried land surfaces, alluvial deposits, and wet remains in the Fenland Region (Brown & Glazebrook 2000, 46-57). Finally, the research theme "Political and social development within territories" draws attention to named Iron Age tribes of the region and the dominant Anglo-Saxon Kingdoms, and invites study into the origins and development of these neighbouring "social and political groupings" (Brown & Glazebrook 2000, 47).

In addition to the national and regional documents, there are a handful of statements that consider exclusively Fenland-related archaeological issues.

An opportunity was given by the editor of *Fenland Research* for

archaeologists involved with the Fenland Survey and Management Projects to describe their research priority wish list (Evans 1992b). Each contributor was asked the theoretical question “if you had upwards of a million pounds what would you do to address the problems of the Neolithic, or Bronze Age...” (Evans 1992b).

Contributors tackled their respective general periods in essays of a few hundred words. Though readily acknowledged as more of a shopping list than an extensive formal research agenda, the printed statements nevertheless provide invaluable informed opinion on where research effort should be applied. The editor noted at the time that there was a need to promote an “element of research continuity” in Fenland studies since many of the old fen hands were no longer active, and a new generation of researchers had yet to become established (Evans 1992b).

Frances Healy raised the question of how much neolithic and Bronze Age variation there was in socio-political organisation around the Fenland basin. The identification of local production sites for the copious quantities of Bronze Age metalwork that have been found across the region also was identified as a priority (Healey 1992, 4-6). This, incidentally, is also identified as a theme for East Anglia-wide research (Brown & Glazebrook 2000, 9). Evans suggested tackling the question of whether the Iron Age Fenland should be seen as a mosaic of neighbouring tribes or a single entity influenced by the onset of much wetter conditions during this period. He raised the questions of the apparent paucity of late Iron Age sites and possible evidence for “cultural backwardness” at this time, and the role of the handful of hill fort-like enclosed sites (Evans 1992a, 9).

Tim Potter advocated investigations that tested long-lived hypotheses such as whether the Fens were developed as an Imperial estate. He made recommendations for large-scale excavations at specific military and settlement sites, and of the road and canal system. Again, the possible symbolic and central role of Stonea Camp, one of region's curious enclosed Iron Age sites, was raised (Evans 1992a, 10-11).

David Hall, writing about the Saxon and medieval periods, encouraged work on a Fenland pottery type-series. He also advocated the greater exploration of the abundant documentary sources for medieval agriculture

and drainage from a topographic perspective, that could be related to the field evidence (Evans 1992a, 11-12). Questions surrounding drainage and the subsequent maintenance of the agricultural landscape were the foci for Nick James's post-medieval essay. James noted that the drainage of the Great Level between 1631 and 1653 probably ranked as "the biggest single feat of pre-industrial engineering in European history". And yet the early construction and maintenance techniques are not known, and our knowledge of the impact of drainage on local communities is mostly a product of later writers. In fact, James noted that despite the applicability of archaeological techniques to post-medieval history, archaeologists had not yet responded to the issues that were of such interest to local people (James 1992b, 12-13).

For the purposes of this research theme, the following NMR Thesaurus of Monument Types terms are likely to be relevant:

wind pump; drainage mill; drainage system; drainage ditch; drain; culvert; sluice; sluice gate; watercourse; canal; flood relief canal; water channel; flood defences; bank (earthwork).

These terms do not conform with a specific Monument Class or broader term definition.

Other more localised suggestions for research topics exist in printed form, albeit of more limited circulation. Produced in 1997 with English Heritage funding, *Peterborough East - a guide to curation in an area of outstanding archaeological importance* (Pryor 1992), is in effect a research framework for the Fengate and Northey fen edge landscapes, and the Flag Fen basin that separates them.

This is an area where threat-led excavation has intertwined with research effort since the early years of the twentieth century. The major pre-development campaign of excavations that ran between 1971 and 1978, for example, were supported jointly by the Department of the Environment and the Royal Ontario Museum (Pryor 1997, 10).

Peterborough East begins with a discussion of the history of research in the area. There then follows a discussion of the commercial, planning and

archaeological management context for work within the area, and some practical advice regarding excavation and analysis techniques. This is followed by an appraisal of zones within the study area based on preservation characteristics (likely depth of peat and alluvium, extent of plough damage, presence of waterlogged conditions, etc.). The zones are given an 'archaeological potential' score of 1 (poor) through to 5 (excellent preservation characteristics). Finally, there is a section entitled 'Some suggested directions for future research'. The author offers thirteen research topics based on his considerable experience of excavation in the area (Pryor 1992, 31-34), then considers the relevant themes introduced in *Exploring Our Past* (English Heritage 1991b). The need to investigate the relationships between the environment and cultural change is prominent among the research themes suggested by Pryor. He also points out the danger of Fenland studies becoming "too environmentally deterministic", and of ignoring the social innovations that changed the nature of activity and the character communities across the region. A second major theme introduced by Pryor pertains to the character of the Bronze Age economy. To what degree was it livestock based, and if so where was the population that ran the system living? The density and character of habitation in the mesolithic and neolithic periods are further avenues put forward for local exploration (Pryor 1992, 31).

7.5 Future directions for Fenland research

Is it possible to characterise the general grain of research that might be applied to Fenland Archaeology over the next decade or so? Is it then possible to suggest a suite of research themes that the region's HERs might be called upon to assist? A survey of the research statements reviewed above suggests that it is feasible to predict at least some general research trends.

One prominent general theme that emerges from the published research agendas, and incidentally a theme that is also prominent among national statements regarding the value of the historic environment (*Power of Place; A Force for our Future; English Heritage Research Strategy*, etc.), is the relationship between archaeology and 'sense of place', and cultural identity.

Regionally, this is expressed in the suggested examination of evidence for distinctive Fenland cultures throughout time. Evans (1992b, Preface) has posed the question as to whether a 'Fenland Archaeology' actually exists at all: "The case has yet to be made that it exists as any kind of archaeological or prehistoric social phenomenon. Is it anything more than a marginal adaptation on the fringes of adjacent dry/upland territories or does (and if so, when) the Fen/wetland constitute a community unto itself?". He asserts that "Arguments relating to the latter instance must envisage 'culture' as being economically/ecologically defined and beg the question to what degree environment alone determines identity". This reading of the archaeological evidence is at odds with the ethnographic observations of early writers, who often presented the Fenland region and its people as a world apart.

The distinctiveness of Fenland archaeology does not necessarily derive from an easily identified suite of unique or distinctive material cultures or monument types. The vast majority of artefact types, pottery styles, building forms, etc. encountered in the Fenland region extend from neighbouring regions into the Fens, or in some cases from the Fens out into neighbouring regions. There are a few monument types that are characteristic of the region and that are not found in similar situations or in exactly the same form, or in such abundance, elsewhere in the country. These include Roman canals, salterns, turbaries, and silt rings, etc. Most general monument types found in the fens, however, are shared with other regions. Nevertheless, the ways that these monuments relate to each other and to the natural environment to form wider landscapes, are often distinctive and unique. Some patterns of human activity in the region, as now expressed by the surviving archaeology, may well prove to be especially distinctive.

Any contribution that HER information can make to the question of cultural identities in the region over time, has to be based around the relationships between monument types within the region, as much as the comparison between individual Fenland and non-Fenland types. This demands an ability to reconstruct landscape types from individual monument components, rather than just looking at monuments as discrete entities in isolation.

Notwithstanding Pryor's observation that it is possible to become distracted by environmental determinism when interpreting Fenland culture, it is clear that the changing natural environment is a highly significant aspect of the region's identity. It is essential therefore that monument and landscape information held by the region's HERs should be examined in the context of the relevant environmental evidence. This requires that environmental information, whether directly related to human activity or not, is captured in a form that allows its integration with monument data and data regarding constructed landscape features generally (compare Figure 38 with Figure 40, for example).

CHAPTER 8 – EXTENDING THE ADS CIE DEMONSTRATOR: A MODEL FOR A FENLAND HISTORIC ENVIRONMENT RECORD

Chapter 6 concluded that the ADS CIE demonstrator, which borrows techniques from faceted classification theory, is a good model for a targeted and user-focused search interface for HER datasets. It provides a framework for retrieving similar information types efficiently (i.e. data that can be grouped into common classifications, and that can share the same metadata schema). It can do so with reference to historic environment themes as expressed by facets, classifications and sub-classifications (or 'concepts').

The ADS CIE demonstrator constitutes a significant improvement over systems that rely on keyword only searches, or selection from lists, by allowing users to engage with the structure of the data. Users can narrow or broaden their search, or search with combined concepts, with full knowledge of the magnitude of the expected search results. It is a search mechanism that would be suitable both for single Historic Environment Records and aggregated online HERs.

Historic Environment Records should seek to provide a holistic view of the historic environment, and not merely represent monument information (Chapter 3, section 3.4; Chapter 4, section 4.6; Appendix 4). Chapter 7 concluded that in order to represent the archaeology of the Fenland region, for example, its Historic Environment Records have to represent landscape-scale phenomena, both natural and constructed. In fact, it is questionable whether a distinction should be drawn between the two. The entire English landscape has been influenced and modified by direct or indirect human activity. It is arguable whether there are any substantial visible wholly 'natural' environments in England at all.

The perception of the natural environment as something that is inextricably connected with society, however, is not merely reflected in physical evidence. It is also represented in the ample documentary evidence and oral traditions that link natural phenomenon with special cultural activities.

In order to raise awareness of HERs as research resources, and not just management tools, HER search mechanisms should clearly signpost research theme entry points to the HER information. In order to engage more fully with current research, it should be possible for all users to contribute models (theories, concepts, ideas, alternative perceptions, etc.), that are not already inherent within the original structure of HER information.

Are the principles behind the ADS Common Information Environment demonstrator capable of extension to accommodate these features?

The Fenland case study has been chosen to illustrate certain non-monumental aspects of the historic environment, and how these (and related search themes), might be integrated into HER recording practice and search mechanisms. The issues, albeit with differing subject areas, matters of detail and emphasis, are relevant to any HER that seeks to be more representative of historic environment research than a traditional SMR.

The building blocks for a digital representation of Fenland's historic environment should be drawn, as far as possible, from nationally agreed data standards and thesauri. While many aspects of the historic environment have received considerable attention and benefit from well-established or emergent data standards, the digital representation of other categories of historic environment information have yet to be addressed.

The framework provided by MIDAS and the English Heritage NMR Thesaurus of Monument Types (Chapter 5, section 5.2) is applicable to Fenland archaeological monuments, as expected. The MIDAS structure can accommodate new monument types that have been defined through national or local specialist surveys. New monument terms can be submitted to the Thesaurus compilers as candidates for inclusion as necessary.

However, MIDAS and the Monument Thesaurus are simply not elastic enough to accommodate all of the existing relevant forms of historic environment information. Furthermore, single data structures that continue

to grow organically in order to accommodate new subject areas, eventually become unwieldy and unmanageable. They invariably fail to represent individual subject areas adequately (Chapter 6, section 6.3; Crofts et al 2003a). HEIRPORT, ADS ArchSearch and the ADS CIE demonstrator have shown, however, that heritage data from a wide variety of complementary sources can be mapped into common metadata schemas, and then retrieved successfully through combined searches. MIDAS structured SMR records have been successfully mapped into Dublin Core compatible metadata records. Portable Antiquities Scheme records have been successfully mapped into metadata standards shared with monument information (Chapter 5; Appendix 8, section A.8.3).

We should think of future Historic Environment Records, therefore, as groups of different but related databases, linked by a common metadata schema, with MIDAS as a guiding structural principle (Figure 41, below). Systems to manage metadata and to support user-defined searches should form the core of Historic Environment Records, not simply monument and event databases (Figure 41, below).

3.1 Historic landscape character

The description of monuments and parks and gardens as static data do not adequately represent the breadth or complexity of the physical historic environment.

The development of a series of modules for the HER is suggested as follows:

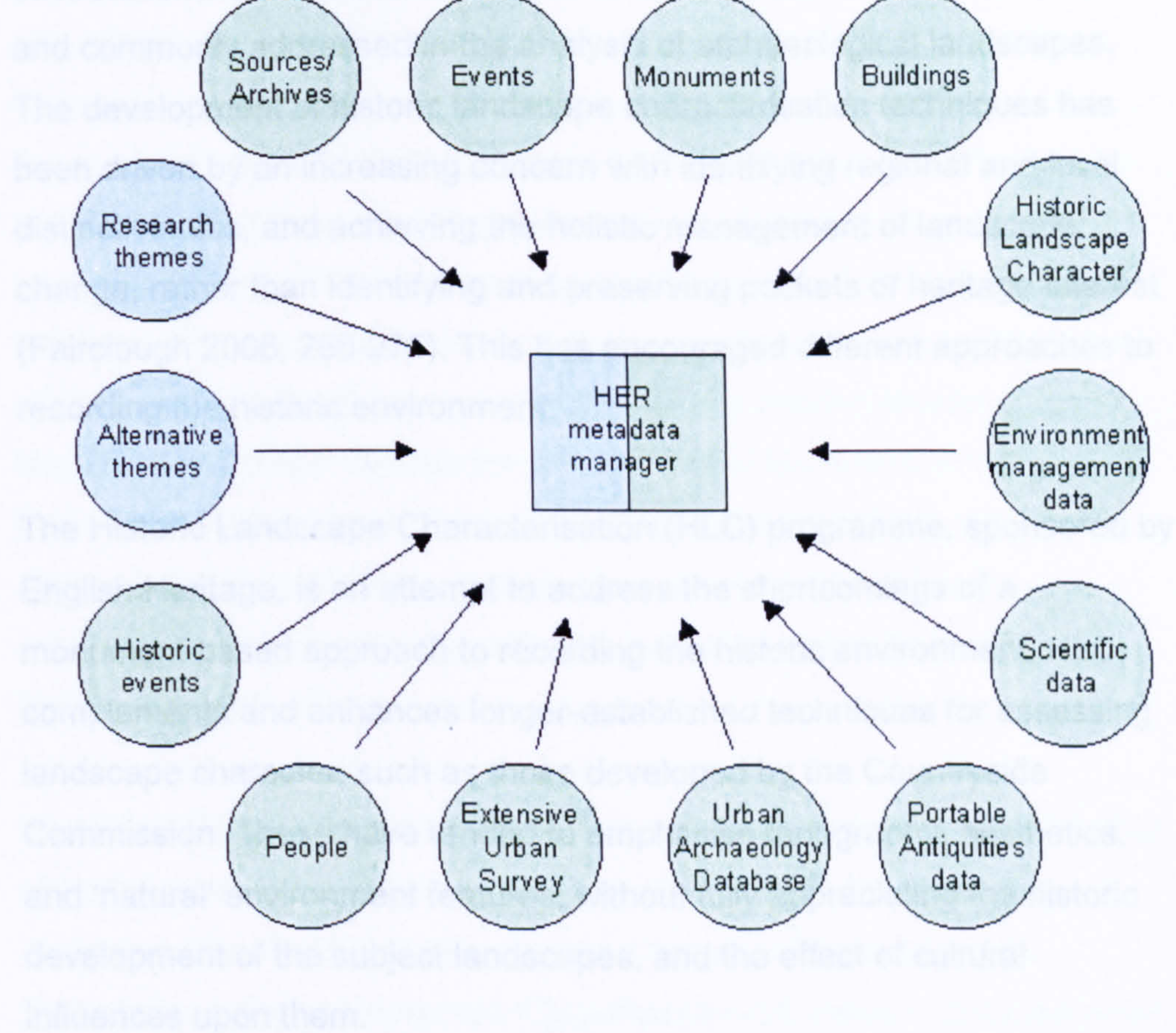


Figure 41. The modular HER. This suggested set of modules is by no means definitive. Some are well established (monuments, events, etc.), some are in formative stages (historic landscape characterisation, scientific and environmental data, etc.), and some are suggested here for the first time (alternative themes, research themes, people, etc.). New modules can be added according to local need and professional consensus. The user extensible modules are coloured blue. Original in colour.

23) It is progressing through England county by county.

The English Heritage Historic Landscape Characterisation technique requires the definition of 'Historic Landscape Types' which can be envisaged as a collection of attributes and GIS polygons (Fairclough 2001, 25). They may be based on historic processes, or present landscape and appearance, and typically comprise areas or clusters of fields, or other large land parcels.

8.1 Historic landscape character

The description of monuments and portable antiquities alone does not adequately represent the breadth or complexity of the physical historic environment. Other scales and types of features exist that are observable and commonly addressed in the analysis of archaeological landscapes. The development of historic landscape characterisation techniques has been driven by an increasing concern with identifying regional and local distinctiveness, and achieving the holistic management of landscape change, rather than identifying and preserving pockets of heritage interest (Fairclough 2006, 266-275). This has encouraged different approaches to recording the historic environment.

The Historic Landscape Characterisation (HLC) programme, sponsored by English Heritage, is an attempt to address the shortcomings of a monument-based approach to recording the historic environment. HLC complements and enhances longer-established techniques for assessing landscape character, such as those developed by the Countryside Commission. These have tended to emphasise topography, aesthetics, and 'natural' environment features, without fully appreciating the historic development of the subject landscapes, and the effect of cultural influences upon them.

The HLC programme seeks to ensure that the "contribution of human activity to the landscape's history and appearance" (Fairclough 2001, 23) is fully appreciated in landscape conservation and strategic development schemes. HLC has been described as "a powerful tool that provides a framework for broadening our understanding of the whole landscape and contributes to decisions affecting tomorrow's landscape" (Fairclough 2001, 23). It is progressing through England county by county.

The English Heritage Historic Landscape Characterisation technique requires the definition of 'Historic Landscape Types', which can be expressed as a collection of attributes and GIS polygons (Fairclough 2001, 25). They may be based on historic processes, or present land-use and appearance, and typically comprise areas or blocks of fields, or other large land parcels.

Since 1995, much of England has been characterised or is in the process of characterisation under the HLC programme. Inevitably over this time, and considering the range of different landscapes concerned, significant variations in methodology and terminology have been used. Indeed, there are fundamental differences in the philosophy that determines the recording approaches for each area.

Some areas have decided to adopt a 'Time Slice' approach, whereby the characterisation focuses on trying to represent landscapes at various periods in history. This involves mapping features that no longer exist, or that have little apparent connection to the present landscape. Others have adopted a 'Time Depth' approach, whereby the historic interest of the landscape is defined through the analysis of the features and morphology that survive in the present landscape. The exponents of this method acknowledge that it "does not often allow reconstruction of past environments [landscape character] at particular dates" (Aldred & Fairclough 2003, 16).

The 'Time Depth' approach can be further sub-divided. Those studies that attempt to create models from the analysis of current maps, and by assigning areas to Historic Landscape Character Types based on prescriptive criteria, are named 'Classification-led' studies. 'Document-led' studies use historic maps as a starting point, but also use prescriptive criteria. 'Attribute-based' methods use present field morphology and descriptive attributes to build models on which to base Historic Landscape Character Types. 'Multi-mode' studies use a combination of descriptive attributes and interpretation that results in the creation of models of landscape character (Aldred & Fairclough 2003, 1-20).

It is the 'Multi-mode' 'Time-Depth' technique that is now favoured as most closely meeting the primary objectives of Historic Landscape Characterisation - those of conservation management, rather than "trying to achieve landscape archaeology" (Aldred & Fairclough 2003, 16-17). The 'Time-Slice' method, however, would appear to be far more conducive to supporting academic research and complementing the monument-centric view of past landscapes currently offered by most SMRs and HERs. 'Time-Slice' characterisations should also form a more secure research basis for 'Time-Depth' characterisations and subsequent conservation decisions.

A recent study of the implementation of Historic Landscape Characterisation projects has noted that the finished products are seldom fully integrated within SMRs and HERs. They are rarely capable, for example, of being accessed and viewed through the same GIS facility, in combination with the core SMR/HER records. More often, the information sits alongside the existing core SMR/HER information, and has to be interrogated through a different system, usually “for IT and related reasons” (Aldred & Fairclough 2003, 25). Obviously, it is highly desirable to aim for a fully integrated approach to viewing historic environment information.

The Historic Landscape Characterisation programme has resulted in great variations in mean polygon size and the number of characterisation types produced by each county. There are some suggested attribute sets, however, that could be adopted as a basis for national standards (Aldred & Fairclough 2003, Appendix B). Of these, Attribute Set 3 is perhaps most applicable to the creation of a Fenland Historic Environment Record. It is similar in form to a simple hierarchical thesaurus, with broad terms ('Woodland', 'Enclosed Fieldscapes', etc.) and narrow terms ('Ancient [woodland]', 'Deciduous plantation [woodland]', 'Strip Fields [Enclosed Fieldscapes]', 'Parliamentary Enclosure' [Enclosed Fieldscapes]', etc.). These terms are then augmented by a series of morphological qualifiers ('Small Irregular', 'Medium-Large Irregular', 'Small Rectilinear', etc.).

Attribute Set 3 is by no means a definitive list, or nationally prescribed. In fact, no HLC word lists yet figure in the English Heritage NMR Thesauri list, or in the Inscription set maintained by FISH. There is some overlap, however, between the suggested narrow terms and terms within the English Heritage Thesaurus of Monument Types ('Field barn[s]', 'Marl pit[s]', 'Quarry'; 'Airfield', etc.). Some use of new and non-preferred monument-scale terms is also evident. 'Droeway' (HLC) is a non-preferred term for 'Drove Road', for example.

The nature of the methods that have been employed to define blocks of landscape character has dictated the use of a 'confidence' attribute, by which the recorder can assign 'certain', 'probable', or 'possible' degrees of certainty to their interpretation. This feature is absent from the MIDAS structure, where any qualifications about the certainty of the interpretation

of monuments are often left to supporting free text description fields.

The English Heritage Historic Landscape Characterisation projects are not the only examples of projects to characterise the historic environment on a landscape-scale. A slightly different approach, for example, has been taken by the Rockingham Forest Project in Northamptonshire (Foard et al 2005). For this sub-county project, mapping takes place at individual field level, and relies on much more historic map analysis and regression than that typically employed by HLC projects (David Hall pers. comm). Again, the project has a list of terms that relate to characterisation units that appear as layers of GIS polygons.

Both projects draw on present landscape features and maps that were invariably produced in post-medieval and modern times. As such, they are inherently focused on late medieval, post-medieval, and modern landscape definition (Aldred & Fairclough 2003, Annex A, 35). Some of the landscape types belonging to these periods do of course have parallels in more ancient landscapes. Nevertheless, certain landscape types that are commonly discussed in prehistoric or Roman studies, such as ritual landscapes, structured landscapes, or centuriated landscapes, are not recognised in later period studies.

Neither the HLC projects or the Rockingham Forest project contains the full suite of terms necessary to describe the Fenland landscape in sufficient detail. The Rockingham Forest survey area does not extend into Fenland areas. Regional examples of the HLC project have made use of the terms 'post-medieval drainage field' and 'reclaimed land'. These are terms that could apply to the majority of the Fenland. The creation of one large GIS polygon of around 200,000 hectares would be of no analytical or descriptive value to Fenland research and management!

Furthermore, there is no nationally agreed thesaurus to describe ancient natural or 'unimproved' (as they are sometimes termed by the English Heritage HLC projects) landscape units for archaeological applications. Similarly, a definitive national data structure and wordlist to describe scientific and environmental evidence and analytical events has yet to be adopted. Some progress has been made in this direction, however, and it is probable that the first major revision of MIDAS (MIDAS 2) will

incorporate some of these themes (Anon 2006).

The wordlists for both the HLC and Rockingham Forest projects are extensible, however, and have grown as the respective projects move into new areas. So it would be possible to expand either wordlist into a thesaurus, and to create new terms as a basis for Fenland Historic Landscape Characterisation types.

A good range of appropriate terms for ancient wetland landscape units can be drawn from the Fenland Project palaeoenvironment maps (for example, Hall 1987, 14; Hall 1992, 11; Hall 1996, 4; Waller 1994). The sample of these reproduced in Chapter 7 may be classed as 'Time-Slice' characterisations (Figures 35-39).

The following mini thesaurus comprises some suggested 'natural' or 'unimproved' historic landscape character types for Fenland.

Class: *Wetland landscape*;

Broad Term: ***Fen***

Narrow Terms:

Peat fen (primarily freshwater *Phragmites* swamp, with fluctuating degrees of wetness);

Raised bog (primarily acidic *Sphagnum* bog);

Fen woodland (semi-wet woodland);

Lagoon (area under marine inundation);

Salt marsh (tidal/inter-tidal environment with salt tolerant vegetation);

Mud flat (tidal/inter-tidal environment);

Silt fan (area subject to course alluviation);

Water course (an active watercourse, either tidally influenced or carrying freshwater);

Roddon (dry, extinct or near extinct watercourse, with raised banks);

Mere (area of shallow open fresh water which can expand or contract);

Island (raised area surrounded by wetland);

Fen edge (interface between wetland and upland);

It is possible to create tiers of narrower terms for many of these terms. *Fen woodland*, for example, could be further sub-divided into *Fen alder-carr*, *Fen willow carr*, *Fen buckthorn carr*, etc. according to dominant species (Waller 1994, 40).

The evidence that underlies the characterisations may be summarised as either lithostratigraphic (field observation of deposit character, soil micromorphology analysis, etc.) or biostratigraphic (palynological analysis, macrobotanical analysis, mollusc analysis, diatom analysis, etc.) in nature. It would be possible to extend the thesaurus structure to record individual signature species (or groups of species) as an elemental tier. There are obvious drawbacks to HER managers, however, in going into such a level of detail. Nevertheless, each natural environment term, whether broad or narrow, could be linked to an event and source record. For example, the collection of a pollen monolith and the pollen diagram, or the report resulting from its analysis.

Another alternative model for the wetland environment component of the characterisation thesaurus would be to adopt the analytical stratigraphic units used by Waller (1994, 18-19). These include terms such as 'peat', 'predominantly clay/silt', 'humic sand', 'chalky marl', 'fine organic material', 'phragmites remains', 'wood', 'humified organic material', etc. The terms include very little interpretation of the environment that may have produced them. They are obviously less subjective than the broad terms suggested above, but perhaps not quite evocative enough to encourage the appreciation of the landscape that HERs are trying to represent. The mini-thesaurus presented above is preferred for this case study.

8.2 Conceptual landscapes

The historic environment is not just a collection of physical features. Places are characterised by historic events and happenings, and the presence of people (famous or otherwise), regardless of whether or not they leave a physical impression. We associate places with memories, and project meanings in accordance with our own values and beliefs. These attributed perceptions can be personal, or shared by cultural groups. Legend and folklore perpetuate the attributed significance of certain places through

generations. Alternative and 'New Age' beliefs, folklore, and other non-academic interpretations, can evoke powerful and influential responses to places. The emotions and drama that occasionally erupt into conflict at iconic monuments such as Stonehenge and Seahenge, are not isolated phenomena. Similar responses are focused on many other places, at various times, and in varying degrees of intensity.

It is often these less tangible attributes, rather than the observable physical characteristics, that define the identities of landscapes and places. And yet HER recording practice has not responded at all to such "hyper-holistic" (Grenville 2006, 170) characterisations of the historic environment. There is no consensus, for example, regarding whether or how historic events that have left no obvious physical traces (such as battles and skirmishes, rather than battlefields; or documented historic fires, rather than charred remains) should be recorded by HERs (discussion on HERForum in July 2006; <http://www.jiscmail.ac.uk/lists/HERFORUM.html>). Many cultures would find the English approach to recording landscape heritage extremely limited.

It is perhaps not surprising that HER recording practice has not yet attempted to accommodate the shifting and diffuse alternative perceptions of the historic environment. It is more surprising, however, that HERs are still wholly geared towards documenting consensus (inherently conservative) interpretations, rather than allowing some room for the arguments and emergent theory that archaeologists find so stimulating.

A conceptual landscape (or historic environment theme) can be defined partly by the relationships between historic environment elements (monuments, portable antiquities, natural landscape features, etc.) and partly by an interpretative or theoretical framework. It can be a 'many [historic environment elements] to one [historic environment theme]' type relationship, that requires the concepts linking the elements to be expressed in some form. Knowledge about the individual historic environment elements is contained in 'sources', which often derive from recording 'events'. The sources need not be written down, however, and the historic environment themes need not result from recording events. They could be perceptions or theories.

8.3 Capturing historic environment themes and concepts

Traditionally, SMR staff have been solely responsible for assimilating and synthesising archaeological information (from reports, aerial photographs, etc.) and creating SMR database entries. However, Chapter 5 (section 5.5; Figure 23), concluded that HERs could be enriched considerably by the addition of ideas (concepts and themes) provided directly by users.

OASIS (Chapter 1, section 1.1) allows those responsible for projects to generate event record entries (Figure 42, below) directly, by completing online forms (<http://ads.ahds.ac.uk/project/oasis/>). SMR and HER staff may still exercise some control, by contributing to the verification of record details before they are accessioned and disseminated. They can then choose to download OASIS records in a variety of machine-readable formats (XML, CSV file, HTML, etc.). An XML example of an OASIS record is provided in Appendix 11.

OASIS therefore provides a good model for the near automatic accessioning of users' thematic and conceptual input to HERs. It is easy to envisage a system whereby researchers who have made use of HER information are then encouraged to complete an OASIS-type form, regardless of whether or not their research has involved a fieldwork project, or has generated a traditional publication or report. Clearly, it would also be possible for HER staff to add historic environment themes and concepts that have been drawn from a variety of sources, such as research frameworks, seminars, books, articles, etc.

It is essential, however, that the metadata records created by this process are compatible with well-known metadata schema.

Historic environment themes and concepts may be geographically constrained, but are not necessarily tied to a particular area. They can also manifest themselves in many discontinuous locations within the landscape, and may relate to specific archaeological periods or span several archaeological periods. The Dublin Core is weak with regard to locational information, but compatible schemas are able to absorb elements of more sophisticated geographic (GIS-friendly) metadata schemas. The ADS·CIE demonstrator and OASIS metadata schemas (Appendix 11) offer models

for the more sophisticated capture of locational information (see Bell & Bevan 2004 for other options).

OASIS DATA COLLECTION FORM: England

List of Projects

Main

This is the main page of the OASIS form, the form is split into sections as listed below.

Please validate the completed sections (these are marked as incomplete/complete below). Validation of individual sections can be carried out in two ways. If you wish to edit data fields within the OASIS record or do not wish to validate all of the completed sections of the form in one go, click on the button next to each section to edit and validate entries and then tick the checkbox at the end of each section to validate. If however you are happy with the completed sections as they appear on this screen and want to validate them all, simply check the 'validate all completed sections' checkbox at the bottom of this page before saving the record by clicking on 'Save validated record'.

Please note: the form entries are only saved when the Save record has been pressed. If you leave the form inactive for over 30 minutes any entries will be lost, this is to retain the security of your username and password.

OASIS ID: cambridg3-10655

Project details Edit and validate entries

| | |
|--|---|
| Project name | Must Farm Archaeological and Palaeo-environmental Investigations |
| Short description of the project | An intense survey was undertaken on 132 hectares at Must Farm, Whittlesey, covering an area which spanned two planning authorities (Cambridgeshire and Peterborough unitary). A thorough desk-top study had previously been undertaken which included aerial photographic and LIDAR evidence. This project began with an environmental study over the area with a number of test pits dug on a predefined grid. These revealed traces of a gravel terrace edge below 0m OD and a series of palaeo-channels which had been sealed and protected by thick peat deposits. In response to this a series of trenches were cut to further elucidate these deposits, in particular a large palaeo-channel visible as a roddon. Based upon the information retrieved from these studies a series of trenches were cut to assess the archaeological potential of the site. Despite the gravel terrace occurring below 0m OD a range of feature types were encountered. Two upstanding barrow monuments were recorded which (due to the depth of peat deposits) were previously unknown. Contemporary to these, a preserved bank and ditch system was identified along with evidence for a possible settlement. |
| Project dates | Start: 01-12-2004 End: 01-02-2005 |
| Previous/future work | Yes / Yes |
| Any associated project reference codes | MUS04 - Sitecode |
| Any associated project reference codes | cambridg3-10654 - OASIS form ID |
| Type of project | Field evaluation |
| Current Land use | Cultivated Land 4 - Character Undetermined |
| Monument type | BARROW Bronze Age |
| Monument type | BARROW Late Neolithic |
| Monument type | CAUSEWAY Bronze Age |
| Monument type | SETTLEMENT Bronze Age |

Figure 42. Online OASIS report form. Original in colour.

A small sample of historic environment theme and concept metadata records (based on the Dublin Core) for a Fenland HER, is presented in Appendix 12. The metadata records are based on some of the themes and concepts introduced in Chapter 7. A GIS compatible metadata component has been left out for the purpose of clarity. These metadata records could link to many types of digital (and non-digital) sources (such as documents, images, GIS mapping, etc.) via the content of the *HER theme source* metadata element (Appendix 12, section A.12.1).

8.4 Disseminating historic environment themes and concepts

The HER user interface must ensure that potentially relevant user-defined themes and concepts are visible to users during searches, and presented along with associated monument, event, and finds records, etc.

The ADS CIE demonstrator uses four main concepts ('When', 'What', 'Where', and 'Media'), under which tiers of concepts are organised (Chapter 6, section 6.7; Appendix 9). The 'What' facet could be broadened to incorporate hierarchical Historic Landscape Character classifications, such as the sample of natural environment concepts offered above (section 8.1). Alternatively, the Historic Landscape Character records, and records for other historic environment themes and concepts need not be visible in the main concept tree at all. Their metadata records (Appendix 12) would be returned by searches, however, if they contained keywords that conform to the users' search criteria.

So for example, a HER search for modern remains, Second World War remains, or military remains, within Thorney parish would require both interrogation of the relevant metadata elements within monument, event, etc. HER records, and the relevant elements of HER theme metadata records (Appendix 12).

This type of search can be expressed (in a simplified form) as:

When contains 'modern' AND **What** contains 'defence' AND **Where** contains 'Thorney';

Which in terms of the HER theme metadata record, could be expressed (simply) as:

HER theme coverage (temporal) contains 'modern' AND **HER theme subject** contains 'defence' AND **HER theme coverage(spatial)** contains 'Thorney'

This type of search would return metadata summary lists such as:

| IDENTIFIER | TITLE | TYPE | SUBJECT(S) |
|------------|---|-----------------|---|
| HER 50443 | GHQ Line | monument | pillbox |
| HER 50458 | GHQ Line | monument | pillbox |
| HER 50565 | Thorney POW camp | monument | prisoner of war camp |
| HER 51376 | GHQ Line | monument | anti tank ditch |
| HER 51377 | GHQ Line | monument | pillbox |
| HER 51378 | GHQ Line | monument | pillbox |
| HER 51379 | GHQ Line | monument | pillbox |
| HER 51380 | GHQ Line | monument | machine gun post |
| HER 51381 | GHQ Line | monument | pillbox |
| HER 51384 | GHQ Line | monument | spigot mortar emplacement |
| HER 51385 | GHQ Line | monument | anti tank obstacle |
| HER 51393 | Letch Farm, Thorney | monument | home guard store |
| HERtheme1 | Thorney village as an anti-invasion strongpoint | landscape theme | defence, protective measure, pillbox, anti-tank cube, anti-tank ditch, machine gun pit, anti-aircraft site, road block, spigot mortar emplacement |

In this example, the field 'Identifier' maps to the 'HER theme identifier' element, 'Title' maps to 'HER theme title', 'Type' maps to 'HER theme type', and 'Subject' maps to 'HER theme subject' (Appendix 12, section A.12.1), etc. It would be straightforward to map the contents of other elements into the initial presentation of search results, such as location information (= 'HER theme coverage(spatial)'), and period (= 'HER theme coverage (temporal)'), as required.

Selecting any of the records identified as 'monuments' with Historic Environment Record number identifiers would produce the full record for those monuments. See Figures 80, 81, and 83 (Appendix 9) for an example of the presentation of HER records for World War 2 defensive monuments. See Appendix 8 for a wider range of examples of the online presentation of HEIR entries.

The type of search described above would not only return entries for monument records, event records, etc., but would also flag up

HERtheme1- Thorney village as an anti-invasion strong point (Appendix 12, Example 1)

as a potentially relevant concept, which the user may wish to explore more fully.

In summary, HER users' searches would not only return information about recorded monuments, events, etc., but would also expose users to related concepts which might serve as inspiration for new ideas and further research. In this case, HER theme 1 has been extracted from an aim within a project design that encourages participants to look for traces of defensive structures in the built environment of a village.

The most important aspect of the HER theme1 metadata record is not the brief description of the GHQ line around Thorney it contains, but the questions about the village's intended status as an defensive obstacle (Appendix 12, Example 1). The intention of this record is to inspire HER users to think about the existing evidence, to search for and submit new evidence, and to offer alternative interpretations to the HER (Chapter 5, section 5.5; Figure 23).

8.5 The 'Why' facet

Existing online HEIR search techniques (Chapter 5, section 5.4; Appendix 8) which combine traditional SMR-type records with metadata records for thematic and conceptual information, would add considerable scope and potential value to users' searches.

Embedding the new themes and concepts within the ADS CIE demonstrator concept tree, however, would more firmly integrate them with the full benefits of this iterative and responsive search interface (Chapter 6, section 6.7). Another concept group (or facet), the 'Why' facet, could be introduced into the ADS CIE demonstrator search structure for this purpose:

When; What; Where; Why

The 'Media' facet used by the ADS CIE demonstrator is not essential for the HER model, and has been left out for the purpose of clarity.

The 'Why' facet could provide the starting point (or root concept) for the users' selection of concepts, themes, and ideas, organised as records

within a common metadata schema (Appendix 12). The word 'why' has been chosen because it represents both questions and explanations. In the context of HER search interfaces, it represents both the questions inherent in historic environment research agenda aims, and also the explanations offered to interpret aspects of the historic environment.

As previously suggested (section 8.2), these concepts could include historic events, memories, and perceptions that lend meaning to places, without leaving direct physical traces (Appendix 12, Example 9). They could include ideas for further research, such as those expressed in research agendas and project designs (Appendix 12, Example 1, Example 5, Example 6, Example 7). They could comprise explanations, such as those put forward in academic publications (Appendix 12, Example 2, Example 3), or by alternative theory (Appendix 12, Example 8).

The 'Why' facet differs from the 'What' facet, because the latter only comprises physical items that have been observed and interpreted within the bounds of current recording frameworks, such as MIDAS and the Thesaurus of Monument Types. The 'Why' facet encompasses concepts which may or may not relate directly to specific physical 'whats', such as monuments, groups of monuments, artefact finds, recording events, etc.

To aid the visibility and retrieval of these concepts during the search process, the 'Why' facet could be further divided into a group of sub-categories. Initially, these might comprise:

Landscape theme (landscape scale concepts);

Monument theme (concepts that pertain to particular monument types);

Artefact theme (concepts that pertain to artefact types);

Historic event theme (events that may or may not have left physical traces);

People theme (concepts surrounding a person's connection with places);

Other theme (not fully categorised by the above themes);

Historic Environment Record theme metadata records could be tagged or indexed to these sub-categories using the 'HER theme type' metadata element (Appendix 12).

The retrieval of records could then take place using the type of techniques employed by the ADS CIE demonstrator (Chapter 6, section 6.7; Appendix 9). The following figures provide simplified illustrations of various searches. They can be read with reference to the concept tree search selection described in Chapter 6 (section 6.7; Figure 25; Figure 27) and Appendix 9.

Figure 43 (below) illustrates a search from the root 'Why' concept on a dataset comprising only the example metadata records in Appendix 12. Clearly, this is a very much smaller dataset than would be available in practice, but it nevertheless helps to illustrate the basic principles.

In this case the user, perhaps a researcher looking for research themes and concepts to inspire or contribute to a project, has chosen to examine all the theme branches. The concept search tree tells them that there are a total of 9 records. Looking at the next tier tells them that 8 are considered to be relevant to landscapes studies (*landscape theme*), 1 is considered to be relevant to artefact studies, 1 concerns historic events, 1 concerns people, and 1 is relevant to 'other' types of themes. In fact, some of the theme records are relevant to more than one theme category (for example, Appendix 12, Example 7, Example 8), but this does not affect the total number of theme metadata records available.

If the user then chooses to select the 'landscape theme' branch of the concept tree, they will retrieve 8 theme records (HER themes 1-8; Appendix 12, Examples 1-8). If they chose to select both the 'historic event theme' and the 'people theme' branches, they would retrieve just 1 record (HERtheme 9; Appendix 12, Example 9). If they chose to select 'artefact theme', 'historic event theme' and 'people theme' branches, they would retrieve 2 records (HERtheme7, HERtheme9).

Figure 44 (below) illustrates the effects of combining facets to narrow the remit of the search. Here the user is interested only in landscape themes that concern later prehistory. Selecting the relevant branches of the concept tree tells the user that only 4 records are considered to be relevant. The user can then select these records. Clearly this search could be refined considerably by selecting more facet criteria. For example, selecting 'Borough Fen', within 'Where', would retrieve only HERtheme2 (Appendix 12, Example 2).

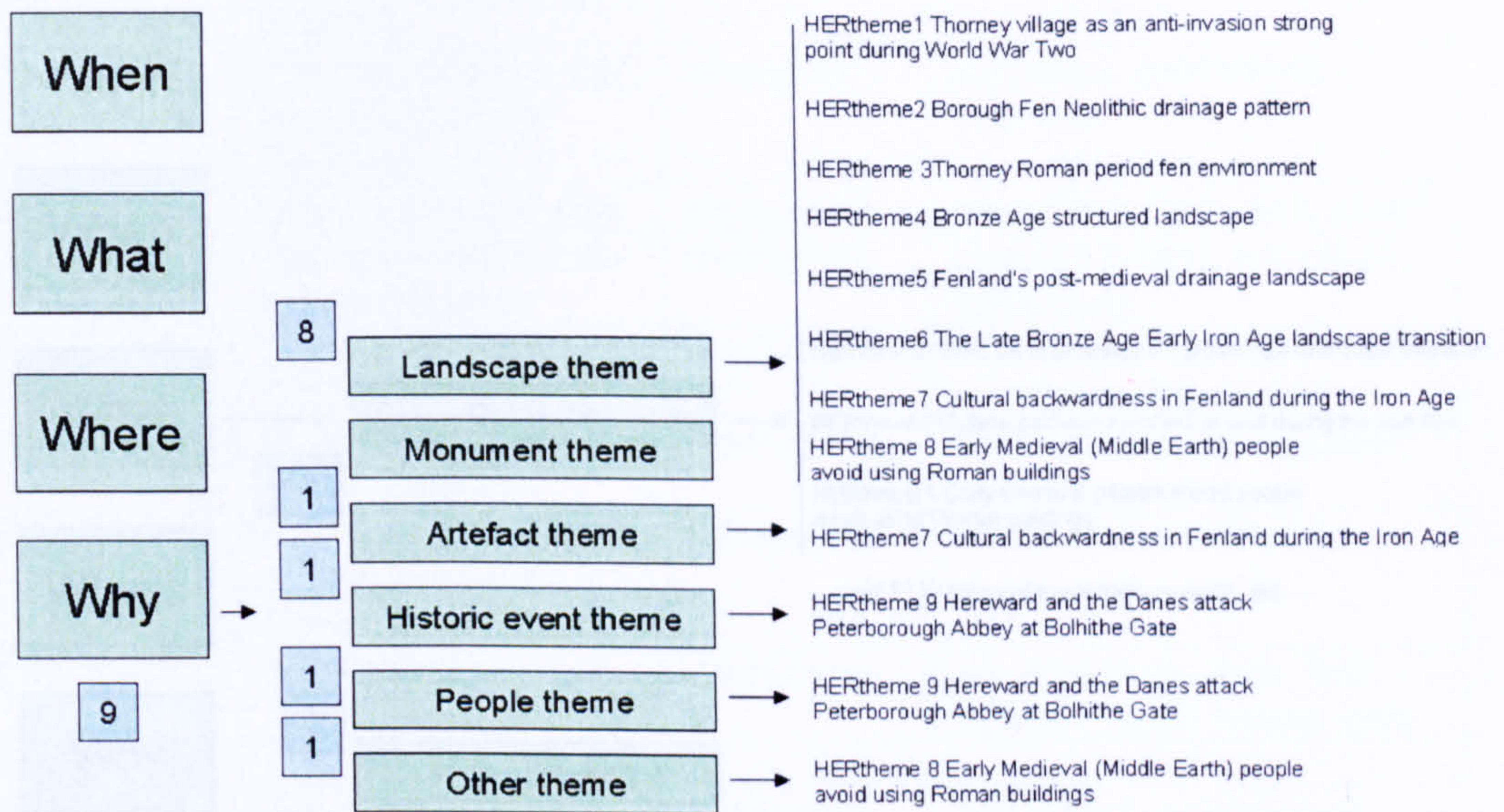


Figure 43. Simplified schematic representation of a search interface. The search process is assisted by the advance notice that the user receives of the number of relevant records that would be returned by the search. Original in colour.

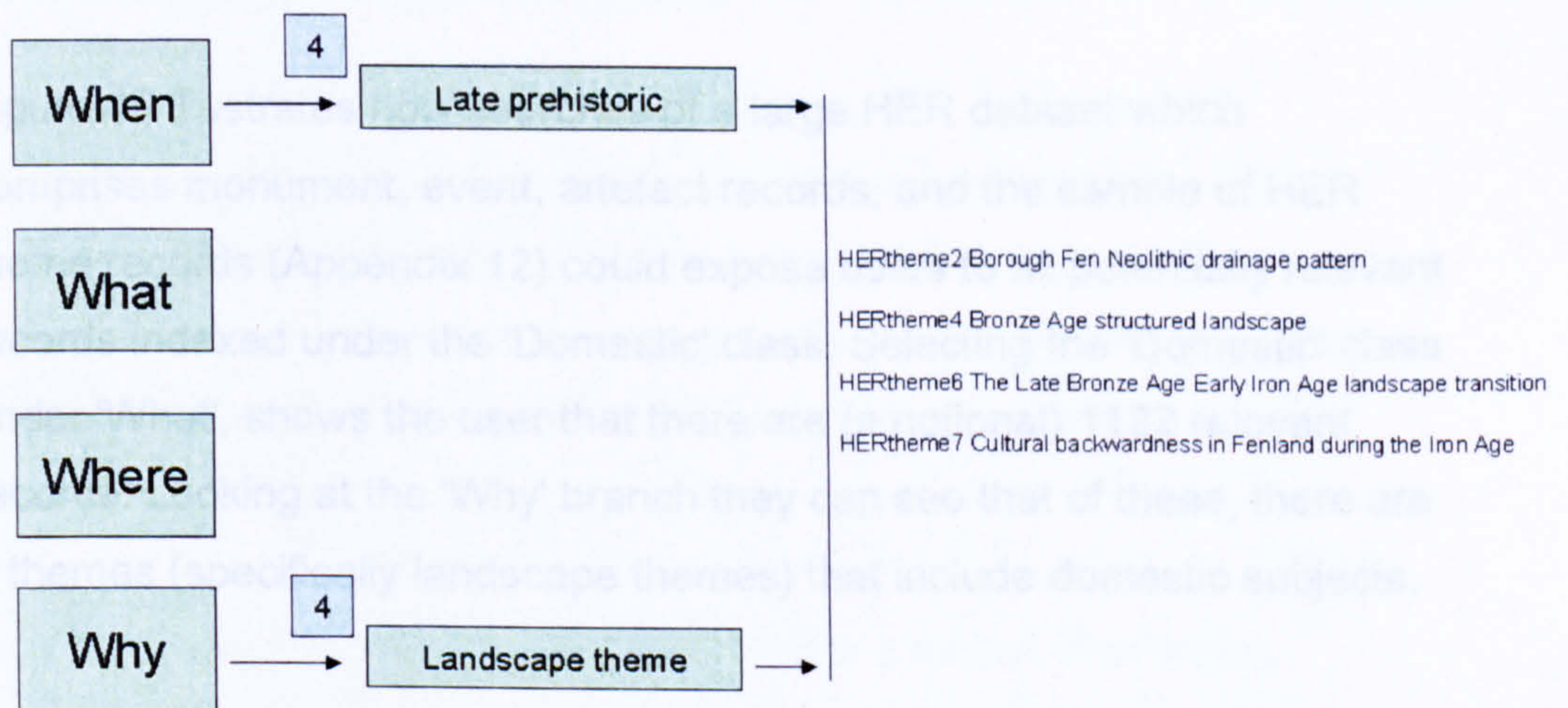


Figure 44. Simplified schematic representation of a search that combines concepts. In this case the search is for themes relevant to late prehistoric landscapes. Many combinations can be used to refine the selection considerably. Original in colour.

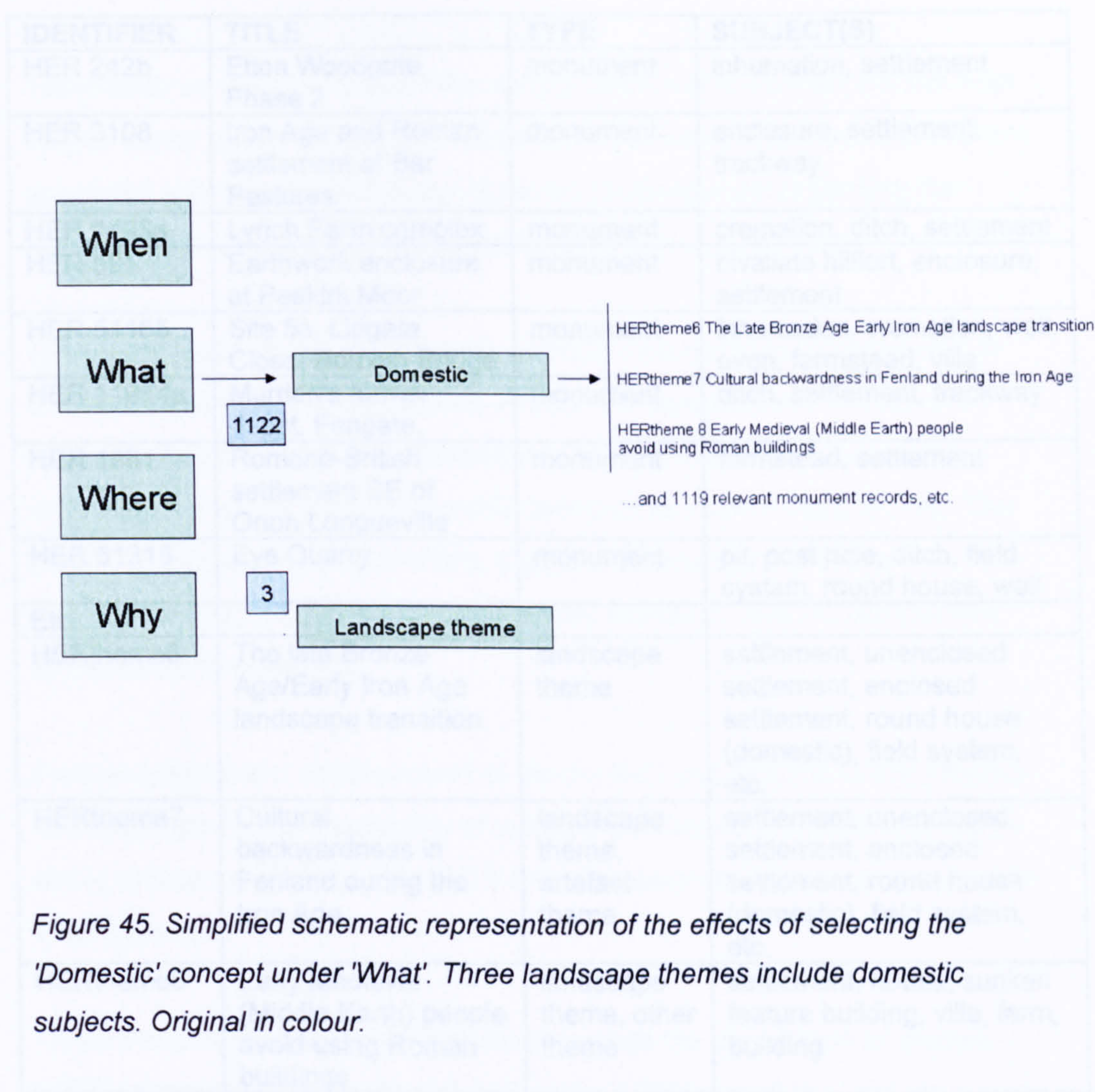


Figure 45. Simplified schematic representation of the effects of selecting the 'Domestic' concept under 'What'. Three landscape themes include domestic subjects. Original in colour.

Figure 45 illustrates how searches of a large HER dataset which comprises monument, event, artefact records, and the sample of HER theme records (Appendix 12) could expose users to all potentially relevant records indexed under the 'Domestic' class. Selecting the 'Domestic' class under 'What', shows the user that there are (a notional) 1122 relevant records. Looking at the 'Why' branch they can see that of these, there are 3 themes (specifically landscape themes) that include domestic subjects.

Selecting only 'domestic' would return results such as:

| IDENTIFIER | TITLE | TYPE | SUBJECT(S) |
|------------|--|---------------------------------|--|
| HER 242b | Etton Woodgate Phase 2 | monument | inhumation, settlement |
| HER 3108 | Iron Age and Roman settlement at Bar Pastures | monument | enclosure, settlement, trackway |
| HER 1433a | Lynch Farm complex | monument | cremation, ditch, settlement |
| HER 591 | Earthwork enclosure at Peakirk Moor | monument | bivallate hillfort, enclosure, settlement |
| HER 51165 | Site 5a, Lidgate Close, Botolph Bridge | monument | inhumation, cremation, well, oven, farmstead, villa |
| HER 11954a | Murden's former depot, Fengate. | monument | ditch, settlement, trackway |
| HER 1961 | Romano-British settlement SE of Orton Longueville | monument | farmstead, settlement |
| HER 51315 | Eye Quarry | monument | pit, post hole, ditch, field system, round house, well |
| Etc. | | | |
| HERtheme6 | The late Bronze Age/Early Iron Age landscape transition | landscape theme | settlement, unenclosed settlement, enclosed settlement, round house (domestic), field system, etc. |
| HERtheme7 | Cultural backwardness in Fenland during the Iron Age | landscape theme, artefact theme | settlement, unenclosed settlement, enclosed settlement, round house (domestic), field system, etc. |
| HERtheme8 | Early Medieval (Middle Earth) people avoid using Roman buildings | landscape theme, other theme | settlement, house, sunken feature building, villa, farm, building |

These 3 landscape themes may or may not be relevant to the user's particular research interests. Their visibility in the search process, however, at least offers the user the benefits of other researchers' ideas, and contextual information that complements the rest of their search results.

Again, refining the search would be a simple a matter of selecting successive branches of 'What', or other branches within the 'Where' and 'When' facets. The additional selection of 'Early Medieval' under 'When' for example, would return only HERtheme 8 (Appendix 12, Example 8) and other records pertaining to early Medieval habitation.

8.6 Conclusions

Tools such as the ADS CIE demonstrator were not available until the final stages of my research. Happily, aspects of the development of this system coincided with several of the conclusions I had reached regarding the management of online HER dataset searching.

One of the hazards of working with exciting new techniques, however, is their potentially ephemeral nature. Adiuri, the company with whom the ADS CIE demonstrator was developed, ceased production before the demonstrator could be developed further and launched more widely. The ADS CIE demonstrator, therefore, was not accessible for further development at the time of completing my research, and no comparable systems were available.

Further testing and development of the model I put forward in this chapter is dependent on the availability of suitably developed software that works along similar principles to the ADS CIE demonstrator's concept tree search mechanism.

Nevertheless, this model (in combination with the discussion of proven HEIR information management and online HEIR searching techniques; for example, Chapter 5; Appendix 8; Chapter 6, section 6.7) suffices to demonstrate the viability of integrating traditional SMR entry subjects, with user-supplied concepts and themes.

Clearly there are other potential ways to encourage users to submit new conceptual links between items of historic environment information to HERs. Wikipedia contributors' liberal use of embedded links (Chapter 6, section 6.5) and user-defined XML 'tagging' of document content, are perhaps superficially more attractive to many users than form-filling. Structured metadata files such as those employed by OASIS, however, offer much better prospects for integration with the other categories of information that comprise Historic Environment Records.

The success of the system I propose could be measured in the long term by the number of thematic records accessioned to the HER, the degree to which users access them, and the number of new ones submitted by

various user groups. The growth in number and variety of thematic records would undoubtedly require the introduction of new sub-categories alongside and beneath the *landscape theme*, *monument theme*, *artefact theme*, *historic event theme*, etc. concept categories that I have initially proposed. So eventually the structure, as well as the content, of this part of the Historic Environment Record would respond to the input of its users.

After all, this is the key to extending HERs and encouraging their greater research use. It would demonstrate to researchers that the products of their research are an integral part of our records of the historic environment. It would also encourage practitioners involved with conservation management to engage with live research issues.

CHAPTER 9 - CONCLUDING REMARKS

The time taken to complete this study as part-time research, while working, has inevitably influenced the character of this thesis. I realised at the outset that SMRs stood on the threshold of the next stage of their evolution (Robinson 2000, 104), but it was difficult to predict how this might progress. In fact, the duration of my study has coincided with an unprecedented period of activity and change.

I began my work at around the time that the influential Baker Survey of English SMRs (Baker 1999) was released. The Monument Inventory Data Standard (RCHME 1998a) was still new. The event-monument-archive/source model and the ExeGesIS HBSMR software package (Chapter 1, section 1.3) had yet to make a widespread impact on recording practice. *Informing the Future of the Past* (Ferne & Gilman 2000), the first comprehensive, nationally distributed SMR manual, had not been published. *Historic Environment Records: Benchmarks for Good Practice* (English Heritage & Association of Local Government Archaeological Officers 2002) had not been written. Online searching of HEIR information was in its infancy. Only the Archaeology Data Service catalogue offered online access to SMR information.

The wider political and management framework within which SMRs operated had just changed, and the ripples were spreading. Single tier local government had been introduced. Some new Unitary Authorities had taken on SMR services formerly maintained at county level, increasing the total number of SMRs. English Heritage had just absorbed the Royal Commission on the Historical Monuments of England, along with the National Monuments Record, and with it the responsibility for supporting local SMR development.

Government then began to take a renewed interest in the management of the historic environment. Strategic policy statements such as *The Historic Environment: A Force for our Future* (Department of Culture, Media and Sport 2001) were published, and a wide-ranging review of heritage protection was implemented (Department of Culture, Media and Sport 2003a).

The ambition for SMRs to acquire a statutory status within Local Planning Authority functions and the intention to widen their remit, were given Government backing. SMRs began to be known as Historic Environment Records in anticipation of these developments.

Now, at the time of completing this thesis, a steadily increasing number of HERs offer a variety of online search methods. New Web portal technology has widened the possibilities for cross-HER searching. Practitioners are discussing 'Web 2.0' concepts, and the replacement of the first generation of online HEIRs. *Informing the Future of the Past* has been totally revised and has just been released in digital form only (Gilman & Newman 2007; <http://www.ifp-plus.info/>).

The planning system has changed, and entirely new heritage legislation and guidance is expected. It now seems as though the long awaited statutory status for HERs will bring with it increased responsibilities and recording burdens - not least, the need to better represent historic buildings and built environment conservation.

The changing landscape of SMR studies over the past few years has caused me some inconvenience. Several times over I have had to re-write, amend, and discard chapters that I thought were complete. Some important initiatives and information that would have been extremely useful two years ago, came along frustratingly late in the day for my convenience. The much-anticipated trial version of the Heritage Gateway portal (Chapter 1, section 1.5), for example, was launched after I had submitted my thesis for examination.

The laborious journal survey methods that I employed (Chapter 3, section 3.1) could have been avoided if I had waited for increased digital access to relevant journals (which has indeed gradually happened during the course of this study) and concentrated only on those journals that offered online availability. The comparison of the digital collation of survey data with my manual method will be an issue for future extensions of these surveys.

Similarly, it would have been useful to have compared manual SMR enquiries with their online search equivalents, more thoroughly. I was only

able to draw on the ADS Archsearch facility for this purpose (Chapter 2, section 2.4). Methods for the capture and analysis of enquiries to online HEIRs are still not widely employed.

The focus group of higher-level researchers provided valuable insights about the informational needs and experiences of this important user group (Chapter 4; Appendix 4). On reflection, this was a key survey, and I am sure that a larger focus group would have added further important insights.

On the whole, however, there were advantages in being able to track progress over this important period of time. Not least has been the ability to participate (albeit in a small way) in some of the discussion and initiatives that have helped to guide recent SMR developments.

I have been able to attend national meetings and seminars (organised by English Heritage, ALGAO, etc.) and to contribute to the debate and consultation surrounding some of the changes summarised above. Over the last few years, I have given three presentations on aspects of my study to national SMR/ HER Forum meetings, presentations to professional regional groups, and one presentation to a specialist national conference (Richards 2007, 2; Robinson 2007). I have also been invited to contribute to surveys, studies, and the development of new HER guidance (for example, Gilman & Newman 2007, F.6).

In summary, I believe that I have generally benefited from combining my experience as an SMR/HER practitioner over the period of study, with the different type of insights gained through DPhil research. I have been grateful for the opportunities for contemplation and the exposure to interesting new ideas that research study brings. Therefore, although there might have been more direct paths to the completion of my studies, following these might have caused me to miss several nuances and emergent trends that have proved important to my conclusions.

Despite labouring under the familiar archaeological delusion that it is always too soon to write-up, there are in fact good reasons to review the implications of my study at this time. There is a growing consensus that *Historic Environment Records: Benchmarks for Good Practice* (English

Heritage & Association of Local Government Archaeological Officers 2002) needs to be revisited, in consideration of legislative and operational changes. Furthermore, the new version of *Informing the Future of our Past* is intended to be a dynamic document that is able to respond quickly to developing theory and practice. It was a long time in gestation, and already needs some revision with regard to user-services and online HER opportunities.

Finally, and most importantly, although some online HERs are already now well established, the vast majority of HERs do not yet offer any online searching facilities. There are now, however, several successful models (Archaeology Data Service ArchSearch, HEIRPORT, CANMORE, Oxford ArchDigital's IIMS, the ADS CIE demonstrator, the Heritage Gateway, etc.; Chapter 5; Chapter 6; Appendix 8) to inspire the creation of a fully comprehensive national online network of local HERs. Some form of online search access is an achievable objective for many HERs within the next five years. Many of the existing facilities are also due for revision and further development.

It is vital that future HER developments should be informed by a good understanding of use trends and user needs. It is important that full consideration is given to methods that could enrich users' involvement with HERs. I hope that this study will make a contribution to the discussion of these imminent and future initiatives.

9.1 The study conclusions and their implications

This study began with the aim of attempting to define ways in which SMRs should develop in order to support archaeological research, and how they could widen their appreciation and use as research tools.

It is necessary to document the challenges, mistakes, and successes of the past, when planning for the future. Chapter 1, therefore, comprises a history of SMRs, and highlights many of the issues that have affected their development in these regards.

It soon became clear to me that very little concrete information was available regarding how SMRs were actually used by researchers, or indeed by any user group. At the outset of my study, this was not generally noted by the profession as a particular cause for concern. But the issue achieved greater prominence as projects were developed to widen access to HER information.

Fortunately, I had anticipated the growing calls for better understanding of HEIR users and their use of historic environment information (for example, Grant 2002, 3; Brewer & Kilbride 2006, 1.1.2; English Heritage & Association of Local Government Officers 2002, section 1.3) by developing and testing survey methods, and carrying out my own extensive surveys (Chapter 2; Chapter 3; Chapter 4).

These focused on education and research users, a group particularly mentioned as a developmental priority by the HER *Benchmarks for Good Practice* (English Heritage & Association of Local Government Officers 2002, section 1.3b). But they also considered other user groups (Chapter 2, section 2.2; section 2.7). The surveys not only characterised SMR users, enquiries and use, but also established some simple benchmarks that can be used to help examine patterns of future HER use. Using these benchmarks, it will be possible, for example, to investigate the efficacy of new policies and guidance that encourage the development of user services (English Heritage & Association of Local Government Officers 2002, section 1; Gilman & Newman 2007, section F). Specifically, it will be possible to investigate the effects of increased access to online HER information.

My survey methods provide templates that HERs may wish to adopt in order to help meet their obligations under the *Benchmarks for Good Practice*. These require HERs to maintain records of use and to carry out analysis of usage and users (English Heritage & Association of Local Government Officers 2002, section 1.3). Many Local Authorities will wish to collect this type of information routinely as 'performance indicators' for internal service assessment, or in anticipation of their use for external service assessments (Chapter 1, section 1.2).

My surveys established that SMR (and HER) information is used at the highest levels of archaeological education and research, and that its use is growing (Chapter 2; Chapter 3; Chapter 4). The surveys reiterate the growing interest and enthusiasm that researchers express for unconstrained online access to HER information (Chapter 2.4.5; Chapter 3, section 3.1.3; Chapter 4, section 4.4; Appendix 4).

In fact, the emphasis of these surveys on only a limited set of the products of research (dissertations and published articles) undoubtedly under-represents SMRs' past and HERs' current contribution to research effort. SMR and HER information can be used to inform a variety of significant research outputs (such as conference contributions, lectures, seminars, essays, project designs, and informal discussions, etc.) which might not result directly in publication, or generate any other easily measurable product. Complementary, more sophisticated, assessments of the value of HER information to research are also now required.

The literature review (Chapter 1), enquiry surveys (Chapter 2), publication surveys (Chapter 3), focus group (Chapter 4) and case studies (Chapter 7; Appendix 5), highlight two main issues of relevance to the future development of HER services generally, and specifically to the development of online user interfaces.

The first of these is the difficulty that current HER data structures face in representing the wide range of historic environment information necessary to facilitate both serious research (Chapter 4, section 4.6; Chapter 7; Chapter 8; Appendix 4), and a broadening resource management remit (Chapter 1, section 1.6). I arrive at the conclusion that future HERs should comprise groups of separate structural modular elements, each designed to cover specific historic environment subject areas. They should not comprise single databases that attempt to cover all the necessary subject areas (Chapter 8, Figure 41). Future developmental effort should focus on ensuring interoperability between the HER modules, between individual HERs, and between HERs and related information resources (natural environment, conservation, planning, etc.).

The second major issue, is the ability of users to extract meaningful search results from the mass of historic environment information potentially at

their disposal. Analysis of the processes necessary to complete successful research enquiries (Chapter 4; Appendix 4; Appendix 5) has helped to form basic models for responding to HER enquiries. Clearly establishing the purpose and the parameters of the enquiry is important. An iterative and responsive search process was also found to be particularly important to a successful outcome (Chapter 5, section 5.5, Figure 23; Appendix 6). I have been able to introduce some of these principles into national HER management guidance, as a contributor to the revised edition of *Informing the Future of the Past* (Gilman & Newman 2007, section F) and hope to develop these further.

Many HER officers consider it part of their duty to help interpret HER information for their clients, if possible. They use their experience and knowledge of their HER datasets to widen or narrow access to information where appropriate. They help to maximise the opportunities provided by HER information holdings by thinking laterally about the nature of information requests presented to them. Clearly, human 'gatekeeper' intervention in the search process is not infallible. Personal research bias, favouritism towards certain sources, plain forgetfulness, and naturally limited knowledge, can lead to subjective and selective assistance being offered to researchers. Conversely, an element of human assistance can provide a complementary intuitive resource that may be crucial to researchers and the integrity of their research.

Theoretically, the combination of locally managed HER information, linked by a common search portal that incorporates other national databases, offers the promise of a truly awesome research resource for the historic environment. The convenience of such a facility is certain to encourage the growing use of historic environment information by the research community. However, the full potential of this resource will not be realised, unless online search mechanisms are able to offer intelligent and responsive search interfaces.

My study of online HEIRs (Chapter 5; Appendix 8) has shown that few currently provide the necessary contextual information and the search mechanisms needed to ensure that research users obtain all relevant, and potentially relevant, information from their searches.

The Archaeology Data Service Common Information Environment demonstrator provides one practical example of how continuing feedback during the search process allows users to make informed choices about narrowing or widening their searches (Chapter 6, section 6.7).

I believe that techniques such as these offer better prospects for researchers than the inherent 'hit and miss' nature of systems that rely heavily on keyword searching. The view has been expressed, however, that researchers' ability to exert tight control over their search processes results in a limited experience, and prevents well-rounded and accidental exposure to rewarding knowledge (see Carver 2005; 757; and a reply, Richards 2006, 970-979). In fact, one important purpose of a historic environment information resource is to encourage people to think beyond their initial assumptions and interests.

The thematic entry points to searches offered by the ADS CIE demonstrator and other online HEIRs, is relevant to researchers at all levels. They provide important contextual information and point towards avenues of research that otherwise might have remained hidden. The search tree technique exposes users to some of the conceptual links between groups of information items, and encourages their re-evaluation.

There is an intention to make the local planning system, and conservation decisions made under its provisions, more responsive to community concerns (Chapter 1, section 1.2). This principle has to be extended to the content of the resource management inventories that inform decision making. HERs, therefore, should reflect the ambitions of heritage management, and become more inclusive and more representative of community interests. In fact, considerable encouragement is being given to ensure that HERs extend these principles to a widening user constituency of professional and non-professional users (English Heritage & Association of Local Government Officers 2002, section 1 'User Services and Access', section 1.4 'Reaching New Audiences'; section 2 'Information Coverage and Content'; Gilman & Newman 2007, section F.1 'HER information services policy', section F.2 'HER audiences', section F.7 'Developing public access and outreach').

I maintain that encouraging a variety of users to participate in the creation of HER content, is a good way of ensuring that HERs come to reflect users' interests. With regard to research use and users, I propose the capture of user-derived concepts and themes, using the principles established by the OASIS scheme (Chapter 8, section 8.3). Other methods, however, are worthy of consideration.

The model I develop in Chapter 8, comprising the combination of user-supplied records and concept-driven search techniques, would allow users to become more involved in the process of creating and re-interpreting our record of the historic environment. HERs would become more user-extensible and democratic, without threatening the integrity of other aspects of their core data.

HERs that encourage participation and creativity in the interpretation of the historic environment, will become more closely linked with the dialogue of current archaeological research. They will then begin to fulfil their potential as a crucial bridging point between resource management, academic endeavour, and public interest.

9.2 Future research

The model I put forward in Chapter 8 is grounded in both established and successful methods (OASIS) and in experimental techniques (ADS CIE demonstrator). Clearly, these two elements of the model should be brought together with a much larger dataset, in order to extend the principles of user-participation and contextual searching into HER practice.

Unfortunately, this has not yet been possible (Chapter 8, section 8.5), although there are emerging prospects to do so. Further research on the capture and integration of 'folksonomies' (user-generated taxonomies) within HERs would be rewarding.

There is also a need for further research on online enquiry trends, and how users respond to the new online HER systems. The analysis of users' Web browsing and search habits is now commonplace in commercial applications. Only very recently, however, has thought been given to how evidence of online HER use should be captured, and what form the

analysis should take. I hope that my surveys suggest avenues for further research in this regard.

Further consideration should be given to how licensing techniques might be developed in order to help ensure the responsible use of online HER data (copyright issues, protection of sensitive sites, etc.; Chapter 1, section 1.5) and to assist the analysis of online HER use. Users could be encouraged to declare their background and interests (Appendix 6) as a condition of online HER use. License agreements could require users to cite HER use in a formal and standardised way in their publications. This would help to increase the visibility of HERs as research resources in their own right, and should increase their visibility as gateways to other sources of information (Chapter 3, section 3.2). Licensing arrangements could also encourage the deposition of copies of users' research work at HER libraries, or as digital records (Chapter 8, section 8.3).

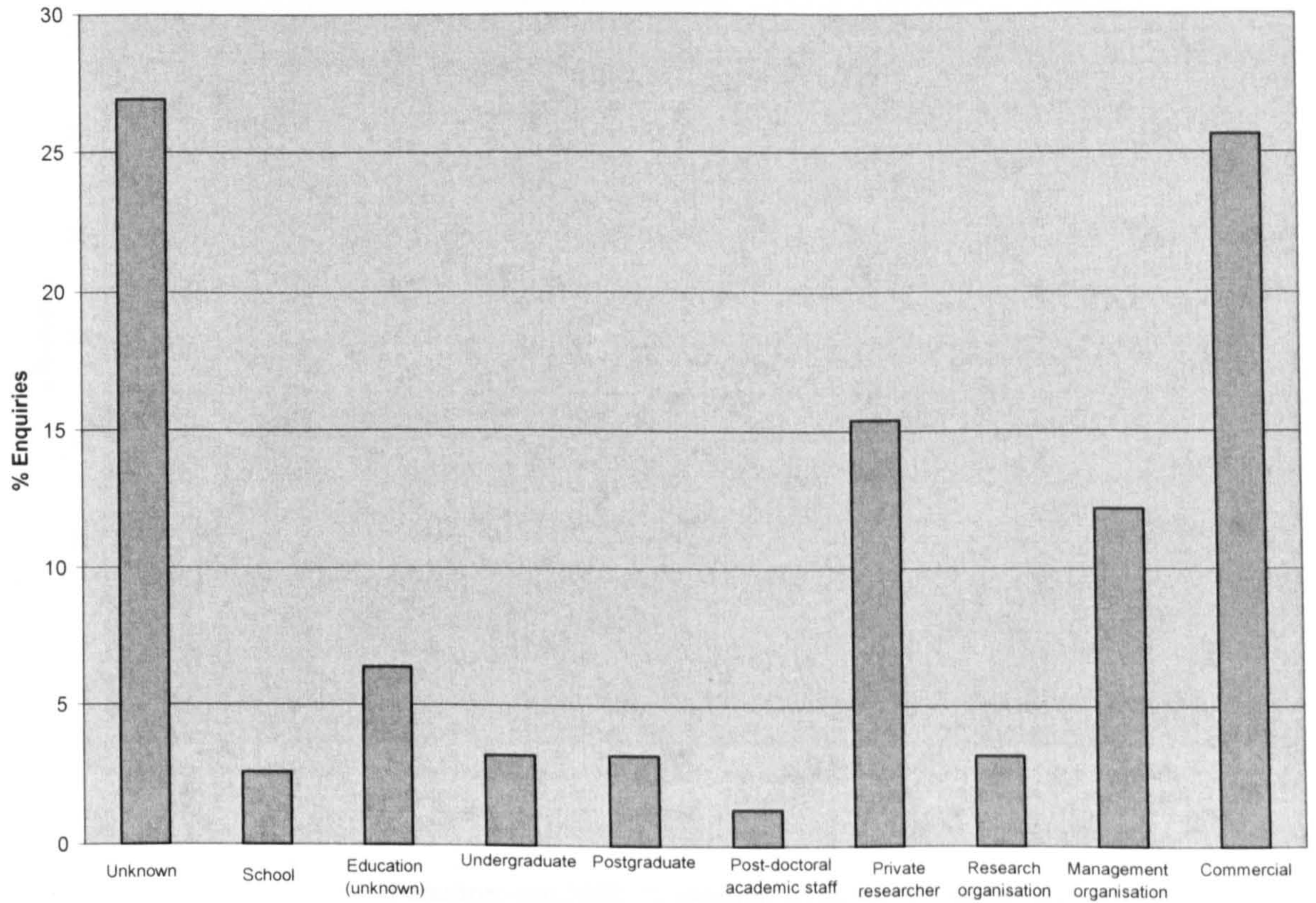
Another important avenue for further research, is to assess how access to online aggregated HER datasets, and the introduction of more research-led content, affects the character of archaeological research.

My surveys have shown that the use of SMR information has tended to be conservative. Typically, students and researchers made use of only one SMR at a time (Chapter 3, section 3.2, section 3.4). I anticipate that increasing online HER availability will have a profound influence on the character of historic environment research. It should encourage more creative use of HER information by assisting, for example, research that crosses administrative boundaries, and the use of much larger and more diverse datasets.

The development of user-extensible online Historic Environment Records, if correctly informed, will broaden the horizons of both historic environment research and historic environment conservation.

APPENDIX 1 – A SURVEY OF SMR USERS AND ENQUIRY TYPES

Northamptonshire SMR - % external enquiries by user group (n=156)



Northamptonshire SMR - % external enquiries by type (n=184)

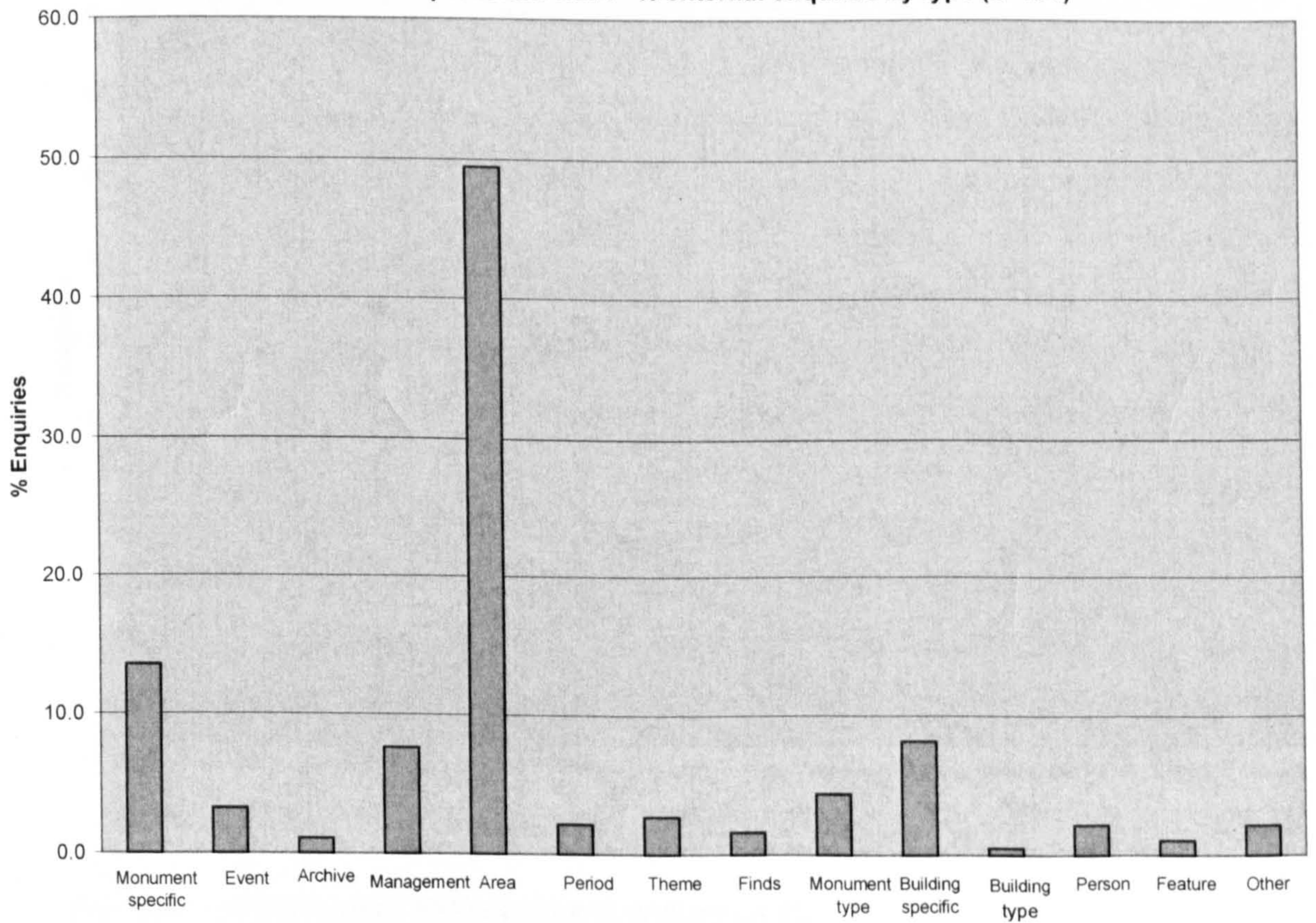
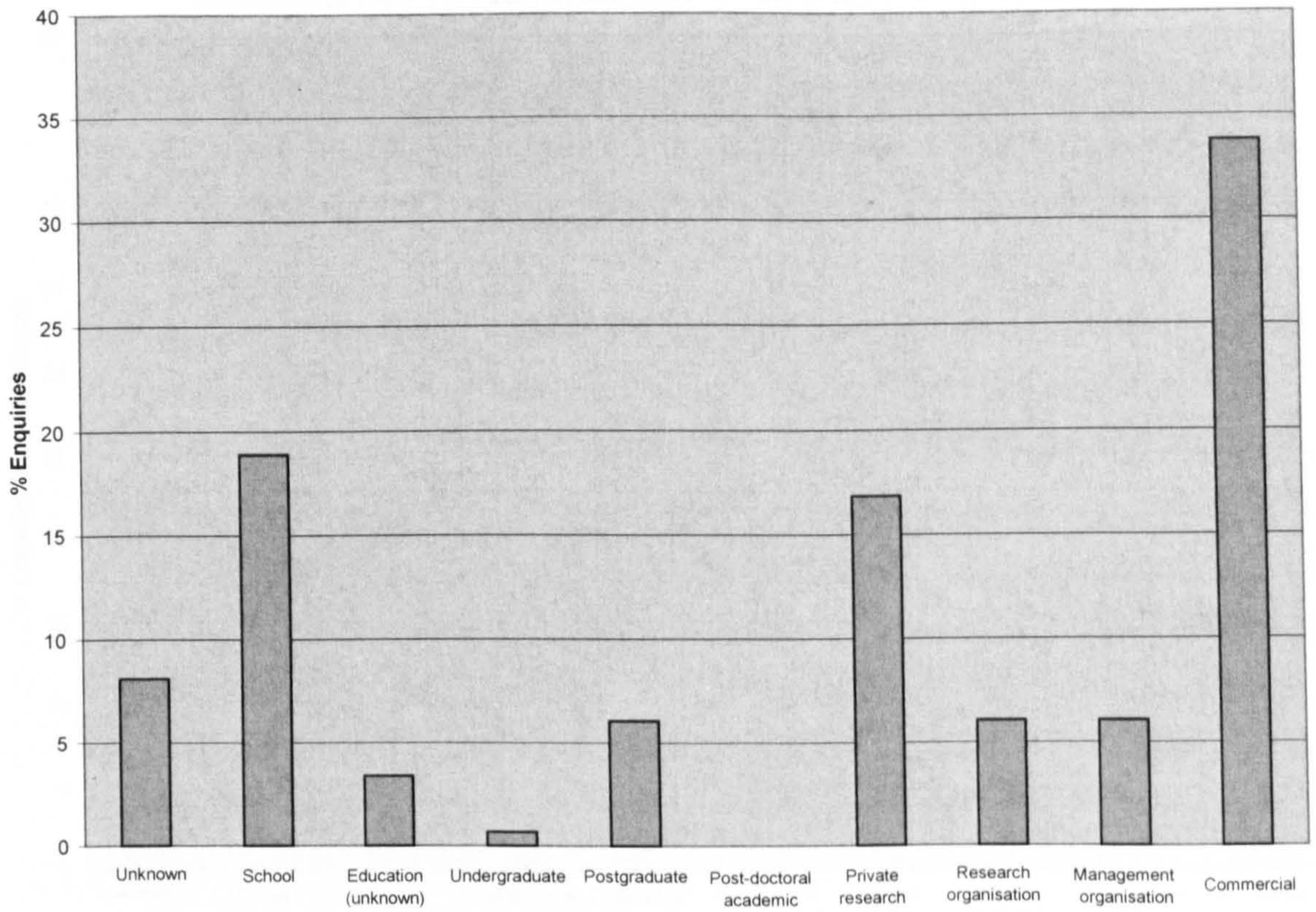


Figure 46. Northamptonshire SMR users and enquiry types.

Peterborough SMR - % external enquiries by user group (n=148)



Peterborough SMR - % external enquiries by type (n=166)

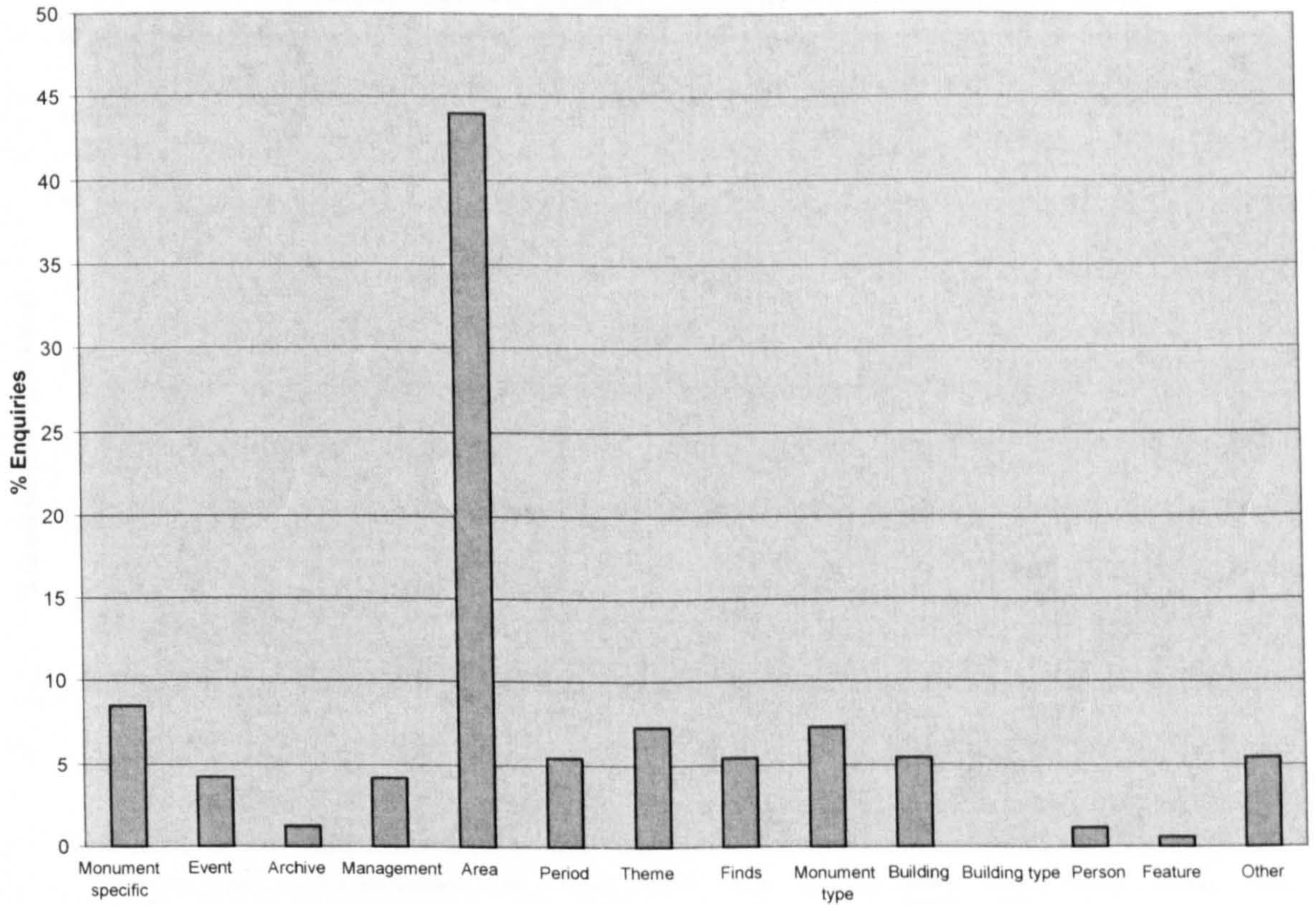
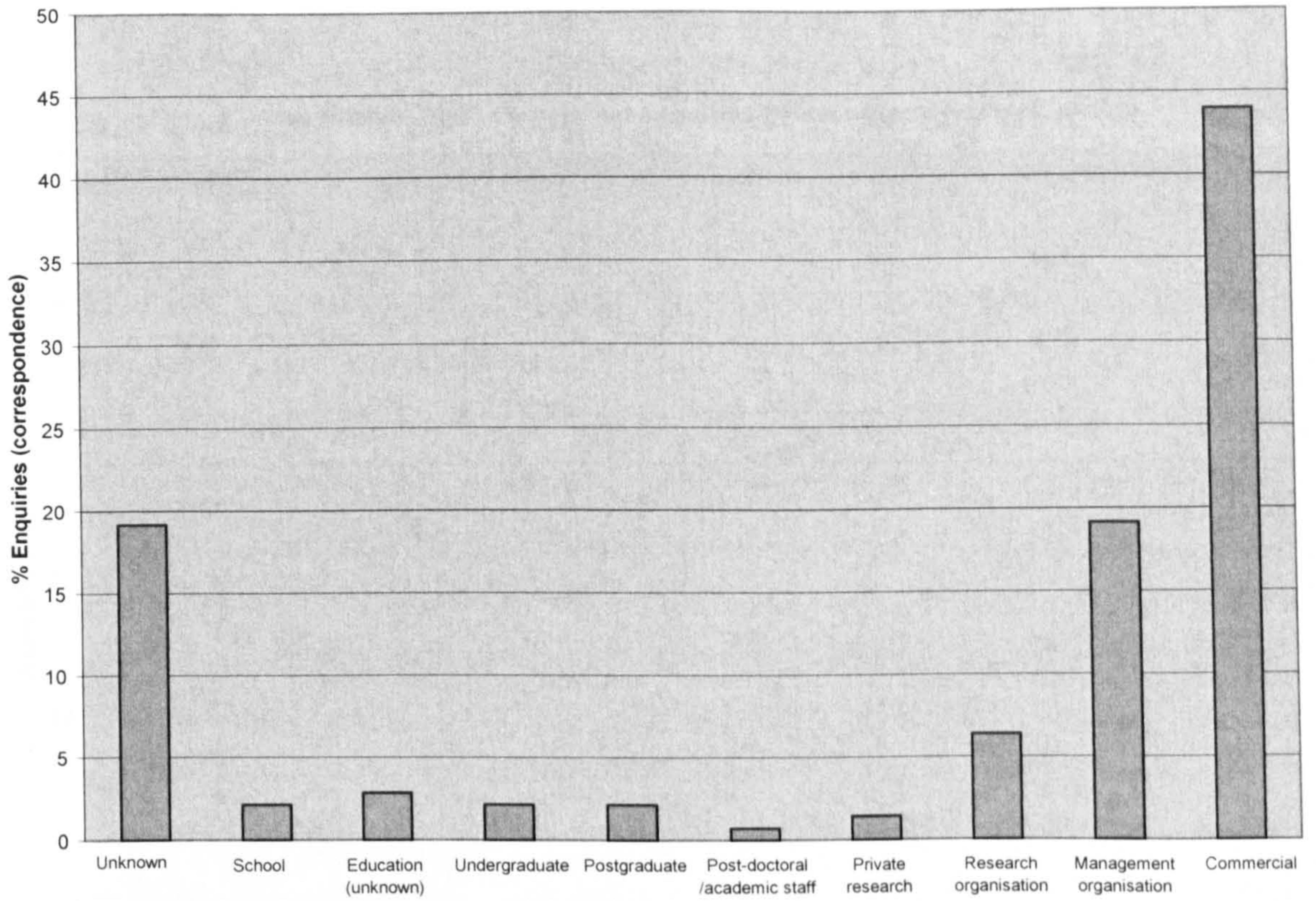


Figure 47. Peterborough SMR users and enquiry types.

Lincolnshire SMR - % external enquiries by user group (correspondence, n=141)



Lincolnshire SMR - % external enquiries by type (correspondence, n=191)

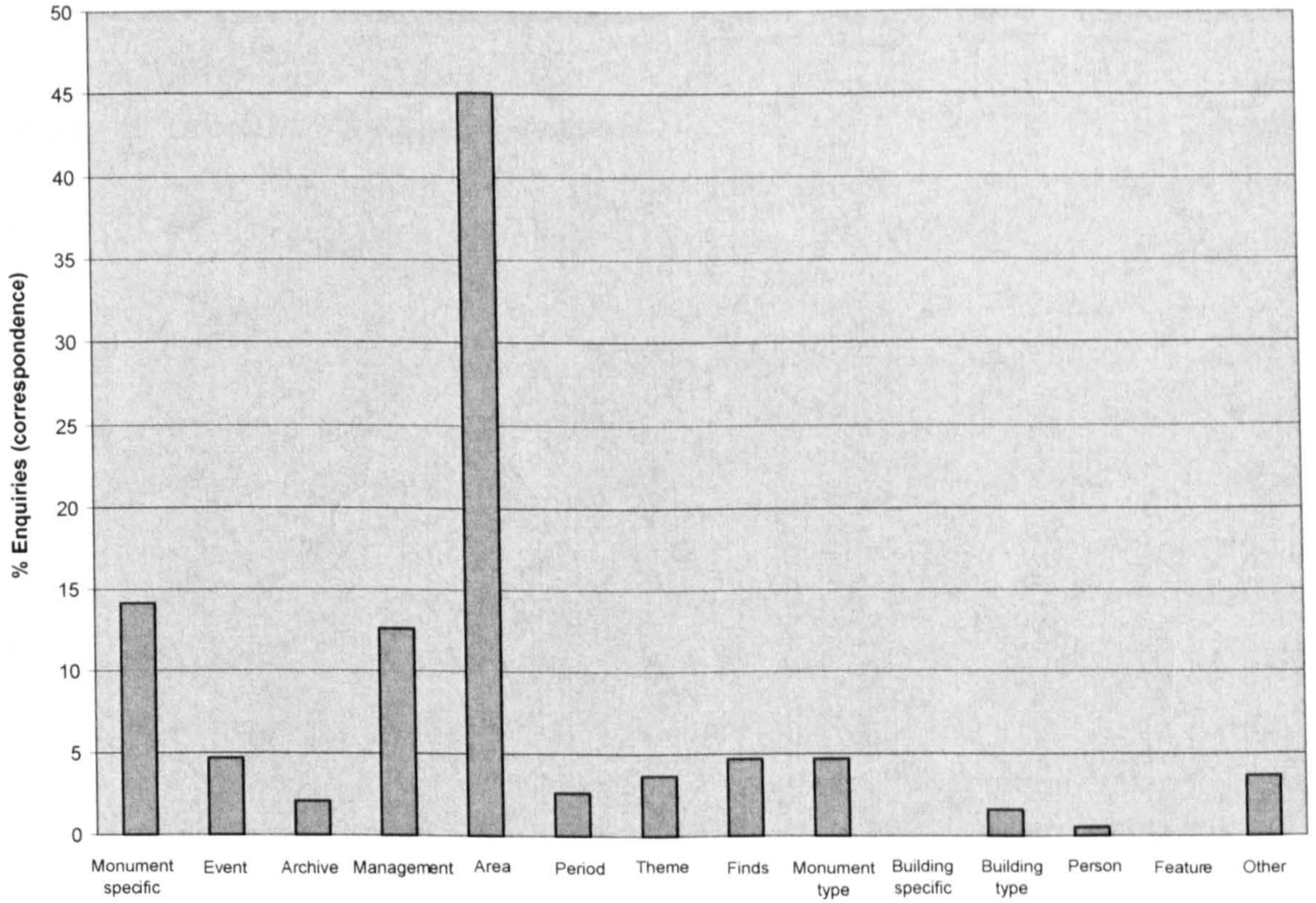


Figure 48. Lincolnshire SMR users and enquiry types.

Lincolnshire SMR - % external enquiries by user group (visitors, n=126)

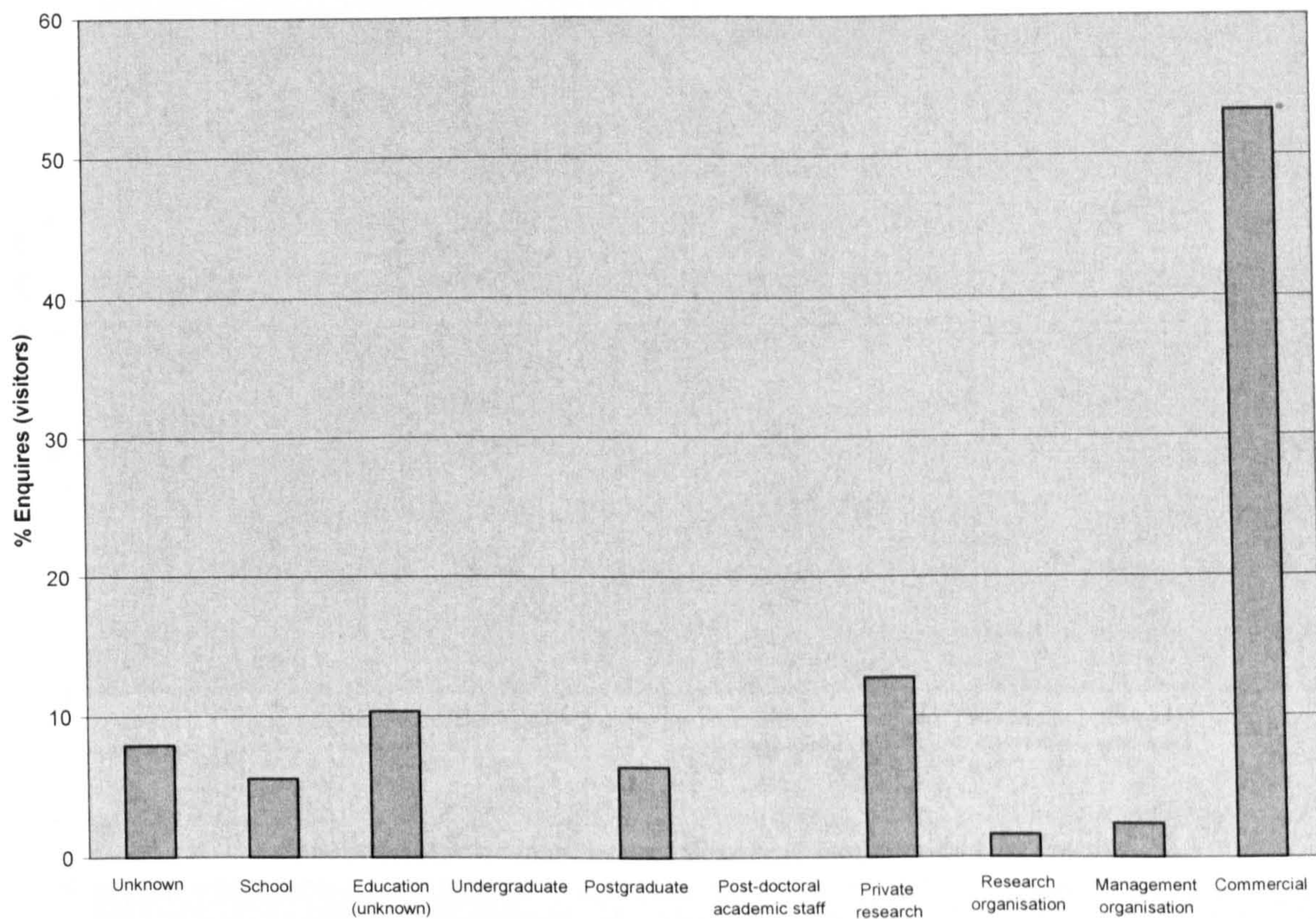
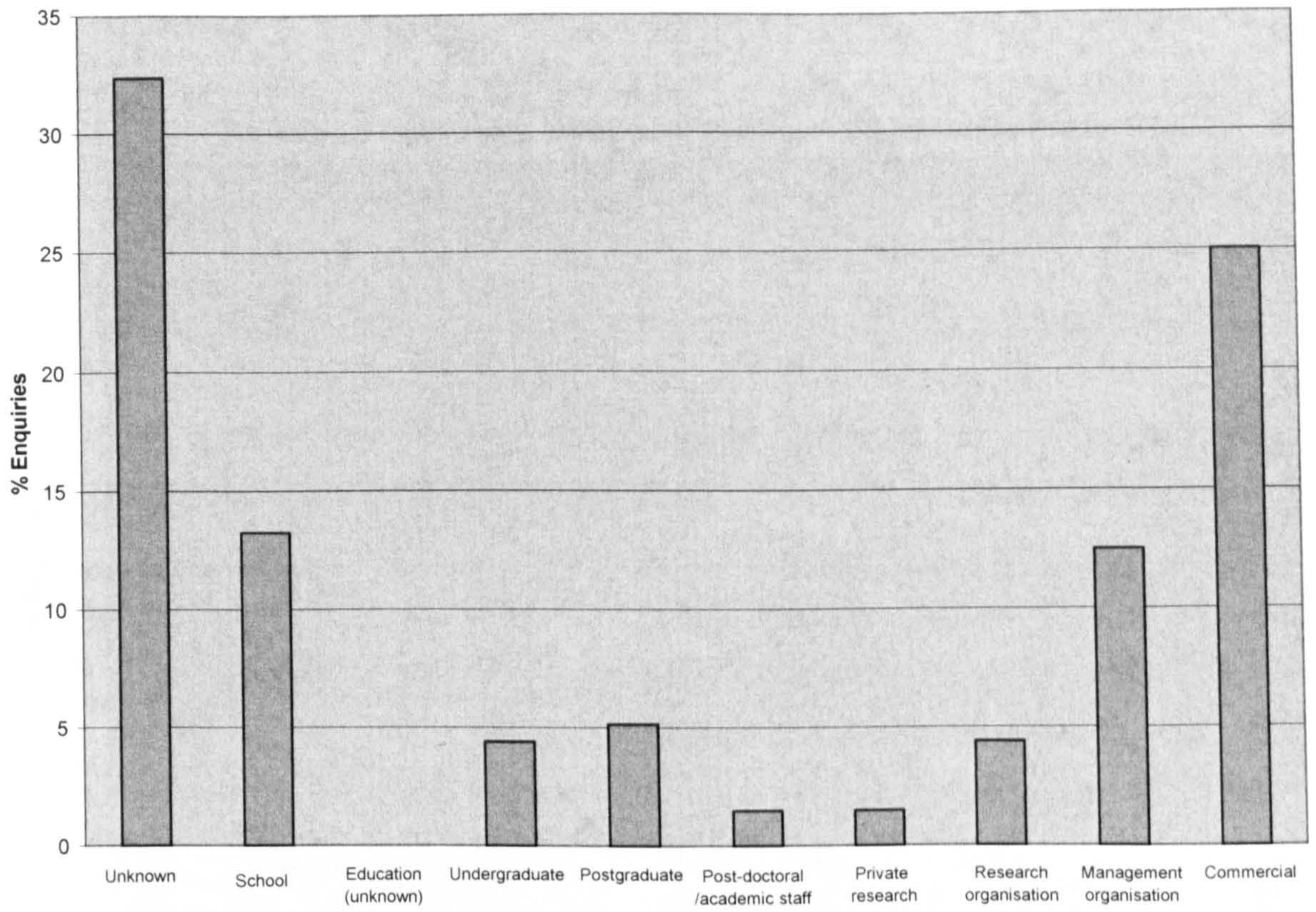


Figure 49. Lincolnshire SMR users (visitors).

National Monuments Record - % external enquiries by user group (n=136)



National Monuments Record - % external enquiries by type (n=151)

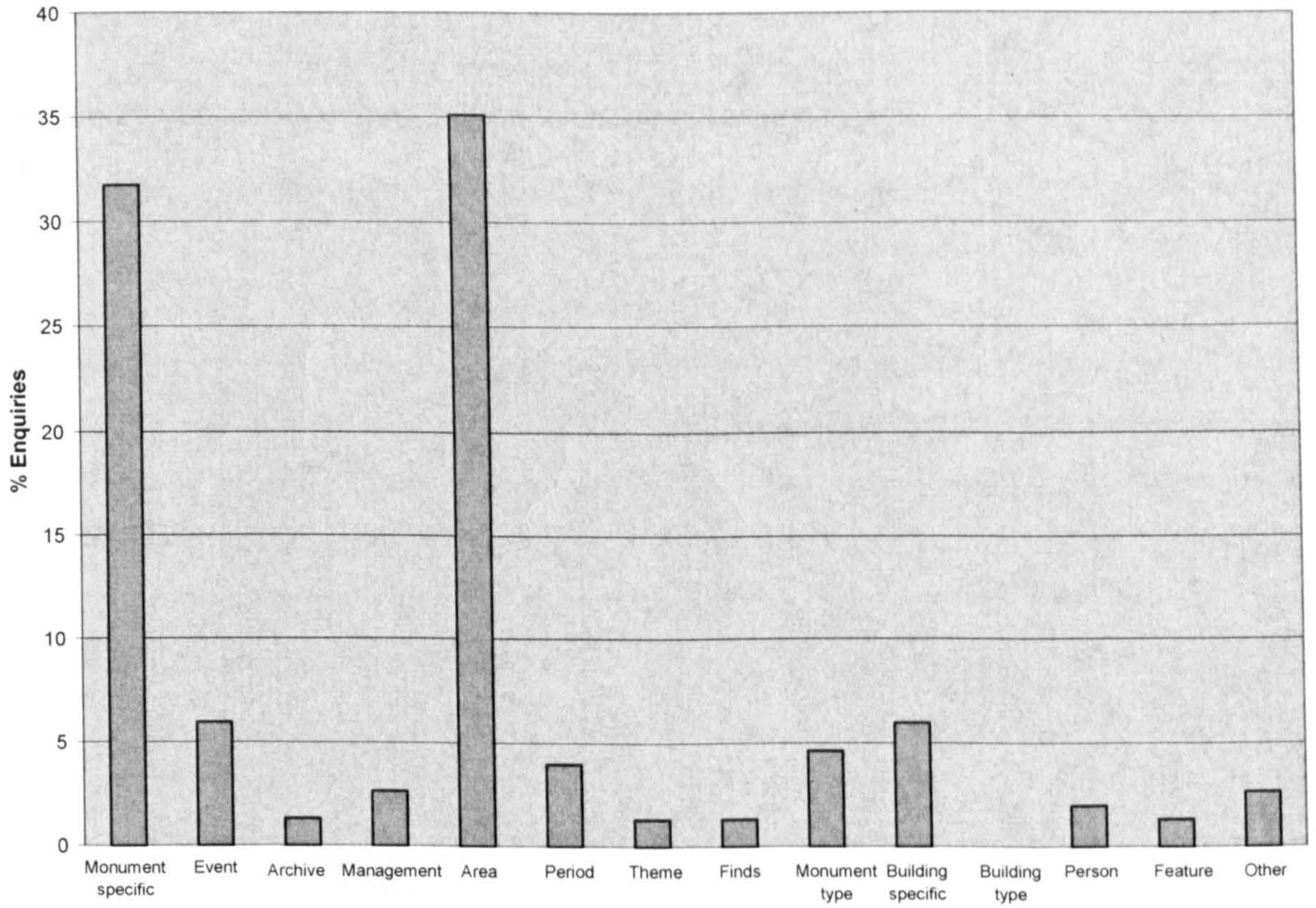


Figure 50. National Monuments Records users and enquiry types.

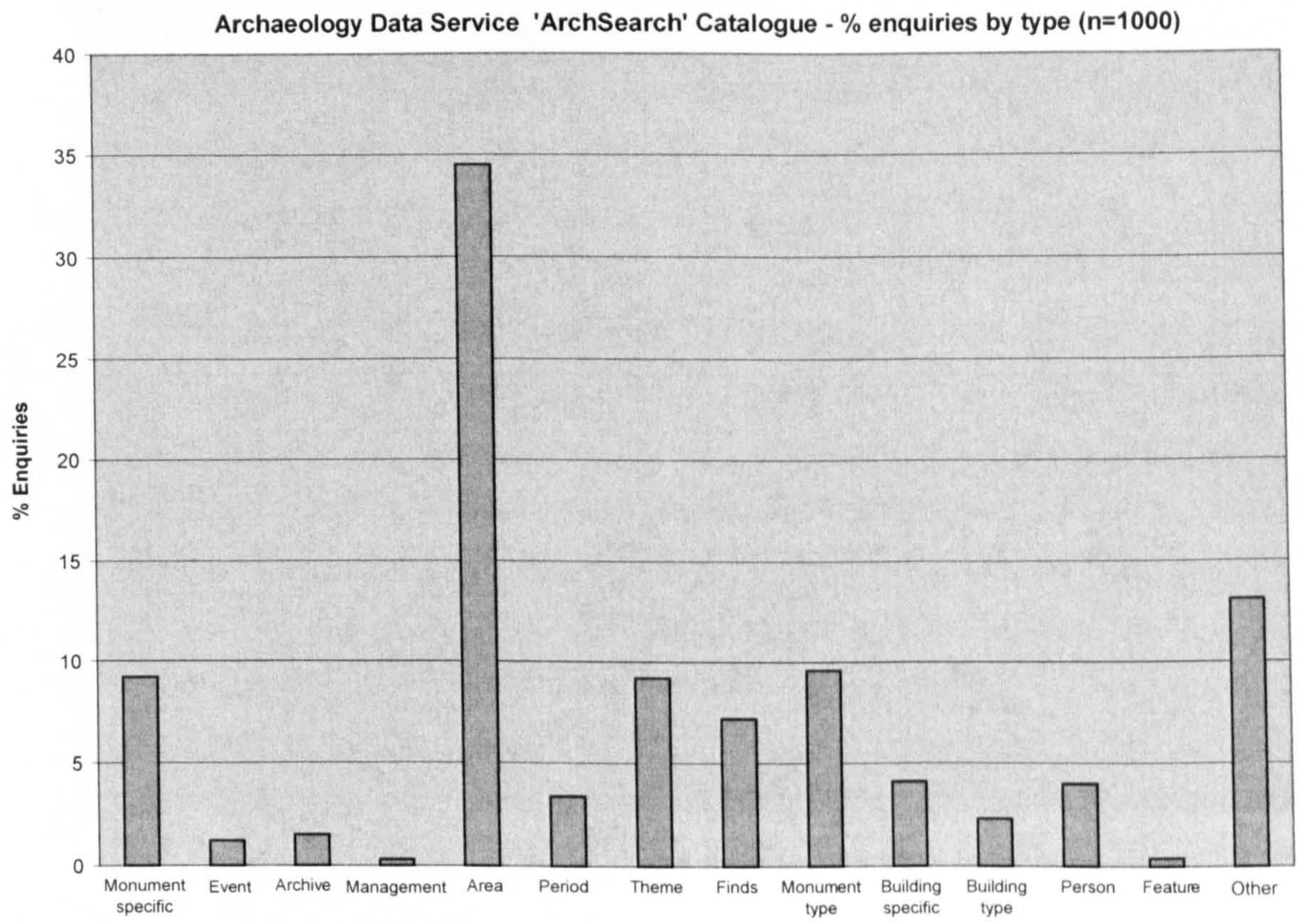


Figure 51. Archaeology Data Service 'ArchSearch' enquiry types.

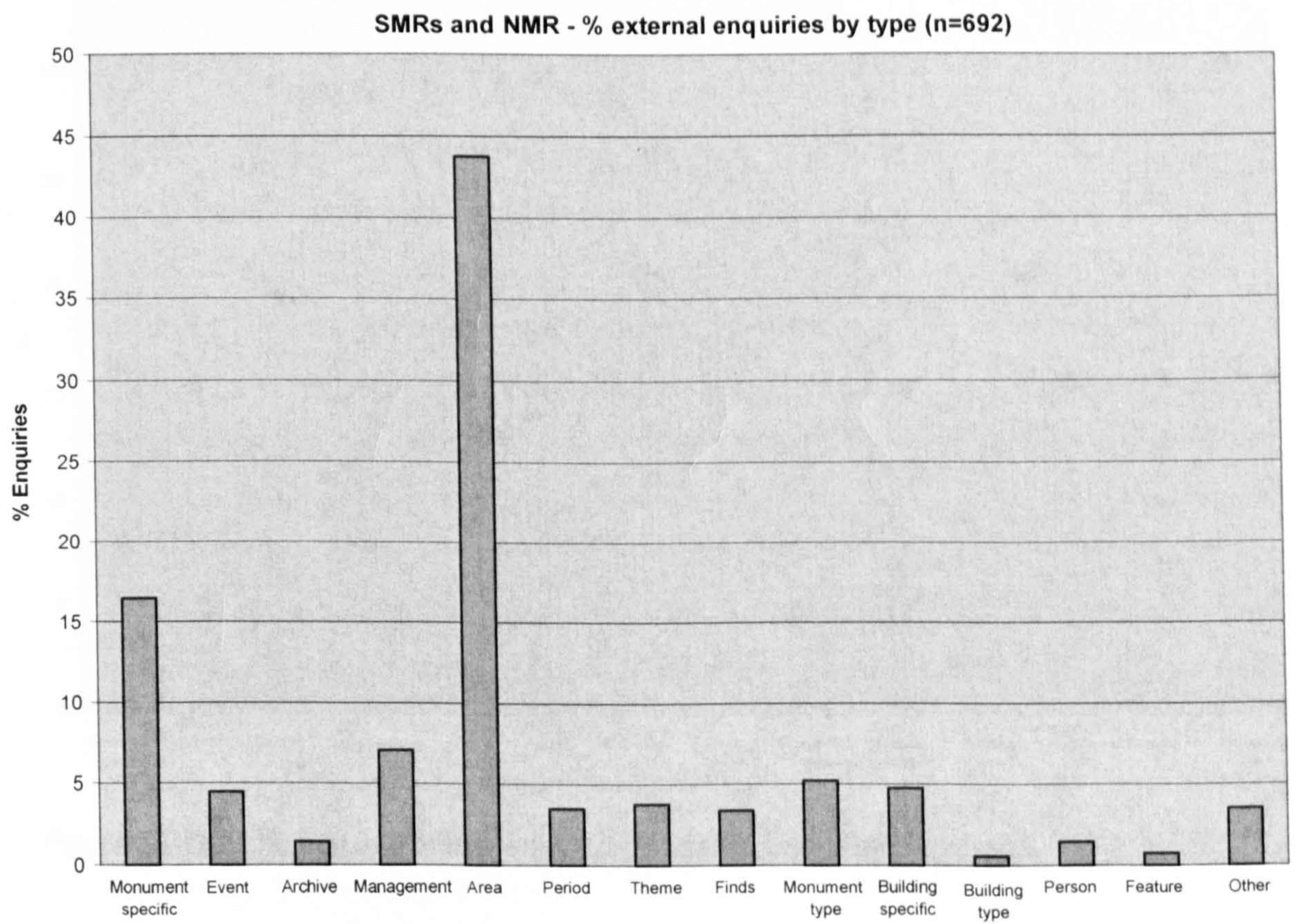
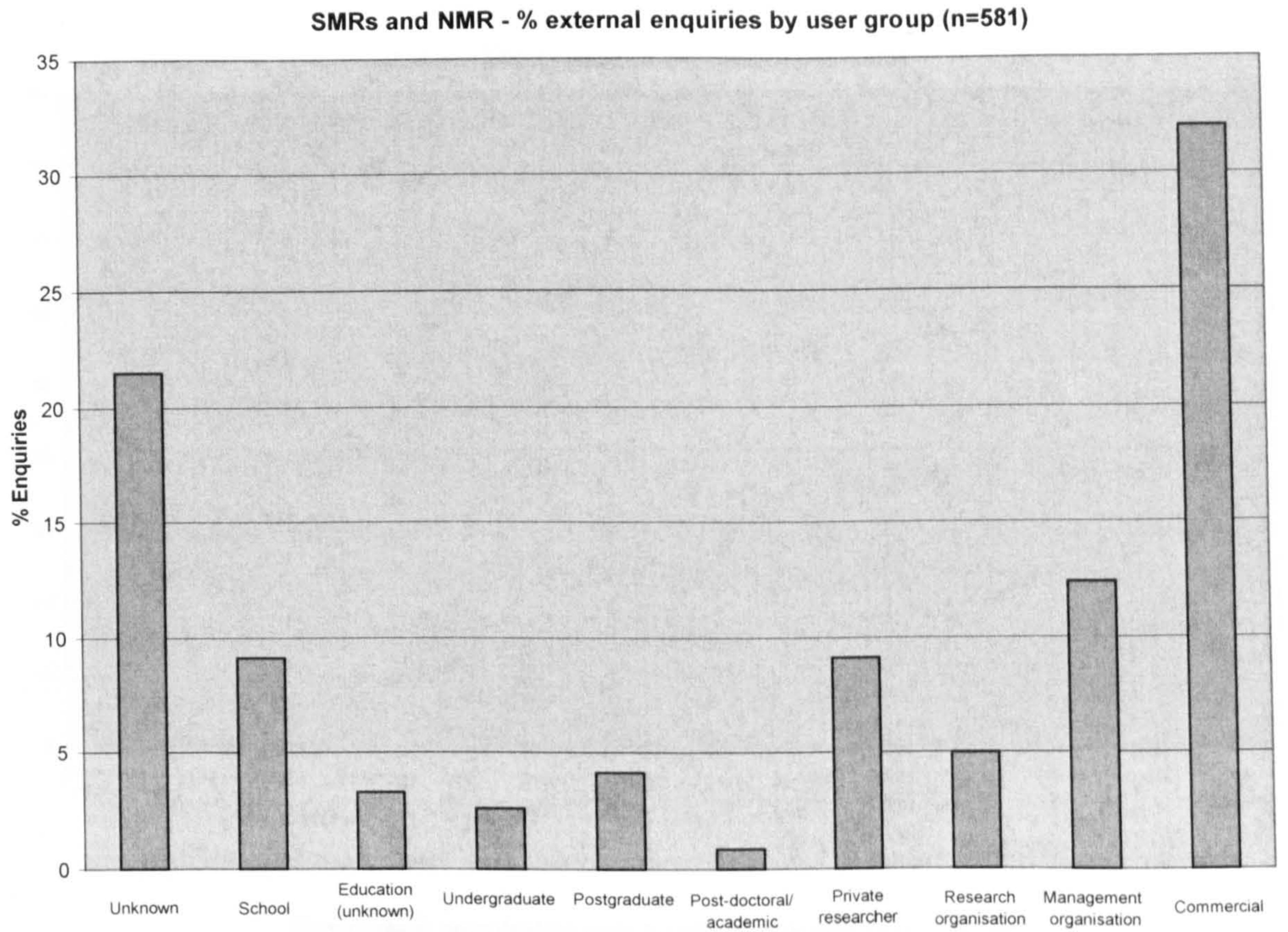


Figure 52. NMR and SMRs users and enquiry types.

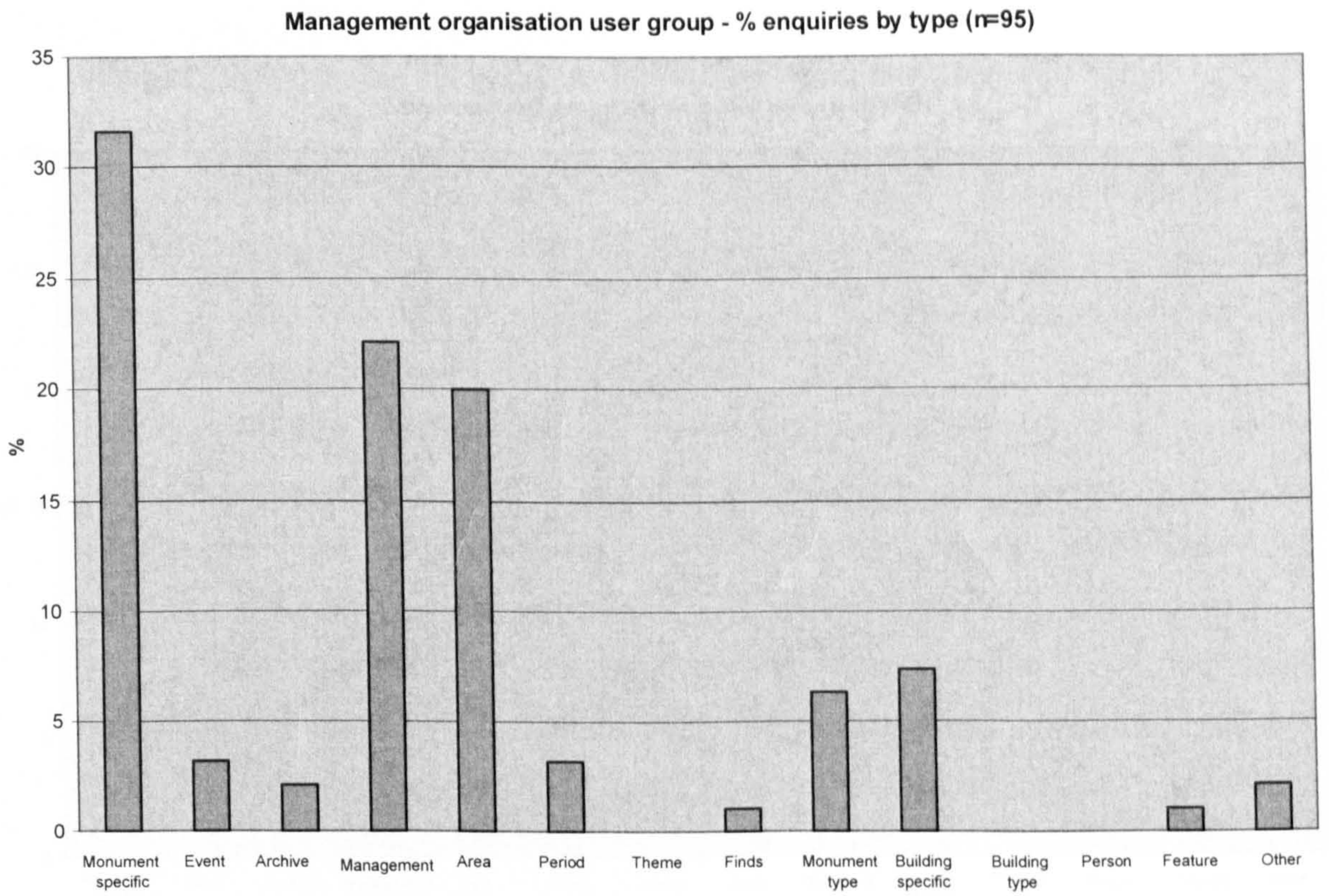
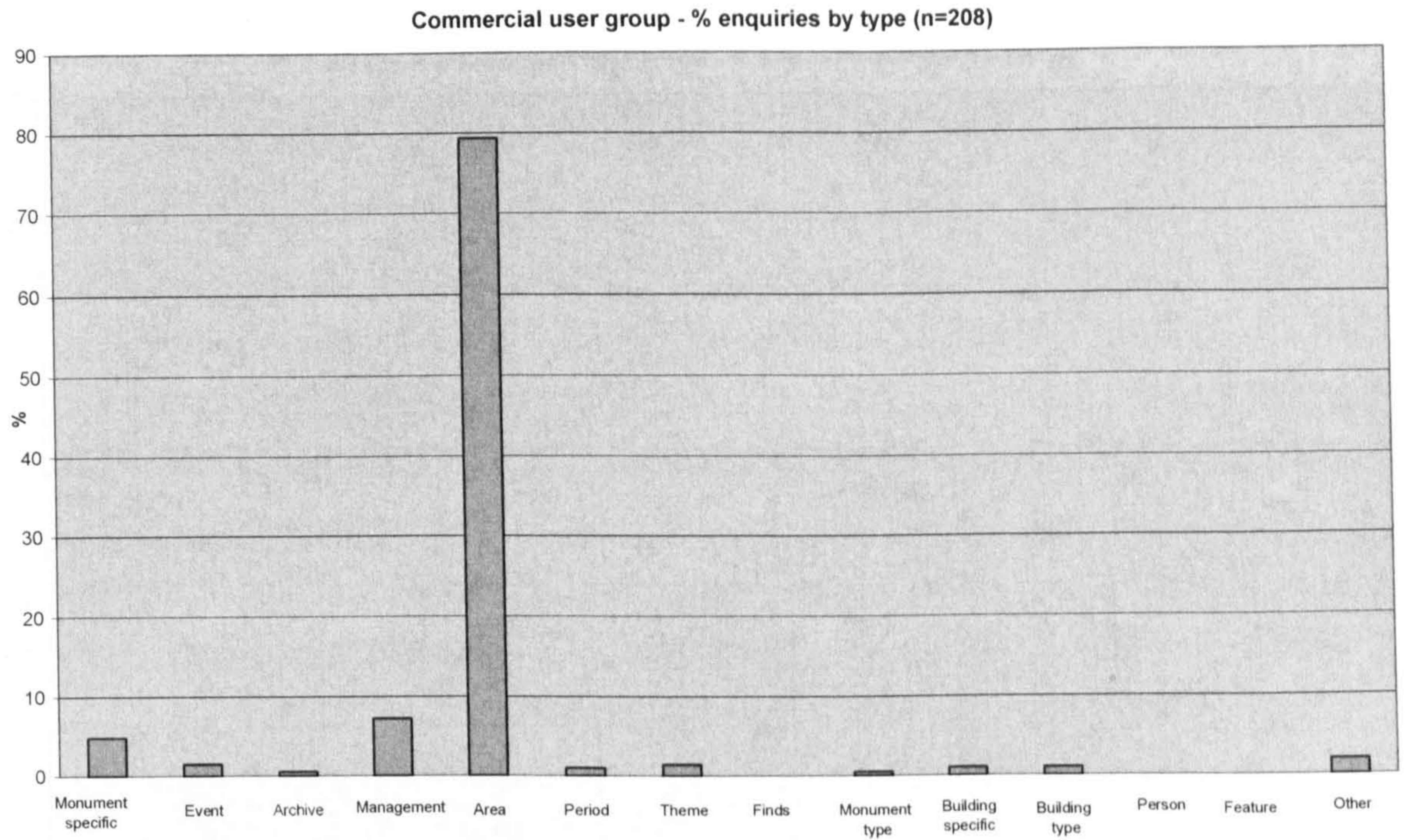


Figure 53. Commercial and Management organisation users' enquiry types.

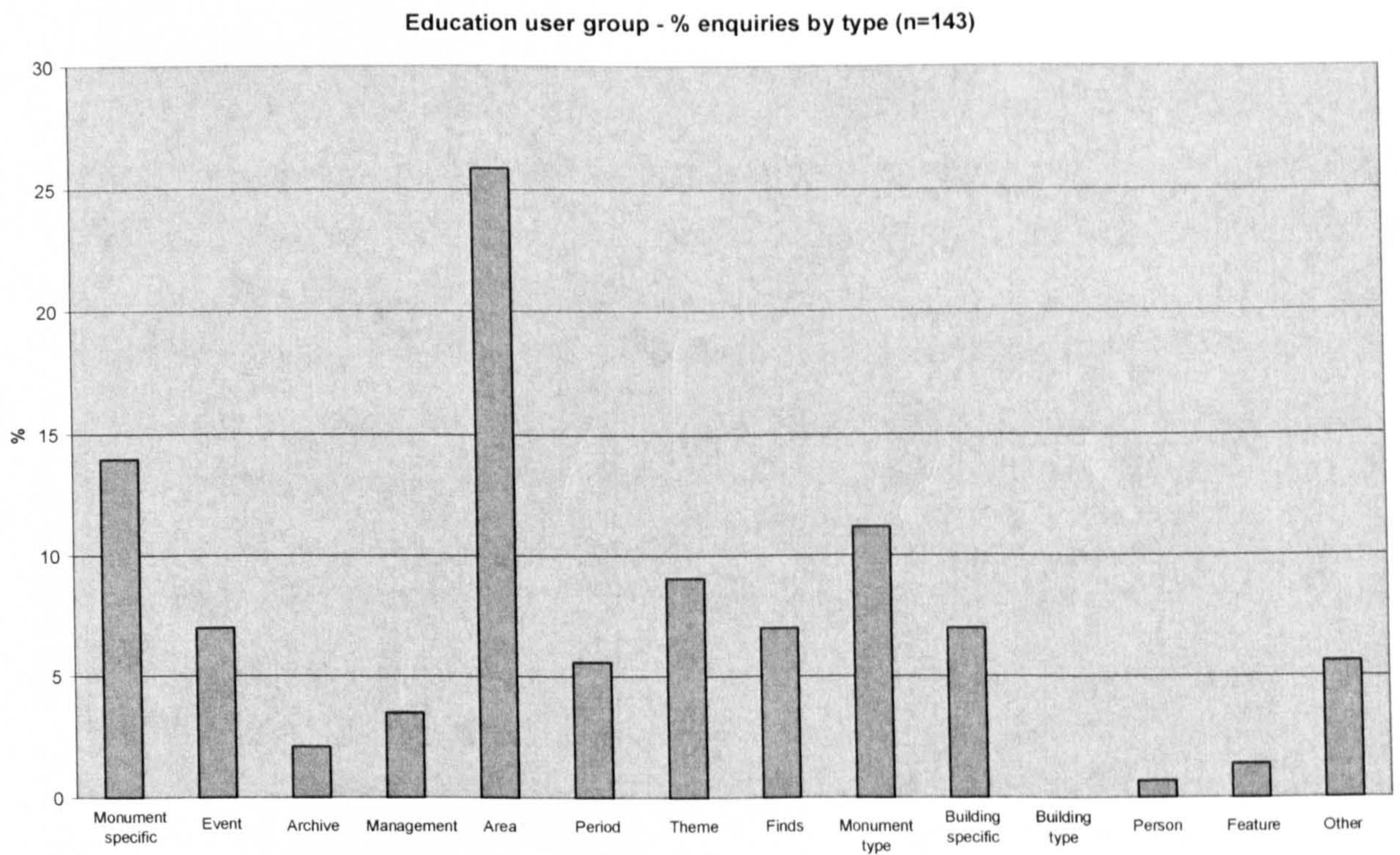
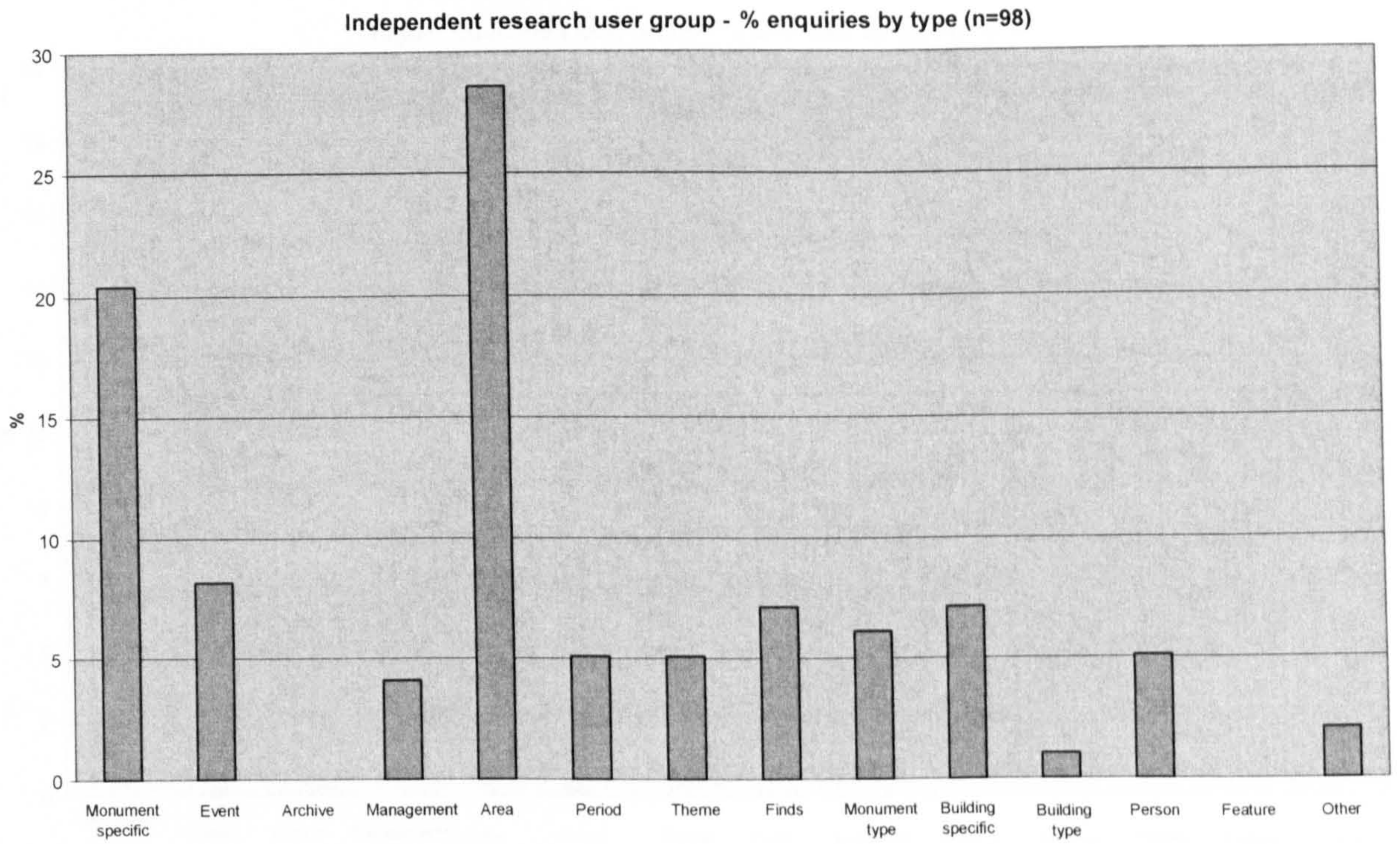


Figure 54. Independent researcher and education users' enquiry types.

Higher Education user group - % enquiries by type (n=62)

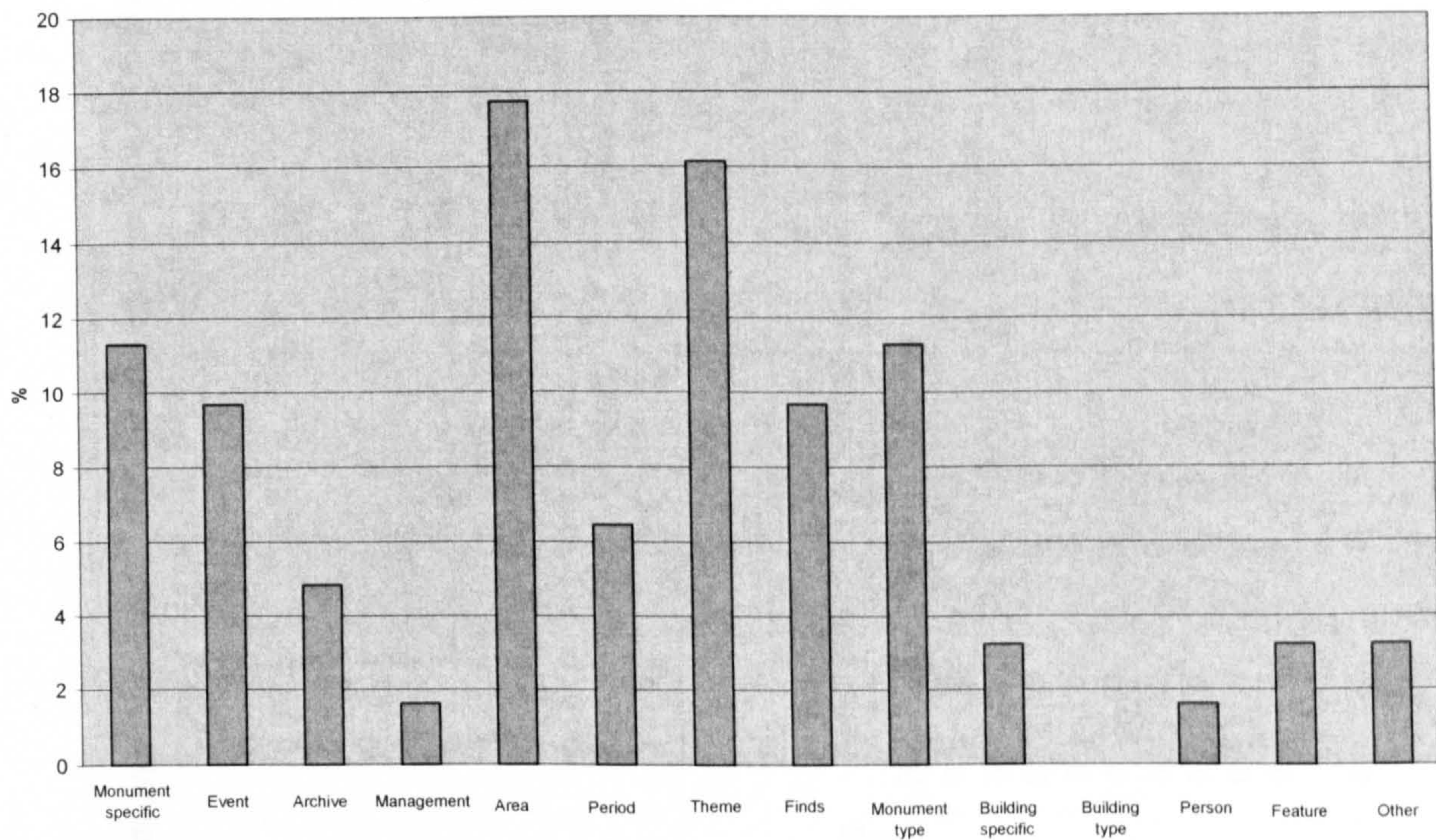


Figure 55. Higher education users' enquiry types.

Table 1. Northamptonshire SMR enquiry data

| User | Mon | Evnt. | Arc | Man. | Area. | Prd. | Theme | Finds | Mon | Bldg. | Bldg type | Pers | Ftre. | ? | Total by enquirer type | Cmplx | Total enq. | % enquiry type total | |
|-----------------|-----------|----------|----------|-----------|-----------|----------|----------|----------|----------|-----------|-----------|----------|----------|----------|------------------------|------------|------------|----------------------|------------|
| Unknown ind. | 8 | 0 | 0 | 2 | 28 | 1 | 1 | 0 | 1 | 3 | 1 | 1 | 1 | 0 | 3 | 49 | 6 | 42 | 26.92308 |
| School | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 2.564103 |
| Educ. unknown | 1 | 1 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 11 | 1 | 10 | 6.410256 |
| Undergrad. | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 5 | 3.205128 |
| Postgrad. | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 11 | 4 | 5 | 3.205128 |
| Postdoc/ac. | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 1.282051 |
| Individual res. | 7 | 0 | 0 | 3 | 8 | 0 | 0 | 0 | 2 | 6 | 0 | 2 | 0 | 0 | 0 | 28 | 4 | 24 | 15.38462 |
| Research org. | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 3.205128 |
| Man. Org. | 6 | 2 | 1 | 3 | 6 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 23 | 3 | 19 | 12.17949 |
| Commercial | 2 | 1 | 0 | 5 | 33 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 43 | 3 | 40 | 25.64103 |
| Total | 25 | 6 | 2 | 14 | 91 | 4 | 5 | 3 | 8 | 15 | 1 | 4 | 4 | 2 | 4 | 184 | 24 | 156 | 100 |

Table 2. Peterborough SMR enquiry data

| User | Mon. | Evnt | Arc. | Man. | Area. | Prd. | Theme | Finds | Mon | Bldg. | Bldg | Pers | Ftre. | ? | Total by enquirer type | Cmplx | Total enq. | % enquiry type total | |
|-----------------|-----------|----------|----------|----------|-----------|----------|-----------|----------|-----------|----------|----------|----------|----------|----------|------------------------|------------|------------|----------------------|------------|
| Unknown ind. | 2 | 0 | 1 | 0 | 5 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 | 0 | 12 | 8.10811 |
| School | 2 | 1 | 0 | 2 | 10 | 1 | 2 | 1 | 4 | 5 | 0 | 0 | 0 | 0 | 2 | 30 | 2 | 28 | 18.9189 |
| Educ. unknown | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 6 | 1 | 5 | 3.37838 |
| Undergrad. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.67568 |
| Postgrad. | 0 | 0 | 0 | 0 | 2 | 4 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 12 | 3 | 9 | 6.08108 |
| Postdoc/ac. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Individual res. | 6 | 4 | 0 | 0 | 5 | 3 | 3 | 4 | 1 | 1 | 0 | 2 | 0 | 2 | 0 | 31 | 4 | 25 | 16.8919 |
| Research org. | 2 | 1 | 0 | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 9 | 6.08108 |
| Man. org. | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 10 | 1 | 9 | 6.08108 |
| Commercial | 2 | 1 | 1 | 3 | 42 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 54 | 3 | 50 | 33.7838 |
| Total | 14 | 7 | 2 | 7 | 73 | 9 | 12 | 9 | 12 | 9 | 0 | 2 | 2 | 1 | 9 | 166 | 15 | 148 | 100 |

Table 3. Lincolnshire SMR enquiry data

| User | Mon | Evnt | Arc | Man | Area | Prd. | Theme | Finds | Mon type | Bldg. | Bldg type | Pers | Ftre spc. | ? | Total by enquirer type | Cmplx | Total enq. | % enquiry type total |
|-----------------|-----|------|-----|-----|------|------|-------|-------|-------------|-------|--------------|------|--------------|---|---------------------------|-------|------------|-------------------------|
| Unknown ind. | 5 | 2 | 3 | 9 | 3 | 3 | 3 | 2 | 4 | 1 | | 1 | | 3 | 35 | 4 | 27 | 19.1489 |
| School | 1 | 1 | 1 | 1 | 1 | | | 1 | | | | | | 1 | 5 | 1 | 3 | 2.12766 |
| Educ. unknown | 1 | 1 | 1 | 1 | | | | 1 | 2 | | | | | 0 | 4 | 0 | 4 | 2.83688 |
| Undergrad. | 2 | 1 | 1 | 1 | | | | 1 | | | | | | 1 | 6 | 1 | 3 | 2.12766 |
| Postgrad. | | 1 | 1 | | 3 | | | 2 | | | | | | 3 | 7 | 2 | 3 | 2.12766 |
| Postdoc/ac. | 0 | 1 | | 0 | | | | 0 | | | | | | 0 | 1 | 0 | 1 | 0.70922 |
| Individual res. | | | | 1 | | | | | 1 | | | | | | 2 | | 2 | 1.41844 |
| Research org. | 1 | 2 | 1 | 3 | 1 | 1 | 2 | | | 1 | | | | | 11 | 3 | 9 | 6.38298 |
| Man. org. | 15 | 1 | | 8 | 1 | | 1 | 1 | 2 | | 2 | | | | 44 | 16 | 27 | 19.1489 |
| Commercial | 2 | 7 | 63 | | | | | | | 2 | | | | 2 | 76 | 3 | 62 | 43.9716 |
| Total | 27 | 9 | 4 | 24 | 86 | 5 | 7 | 9 | 9 | 0 | 3 | 1 | 0 | 7 | 191 | 30 | 141 | 100 |

Table 4. National Monuments Record enquiry data

| User | Mon | Evnt | Arc | Man | Area | Prd. | Theme | Finds | Mon type | Bldg. | Bldg type | Pers | Ftre spc. | ? | Total by enquirer type | Cmplx | Total enq. | % enquiry type total |
|-----------------|-----|------|-----|-----|------|------|-------|-------|-------------|-------|--------------|------|--------------|---|---------------------------|-------|------------|-------------------------|
| Unknown ind. | 19 | 5 | 0 | 2 | 12 | 2 | 0 | 1 | 2 | 4 | 0 | 2 | | 2 | 52 | 6 | 44 | 32.3529 |
| School | 8 | 1 | 0 | 1 | 5 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | | 0 | 20 | 2 | 18 | 13.2353 |
| Educ. unknown | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Undergrad. | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 1 | 6 | 0 | 6 | 4.41176 |
| Postgrad. | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | | 0 | 7 | 0 | 7 | 5.14706 |
| Postdoc/ac. | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 1.47059 |
| Individual res. | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 1.47059 |
| Research org. | 3 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | | 0 | 9 | 2 | 6 | 4.41176 |
| Man. org. | 9 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 1 | 3 | 0 | 0 | | 0 | 18 | 1 | 17 | 12.5 |
| Commercial | 4 | 1 | 0 | 0 | 27 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | | 1 | 35 | 1 | 34 | 25 |
| Total | 48 | 9 | 2 | 4 | 53 | 6 | 2 | 2 | 7 | 9 | 0 | 3 | 2 | 4 | 151 | 12 | 136 | 100 |

Table 5. Archaeology Data Service enquiry data

| User | Mon | Evnt | Arc | Man | Area. | Prd. | Theme | Findings | Mon | Bldg. | Bldg | Pers | Ftre. | ? | Total by enquirer | Cmplx | Total enq. | % enquiry | |
|-----------------|-----|------|-----|-----|-------|------|-------|----------|-----|-------|------|------|-------|------|-------------------|-------|------------|------------|--|
| | | | | | | | | type | | type | type | | | | type | | | type total | |
| Unknown ind. | 92 | 12 | 15 | 3 | 345 | 34 | 92 | 72 | 96 | 41 | 23 | 40 | | 4 | 1000 | 7 | | | |
| School | | | | | | | | | | | | | | | | | | | |
| Educ. unknown | | | | | | | | | | | | | | | | | | | |
| Undergrad. | | | | | | | | | | | | | | | | | | | |
| Postgrad. | | | | | | | | | | | | | | | | | | | |
| Postdoc/ac. | | | | | | | | | | | | | | | | | | | |
| Individual res. | | | | | | | | | | | | | | | | | | | |
| Research org. | | | | | | | | | | | | | | | | | | | |
| Man. org. | | | | | | | | | | | | | | | | | | | |
| Commercial | | | | | | | | | | | | | | | | | | | |
| Total% | 9.2 | 1.2 | 1.5 | 0.3 | 34.5 | 3.4 | 9.2 | 7.2 | 9.6 | 4.1 | 2.3 | 4 | 0.4 | 13.1 | | 100 | | | |

APPENDIX 2 – A SURVEY OF SMR USE IN RESEARCH PUBLICATIONS

Table 6. Britannia data

| Year | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | Total |
|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|-------|
| No. of Papers | 33 | 28 | 27 | 32 | 31 | 21 | 23 | 24 | 20 | 20 | 24 | 20 | 21 | 18 | 20 | 22 | 23 | 17 | 23 | 19 | 19 | 18 | 15 | 18 | 16 | 11 | 563 |
| SMR(England) | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 2 | 2 | 1 | 2 | 0 | 2 | 1 | 0 | 21 |
| NMR(England) | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 0 | 2 | 0 | 23 |
| RCHM(England) | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 1 | 5 | 1 | 2 | 2 | 2 | 3 | 0 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 0 | 0 | 2 | 1 | 52 |
| SMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 3 |
| RCAHM(Scotland) | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 15 |
| SMR(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| NMR(Wales) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| RCAHM(Wales) | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| %SMR(England) | 3 | 0 | 0 | 0 | 0 | 5 | 4 | 0 | 5 | 5 | 0 | 5 | 0 | 6 | 0 | 0 | 13 | 6 | 9 | 11 | 5.3 | 11 | 0 | 11 | 6 | 0 | |
| %NMR(England) | 0 | 4 | 0 | 6 | 3 | 0 | 4 | 4 | 5 | 0 | 4 | 0 | 0 | 6 | 0 | 5 | 9 | 6 | 13 | 11 | 5.3 | 6 | 7 | 0 | 13 | 0 | |
| %RCHM(England) | 3 | 7 | 13 | 13 | 16 | 10 | 13 | 4 | 25 | 5 | 8 | 10 | 10 | 17 | 0 | 5 | 9 | 12 | 9 | 11 | 5.3 | 17 | 0 | 0 | 13 | 9 | |

Table 7. Medieval Archaeology data

| Year | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | Total |
|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|-------|
| No. of papers | 12 | 13 | 12 | 16 | 17 | 12 | 12 | 10 | 17 | 16 | 13 | 14 | 12 | 10 | 13 | 12 | 10 | 11 | 10 | 17 | 12 | 11 | 9 | 13 | 10 | 11 | 325 |
| SMR(England) | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 2 | 4 | 1 | 3 | 0 | 1 | 2 | 27 |
| NMR(England) | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 11 |
| RCHM(England) | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 19 |
| SMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 |
| RCAHM(Scotland) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| SMR(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 7 |
| NMR(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 |
| RCAHM(Wales) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 13 |
| %SMR(England) | 8 | 0 | 0 | 0 | 6 | 8 | 0 | 10 | 6 | 0 | 0 | 7 | 0 | 10 | 8 | 17 | 30 | 9 | 0 | 12 | 33 | 9 | 33 | 0 | 10 | 18 | |
| %NMR(England) | 0 | 8 | 8 | 0 | 6 | 0 | 0 | 0 | 6 | 0 | 15 | 7 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 10 | 0 |
| %RCHME(England) | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 20 | 12 | 0 | 8 | 0 | 8 | 0 | 0 | 8 | 17 | 0 | 0 | 0 | 12 | 8.3 | 9 | 22 | 8 | 0 | 9 |

Table 8. Northamptonshire Archaeology data

| Year | 80 | 81 | 82 | 83 | 84 | 85 | 86-87 | 88-90 | 91 | 92 | 93-94 | 95 | 96-97 | 98-99 | 00-01 | 02 | 03 | 04 | 05 | Total |
|-----------------|----|----|----|----|----|----|-------|-------|----|----|-------|----|-------|-------|--------|----|----|----|----|-------|
| No. of papers | 9 | 10 | 7 | 8 | 5 | 8 | 6 | 4 | 19 | 12 | 20 | 8 | 15 | 16 | 15 | 11 | 10 | 7 | 10 | 200 |
| SMR(England) | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 4 | 5 | 2 | 5 | 4 | 5 | 3 | 3 | 5 | 42 |
| NMR(England) | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 17 |
| RCHM(England) | 4 | 2 | 2 | 3 | 2 | 6 | 5 | 2 | 2 | 5 | 10 | 5 | 7 | 6 | 7 | 6 | 2 | 1 | 3 | 80 |
| SMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NMR(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RCAHM(Scotland) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SMR(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NMR(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RCAHM(Wales) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| %SMR(England) | 11 | 0 | 0 | 0 | 40 | 13 | 16.7 | 0 | 0 | 0 | 20 | 63 | 13.33 | 31.25 | 26.667 | 45 | 30 | 43 | 50 | |
| %NMR(England) | 11 | 30 | 0 | 13 | 20 | 0 | 33.3 | 0 | 5 | 0 | 15 | 13 | 13.33 | 6.25 | 6.6667 | 0 | 0 | 0 | 0 | |
| %RCHM(England) | 44 | 20 | 29 | 38 | 40 | 75 | 83.3 | 50 | 11 | 42 | 50 | 63 | 46.67 | 37.5 | 46.667 | 55 | 20 | 14 | 30 | |

APPENDIX 3 – A SURVEY OF STUDENT SMR USE

Table 9. Student work that made use of SMR data

| <u>Student</u> | <u>No. of SMRs /NMRs used</u> | <u>Acknow- ledgement</u> | <u>Bibliography /References</u> | <u>Tables/Catalogues Record extracts /Full records</u> | <u>Distribution maps</u> | <u>Other figures</u> | <u>Other mentions (abbreviations, text etc.)</u> | <u>Statements of Use/Search methods</u> | <u>Original reference numbers used</u> |
|---------------------------|-------------------------------|--------------------------|---------------------------------|--|--------------------------|----------------------|--|---|--|
| Sub- undergraduate | | | | | | | | | |
| Fleet, D | 1 | yes | yes | yes | yes | no | yes (text) | yes | no |
| Baruah,A | 1 | yes | no | no | yes | no | yes (text) | yes | yes |
| Baruah,M | 1 | yes | no | yes | no | no | yes (text) | yes | yes |
| Weald, S. | 1 | no | no | no | no | no | yes (abbrev, text) | no | yes |
| Davies, R.J. | 1 | yes | no | yes | yes | no | yes (text) | yes | yes |
| Undergraduate | | | | | | | | | |
| Finch, E. | 1 | yes | no | yes | yes | yes(artefacts) | yes(text) | yes | yes |
| Hull, D. | 1 | yes | no | yes | yes | no | yes(text) | yes | no |
| Jarron, M.H | 1(NMRS) | yes | no | yes | no | yes(cropmark plots) | yes(text) | yes | yes |
| Keating, C.A. | 1 | yes | no | yes | no | yes(earthwork plot) | yes(text) | no | yes |
| Anon. | ??(ADS catalogue) | no | no | yes | yes | no | yes(text) | yes | yes (?) |
| Birch, V | 2 (NMRE, SMR) | yes | yes | no | yes | no | yes(text) | yes | no |

| <u>Student</u> | <u>No. of SMRs /NMRs used</u> | <u>Acknow- ledgement</u> | <u>Bibliography /References</u> | <u>Tables/Catalogues Record extracts /Full records</u> | <u>Distribution maps</u> | <u>Other figures</u> | <u>Other mentions (abbreviations, text etc.)</u> | <u>Statements of Use/Search methods</u> | <u>Original reference numbers used</u> |
|-----------------------------------|-----------------------------------|------------------------------|-------------------------------------|--|------------------------------|----------------------|--|---|--|
| Taught post-graduate | | | | | | | | | |
| Austin, T | >1(unknown) | yes | no | no | no | no | no | no | no |
| Duffy, J. | 2(NMRE, SMR) | yes | yes | no | yes | yes(text) | yes | yes | yes |
| Campbell, M.A. | 1 | no | no | no | no | yes(text) | yes | yes | no |
| Christianson, N. | 2(NMRE, SMR) | yes | no | yes | no | yes(text) | yes | yes | no |
| Herkes, S. | 1 | yes | no | no | no | yes(text) | yes | yes | no |
| Mabbit, J. | 1 | no | no | no | no | yes(text) | no | no | yes |
| Mack, A. | 1 | yes | no | yes | no | yes(abbrev, text) | yes | yes | no |
| Oliver, T.M. | 1 | yes | no | no | no | no | no | no | no |
| Robinson, B. | 1 | yes | yes | yes | no | yes(text) | yes | yes | yes |
| Smith, J.G. | 2(NMRE, SMR) | yes | no | no | no | yes(text) | yes | yes | no |
| Grubb, T. | SMR theory | | | | | | | | |
| Research post-graduate | | | | | | | | | |
| Geake, H. | ? | ? | | no | no | no | no | no | no |
| Miller, P. | SMR theory | | | | | | | | |
| Symonds, L.A. | 5 | yes | no | no | no | no | no | no | no |

Table 10. Student dissertations consulted

Sub-Undergraduate

Baruah, A. 1999. *An Archaeological Field Walk, Marholm, Peterborough*, submitted for 'A' Level Archaeology, Peterborough Regional College

Baruah, M. undat. *Archaeological Survey of the Graveyard of St. Mary the Virgin, at Marholm, near Peterborough, Cambs.* Submitted for 'A' Level Archaeology, Peterborough Regional College

Davies, R.J. 1999. *The Archaeology of Thorney Parish, Cambridgeshire*, Coursework submitted for 'A' Level Archaeology, Peterborough Regional College

Davies, R.J. 2001. *An Unclassified Earthworks Monument on the Nene Washes, North Cambridgeshire*, submission for Certificate in Archaeology, Level One Research Module – A Monument in its Landscape, Cambridge University Board of Continuing Education

Fleet, D. 1992. *An Archaeological Survey of the Parish of Southorpe*, submission for 'A' Level Archaeology at Peterborough Regional College

Weald, S. 2000. *Earthworks at Southorpe, Cambridgeshire*, submission for Certificate in Archaeology, Level One Research Module – A Monument in its Landscape, Cambridge University Board of Continuing Education

Undergraduate

Anon. 2001. *A Study Of The Archaeological Evidence From The Mesolithic To The Bronze Age In The Harthope Valley, Northumberland*

Birch, V. 2001. *Investigation Into The Stone Age Distribution Pattern In The Seamer Region Of The Vale Of Pickering*

Bone, K. 2001. *Examining the Possible Elements Which Could Determine The Distribution Of Pictish Symbol Stones*

Clay, T. 2001. *Wealth And Worship: Twelve Parishes In Medieval Warwickshire*

Daly, A. 2001. *The Myth Of Medieval Childhood: Images Of Childhood In Children's Medieval History Books*

Donahue, R. 2001. *Is Religion The Main Factor Structuring Urban Settlement In Israel During The Period Of The United Monarchy?*

Doulton, L. 2001. *An Exploration Into Which Factors Were Responsible For The Development Of Feminist Archaeology In Britain During The Late 1980s And Early 1990s*

- Egan, D.R. 2001. *An Interpretation Of The Medieval Funerary Effigy From An Archaeological Perspective*
- Felter, M. 2001. *Quoygrew, Westray, Orkney. A Study Of The Floor In A Norse House*
- Finch, E. 1996. *The Question Of The Sandlings*
- Hull, D. 1997. *An Examination of Moated Sites In The Peterborough Region*
- Jarrow, M.H. 1995. *A Study Of Rectilinear Enclosures In East Lothian*
- John, L. 2001. *How Is Archaeology Portrayed Through Film And Television And What Implications Does This Have For The Discipline ?*
- Johnson, K. 2001. *A New Analysis Of The Castles Of The Welsh Princes Of Gwynedd*
- Keating, C.A. 1995. *The Desertion of Villages In Medieval Somerset*
- Kidner, S. 2001. *Defining Draft-Related Pathologies In Oxen*
- Lock, R. 2001. *A Study Of Marine Molluscs From Sample Column C, Roberts Haven, Caithness*
- McKee, K. 2001. *Archaeology Is A DIRTY Word. A Critical Analysis of Geochemical Field Techniques in Archaeology*
- Menzies, A. 2001. *Did the Picts Paint Their Stones ?*
- Pitts, M.E.J. 2001. *The Social Logic of Settlement Space at Two Auxiliary Forts on Hadrian's Wall*
- Porteus, S. 2001. *Reconstructing Total Long Bone Length From Partial Measurements*
- Robb, A. Tap 'O North. *A Vitriified Hillfort: Aspects Of Its Nature and Function and Their Implications For The Reconstruction Of Iron Age Society in North East Scotland*
- Simmonds, C. 2001. *Three Irish Graveyards. Iconography, Ideology and the Gravestone in the 18th and 19th Century*
- Smith, L. 2001. *Victualling In The Medieval Town: A Comparative Study Of York And Winchester*

- Smith, P. 2001. *Decoding Material Culture. The Relationship Between Structuralism and Material Culture*
- Southeran, A. W. 2001. *A Catalogue of Viking Age Gaming Pieces*
- Speight, H. 2001. *Status from Rubbish. Exploring the Nature of Medieval Occupation in York for Vertebrate Remains*
- Thompson, A. 2001. *A Study of Civil War Coin Hoards From Yorkshire*
- Trowe, J. 2001. *Forensic Archaeological In The US And The UK: A Comparative Study*
- Web, F. 2001. *The Concept Of The Child and Childhood Within Archaeology With Particular Reference To The Medieval Period*
- White, L. 2001. *How Significant Was The Middlesbrough Pottery Industry in the Growth of Nineteenth Century Middlesbrough ?*
- White, P. 2001. *An Analysis Of The Terrestrial Molluscan Fauna From Evertaft, Westray, Orkney*
- Witt, A. 2001. *Medieval Dispersed Settlement in Carmarthenshire*
- Williamson, K.A. 2001. *The Archaeology Of Collegiate Buildings – The Vicar’s Colleges And Chantry Priests Colleges At The Secular Cathedral Foundations of England*
- Woodhall, D. 2001. *Hogbacks in Viking Age Northern England*
- Taught Post Graduate**
- Austin, T. 1996. *Defining Monasticism Archaeologically in Britain and Ireland During the Middle Saxon Period*, MA dissertation, University of York
- Ayton, J. 1998. *Thorney Abbey: An Architectural Analysis of a Romanesque Fen Abbey-Church*, MA dissertation, Courtauld Institute of Art
- Brukner, R.G.F. 1997. *The Human Remains of Roman York*, MA dissertation, University of York
- Duffy, J. 1998. *A Survey of Suburban Aldborough*, MA dissertation, University of York
- Haigh, S. 1993. *Lobby Entry and Hearth-Passage Houses in North Yorkshire*, MA dissertation, University of York
- Moody, S. 1993. *The Premonstansian Cannons in England and Wales: An Archaeological Assessment*, MA dissertation, University of York

- Morris, A.M. 1998. *A Study of the Parish Church of Saint Kyneburgha at Castor, Near Peterborough*, MA submission, University of Leicester
- Prescott, M. 1995. *Burton Constable: An Evaluation of the Archaeology*, MA dissertation, University of York
- Robinson, B. 1993. *Archaeological Resource Management Strategies: A New Framework for Development-Led Archaeology in Towns*, MA dissertation, University of York
- Smith, J.G. 1995. *Archaeological Survey of Burnden Park, Bolton*, MA dissertation, University of York
- Symonds, L.A. 1995. *The Burghal Economy of Late Saxon England*, MA dissertation, University of York
- Thomas, S. R. 1999. *The Great Hospital, Norwich*, MA dissertation, University of York
- Vance, M.A. 1985. *Aspects of Viking Age Sculpture in the British Isles*, MA dissertation, University of York
- Woodland, E.L. 1997. *Why do Cruck-Framed Buildings Survive on the North York Moors ?* MA dissertation, University of York
- Research Post Graduate**
- Geake, H. 1995. *The Use of Grave Goods in Conversion Period England c. 600 - c. 850 AD*, DPhil dissertation, University of York
- Miller, A. P. 1997. *The York Archaeological Assessment: An Investigation of Techniques for Urban Deposit Modelling Utilising Geographic Information Systems*, DPhil, University of York
- Symonds, L.A. 1999. *Landscape and Social Practice: The Production and Consumption of Pottery in Tenth Century Lincolnshire*, DPhil, University of York

APPENDIX 4 - ACADEMIC SMR USE QUESTIONNAIRES

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher A**

2. Institution: -

3. (*highlight one of*) **academic staff** **post-graduate student** **undergraduate student**

4. Research Interests:

Neolithic and early Bronze Age in East Anglia - pits

5. SMRs consulted (*highlight one*): **1 SMR only** **2-5 different SMRs** **6-10 SMRs** **10+ SMRs**

6. What questions have you asked of SMRs ?

To tell me excavated sites with Neolithic/early Bronze Age pits on them

7. General level of satisfaction with SMR information output (*highlight one*):
very poor **poor** **adequate** **good** **very good**

8. What types of question would you like to ask of SMRs ?

If I could customise my search to refer to 'pits' only it would be useful

9. Other comments regarding the use of SMRs:

Which excavation unit dug a site is not always evident, but would be useful to know sometimes. Sources (e.g. site reports) are not always clear enough

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area ? **2**

or the primary source of archaeological information for a defined geographic area ? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence ? **1**

or focus on a greater depth of information for a narrower range of archaeological subjects ? 3

or extensive coverage with selective themes at greater depth? 2

12. Rank in order of importance (1=*most important*, 2, 3, 4=*least important*):

classification and terminology control of SMR information conforming to national standards 2

interpretative statements from authoritative sources to support SMR entries 3

interpretation of evidence at a local level using local classification and terminology control 4

ability to use basic SMR information in order to create your own classifications 1

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Event = type of evidence, monument = individual entry, archive/source=how or where information is stored

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

relevant

15. Are you (*highlight one*):

fully familiar, **not fully familiar but aware**, or unaware, of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)? **No**

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (score in order of desirability - 3 important, 0=irrelevant)

17. **Text record output type (score in order of desirability - 3 =important, 0=irrelevant)**

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 3

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 3

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 1

d. Customised record (information categories self-selected from an available list) 3

e. Index to further published sources (fieldwork reports etc.) 3

f. Copies of full fieldwork reports and other published sources 3 (if 'grey' reports)

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records **1**
- b. Symbol or colour coded distribution plots with key, but not supported by text records **0**
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type **0**
- d. Full feature plans (building elevations, earthwork survey, etc.) **0**
- e. Phase summary plans (interpretative building elevations, etc.) **0**
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) **0**
- g. Raw data plots (geophysical survey, height data, etc.) **0**
- h. Photographs (aerial, feature, artefact, etc.) **0**
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) **0**
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) **0**
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) **0**

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

It would be good if they were on the Internet.

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher B**

2. Institution: -

3. (*highlight one of*) **academic staff** post-graduate student undergraduate student

4. Research Interests:

British prehistory

5. SMRs consulted (*highlight one*): 1 SMR only 2-5 different SMRs 6-10 SMRs **10+ SMRs**

6. What questions have you asked of SMRs ?

Grey literature – unpublished excavations and field survey

7. General level of satisfaction with SMR information output (*highlight one*):
very poor poor adequate good **very good**

8. What types of question would you like to ask of SMRs ?

9. Other comments regarding the use of SMRs:

How the grey literature is stored is variable – separately or within SMR records themselves

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **2**

or focus on a greater depth of information for a narrower range of archaeological subjects?

3

or extensive coverage with selective themes at greater depth? 1

12. Rank in order of importance (1=most important, 2, 3, 4=least important):

classification and terminology control of SMR information conforming to national standards

3

interpretative statements from authoritative sources to support SMR entries 4

interpretation of evidence at a local level using local classification and terminology control

1

ability to use basic SMR information in order to create your own classifications 2

Will the terms used always answer the question? See note at end

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

**Event-monument – excavation/disturbance of archaeological remains .
Archive/source – information(on above) and where gathered and stored**

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Seems to be 'created' terminology, perhaps I didn't understand the previous

15. Are you (*highlight one*):

fully familiar, not fully familiar but aware, or unaware,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

*** Only EH Thesaurus**

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets *

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. **Text record output type** (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 3

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 0

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) 0

- e. Index to further published sources (fieldwork reports etc.) 3
- f. Copies of full fieldwork reports and other published sources 3 –selfishness?

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records 3
- b. Symbol or colour coded distribution plots with key, but not supported by text records 0
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type 3
- d. Full feature plans (building elevations, earthwork survey, etc.) 0
- e. Phase summary plans (interpretative building elevations, etc.) 3
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) 3
- g. Raw data plots (geophysical survey, height data, etc.) 0
- h. Photographs (aerial, feature, artefact, etc.) 3
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) 3
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) 3
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) 3

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

Already convinced that they are essential to thorough research, but they need to give themselves a higher profile to demonstrate their usefulness. I am visiting every SMR in the country!

***As a result of present research I am finding that many prehistoric monuments do not fit the current typology/terminology as set out in EH Thesaurus. Yet without types and terms how can the data be classified? Catch 22?**

Problem of typology/terminology – necessary to catalogue/store/access information

-problem – when I've used various computer databases in SMRs they have not pulled out everything that is relevant (asking questions about the prehistory in the grey literature). As a result, I trawl through all the grey literature if it is stored separately; or through the SMR if it is not!

Problem of dispersed/centralised records: Centralised – less travel for me, greater problems for local enquiries, loss of local expertise and knowledge.

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Research C**

2. Institution: -

3. (*highlight one of*) **academic staff** **post-graduate student** **undergraduate student**

4. Research Interests:

Bronze Age structured landscapes

5. SMRs consulted (*highlight one*): **1 SMR only** 2-5 different SMRs **6-10 SMRs** 10+ SMRs

6. What questions have you asked of SMRs ?

Total printout of BA sites
Field system occurrence in later prehistory

7. General level of satisfaction with SMR information output (*highlight one*):
very poor **poor** **adequate*** good very good

8. What types of question would you like to ask of SMRs ?

1 Ideally vantage points from site
2 Diagrammatic gaps e.g. EBA, MBA, LBA – IA i.e. discontinuity in landscape

9. Other comments regarding the use of SMRs:

Never been my main means of research. Field staff are better. SMR time delay. SMR entry is a summarised entry (subjective) from a mass of data. Site/find specific and it works poorly on landscapes – and especially those regimented land blocks straddling county borders.

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2, 3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **3**

or focus on a greater depth of information for a narrower range of archaeological subjects? **2**

or extensive coverage with selective themes at greater depth? 1

12. Rank in order of importance (1=most important,2,3,4=least important):

classification and terminology control of SMR information conforming to national standards
2

interpretative statements from authoritative sources to support SMR entries 2

interpretation of evidence at a local level using local classification and terminology control
4

ability to use basic SMR information in order to create your own classifications 1

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Discrete events

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Model works against research

15. Are you (*highlight one*):

fully familiar, **not fully familiar but aware**, or unaware,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. **Text record output type** (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 1

b. Partial record (comprising basic information, 5-10 standard information fields – 1or 2 records per A4 sheet) 2

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) 3

e. Index to further published sources (fieldwork reports etc.) 1

f. Copies of full fieldwork reports and other published sources 1

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records **2**
- b. Symbol or colour coded distribution plots with key, but not supported by text records **3**
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type **2**
- d. Full feature plans (building elevations, earthwork survey, etc.) **1**
- e. Phase summary plans (interpretative building elevations, etc.) **1**
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) **1**
- g. Raw data plots (geophysical survey, height data, etc.) **3**
- h. Photographs (aerial, feature, artefact, etc.) **1**
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) **3**
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) **2**
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) **2**

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

Direct access to PC screen to instigate own interrogation. Time to dwell over plotted SMR overlays. Unhurried access to delve into printed extracts of SMR entries, because in researching landscapes this scale of phenomenon is not easily caught in the SMRs.

Ideally, ability to be sent by email an entire file (e.g. all Bronze Age) entries would help.

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher D**

2. Institution: -

3. (*highlight one of*) **academic staff** post-graduate student undergraduate student

4. Research Interests:

Landscape archaeology, geoarchaeology, no period bias. Also Mediterranean.

5. SMRs consulted (*highlight one*): **1 SMR only** 2-5 different SMRs 6-10 SMRs 10+ SMRs

6. What questions have you asked of SMRs ?

All BA sites through undergraduate study.

7. General level of satisfaction with SMR information output (*highlight one*):
very poor poor adequate good **very good (for undergraduate purposes)**

8. What types of question would you like to ask of SMRs ?

For Wolds project – all prehistory within the Wolds.

9. Other comments regarding the use of SMRs:

Include environmental information, landscape character, integrate MAFF data for example.

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **1**

or the primary source of archaeological information for a defined geographic area? **2**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **1**

or focus on a greater depth of information for a narrower range of archaeological subjects? **2**

or extensive coverage with selective themes at greater depth? 3

12. Rank in order of importance (1=*most important*, 2, 3, 4=*least important*):

classification and terminology control of SMR information conforming to national standards
1

interpretative statements from authoritative sources to support SMR entries 2

interpretation of evidence at a local level using local classification and terminology control
3

ability to use basic SMR information in order to create your own classifications 4

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Not conversant with term.

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Not relevant.

15. Are you (*highlight one*):

fully familiar, **not fully familiar but aware**, or unaware,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)? **None**

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. **Text record output type** (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 3

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 2

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) 3

e. Index to further published sources (fieldwork reports etc.) 3

f. Copies of full fieldwork reports and other published sources 1

18. **Mapping** (*score in order of desirability – 3=important, 0=irrelevant*)

- a. Distribution plots (with primary record number) supported by text records 3
- b. Symbol or colour coded distribution plots with key, but not supported by text records 3
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type 3
- d. Full feature plans (building elevations, earthwork survey, etc.) 1
- e. Phase summary plans (interpretative building elevations, etc.) 1
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) 1
- g. Raw data plots (geophysical survey, height data, etc.) 1
- h. Photographs (aerial, feature, artefact, etc.) 1
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) 1
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) 3
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) 3

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

| |
|---------------------------------|
| Accessible via Internet. |
|---------------------------------|

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Research E**

2. Institution: -

3. (*highlight one of*) **academic staff** **post-graduate student** undergraduate student

4. Research Interests:

Prehistoric land divisions in Peterborough and surrounding area.

5. SMRs consulted (*highlight one*): **1 SMR only** **2-5 different SMRs** 6-10 SMRs 10+ SMRs

6. What questions have you asked of SMRs?

Search for palisades pit/post alignments, linear banks and ditches, dykes, multiple banks and ditches and details recorded in SMR

7. General level of satisfaction with SMR information output (*highlight one*):
very poor poor adequate **good** very good

8. What types of question would you like to ask of SMRs?

For archaeological data – the main basis for interpretation e.g. excavation or aerial photos and degree of confidence.

9. Other comments regarding the use of SMRs:

With regard to 'ditches', it would be helpful if these could be categorised by: length, form (e.g. with bank/multiple), association with other features (e.g. field system/enclosure).

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **2**

or focus on a greater depth of information for a narrower range of archaeological subjects?
1

or extensive coverage with selective themes at greater depth? 3

12. Rank in order of importance (1=most important,2,3,4=least important):

classification and terminology control of SMR information conforming to national standards
1

interpretative statements from authoritative sources to support SMR entries 3

interpretation of evidence at a local level using local classification and terminology control
4

ability to use basic SMR information in order to create your own classifications 2

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Event = intervention – excavation/survey/field walking
Monument = archaeological feature – usually visible above ground, but also buried such as Roman villa

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Essential

15. Are you (*highlight one*):

fully familiar, **not fully familiar but aware**, or unaware, of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (score in order of desirability - 3 important, 0=irrelevant)

17. **Text record output type (score in order of desirability - 3 =important, 0=irrelevant)**

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 3

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 3

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 1

d. Customised record (information categories self-selected from an available list) 2

e. Index to further published sources (fieldwork reports etc.) 2

f. Copies of full fieldwork reports and other published sources 2

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records 1**
- b. Symbol or colour coded distribution plots with key, but not supported by text records 1**
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type 2**
- d. Full feature plans (building elevations, earthwork survey, etc.) 1**
- e. Phase summary plans (interpretative building elevations, etc.) 1**
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) 3**
- g. Raw data plots (geophysical survey, height data, etc.) 1**
- h. Photographs (aerial, feature, artefact, etc.) 2**
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) 2**
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) 1**
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) 2**

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

Brief guide on using SMR data software supplied when booking appointment – to help SMR staff

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher F**

2. Institution: -

3. (*highlight one of*) **academic staff** **post-graduate student** **undergraduate student**

4. Research Interests:

Middle Iron Age warfare of the hill fort dominated zone

5. SMRs consulted (*highlight one*): **1 SMR only** **2-5 different SMRs** **6-10 SMRs** **10+ SMRs**

6. What questions have you asked of SMRs?

Locations of hill forts in a given area, excavation information for the same

7. General level of satisfaction with SMR information output (*highlight one*):
very poor **poor** **adequate** **good** **very good**

8. What types of question would you like to ask of SMRs?

Links to more information relating to excavation documents, but in particular who owns a particular monument, as this is one of the most difficult things to find out if I wish to undertake a survey

9. Other comments regarding the use of SMRs:

I have always found the staff who administer the SMRs helpful and the information provided clear.

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **3**

or focus on a greater depth of information for a narrower range of archaeological subjects? **2**

or extensive coverage with selective themes at greater depth? 1

12. Rank in order of importance (1=most important,2,3,4=least important):

classification and terminology control of SMR information conforming to national standards
1

interpretative statements from authoritative sources to support SMR entries 2

interpretation of evidence at a local level using local classification and terminology control
4

ability to use basic SMR information in order to create your own classifications 3

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Nothing

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

N/A

15. Are you (*highlight one*):
fully familiar, not fully familiar but aware, or **unaware**,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument Types in making SMR enquiries /
in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. **Text record output type** (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 1

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 1

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 2

d. Customised record (information categories self-selected from an available list) 3

e. Index to further published sources (fieldwork reports etc.) 3

f. Copies of full fieldwork reports and other published sources 3

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records **1**
- b. Symbol or colour coded distribution plots with key, but not supported by text records **0**
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type **3**
- d. Full feature plans (building elevations, earthwork survey, etc.) **1**
- e. Phase summary plans (interpretative building elevations, etc.) **2**
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) **2**
- g. Raw data plots (geophysical survey, height data, etc.) **0**
- h. Photographs (aerial, feature, artefact, etc.) **2**
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) **1**
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) **1**
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) **2**

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher G**

2. Institution: -

3. (*highlight one of*) **academic staff** **post-graduate student** **undergraduate student**

4. Research Interests:

Mottes of Gwent and south March of Wales

5. SMRs consulted (*highlight one*): **1 SMR only** **2-5 different SMRs** **6-10 SMRs** **10+ SMRs**

6. What questions have you asked of SMRs?

A list was required of all listed motte and baileys within a specified area, and any unclassified mounds or earthworks

7. General level of satisfaction with SMR information output (*highlight one*):
very poor **poor** **adequate** **good** **very good**

8. What types of question would you like to ask of SMRs?

Has a site been actively checked with modern research or has its record just been accepted from past reports?

There is a great deal of difference between SMRs, both with charges and accessibility. More standardisation would be helpful. The NMP is excellent.

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **1**

or focus on a greater depth of information for a narrower range of archaeological subjects? **3**

or extensive coverage with selective themes at greater depth? 3

12. Rank in order of importance (1=most important,2,3,4=least important):

classification and terminology control of SMR information conforming to national standards
1

interpretative statements from authoritative sources to support SMR entries 2

interpretation of evidence at a local level using local classification and terminology control
4

ability to use basic SMR information in order to create your own classifications 3

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Target site of importance

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Relevant

15. Are you (*highlight one*):
fully familiar, **not fully familiar but aware**, or unaware,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries /
in own datasets

English Heritage Thesaurus of Monument Types in making SMR enquiries / in own
datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. **Text record output type** (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 3

b. Partial record (comprising basic information, 5-10 standard information fields – 1or 2 records per A4 sheet) 0

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) 3

e. Index to further published sources (fieldwork reports etc.) 3

f. Copies of full fieldwork reports and other published sources 3

18. Mapping (score in order of desirability – 3=important, 0=irrelevant)

- a. Distribution plots (with primary record number) supported by text records **3**
- b. Symbol or colour coded distribution plots with key, but not supported by text records **0**
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type **3**
- d. Full feature plans (building elevations, earthwork survey, etc.) **3**
- e. Phase summary plans (interpretative building elevations, etc.) **3**
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) **3**
- g. Raw data plots (geophysical survey, height data, etc.) **3**
- h. Photographs (aerial, feature, artefact, etc.) **3**
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) **3**
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) **3**
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) **1**

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

| |
|--|
| <p>Internet available searches with full access</p> |
|--|

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher H**

2. Institution: -

3. *(highlight one of)* **academic staff** post-graduate student undergraduate student

4. Research Interests:

Landscape history

5. SMRs consulted *(highlight one)*: **1 SMR only** 2-5 different SMRs 6-10 SMRs 10+ SMRs

6. What questions have you asked of SMRs?

Recently – information on pillow mounds

7. General level of satisfaction with SMR information output *(highlight one)*:
very poor poor adequate **good** very good

8. What types of question would you like to ask of SMRs?

9. Other comments regarding the use of SMRs:

Very variable: some SMRs provided only very basic data – others full printouts, some even relevant articles from local journals.

Information intensity and standards

10. Should SMRs comprise *(rank in order of preference – 1=preferred, 2=least preferred)*:

a comprehensive basic index to primary information sources for a defined geographic area? **2**

or the primary source of archaeological information for a defined geographic area? **1**

11. Should SMRs seek to provide *(rank in order of preference – 1=preferred, 2,3=least preferred)*:

extensive but 'light' coverage of a broad spectrum of archaeological evidence? **3**

or focus on a greater depth of information for a narrower range of archaeological subjects? **2**

or extensive coverage with selective themes at greater depth? **1**

12. Rank in order of importance (1=*most important*,2,3,4=*least important*):

classification and terminology control of SMR information conforming to national standards
4

interpretative statements from authoritative sources to support SMR entries 2

interpretation of evidence at a local level using local classification and terminology control
3

ability to use basic SMR information in order to create your own classifications 1

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Haven't a clue

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

Don't know

15. Are you (*highlight one*):

fully familiar, **not fully familiar but aware**, or unaware,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

No to all of the above

Preferred SMR output (*score in order of desirability - 3 important, 0=irrelevant*)

17. Text record output type (*score in order of desirability - 3 =important, 0=irrelevant*)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 0

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) -

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) -

e. Index to further published sources (fieldwork reports etc.) 1

f. Copies of full fieldwork reports and other published sources 2

18. Mapping (*score in order of desirability – 3=important, 0=irrelevant*)

- a. Distribution plots (with primary record number) supported by text records 3
- b. Symbol or colour coded distribution plots with key, but not supported by text records 2
- c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type 1
- d. Full feature plans (building elevations, earthwork survey, etc.) 3
- e. Phase summary plans (interpretative building elevations, etc.) 2
- f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) 3
- g. Raw data plots (geophysical survey, height data, etc.) 2
- h. Photographs (aerial, feature, artefact, etc.) 2
- i. Historic maps and plans (OS, estate maps, tithe maps etc.) 2
- j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) 0
- k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) 3

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

| |
|------|
| None |
|------|

RESEARCHER I

[No form. Comments instead]

(i) I have been in touch with 12 SMRs, so I'm in a position to offer a point of view. Obviously my only topic has been that of Roman villas and roads, and perhaps they have different strengths in different areas.

(ii) Of the 12, I would say that 8 were above expectations (Peterborough included) in the sense that they went beyond answering a question, and actually provided me with (map) material. This was done professionally, efficiently, cheerfully, graciously. Of the remaining four, one was useless, one poor, one adequate, and one good (but not very good).

(iii) In the particular context of my research, six could NOT produce a computer-based map that included Roman roads. Taking two of these ([X] and [Y]) as case-studies, this is absurd given that maps featuring Roman roads have been published for these areas for 30 years or more. In the end I had to pay (a [Z] technician) to have roads inserted. Clearly the issue here is that all SMRs do not have the same software (as you know)...and this is daft.

(iv) Some basics were also overlooked (without prompting), including the addition of north points, scales, captions etc.

(v) Clearly the villa databases are all out-of-date. Whilst this owes partly to issues of 'definition', it is equally the case that (a) information is not being kept up-to-date or (b) there is a data backlog. Coming from a background of self-employment (you work all hours that are necessary or go bust...), I find the above an unacceptable situation. It's all too easy for people to make excuses. A vacation job for an MA could sort the problem out in weeks.

(vi) I think SMRs could be more pro-active. Where they get to know that an archaeological report is being written, they could offer to 'help'. Here's an example: Villa reports rarely feature the building in its proper local/regional context. Perhaps a map is included with a few dots...whereas it is possible (see the 1997 book on Great Bedwyn villa in Wiltshire) to place the villa (using SMR data) in the context of other villas, roads and other settlements. This can be taken further (Institute of Archaeology papers 1994: Mehoux) by examining villa sites from a diachronic point of view (as far as evidence permits).

Returning to my point: villas did not operate in social isolation. They should not therefore be discussed in stand-alone terms.

(vii) SMRs might also produce virtual newsletters to keep the 100/200 organisations/individuals in their area(s) up-to-date.

(viii) They could also stage an event (or four a year?) to help communicate the potential of their resource. The more you are used, the better!

(ix) Only one SMR (Leicestershire) produces an overview of the Roman period. All periods should be presented in this way. Again ... a job for specialist MAs? Otherwise none of the information that is given is placed in context.

(x) SMRs should not work in isolation. They should talk to each other, and try to share experience and standards. (I know you know this, but it doesn't happen). They should also be the 'gateway' to archaeology in their respective regions. This should mean .. a project for National Archaeology Weekend (July) .. a list of events on their websites .. a list of key local contacts willing to receive email questions .. and so on. Not everyone pulls down the portcullis and refuses to help others. (Paul Middleton was fantastically helpful to me).

(xi) To sum up, the SMRs are not just a repository of data; they are the face of archaeology for the county. This may mean in future that they employ two types of people: the academic, and the communicator. The expertise may be archaeological, but equally it should be offered by people trained in customer care.

(xii) This then raises the stakes. The end product of an SMR engagement with an outsider has to be evaluated in a more objective way. Questionnaires are inadequate. The real solution is post-use telephone research or even focus groups. Best practice (using American equivalents?) should be the goal. An annual 'SMR of the Year' Award would stimulate competition. SMRs are not libraries by another name .. they are mediums by which attitudes to archaeology can be monitored and improved.

ACADEMIC SMR USE - INTERVIEW QUESTIONNAIRE

General background

1. Name: **Researcher J** 2. Institution: -
3. (*highlight one of*) academic staff post-graduate student undergraduate student

4. Research Interests:

Doctoral research into modes of movement and mobility within neolithic and Bronze Age river valleys.

5. SMRs consulted (*highlight one*): 1 SMR only 2-5 different SMRs 6-10 SMRs 10+ SMRs

6. What questions have you asked of SMRs?

The location of neolithic – Bronze Age sites and monuments. Details of each of these sites/monuments.

7. General level of satisfaction with SMR information output (*highlight one*):
very poor poor adequate good very good

8. What types of question would you like to ask of SMRs?

Is it possible to ask query more thematically? E.g. Data on Bronze Age field systems, or neolithic finds from rivers. 'Thematic' queries can be difficult.

9. Other comments regarding the use of SMRs:

In some SMRs it is difficult to get a picture of site distributions when they are only depicted on a computer screen. The availability of maps/plans should be greater. Printouts of sites are helpful, but only take the research so far.

Information intensity and standards

10. Should SMRs comprise (*rank in order of preference – 1=preferred, 2=least preferred*):

a comprehensive basic index to primary information sources for a defined geographic area? 2

or the primary source of archaeological information for a defined geographic area? 1

11. Should SMRs seek to provide (*rank in order of preference – 1=preferred, 2,3=least preferred*):

extensive but 'light' coverage of a broad spectrum of archaeological evidence? 3

or focus on a greater depth of information for a narrower range of archaeological subjects? 2

or extensive coverage with selective themes at greater depth? 1

12. Rank in order of importance (1=most important,2,3,4=least important):

classification and terminology control of SMR information conforming to national standards
4

interpretative statements from authoritative sources to support SMR entries 1

interpretation of evidence at a local level using local classification and terminology control
3

ability to use basic SMR information in order to create your own classifications 2

13. What do you understand by the term 'event-monument-archive/source' as applied to SMR datasets ?

Have no idea!

14. Is SMR compliance with this model essential, relevant, or not relevant to your SMR enquiries?

?

15. Are you (*highlight one*):
fully familiar, not fully familiar but aware, or **unaware**,
of the RCHME/EH Monument Inventory Data Standard (MIDAS)?

16. Do you make use of any of the following (*highlight as appropriate*)?

MDA Archaeological Objects Thesaurus in making SMR enquiries / in own datasets

English Heritage Thesaurus of Monument types in making SMR enquiries / in own datasets

INSCRIPTION in making SMR enquiries / in own datasets

Other thesauri (please name them) in making SMR enquiries / in own datasets

No [to all]

Whilst classification of sites is essential for SMRs, in my own research I feel that 'classifications'/'types' etc. can be somewhat misleading and generalising.

Preferred SMR output (score in order of desirability - 3 important, 0=irrelevant)

17. Text record output type (score in order of desirability - 3 =important, 0=irrelevant)

a. Summary list (comprising very basic information only – 5 standard information fields or fewer, several records per A4 sheet) 1

b. Partial record (comprising basic information, 5-10 standard information fields – 1 or 2 records per A4 sheet) 1

c. Full record (comprising all information 25+ standard fields of information – several A4 sheets per record) 3

d. Customised record (information categories self-selected from an available list) 3

- e. Index to further published sources (fieldwork reports etc.) 3
- f. Copies of full fieldwork reports and other published sources 3
- 18. Mapping (score in order of desirability – 3=important, 0=irrelevant)**
 - a. Distribution plots (with primary record number) supported by text records 3
 - b. Symbol or colour coded distribution plots with key, but not supported by text records 3
 - c. Distribution plots identified by PRN and supported by text records, and coded according to evidence type 3
 - d. Full feature plans (building elevations, earthwork survey, etc.) 3
 - e. Phase summary plans (interpretative building elevations, etc.) 3
 - f. Interpretative plots (geophysical survey, geochemical survey, air photograph survey, etc.) 3
 - g. Raw data plots (geophysical survey, height data, etc.) 3
 - h. Photographs (aerial, feature, artefact, etc.) 3
 - i. Historic maps and plans (OS, estate maps, tithe maps etc.) 3
 - j. Landscape character interpretation mapping (ancient or modern land form and use mapping – formal enclosure, meadow, piecemeal enclosure, woodland, heath, leisure, military, industrial, etc.) 1
 - k. Customised mapping (interpretations self-mapped from evidence supplied by SMR searches, exact form of mapping dictated by user) 1

Miscellaneous

19. Please state any factors that would increase significantly your use of SMRs.

At the moment I feel that digital records are a bit too inflexible – you are at the mercy of who has entered the data. This can be rigidly classified so that not all records can be found. I would use SMR data a lot more if it was available over the Web. Such as a central database which could be accessed by all academic institutions.

APPENDIX 5 – AN SMR RESEARCH ENQUIRY CASE STUDY

A.5.1 A research question: Bronze Age enclosure in the Nene and Welland Valleys

The survey of research users' experience of SMR use raised many important issues, both for the delivery of Historic Environment Record information through traditional (hybrid manual-digital services) and fully digital remote services. Of these issues, the character of the assistance provided by HER staff to researchers, the methods used to gather information, and the compatibility of information from different HERs, now require further exploration.

Researcher C (Chapter 4; Appendix 4) made specific observations about the suitability of SMRs to answer research questions that required a view of 'landscape scale' information, as opposed to discrete monument information. He also drew attention to the difficulty of matching information across SMRs' administrative boundaries. In order to test in detail the ability of two neighbouring HERs to support landscape modelling, an enquiry has been posed in the general spirit of Researcher C's research. The chosen records are Northamptonshire and Peterborough SMRs. The use profile (with regard to external users) of both SMRs has been examined in Chapter 2 (Appendix 1).

Huge areas of Bronze Age ditched enclosed land have been identified recently along the valleys of the rivers Welland, Nene, and Ouse, and along the prehistoric fen edge of Lincolnshire, Peterborough, and Cambridgeshire. Similar landscapes have been noted along the Stour in Essex and in the Thames Valley west of London (Pryor 2001a, 419). Large scale excavations over the last decade or so, usually in advance of mineral quarrying, has allowed the character of these blocks of enclosed landscape to be explored in some detail. The model for second millennium BC lowland enclosure and settlement provided by Francis Pryor's seminal excavations at Fengate during the 1970s (Pryor 1980; Pryor 1984) may now be re-examined in the context of a large amount of comparable regional evidence.

One notable observation made of the Fengate enclosed landscape, also now noted elsewhere, is the probable presence of various marker features that predate the creation of ditched field boundaries (Evans & Pryor 2001, 17; Pryor 2001a, 407-408; *ibid* 418-420). One interpretation of this evidence is that land units had been defined, marked out and maintained, long before their expression in many kilometres of field ditch excavated during the Bronze Age.

The suggested marker features are often funerary monuments, either small pits containing cremated human remains or round barrows. The location of these funerary monuments may have been a reflection of early kin group territorial boundaries. The possible relationship between funerary monuments and field systems has been used to reinforce interpretations of the interwoven nature of prehistoric religious and spiritual activity within everyday agricultural and economic endeavour.

Comparisons of the Fengate enclosed Bronze Age landscape with that excavated at Stanwick in Northamptonshire have been made by other authors several years ago (Parry undat). Both sites are within the Nene Valley, but are around 30 kilometres apart and within different SMR administrative areas. Are they in fact isolated or part of a more extensive system that extends along the river valley? Using SMR information, can we identify comparable Bronze Age landscapes along the Nene Valley between Fengate and Stanwick? Comparable Bronze Age landscapes also have been investigated around the River Welland's 'delta' junction with the fens, east of Stamford. Do these extend westwards along the Welland Valley into Northamptonshire? Within these enclosed landscapes, how widespread is the coincidence of barrow monuments with the alignment of the main axis of ditches? Can we prove a regional model for the progression of Bronze Age territorial markers from barrows to the field ditches of extensive field systems?

A.5.2 A comparison of search methods

Peterborough SMR

A Boolean search of the Peterborough SMR database under the general period 'Bronze Age' AND monument type 'field system', produced 16 relevant database entries. Of these, 4 also contained a mention of some kind of association with barrows or ring ditches within their free text description field. This is a good starting point, but the net must be cast wider to be sure of obtaining all possible examples.

Clearly, there might be some field systems that could well be Bronze Age, but for which no emphatic dating evidence has yet been forthcoming. A search of the database for field systems that have been assigned a general prehistoric date

(general period 'prehistoric' AND monument type 'field system') produced 4 database entries, none of which contained incidental references to associated barrows or ring ditches. A search for undated (period = 'unknown') field systems produced 41 records, 3 of which also contained incidental references to ring ditches or barrows.

Another factor to consider in framing a search for 'field systems' is that the fragmentary remains of field systems may have been recognised and recorded only as individual elements - 'ditch', 'trackway', 'boundary feature', etc. Smaller field units may have been indexed under the monument type 'enclosure'. There are no set dimensions to help record compilers distinguish between an enclosed field and an enclosure. To be truly inclusive, and to spot the significance of evidence that has not been fully appreciated by the record compilers, the researcher has to think wider than the immediately obvious search terms.

An alternative strategy for this question is to focus first on the occurrence of Bronze Age barrows. A Boolean search (monument type = 'barrow' AND period = 'Bronze Age') produced 52 records, of which 2 also made references to possibly associated field system evidence within the free text description field. However, some probable barrows, known only as crop marks, are likely to be indexed only under the term 'ring ditch'. A search for the monument type 'ring ditch' produced 254 records from the Peterborough SMR. In many cases, especially where the ring ditch is known only from aerial photographs, the diameter of the ring ditch has been recorded in the free text description field. This helped to discriminate many ring ditches that were more likely to be associated with prehistoric houses (usually less than 10m in circumference) and hengiform monuments (often more than 40m in circumference) than with round barrows. Recording dimensions of monuments is not a standard part of the MIDAS scheme (Chapter 5, section 5.2; RCHME 1998a).

The text database records for undated field systems, ring ditches, etc. pointed towards areas of the SMR's crop mark overlay map that might repay examination. Some crop mark information is captured as a series of film overlays and some as a digital (vector element) layer in the SMR's Geographic Information System. In fact, given the relatively compact area of Peterborough's SMR coverage, it did not take much time to look over the entirety of both sources.

The GIS permits the results of Boolean searches to be plotted as a distribution map. The spatial association between barrows (and possible barrows) and field systems (and possible field systems) plotted as crop marks was checked in this way.

In summary, the searches of Peterborough SMR described above, followed by the examination of grey literature reports and aerial evidence plots referenced by the SMR database entries, produced 6 good examples of field systems that appear to be aligned on Bronze Age round barrows. A selection of these is reproduced below (Figures 56-58).

Northamptonshire SMR

An appointment was booked to visit Northamptonshire SMR, and the nature of the research enquiry explained to the SMR Officer. In advance of the visit, the SMR Officer was able to email a copy of the East Midlands Research Framework resource assessment statement for Northamptonshire's neolithic and Bronze Age (Chapman undat.). This provided a very useful overview of the known archaeology of period on a thematic basis. It also provided a short gazetteer with brief descriptions and references to key sites. Site grid references were given, but there were no references to SMR entry numbers. These would have been helpful in order to ensure confidence in correlating SMR entries with the sites discussed in the Research Framework. It is Northamptonshire SMR's practice to forward in advance of SMR visits the relevant Research Framework statements to researchers who might benefit from them.

The research framework statement did not discuss the relationship between Bronze Age funerary monuments and land divisions, suggesting that this was a research topic that had not been thoroughly investigated and published previously in the area (Chapman undat.). This helped to confirm that it was a worthwhile research question.

The SMR Officer was also able to email the results of a search for monuments indexed under the general Bronze Age date range within northeast Northamptonshire. This was in the form of a Word text file exported by ExeGesIS HBSMR , together with a GIS point-based distribution plot that also showed the area of search, parish boundaries, river courses, and shading for basic terrain form.

The text file of exported records amounted to 149 A4 pages, which represented around 140 SMR database entries. Only a few records occupied more than one page.

Of the 140 records captured by the search for Bronze Age evidence, only around 70 records actually referred to Bronze Age sites. Of these, 5 referred to flint scatters or other evidence irrelevant to the theme of the research. The remaining records (around 70) referred to evidence generally dated to the prehistoric period or to the Iron Age, which could be discounted immediately. These records were returned by the database search because of the overlap of the default period date ranges suggested by the Monument Inventory Data Standard and employed by HBSMR. The Bronze Age is considered to date between 2,500 BC and 700 BC. The Iron Age is defined to begin in 800 BC and end in 43 AD (RCHME 1998a, 103). This means that a search carried out for records that fall within the suggested Bronze Age date span will also select all Iron Age entries (that have been recorded under the suggested full Iron Age time span) and any entries recorded under a general prehistoric date (500,000 BC to 42 AD).

All but a handful of the Bronze Age records were for barrows or possible barrows. There were no records that referred to Bronze Age field systems. A few records that referred to barrows also included incidental references to associated features such as a 'rectilinear enclosure', 'linear features', 'linear ditches', a 'ditch', and a 'short length of ditch', that sounded promising as possible associated field system evidence. A few more records were thought to be of special interest because they referred to controlled excavations of barrows. It was thought that excavation plans might provide hitherto unrecognised evidence for associated Bronze Age linear features. Eleven records were selected as a priority for further detailed investigation.

The sources to which these 11 database records referred were requested during the visit to the SMR offices. They comprised aerial photographs, aerial evidence plots produced by the National Mapping Programme, a geophysical survey report, a development-led excavation report ('grey literature'), information published in the RCHME inventory volumes, and reports and notes published in local journals.

Examination of these sources produced no unequivocal firmly dated examples of field systems orientated on barrows of the type noted around Peterborough.

However, the database entry for SMR number 7032/1/1 pointed to the published report for the excavation of a barrow at Tansor, alongside which two short lengths of ditch were recorded (Figure 59). These could not be closely dated, but were cut by medieval furrows, contained some worked flint, and were filled by soil similar in character to that of the barrow ditch. The author suggested they could be part of “a boundary system which respected the location of the prehistoric mounds”, but also noted the very large time span during which they could have been dug (Chapman 1998, 33).

SMR numbers 2588/1/1, 2644/0/1, and 2672/1/1 referenced crop mark plots that were suggestive of ploughed down barrows in proximity to boundary features. Confirmation could be provided only by excavation.

It had been noted during the search that past recording practice had meant that possible barrows (those with no emphatic dating evidence or association with human remains) were as likely to be recorded under the monument type ‘ring ditch’ as ‘barrow’. No distinctions had been made between other ring ditches and possible round barrow ditches on the basis of ring ditch diameter alone, although like Peterborough SMR, a diameter often had been recorded within the free-text ‘description’ field.

It was decided to augment the search by examining crop mark evidence. Scrutiny of those crop mark plots reproduced in the RCHME archaeological inventory for North-East Northamptonshire (RCHME 1975), led to the discovery of a handful of further possible examples of probable round barrows associated with field system elements (Figures 60-62). In addition, the SMR Officer was able to email a geo-referenced DXF (vector graphic) file of the recent English Heritage National Mapping Programme crop mark plot for north east Northamptonshire. This was examined visually using a Geographic Information System as a simple viewer. Further possible examples were noted, although again there was no corroborating excavated evidence for these sites.

A.5.3 Summary

A selection of figures from the sources revealed by the SMR searches is reproduced below. The gathering of information for this case study was greatly assisted by the availability of much of the core data in digital form. This also meant that time spent in the respective SMR offices, drawing on the assistance of

SMR Officers, was reduced greatly. Visits were still required, however, to examine source materials such as grey literature reports and aerial photographs. Scrutiny of the data was made a little cumbersome by the differing data formats and recording practices adopted by both SMRs. Nevertheless, record structures were closely enough related to allow the meaningful comparison of information. Both SMRs were able to provide, relatively rapidly, a wealth of information about archaeological sites across the two administrative areas that could not be matched by other sources. It was possible to select sites that met the research question model, or that probably met the model, or possibly met the model, but this required some thought about how to frame relevant searches that could be answered by the two data sets.

It is now possible to say that there is an absence of definitely dated Bronze Age field systems between the Peterborough fens and the Stanwick area. The clustering of dated field systems along the fen edge and lower (eastern) reaches of the River Nene and Welland is marked. This, however, is partly a reflection of the extent of archaeological excavations carried out in advance of gravel extraction and development in these areas. There are a few examples of undated field systems that may in fact prove to be Bronze Age in date in both northeast Northamptonshire and Peterborough. Only fieldwork could establish their origin emphatically.

There is a distinct group of field systems of regular rectilinear shape that appear to be orientated on round barrows. This group does not extend west of the prehistoric fen edge into Northamptonshire. There are, however, examples of more irregular (as yet undated) field systems across northeast Northamptonshire that may well be orientated on round barrows.

In conclusion, there appears to be tradition of regular rectilinear ditched enclosure using barrows as markers along the fen edge that does not extend greatly 'inland' along the Nene and Welland river valleys. However, several sites have been identified that would repay fieldwork in order to resolve their date. The research question could be tested further by either proactive fieldwork at a small selection of sites, or by flagging it up as a research aim for development-led investigations.

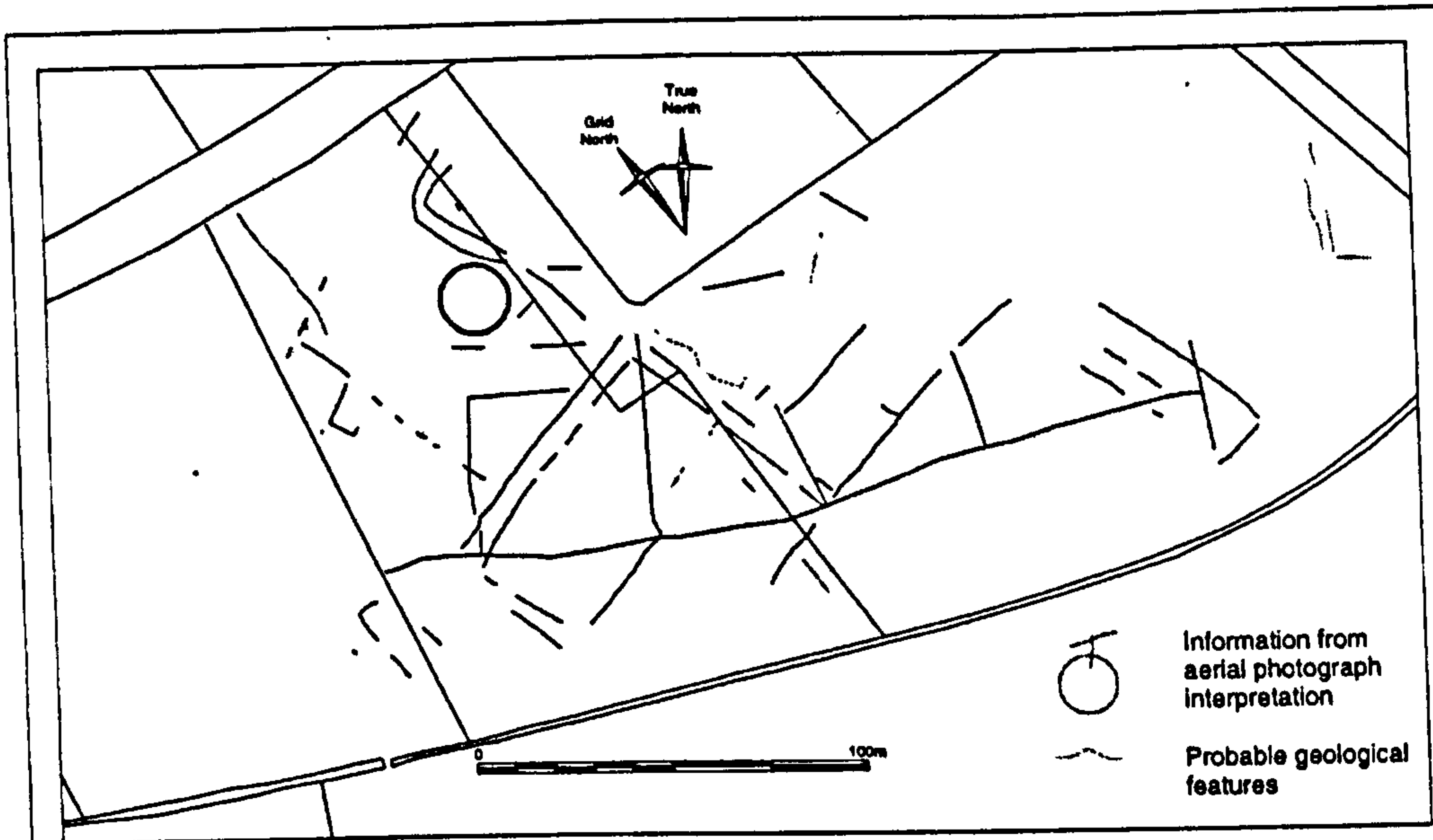


Figure 2 Aerial Photograph Information

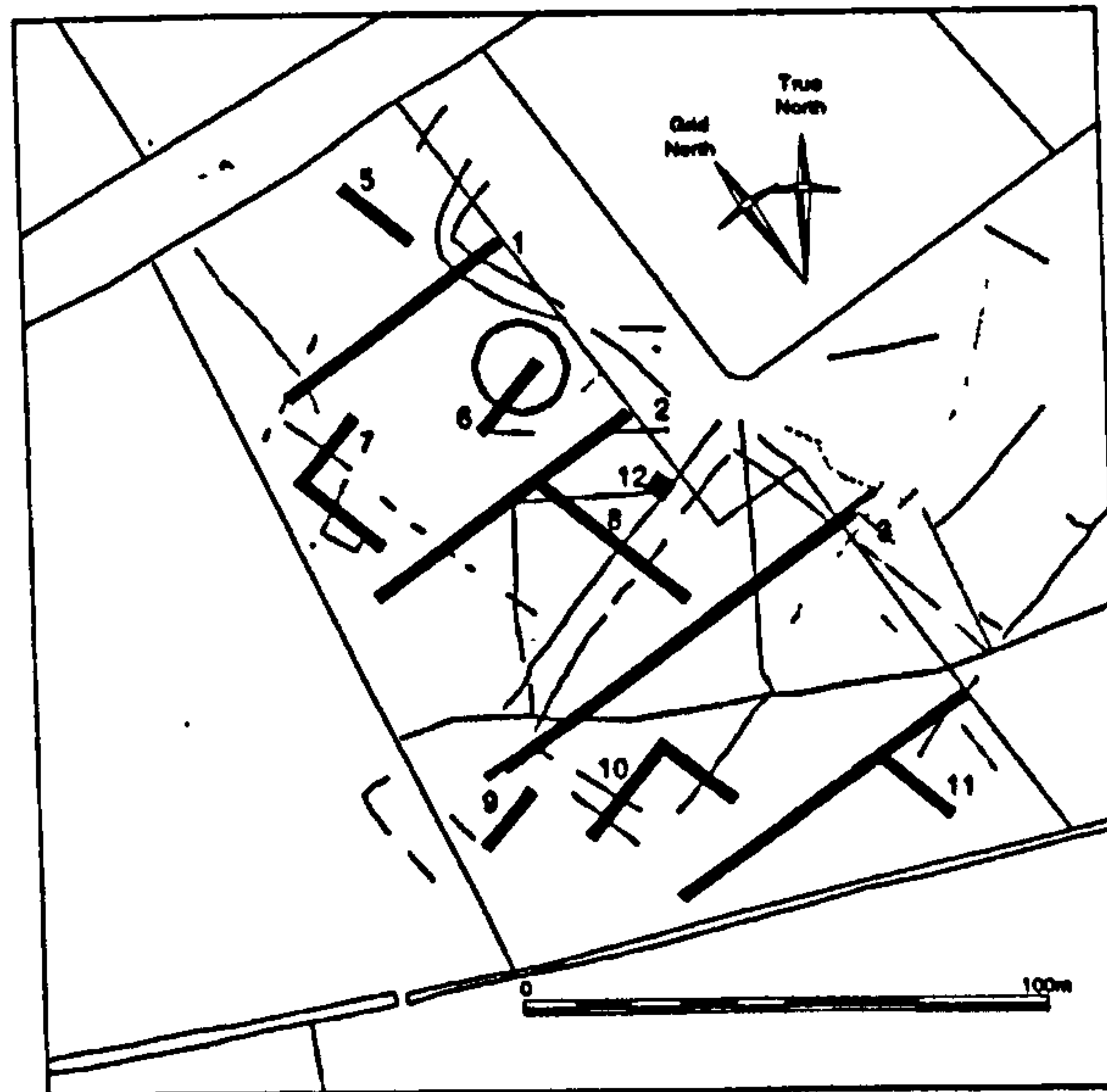


Figure 3 Trenches in Relation to Cropmarks

Figure 56. Crop mark plot and trench plan showing a barrow ring ditch and ditched enclosures. This figure is contained within an evaluation report indexed under Peterborough SMR record number 11419. After Evans 1992c.

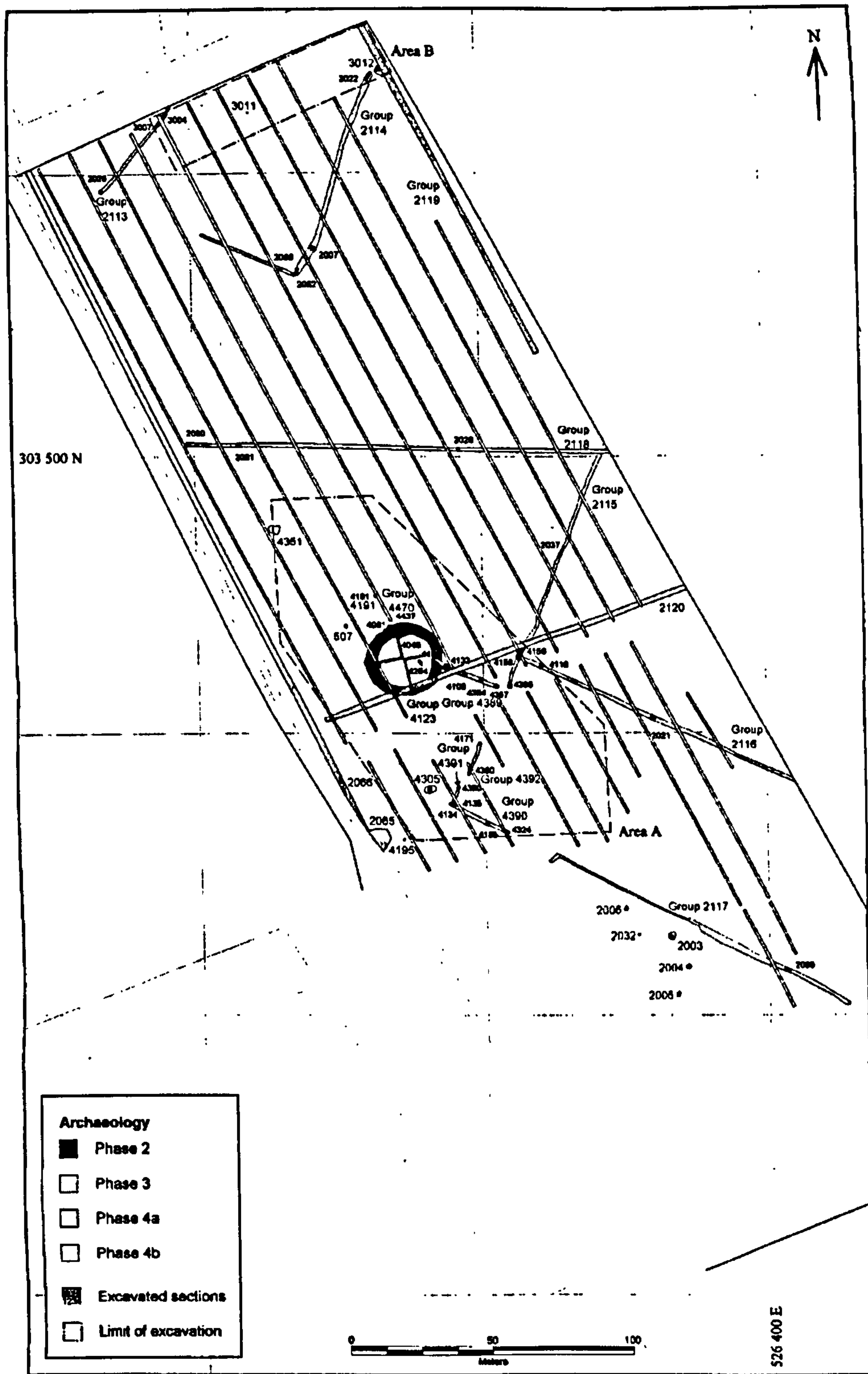


Figure 57. Site plan from an excavation report showing a barrow ring ditch and ditched enclosures. The excavation report is indexed under Peterborough SMR 51203. After Network Archaeology 2002.



Figure 58. Crop mark plot showing a ring ditch and ditched enclosures. The crop mark plot is indexed under Peterborough SMR 50518. Original in colour.

Figure 59. Excavation plan showing ring ditches and possible field system ditches. The plan is from an article indexed under Northants SMR 267102. After Chapman 1929.

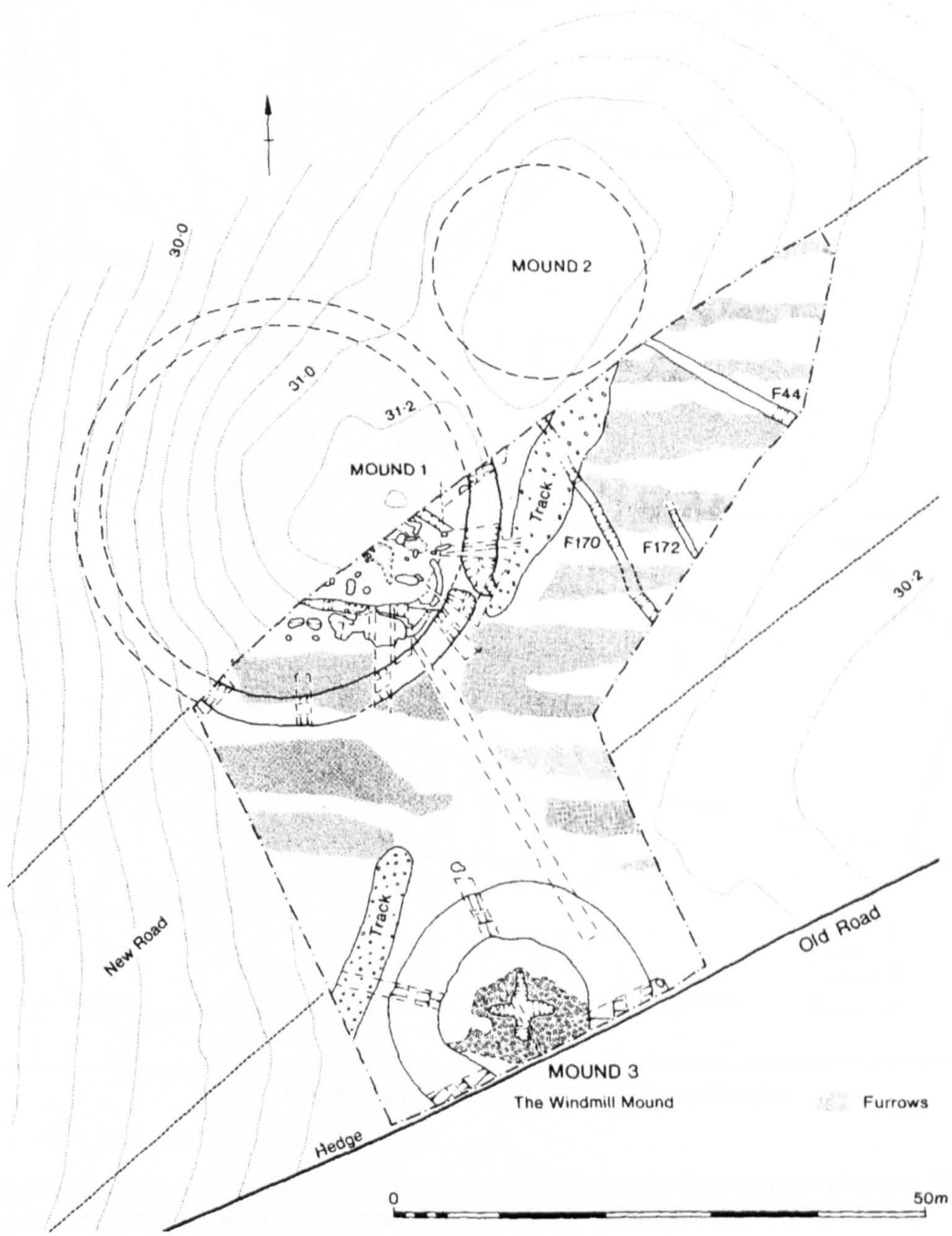


Fig 2 The excavated area, general plan

Figure 59. Excavation plan showing ring ditches and possible field system ditches. The plan is from an article indexed under Northants SMR 2671/0/2. After Chapman 1998.



Fig. 114 WARMINGTON (6-14) North Warmington Complex

Figure 60. Crop marks, including ring ditches and possible field system ditches. The crop marks are indexed under Northants SMR 2588/1/1. After RCHME 1975.

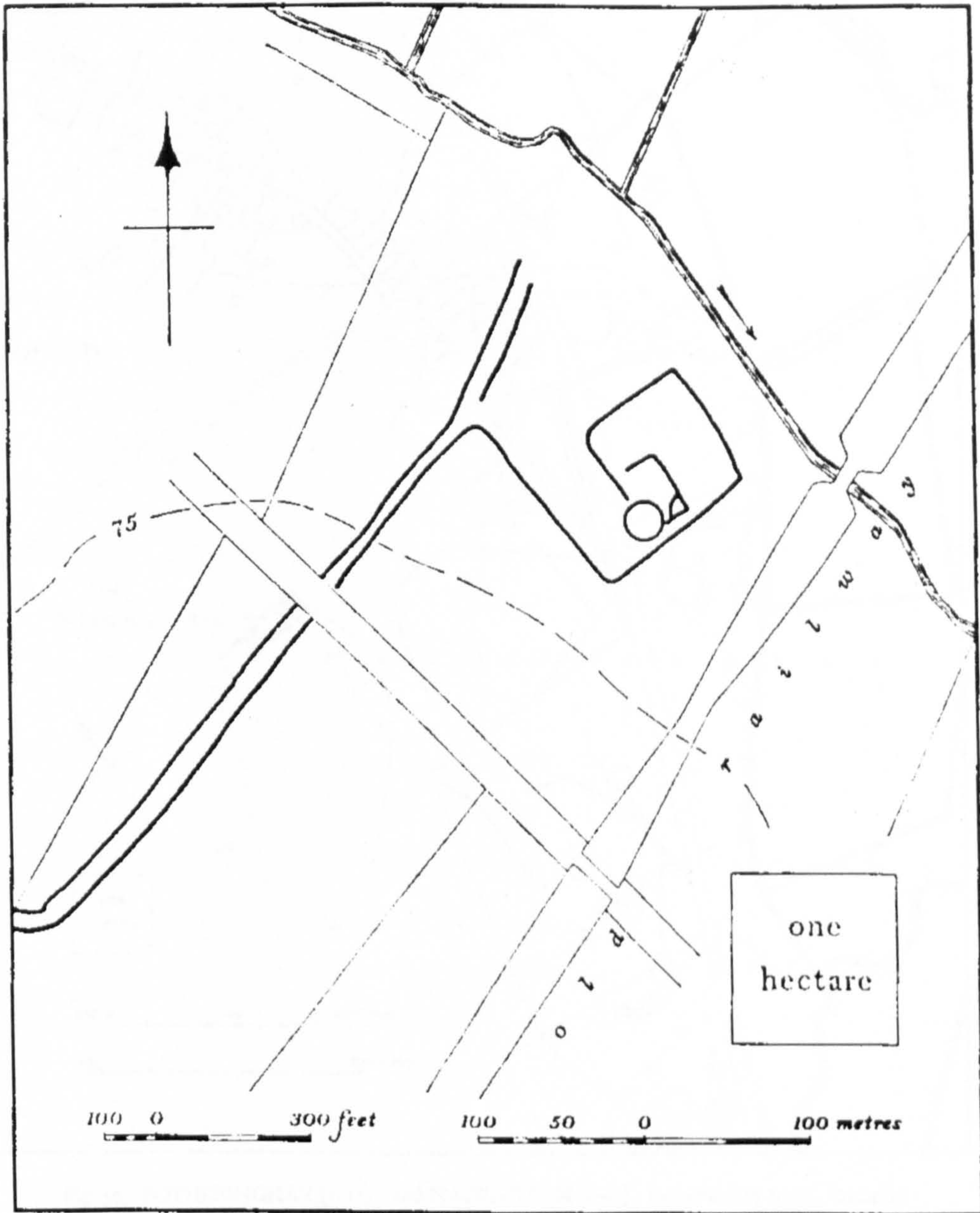


Fig. 113 WARMINGTON (5) Crop-marks

Figure 61. Crop mark plot showing a ring ditch and ditched enclosure. After RCHME 1975.

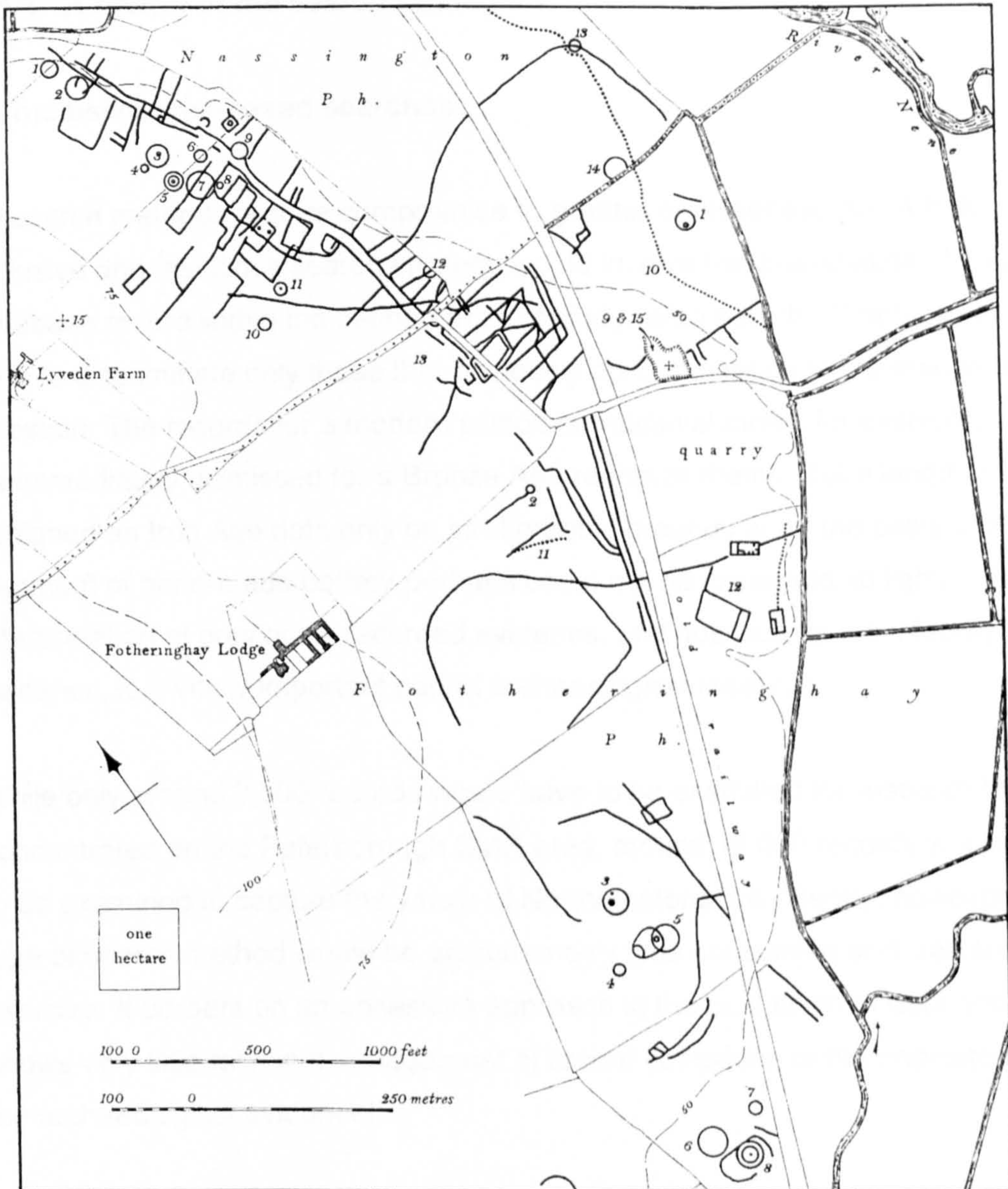


Fig. 50 FOTHERINGHAY (1-15) and NASSINGTON (1-15) Fotheringhay Lodge Complex

Figure 62. Crop mark plot showing several ring ditches and boundary ditches. After RCHME 1975.

A.5.4 A review of the search strategies

All inclusive area-based searches

All search methods require compromise to greater or lesser extents. A truly inclusive and fastidious search strategy would involve the examination of each database record within the defined area of study (*area search*, Chapter 2) and then to discriminate only those that obviously could not relate to the research question. The records for a modern pillbox or medieval motte, for example, could be immediately dismissed for a Bronze Age research theme. But a length of ditch assigned an Iron Age date only on stratigraphic grounds or on the basis of a fragment of hand-made pottery perhaps could not be dismissed so lightly. Re-interpretation of previously recorded evidence, and questioning the integrity of the evidence, is a vitally important part of archaeological research.

While only around 3,500 records would have to be examined for research that concentrated on the Peterborough SMR area, around 15,000 records would have to be examined to capture the whole of Northamptonshire. Clearly, however, this type of search method would be an immensely time consuming and wasteful exercise. It borders on an obsessive approach to the evaluation of data and shows very little faith in the judgement of record compilers, or the originators of the archaeological evidence!

Many SMR services that still rely on paper output are reluctant to supply huge quantities of information for one search, sometimes specifying a maximum number of records or pages of printout a user can request in one go. Several online HER facilities allow area based searches in various formats but some systems, such as *Unlocking Essex's Past*, also put a limit on the number of records that may be viewed at one time (Chapter 5; Appendix 8, section A.8.6). Other systems provide warnings that a request for too many records will result in an extremely slow response (for example, *Pastscape*, Chapter 5; Appendix 8, section A.8.8).

Many of the advantages offered by digital database systems over paper records are lost under search regimes that require the user to manually scan and filter out a small number of relevant records from a large number of irrelevant records.

Period search

In the case study above, a simple search for records indexed under the general period term 'Bronze Age' (or within the recommended Bronze Age time span), resulted in a more manageable selection. Both the 'Period' field (broad and/or narrow terms) and 'Minimum Date' and 'Maximum Date' are mandatory under MIDAS compliant data schemes (Lee 1998, 43). The term 'Bronze Age' is an accepted standard general period index term, but searches across many different HERs may also have to consider alternative ways of describing Bronze Age evidence, such as the non-preferred terms 'Beaker Culture', 'Wessex Culture', 'Devernal Rimbury Culture', etc.

A total of around 140 records within northeast Northamptonshire and 259 Peterborough SMR records were returned under a search for Bronze Age evidence. The results of filtering out the relevant records from the Northamptonshire SMR have been described above. Of the Peterborough records, 67 'Bronze Age' records concerned a 'stray find' (single artefact finds), a category of data that may not contribute much to research aims. 36 records concerned a 'finds scatter' (surface artefact scatter) which only in some cases possibly could be more relevant to the research theme,

Interestingly, by comparison the Unlocking Essex's Past system (Appendix 8, section A.8.6) does not allow searches solely on the 'period' field without further qualification, presumably because of the large number of records involved. Searching for the phrase 'Bronze Age' in any field (simple search) produces 84 records, of which a large percentage do not actually relate to the Bronze Age. Combining this search with a search for 'bronze age' period records (Find Phrase = 'bronze age' AND Period = 'bronze age') produced only 46 records.

In summary, the simple period search provides the widest sample of evidence within the relevant period span. The results encourage the user to consider associated and contextual data for evidence of similar date that may also be helpful to the aims of research.

This search method, however, can produce a large number of irrelevant records. Furthermore, the search does not retrieve records that might be relevant, but for which previous interpretation did not permit recording under a Bronze Age date.

For example, undated ring ditches and mounds characteristic of barrows (but not catalogued as such due to lack of supporting evidence), undated field systems that align with confirmed Bronze Age examples, etc. The search does not pick up associated evidence that may help to 'bracket' or provide a chronological context for field system development. This would require separate searches for neolithic and Iron Age evidence. A single period search may, therefore, reinforce artificial perceptions of discontinuity between periods. Period divisions, after all, are merely modern concepts designed to assist classification of evidence.

Monument Type search

This search involves the selection of records on the basis of the record compiler's interpretation of their conformity to monument types defined, for example, by the scope notes of the English Heritage NMR Monument Type Thesaurus (formerly Royal Commission on the Historic Monuments of England Thesaurus of Monument Types – RCHME 1998b).

It requires searches for the terms 'field system', 'aggregate field system', 'celtic field system', 'coaxial field system', 'enclosed field system', 'open field system' (NMR Monument Type Thesaurus) all of which may be picked up by a search for the floating phrase 'field system' within the Monument Type data field.

81 'field system' records were returned from the Peterborough SMR database for this type of search, of which 41 examples were of unknown date. 37 of these were known only from crop mark plots.

By comparison, a search for the phrase 'field system' within the 'Monument Type' field produced 138 records from the Unlocking Essex's Past database. A search of the Archaeology Data Service catalogue (advanced search for 'field system' within the 'What' [subject] field) produced 2,665 records (Chapter 5; Appendix 8, section A.8.4).

In summary, this search method does not discriminate undated evidence, and therefore may assist the examination of continuity across general period boundaries. It may lead the user to suggest certain hitherto undated field systems conform to known Bronze Age landscape structures and alignments. Such information, if fed back to the HER, may improve the quality of HER data, or suggest different approaches to management, planning advice, and fieldwork.

The search does result in a very wide selection of field systems across a large time span. At the same time, it is restrictive in that associated evidence for formal fields is not presented. Closely related terms, such as 'cairnfield', 'clearance cairn', 'linear clearance cairn', 'cultivation marks', 'plough marks', 'ard marks', 'cultivation terrace', 'lynchet', 'strip lynchet', 'field' (English Heritage NMR Monument Type Thesaurus), could provide important additional information. Other terms, such as 'field' and 'enclosure', 'ditch', 'track', etc. also may provide relevant associated information.

Monument Type AND Period

This search method combines the two simple searches described above. It requires searches for the above terms within the 'Monument Type' combined with a Boolean 'AND' search on the 'Period' field. Capturing the related, associated, or alternative terms ('Beaker', 'enclosure', etc.) described above will require the search to be augmented by Boolean logic 'OR' selections, and a simple search rule to be constructed.

The search returned 16 relevant records from the Peterborough SMR database, and none from northeast Northamptonshire. By comparison, a search through Unlocking Essex's Past (Find Phrase = 'field system' AND Period = 'Bronze Age') returned 77 records. Although this result included many non-Bronze Age records. A search of the ADS catalogue ('What' search on field system AND 'When' search on 'bronze age') produced 289 records.

Clearly this type of search refines the selection of relevant records considerably. However, the narrowness of definition of the search is compounded by the Boolean 'AND', unless the mechanisms to interpret the broader remit of the search are also built in to the search rule.

Northamptonshire SMR, Peterborough SMR, Unlocking Essex's Past, and the ADS database record structures, allow multiple monument types under the same field name and several broad period types under the same field name. In fact, this is also a feature of the Dublin Core metadata standard, and all hierarchical rather than relational database schemes. This means that the search will return records that have a 'Bronze Age' component and a 'field system' component, but not necessarily a 'Bronze Age field system' component. For example, a single

metadata record could describe an excavation that revealed a Roman [field system], which cut across a [Bronze Age] barrow cemetery. This is obviously not a Bronze Age field system.

A.5.5 Conclusions

The 'Monument Type AND Period' search is clearly the one that approximates the original theme of the case study enquiry most closely. However, because of the flat record structure adopted by database metadata records and the decisions often taken by the record compilers to 'lump' site information (Chapter 1, section 1.3) records are often returned that do not exactly conform to the spirit of the simple Boolean logic criteria. The relevance of the search results and efficiency of the search would be improved by the segregation of multiple evidence and period types into separate metadata records. This suggests that a relational event-monument-source model should be adopted fully in metadata schemes. Alternatively, it would be helpful to assign a period attribute to each monument type (see Appendix 11 for an example of OASIS metadata).

The 'Monument Type AND Period' search option, though approximating the theme of the research enquiry, is also inherently restrictive. Only those records that have been interpreted by the record compilers as representing 'field systems' are returned. No pointers are provided to the existence of data that may or may not represent elements of 'field systems' but that have not been recognised as such. For example, various boundary features, trackways, large enclosures, etc. The user is not alerted to the presence of other data that may help provide a context for the search results or that suggest other avenues of research. For example, the relationship between structured landscapes and monumental elements such as barrows.

In summary, when using a HER database, the user must accurately employ a wide range of search terms to ensure that they receive comprehensive results. Ideally, the search should not only identify specific examples of the evidence required, but should also allow for the consideration of fragmentary evidence and evidence not previously interpreted as emphatically associated with the topic in question. It is this kind of archaeological interpretation that pushes archaeological research forward, rather than simply repeating commonly held assumptions.

It cannot be assumed that research users are familiar enough with record structures and terminology sets in order to search for and retrieve all the information they might require. In fact, it should be assumed that users have a generally low level of understanding of record structures and monument terminology (Chapter 3; Chapter 4; Appendix 4).

APPENDIX 6 – A METHODOICAL APPROACH TO RESEARCH ENQUIRIES

A METHODOICAL APPROACH TO RESEARCH ENQUIRIES

This guidance has been written for a typical HER, one for which online search facilities do not yet exist, or offer only limited access to database entries. It assumes that the HER's core database is able to export digital record information in one of the common formats (for example, as a 'Word' document, 'TXT' text file, or 'RTF' rich text file, 'CSV' file, 'Excel' table, or 'Access' database), or that paper records can be printed and mailed. It also assumes that researchers are able to book a visit to the HER to examine grey literature and other sources.

As a minimum level of service, HERs should be able to provide visiting researchers with access (supervised or unsupervised) to a computer terminal that provides look-up facilities to the core HER database, and access to a grey literature library. Preferably, any associated documentation such as aerial photographs and earthwork surveys, etc. that is held by the HER should be readily available when requested. There should be allocated desk space, preferably large enough to spread out maps, away from general office distractions.

HERs should provide as much general information as possible about the facilities on offer in a proactive manner, preferably using Web pages or leaflets.

Information regarding the scope of the HER, the main thesauri used to compile records, types of searches available, search fees, quality and depth of information, anticipated search turn-around time, copyright restrictions, etc., will help the researcher to make informed decisions about their use of the HER services before they contact HER staff. Contextual reference material, such as thematic essays, resources assessments and research agendas should be freely available.

The following are the suggested steps to answering a research enquiry.

- 1. Record user's contact details** (address, organisation or institution name if applicable, phone, email address) for return correspondence.
- 2. Record user's background.** This is for administrative purposes, to help define the take-up rate of HER services by different user groups. It will help to define future HER strategies for encouraging greater use by certain user groups. Chapter 2 (section 2.2) provides one example of a set of user groups. This user group set could easily be refined to provide more detailed management information to help address certain

specific issues, such as equality of access to ethnic minorities or to chart use by specific organisations (i.e. English Heritage, Natural England). For the purpose of national comparison, it is desirable for all HERs to conform to a core set of user categories. For general audience tracking purposes, the following basic categories are suggested:

- a. School (under 16) teacher,*
- b. School (under 16) student;*
- c. Further Education college or adult education college lecturer,*
- d. Further Education college or adult education college student,*
- e. Undergraduate;*
- f. Postgraduate;*
- g. Higher Education staff,*
- h. Private interest or research (no affiliation to formal education programme, general interest or individual research project);*
- i. Media (TV, radio, newspapers, magazines, etc.);*
- j. Management organisation (English Heritage, English Nature, DEFRA, Forestry Commission, etc., local conservation groups, or commercial consultants on behalf of above);*
- k. Research or general interest organisation (such as local archaeological societies, and national period, artefact, or building study societies, museums);*
- l. Commercial (developers and their agents, estate agents, archaeological contractors, consultants, and specialists engaged in commercial projects);*
- m. Internal (within HER host organisation – managers, colleagues, other departments and sections);*

These categories could be simplified to:

Education (a, b, c, d, e, f, g);

Research or general interest (outside formal education)(h, k);

Media (i);

Management Organisation (j);

Commercial (l);

Internal (m);

If the enquirer belongs to several user groups, the primary one for which the search is being undertaken should be recorded.

3. Determine the purpose of the enquiry. The purpose of the enquiry, the use to which the researcher intends to put the HER information, should be obtained from the researcher in as much detail as possible. This provides the researcher with an opportunity to explain their aims, and to engage HER staff in thinking about different ways of running searches and providing output.

4. Make an assessment of how the HER can accommodate the requirements of the search. At this point, it may be decided that the HER is not equipped to answer the enquiry. If there are more suitable information resources than the HER, or if there are essential complementary resources, let the researcher know these immediately. If the researcher wishes to proceed with a search of the HER, proceed to the next step. If not, log the enquiry as a 'Search for alternative information resources' (see below).

5. Suggest a search type, or multiple search types, that should help to answer the enquiry. State the thesauri and search terms that will be used. Explain the limitations of the search strategy. Explain likely sources of bias in the search returns. Are there any resource assessments or other summaries that cover the search subject or provide a context for the subject? Are certain geographic areas poorly covered by the HER? Is there an input backlog of recent 'grey' literature? Are there any known inconsistencies in the quality of the data recorded?

The user may have previous experience of using this HER, or other HERs, and may prefer to run their own searches without supervision. It may be much more efficient to send the researcher a large portion of the HER database (perhaps as a stand alone database, or collection of data tables) so that they can experiment with their own search types and scrutinise an array of related information at their leisure. This will be greatly appreciated by many researchers. Any subsequent office visit to view associated information will be better informed and more time-efficient.

6. Note any modifications to the search strategy that the researcher suggests. If the researcher suggests modifications repeat step 5. If not, proceed to step 7.

7. Suggest output formats and explain licensing stipulations. Any licence stipulations, copyright or reproduction rights and other restrictions on the use of

data should be explained. The appropriate form of citation should be stated. Fees should be explained and agreed. Timescale for the delivery of the data should be agreed. If these terms are acceptable to the researcher, proceed to step 8.

8. Run agreed searches.

9. Allow the researcher to review results. Are they suitable? If not, discuss modifications to the search strategy and repeat step 5.

10. Record a brief description of the aims of the research, and the type of search carried out. This will provide a database of search types that will help to inform future HER development. It will help to define which search functions are virtually redundant, and those that would benefit from further development. Again, for administrative and developmental reasons it is helpful to log broad categories of HER enquiry. Chapter 2 (section 2.3) suggests the following search categories:

- a. Monument specific.*
- b. Event specific.*
- c. Archive specific.*
- d. Management specific.*
- e. General geographic.*
- f. General period.*
- g. Thematic.*
- h. Artefact specific.*
- i. Monument type (/landscape feature) specific.*
- j. Building specific.*
- k. Building type specific.*
- l. Person-based.*
- m. Feature/detail-specific.*
- n. Compound.*
- o. Search for alternative information resources.*
- p. Other enquiries.*

See Chapter 2 for full definitions of these categories.

11. Obtain feedback regarding the level of satisfaction with the service and any suggestions for improvement.

APPENDIX 7 – THE DUBLIN CORE METADATA ELEMENT SET

Dublin Core Metadata Element Set, Version 1.1 (issued 18/12/2006)

Term Name: contributor

URI: <http://purl.org/dc/elements/1.1/contributor>

Label: Contributor

Definition: An entity responsible for making contributions to the resource. Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity.

Comment: An entity responsible for making contributions to the resource. Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity.

Type of Term: element

Status: recommended

Date Issued: 1999-07-02

Term Name: coverage

URI: <http://purl.org/dc/elements/1.1/coverage>

Label: Coverage

Definition: The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.

Comment: Spatial topic may be a named place or a location specified by its geographic coordinates. Temporal period may be a named period, date, or date range. A jurisdiction may be a named administrative entity or a geographic place to which the resource applies. Recommended best practice is to use a controlled vocabulary such as the Thesaurus of Geographic Names [TGN]. Where appropriate, named places or time periods can be used in preference to numeric identifiers such as sets of coordinates or date ranges.

References: [TGN] <http://www.getty.edu/research/tools/vocabulary/tgn/index.html>

Type of Term: element

Status: recommended

Date Issued: 1999-07-02

Term Name: creator

URI: <http://purl.org/dc/elements/1.1/creator>

Label: Creator

Definition: An entity primarily responsible for making the resource.

Comment: Examples of a Creator include a person, an organization, or a service. Typically, the name of a Creator should be used to indicate the entity.

Type of Term: element

Status: recommended

Date Issued: 1999-07-02

Term Name: date

URI: <http://purl.org/dc/elements/1.1/date>

Label: Date

Definition: A point or period of time associated with an event in the lifecycle of the resource.

Comment: Date may be used to express temporal information at any level of granularity. Recommended best practice is to use an encoding scheme, such as the W3CDTF profile of ISO 8601 [W3CDTF].

References: [W3CDTF] <http://www.w3.org/TR/NOTE-datetime>

Type of Term: element

Status: recommended

Date Issued: 1999-07-02

Term Name: description

URI: <http://purl.org/dc/elements/1.1/description>

Label: Description

Definition: An account of the resource.

Comment: Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource.

Type of Term: element

Status: recommended

Date Issued: 1999-07-02
Term Name: format
URI: <http://purl.org/dc/elements/1.1/format>
Label: Format
Definition: The file format, physical medium, or dimensions of the resource. Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME].
Comment: best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME].
References: [MIME] <http://www.iana.org/assignments/media-types/>
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: identifier
URI: <http://purl.org/dc/elements/1.1/identifier>
Label: Identifier
Definition: An unambiguous reference to the resource within a given context.
Comment: Recommended best practice is to identify the resource by means of a string conforming to a formal identification system.
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: language
URI: <http://purl.org/dc/elements/1.1/language>
Label: Language
Definition: A language of the resource.
Comment: Recommended best practice is to use a controlled vocabulary such as RFC 3066 [RFC3066].
References: [RFC3066] <http://www.ietf.org/rfc/rfc3066.txt>
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: publisher
URI: <http://purl.org/dc/elements/1.1/publisher>
Label: Publisher
Definition: An entity responsible for making the resource available.
Comment: Examples of a Publisher include a person, an organization, or a service. Typically, the name of a Publisher should be used to indicate the entity.
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: relation
URI: <http://purl.org/dc/elements/1.1/relation>
Label: Relation
Definition: A related resource.
Comment: Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: rights
URI: <http://purl.org/dc/elements/1.1/rights>
Label: Rights
Definition: Information about rights held in and over the resource.
Comment: Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights.
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: source
URI: <http://purl.org/dc/elements/1.1/source>

Label: Source
Definition: The resource from which the described resource is derived.
 The described resource may be derived from the related resource in whole or in part. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.
Comment:
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: subject
URI: <http://purl.org/dc/elements/1.1/subject>
Label: Subject
Definition: The topic of the resource.
 Typically, the topic will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled vocabulary. To describe the spatial or temporal topic of the resource, use the Coverage element.
Comment:
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: title
URI: <http://purl.org/dc/elements/1.1/title>
Label: Title
Definition: A name given to the resource.
 Typically, a Title will be a name by which the resource is formally known.
Comment:
Type of Term: element
Status: recommended
Date Issued: 1999-07-02
Term Name: type
URI: <http://purl.org/dc/elements/1.1/type>
Label: Type
Definition: The nature or genre of the resource.
 Recommended best practice is to use a controlled vocabulary such as the DCMI Type Vocabulary [DCMITYPE]. To describe the file format, physical medium, or dimensions of the resource, use the Format element.
Comment:
References: [DCMITYPE] <http://dublincore.org/documents/dcmi-type-vocabulary/>
Type of Term: element
Status: recommended
Date Issued: 1999-07-02

APPENDIX 8 – A SURVEY OF ONLINE HEIRS AND RELATED SYSTEMS

A.8.1 CARN (<http://www.rcahmw.org.uk/data/>)

CARN (Core Archaeological Record Index) is the on-line entry point for the Extended National Database for Wales (END). The END represents the collaboration of several Welsh heritage organisations that maintain archaeological and architectural records systems. These include the National Monuments Record for Wales maintained by Royal Commission on the Archaeological and Historic Monuments of Wales (RCAHMW); the Scheduled Monument and Listed building databases held by the Welsh Historic Monuments Executive Agency (CADW); and the Sites and Monuments Records belonging to each of the four Welsh archaeological Trusts (Clwyd-Powys Archaeological Trust, Dyfed Archaeological Trust, Gwynedd Archaeological Trust, Glamorgan-Gwent Archaeological Trust). A future initiative may see END enhanced by the finds database maintained by National Museum and Galleries of Wales.

CARN provides the on-line searchable index and link to information held within END. Essentially it comprises a metadata summary for the detailed records held by each of the participating databases, although it also incorporates two online databases both maintained by the NMRW (for Chapels and the Archive Catalogue). The relevant originating organisation must be contacted directly in order to obtain full record details. This can be achieved via email from the CARN site, quoting the relevant record numbers; an NMRW enquiry request form is included.

CARN came online in 2001. Future developments are anticipated, along with the accumulation of more indexed records and databases.

Searches may be directed towards CARN, either of the online databases, or all databases together. There are five search methods. A simple keyword(s) based search retrieves all records incorporating the given keyword(s) in any of their metadata fields. The second search activates an email request to the NMRW on a standard form. The remaining searches are a 'clickable' map search, grid reference search, or 'advanced search'.

The clickable map search presents the user with a map of Wales divided into 22 colourful geographic regions with a selection of town names. It is not immediately obvious what the regions represent, but it becomes clear on selection that they are current counties, at which point a larger map of the county (with selected town

names) is produced. The user may click on the town names to obtain a screen that permits a keyword-qualified search (actually named 'search pattern') on any of the data holdings based on a set distance from the given grid reference. This search is identical in form to the 'Grid Reference' search.

The 'advanced search' gives the user the ability to search across the various holdings using the incidence of keywords within a combination of the metadata fields (Figure 63). Thus it is possible to search for the incidence of the 'Type' 'barrow' dating to the 'Period' 'Early Medieval', within the 'County' of 'Powys'. The user is provided with very little assistance in order to help frame a Boolean Logic based search. Placing keywords in the metadata fields gives an 'AND' search of the type described above. To obtain an 'AND' search within metadata fields the '+' operator must be used (i.e. to search for single 'long barrows', and not 'long cairns' and 'round barrows' as well, the user must use 'long + barrow').

Some coaching is given within the CARN website to assist the user in selecting appropriate search terms for only some of the metadata fields. The valid term lists for 'Broad Class' and 'Period' fields are given. For other fields, the users fend for themselves.

It is acknowledged by the CARN administrators that differences in data standards and structure occur across the constituent databases. The 'Site-Type' field in particular is a product of the originating organisation's preferred thesaurus application. Records for 'tumulus', and 'burial mound', for example, appear alongside the preferred 'barrow' ('long barrow', 'round barrow', 'barrow cemetery', etc.) and potentially related 'round cairn', 'cairnfield', etc. Using the default 'simple search' produces an even greater array of results for 'tumulus', 'tumuli', 'barrow', etc. since these frequently occur in within the 'Site' [name] field. Uninformed use of this search method can provide very misleading results.

All online searches of CARN produce records with the following metadata fields: 'Reference Number' (as used by the relevant partner's database); 'Name' (a commonly recognised building or place-name, and its alternatives); 'Grid Reference' (6 figures that locate the subject site within 100m); 'Broad Class' (broad site type classifications as defined by the English Heritage thesaurus); 'Type' (site type, based on the site type wordlists and thesauri adopted by the constituent databases); 'Community' (current community council area); 'County'

and 'Pre-1974 County'; 'Organisation' (originating source of the information); 'Period' (broad archaeological periods – 'Bronze Age', 'Post-Medieval', etc.).

This should provide enough information for the user to decide whether it is worthwhile to ask the originator for further details for a particular record. Some records, however, seem to be too vague for this purpose. The search result containing records such as:

CASTELL COLLEN VICUS METAL DETECTOR FIND Reference: 33764

National grid reference: SO0562 Period: Roman Distance: 0.2

Broadclass:Unassigned Type:FIND Pre 74 County:Radnorshire County:Powys

Community:Llanyre Record Originator:Clwyd Powys Archaeological Trust

would not assist users researching the incidence of Roman military equipment, for example, to make a decision about obtaining the full details of this record.

Search results are delivered with a total for the relevant results obtained, unless this amounts to over 100 records (Figure 63). There is no indication of the total records searched or an estimate of the completeness of record coverage for particular themes or geographic area. The user is left with no impression of the integrity of the search as a wholly representative summary of the total known site types, or sites within a particular area. Is the Clwyd-Powys SMR fully indexed or is there a large back-log? Does the Gwynedd SMR place greater emphasis on prehistoric archaeology than post-medieval archaeology? What categories of 'modern' information are well represented in the holdings? Is there a bias towards military and industrial archaeology? Is Dyfed Archaeological Trust's non-Listed building recording programme more advanced than that of Gwynedd Archaeological Trust?

The inevitable uneven coverage of the constituent records is almost entirely invisible to the end user. This need not present a problem if a user merely requires a sample of appropriate sites for their research (for example, a handful of barrow sites in Gwynedd and Clwyd-Powys in order to select possible candidates for surveying), but is worrying if the user seeks a truly representative sample of the monument type.

Such problems, of course, are not confined to the CARN system. The integrity of the user's enquiry is threatened in any system wherein the core data is uneven in

format and the nature of its strengths and weaknesses is not obvious. A user who makes an enquiry to any of the component records that make up the CARN facility may or may not routinely receive information on the content and completeness of the record from its management staff. The user does have the ability to ask, however, and then to make a judgement about the suitability of the data. This facility is lacking in this and other remote systems.

The CARN system, however, well represents the significant advantages in access to information that the Web offers. The ability to cross search important inventories covering a nation's heritage, and to receive immediate results, is a huge step forward. Systems like CARN, and those described below, should yield a significant increase in the general awareness of heritage records and their use in formal and informal research.

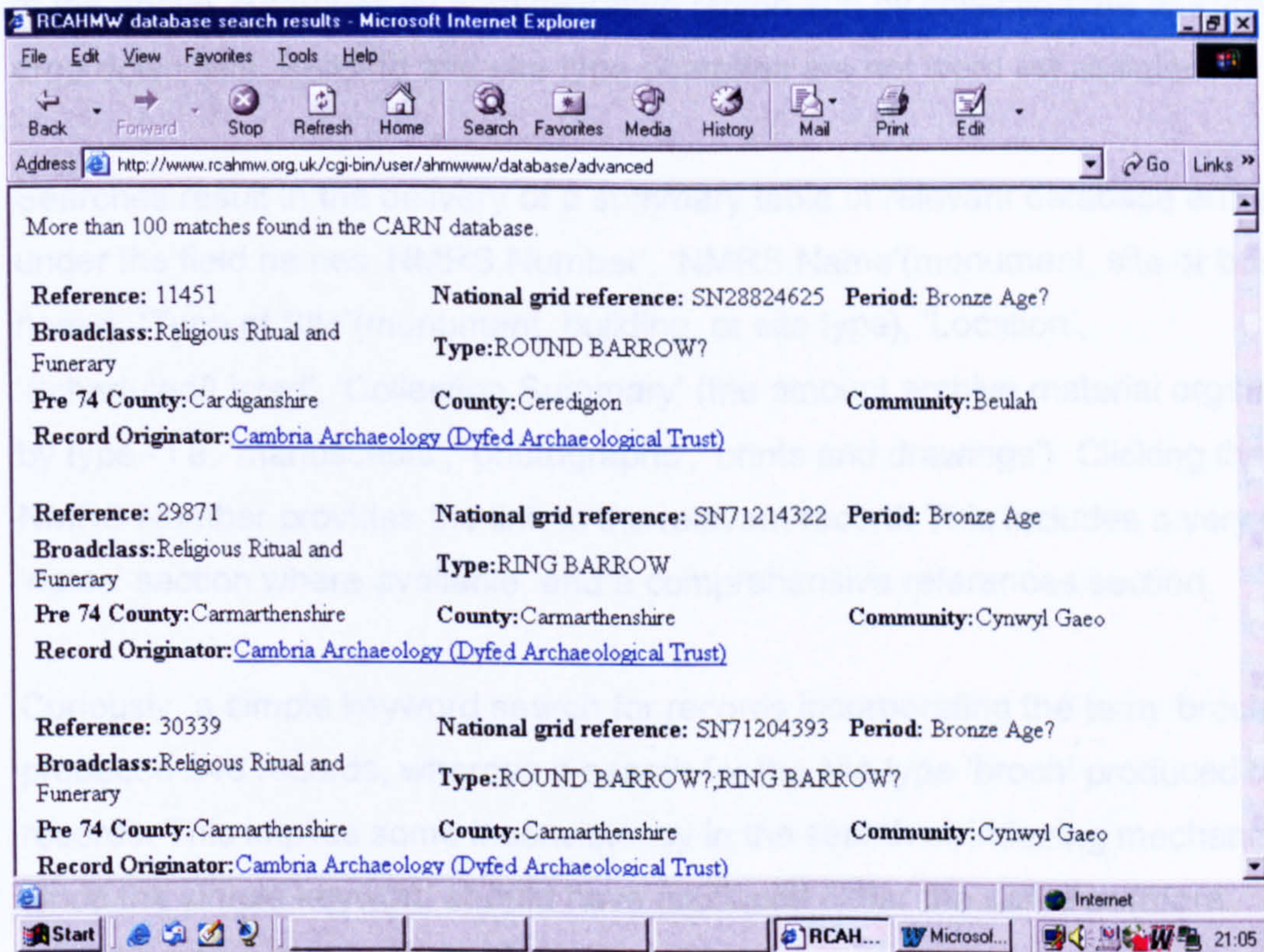
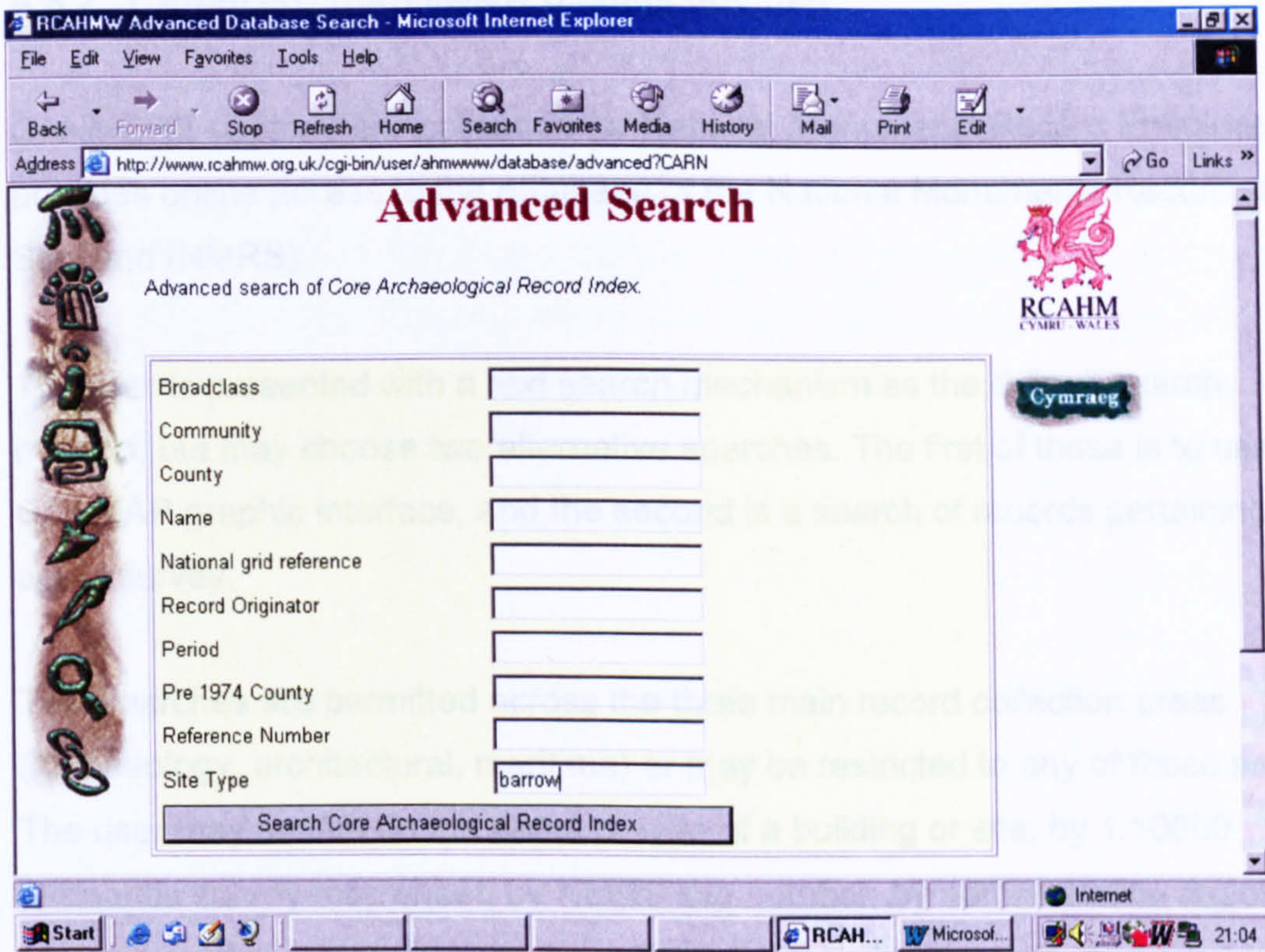


Figure 63. CARN advanced search screen shot. Original in colour.

A.8.2 CANMORE (<http://www.rcahms.gov.uk/>)

CANMORE (Computer Application for National Monuments Record Enquiries) provides online access to the database of the National Monuments Record of Scotland (NMRS).

The user is presented with a text search mechanism as the default search method, but may choose two alternative searches. The first of these is to use the CANMAP graphic interface, and the second is a search of records pertaining to aerial survey.

Text searches are permitted across the three main record collection areas (archaeology, architectural, maritime) or may be restricted to any of those areas. The user may search on the name or type of a building or site, by 1:10000 Ordnance survey map sheet, by NMRS site number, by administrative region (council, former region, parish), by collection name, by keyword, or a combination of the above. Searches by administrative region and by collection are assisted by drop down lists. Building and site type searches are not word list assisted.

Searches result in the delivery of a summary table of relevant database entries under the field names 'NMRS Number', 'NMRS Name'(monument, site or building name), 'Type of Site'(monument, building, or site type), 'Location', 'Scheduled/Listed', 'Collection Summary' (the amount archive material organised by type - i.e. 'manuscripts', 'photographs', 'prints and drawings'). Clicking the NMRS Number provides the link to the relevant record. This includes a very full 'notes' section where available, and a comprehensive references section.

Curiously, a simple keyword search for records incorporating the term 'broch' produced 546 records, whereas a search for the site type 'broch' produced 568 records. This implies some inconsistency in the search or indexing mechanism since the simple keyword should have produced either the same or (more probably) a greater number of records.

The CANMAP facility allows the user to 'zoom in' to an area of Scotland, to obtain a distribution map of point data relating to NMR database entries, and to obtain detailed information regarding one or more of those entries (Figure 64). Schematic maps that show only place names are replaced by a backdrop of 1:250,000 Ordnance survey maps, that in turn are replaced by 1:10,000 Ordnance Survey

mapping at greater degrees of 'zoom'. Other mapping tools allow the user to pan or shift to adjacent map areas, and to interrogate individual NMR points or a batch of NMR points captured within a rectangle (Figure 64). The latter produces a summary table of results under the field names 'NMRS Number', 'NMRS Name' and 'Type of Site'. Clicking on a table entry produces a comprehensive database entry that includes the above, along with a long (where relevant) free text 'Notes' field, 'Location' information (map reference, parish and council), 'Collections Summary' and full 'References'.

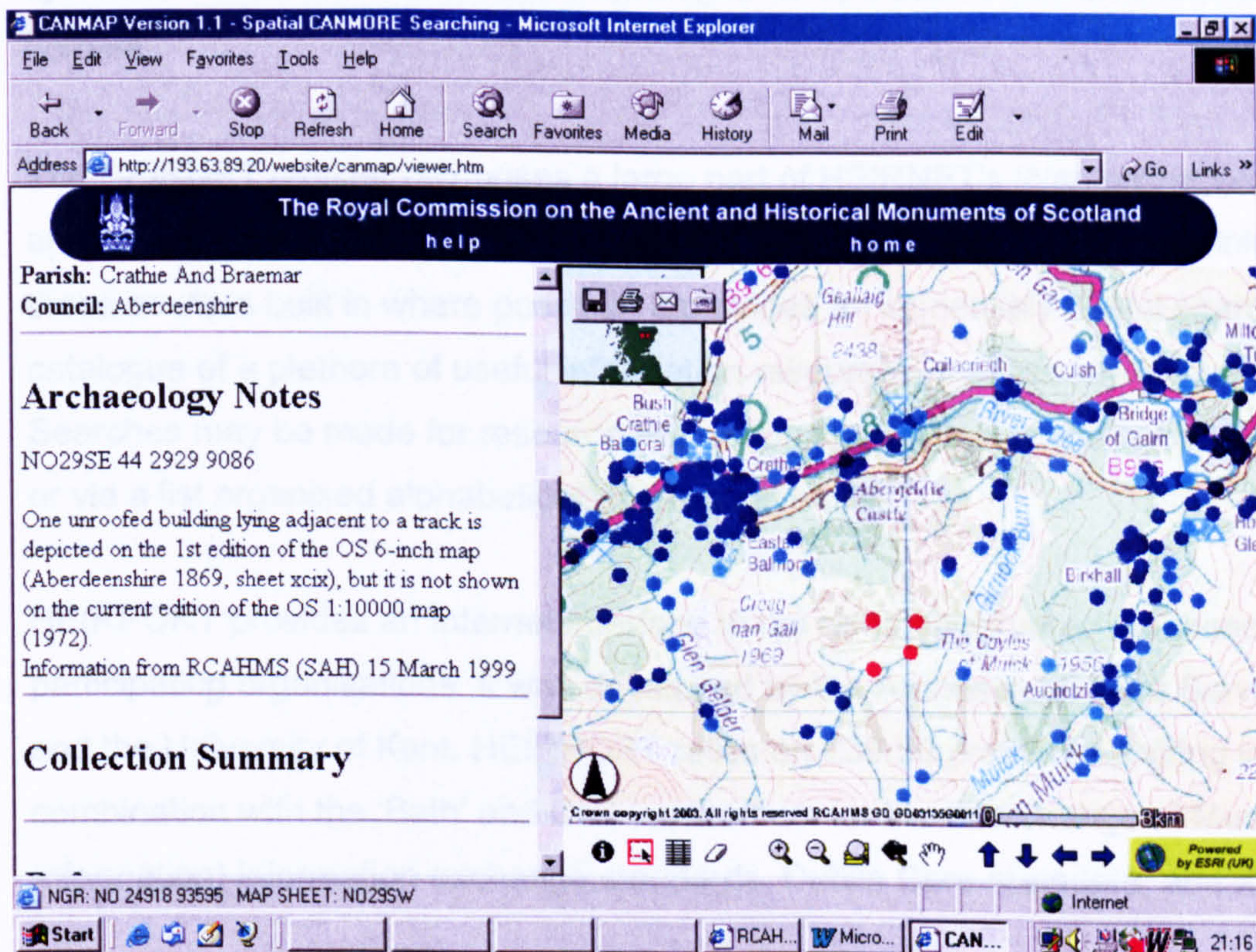
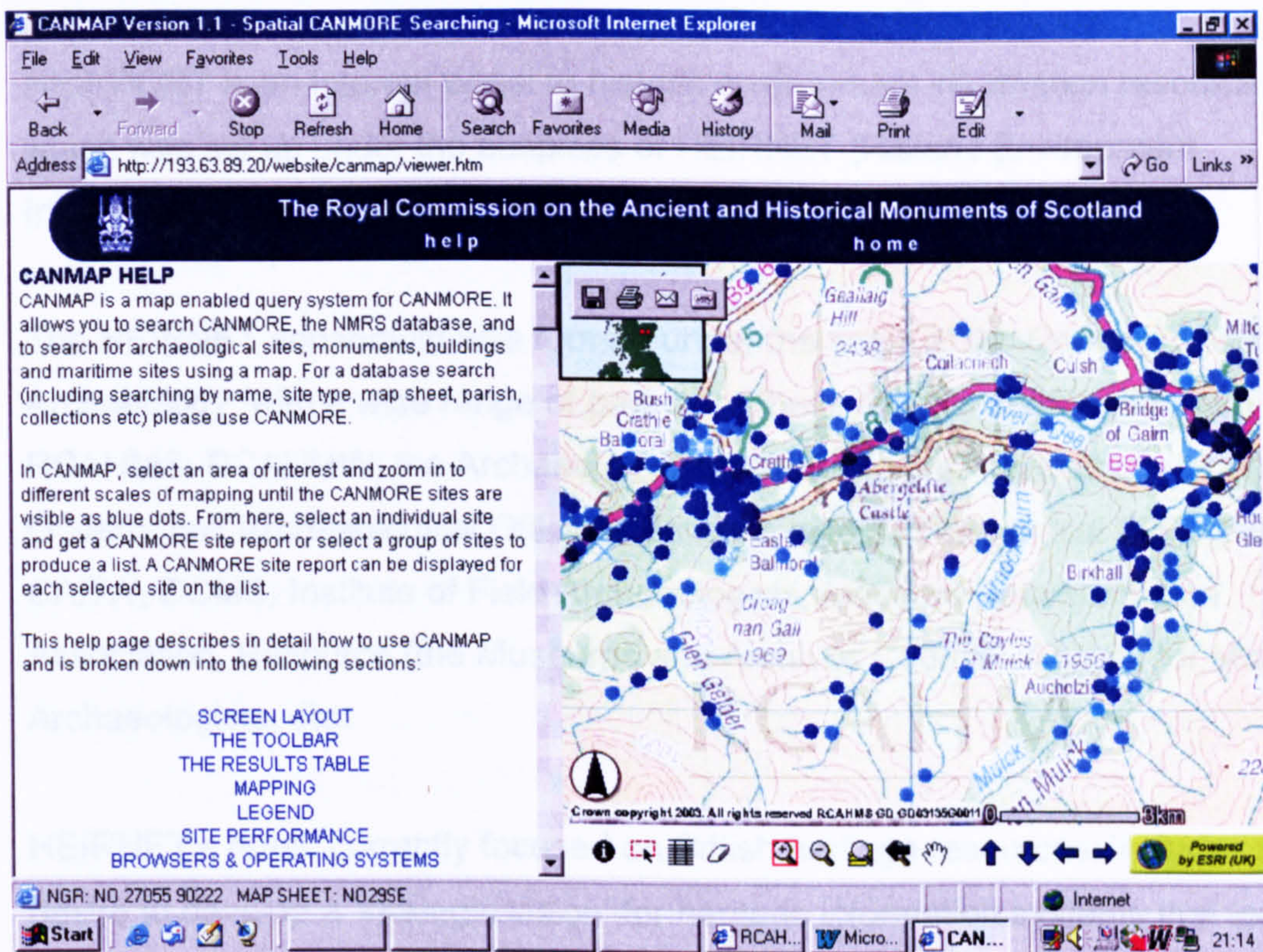


Figure 64. CANMORE map search screen shots. Original in colour.

A.8.3 HEIRPORT (<http://www.britarch.ac.uk/HEIRNET/>)

HEIRPORT is an Internet portal to historic environment information resources, which was set up under the auspices of HEIRNET (Historic Environment Information Resources Network).

The HEIRNET consortium was formed under the aegis of the Council for British Archaeology, with a wide range of partners. These include English Heritage, RCAHMS, RCAHMW, the Archaeology Data Service, the Association of Local Government Archaeological Officers, British & Irish Archaeological Bibliography, CADW, DCMS, Institute of Field Archaeologists, Museum Documentation Association, Resource (the Museums and Archives Council), Society for Museum Archaeologists, etc.

HEIRNET's remit, currently focused on British heritage resources, includes a desire to develop a 'strategic vision' for heritage information systems that focuses on access and user requirements. It reviews developments in information systems, shares information and encourages co-operation between information holders.

The HEIRNET register comprises a large part of HEIRNET's Web presence. It is an online listing of historic environment information resources, with Web-links to those sources built in where possible. It provides an immensely useful searchable catalogue of a plethora of useful information resources, whether on-line or not. Searches may be made for resource title, resource maintainer and subject areas, or via a list organised alphabetically by resource title.

HEIRPORT provides an Internet interface to the remotely situated databases of participating organisations. It was developed by the Archaeology Data Service and the University of Kent. HEIRPORT relies on Z39.50 protocol handling in combination with the 'Bath' and CMI (consortium for the Interchange of Museum Information) information exchange standards, Dublin Core metadata, and XML.

The current HEIRPORT 'target' information holdings are those maintained by the Archaeology Data Service, the Royal Commission for the Ancient and Historic Monuments of Scotland (the CANMORE system), the Portable Antiquities Scheme, and the Scottish Cultural Resource Access Network. HEIRPORT allows searches to be made of the on-line holdings of one or more of these organisations

in any combination (Figure 65). Three types of search are provided for. A 'simple search' allows the user to search across the selected databases using a single keyword type search term.

Users can undertake Boolean-logic built searches on the categories 'Subject' (search for term within the subject terms used to describe a record), 'Title' (search for term within the title field of a record), 'Author' (creator of the record – usually an organisation), or 'Any' of the above. These may be combined with searches for 'Who' (people associated with a resource, such as report authors), 'What' (type of evidence that the resource describes – a monument or artefact type), 'When' (historic or archaeological period), 'Where' (location – administrative area etc.).

This search may be constrained within a rectangular search area defined by origin and north-east corner grid squares.

The 'complex' search again allows searches for keywords within the fields 'Subject', 'Title', 'Author', 'Any' and 'Who', 'What', 'When', 'Where', with a grid reference defined search box. As with the Boolean search, output may be obtained in a variety of data formats ('SUTRS', 'GRS1', and 'XML') and the search may be limited to a geographical box defined by the user (Figure 65, Figure 66). Links to the resource holders allow the user to get a feel for the range and type of data they are searching across. There is a useful help facility to guide users in the submission of searches.

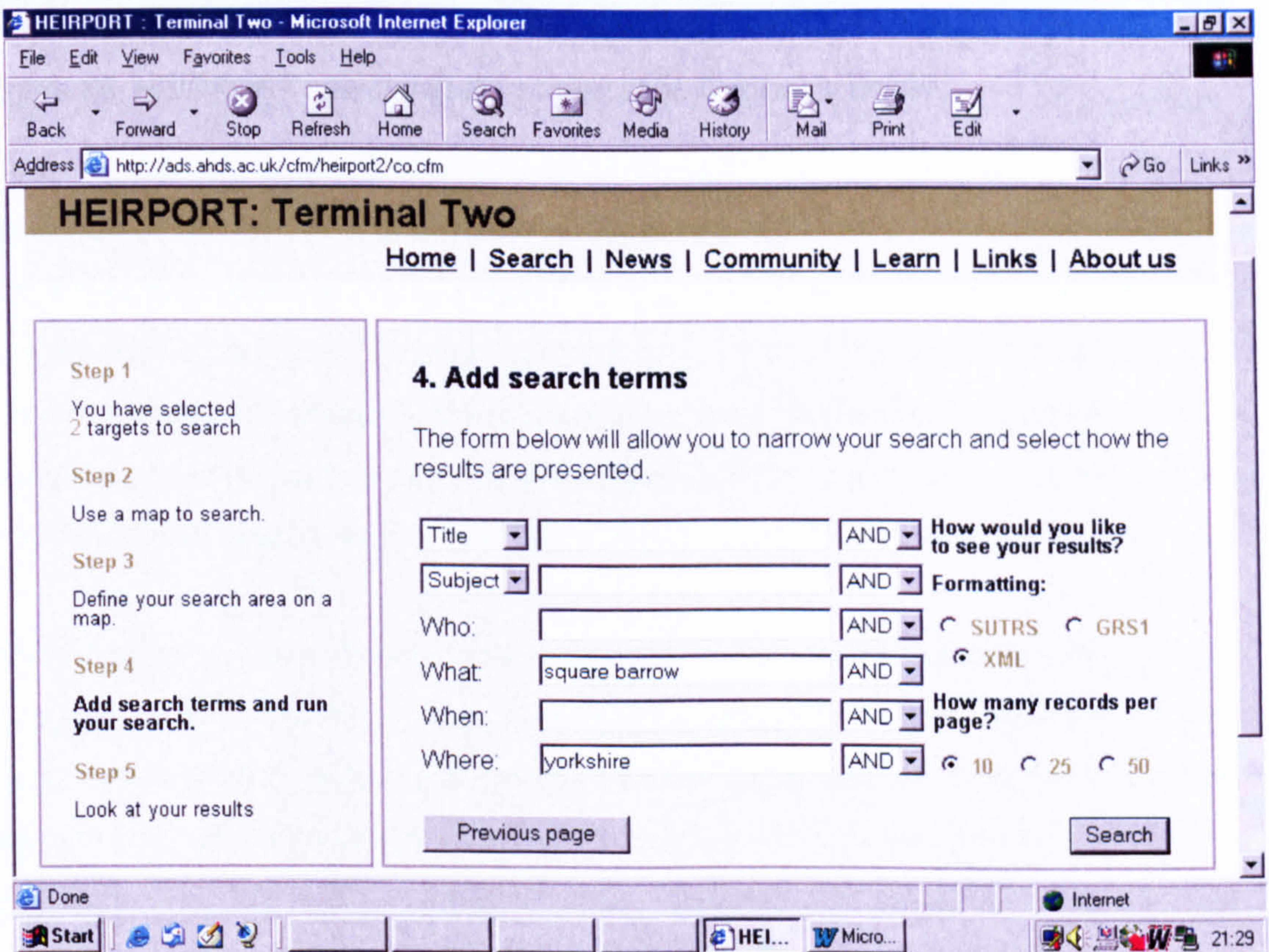
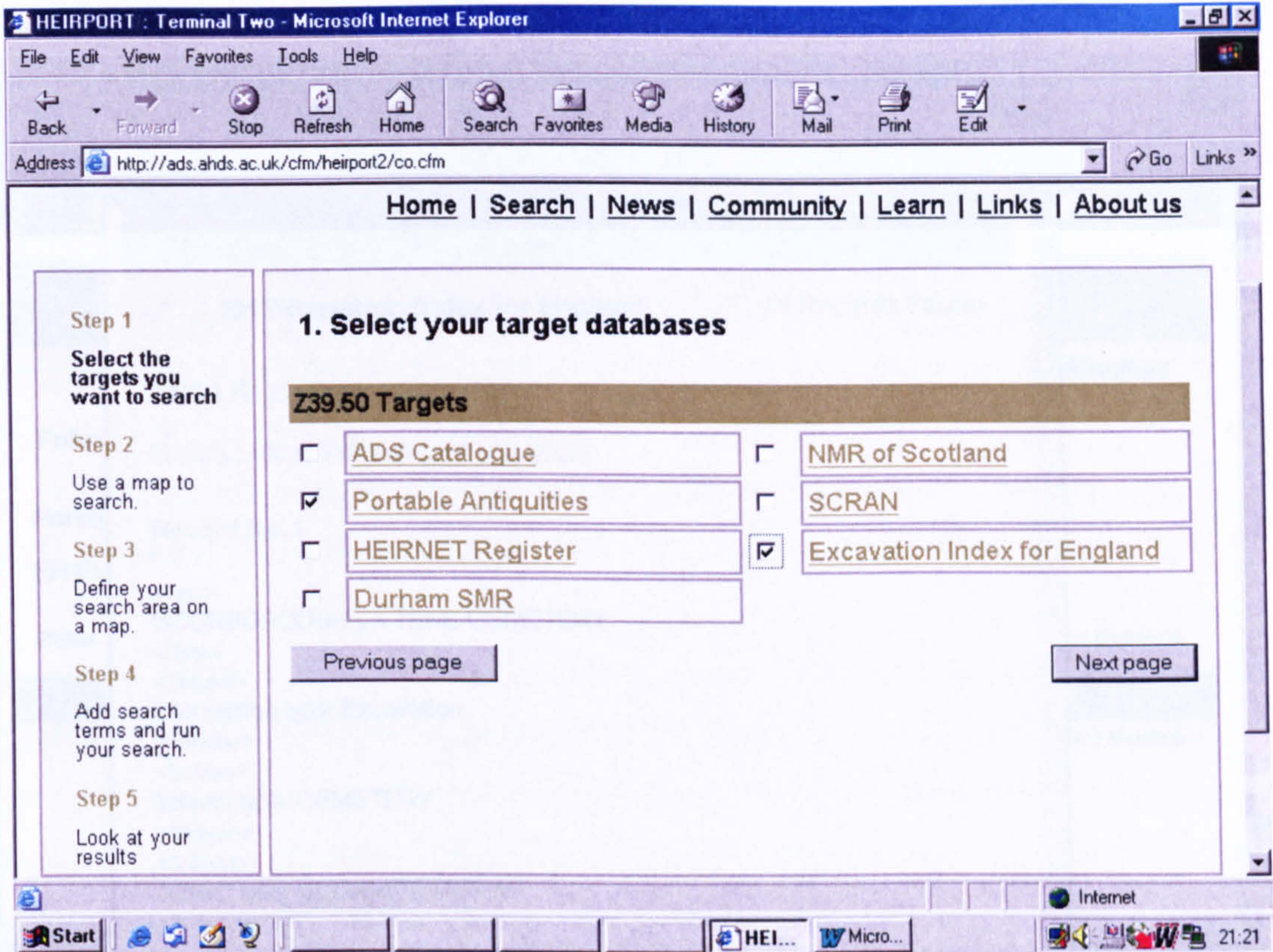


Figure 65. HEIRPORT search portal screen shots. Original in colour.

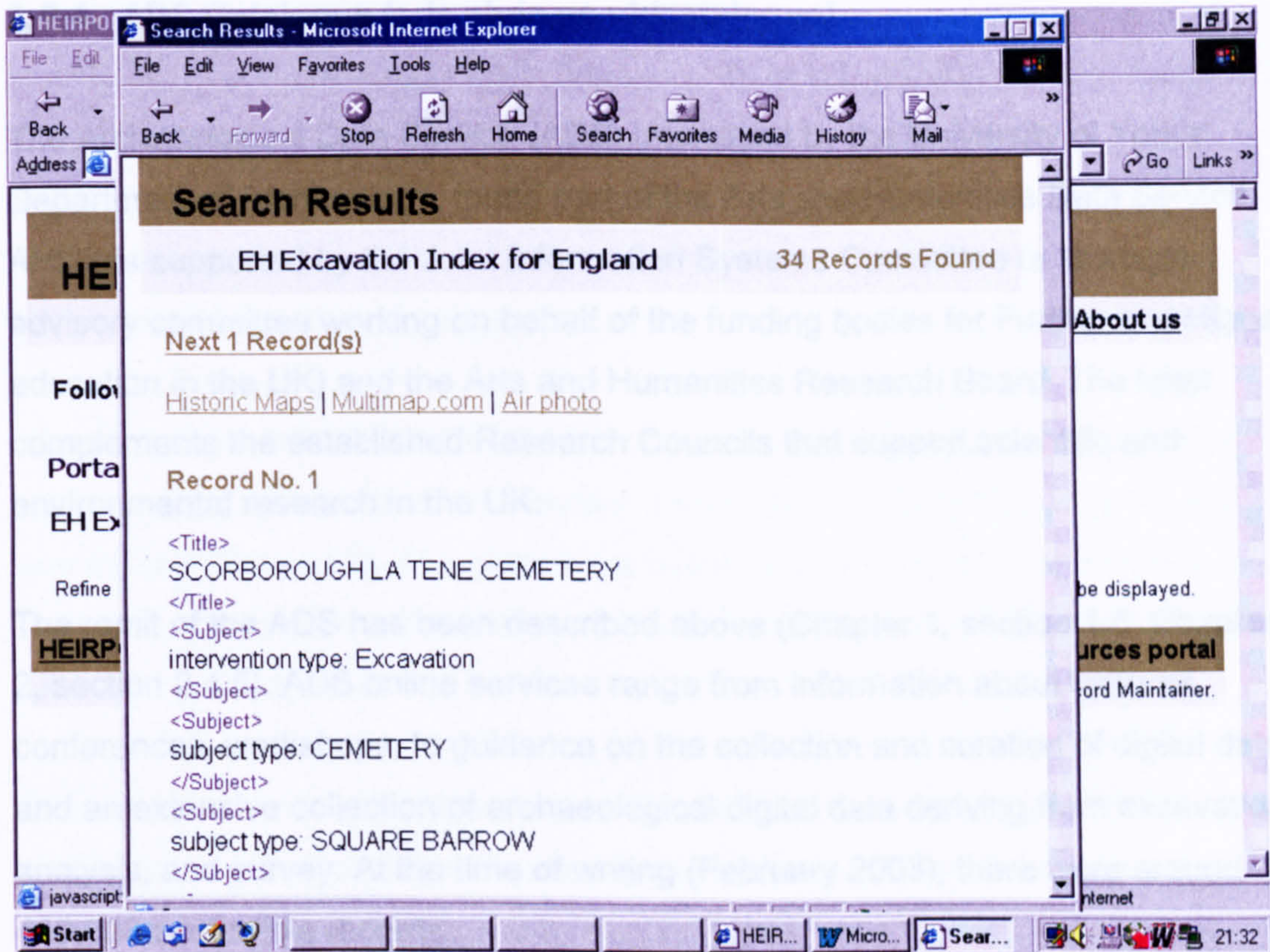


Figure 66. HEIRPORT search results screen shot. Original in colour.

A.8.4 ADS Catalogue (ads.ahds.ac.uk/catalogue)

The Archaeological Data Service (ADS), managed by the University of York's Department of Archaeology, forms part of the Arts and Humanities Data Service. AHDS is supported by the Joint Information Systems Committee (a strategic advisory committee working on behalf of the funding bodies for Further and Higher education in the UK) and the Arts and Humanities Research Board. The latter complements the established Research Councils that support scientific and environmental research in the UK.

The remit of the ADS has been described above (Chapter 1, section 1.5; Chapter 2, section 2.4.5). ADS online services range from information about lectures, conferences, workshops, to guidance on the collection and curation of digital data, and an extensive collection of archaeological digital data deriving from excavation, analysis, and survey. At the time of writing (February 2003), there were around 450,000 accessible records.

The archaeological holdings may be searched using 'ArchSearch' (Archaeological Holdings Search System) in a number of interesting ways. Simple 'keyword' searches detect the incidence of a word (words) within any part of the record. More focused searches 'Who' (person or organisation involved with fieldwork or record generation, etc.), 'Where' (place-name, District, County, etc.), 'What' (resource subject), allow a user to search only within specific information fields. Metadata records, with links to original data sources where available, are returned by the various search methods (Figure 68).

The 'Map-based' search retrieves records from within a coordinate-defined geographic box. The 'Map Search' is truly geographic in nature, allowing the user to point to a map of Britain and Ireland in order to retrieve all records from a 10km square centred on that point. More precision in searches can be achieved by selecting a 'county' view (county boundary outlines) and by focusing on retrieval within 1km, 5km, and 10km squares on a 1:250000 Harper Collins Cartographic map base (Figure 67). The ability to navigate to adjacent maps squares is a particularly useful feature of the 'Map Search' facility.

A link to the Getmapping.com website once a map square has been selected provides a thumbnail geo-corrected aerial photograph of the selected map square.

These derive from the Millennium Map project that produced total seamless geo-referenced coverage of the UK. Another link is provided to the Streetmap.co.uk website, that produces maps from Ordnance Survey Landranger (1:50,000) scale down to town street maps for the selected square.

Both help to give a good topographic context for the records that is lacking in purely textual descriptions of location.

The 'Map Search' facility is the default search for the catalogue and its opening page contains an extremely informative density plot of record coverage for Britain and Ireland (Figure 67). At a glance it is possible to see trends in information collection and therefore the likely bias in the completeness of the search for a particular geographic area.

One drawback in the collation of a variety of different data sources within the catalogue derives from the different ways in which the different record managers have chosen to populate their own records. Clearly, this also relates to the extent of knowledge about a record subject, but it poses problems for ensuring integrity in searches. One example will suffice.

A search for the word 'Feltwell' within the title field pulled up 11 archaeological records from the English Heritage NMR Excavation Index that obviously related to fieldwork in the parish. However, a 'Where' search for the name Feltwell produced 29 records. These included records with titles such as 'Field 6, Sid Maggs Field, Poppylot Road', 'Fossditch, Section 1', 'Glebe Farm', along with titles within which the name 'Feltwell' cropped up, such as 'Red House Farm, Feltwell'. The title field had been used inconsistently (sometimes including the parish name, sometimes not), and therefore in itself does not provide a reliable link to information about Feltwell village. This may be mitigated readily by appropriate use of 'what' and 'where' terms, but some instruction on the suitability of different search methods for different enquiry types is also required.

The inroads made into representing the graphical and spatial distribution of the catalogue data by ADS ArchSearch are exceptional, but also raise further expectations for the representation of non-point based data. Linear monuments (some of which, such as Roman roads appear on the under-lying Ordnance Survey maps), landscape zones, extensive monuments, and surveys that covered a lot of ground, are categories of geographic data that are elusive at present.

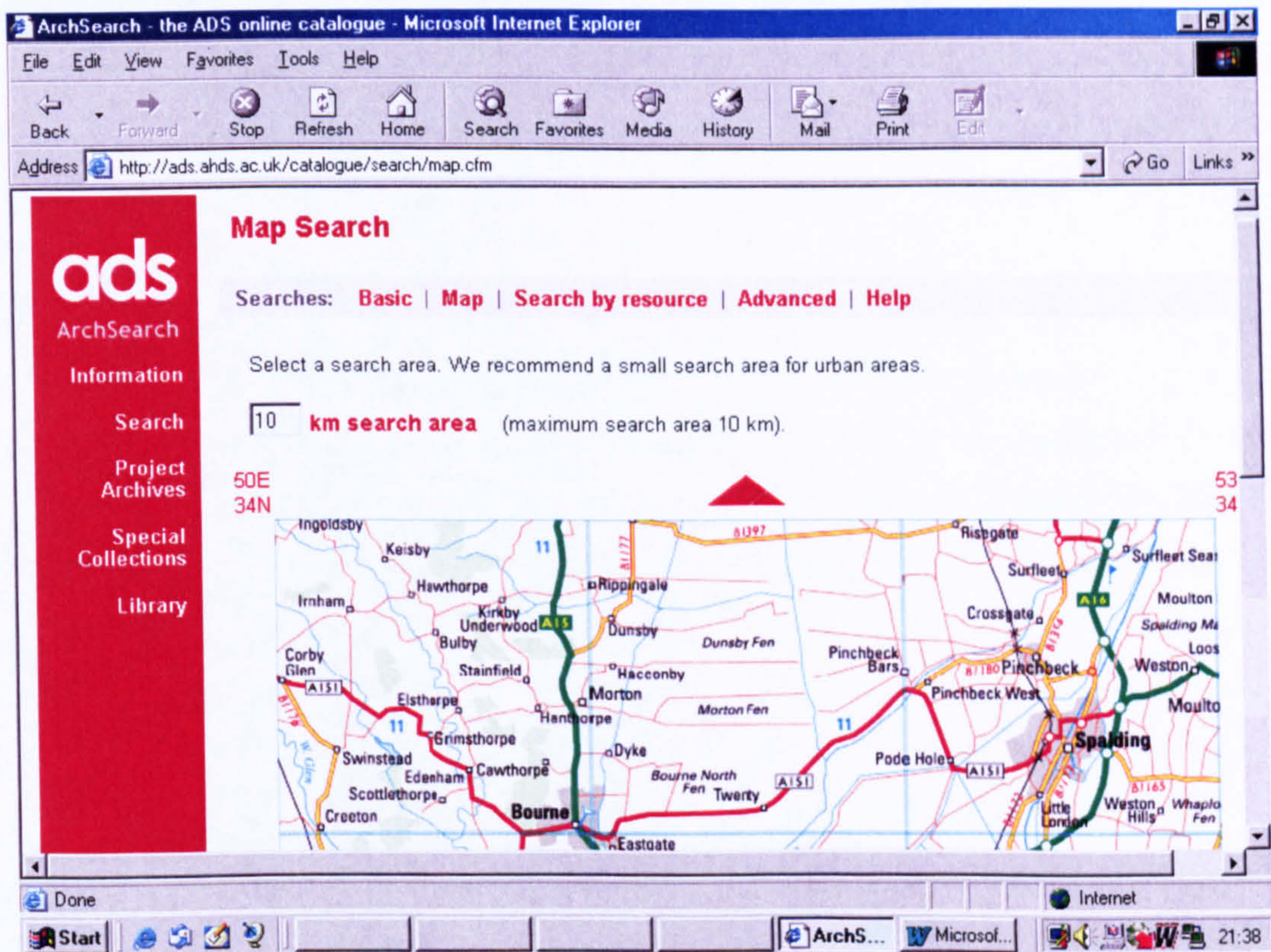
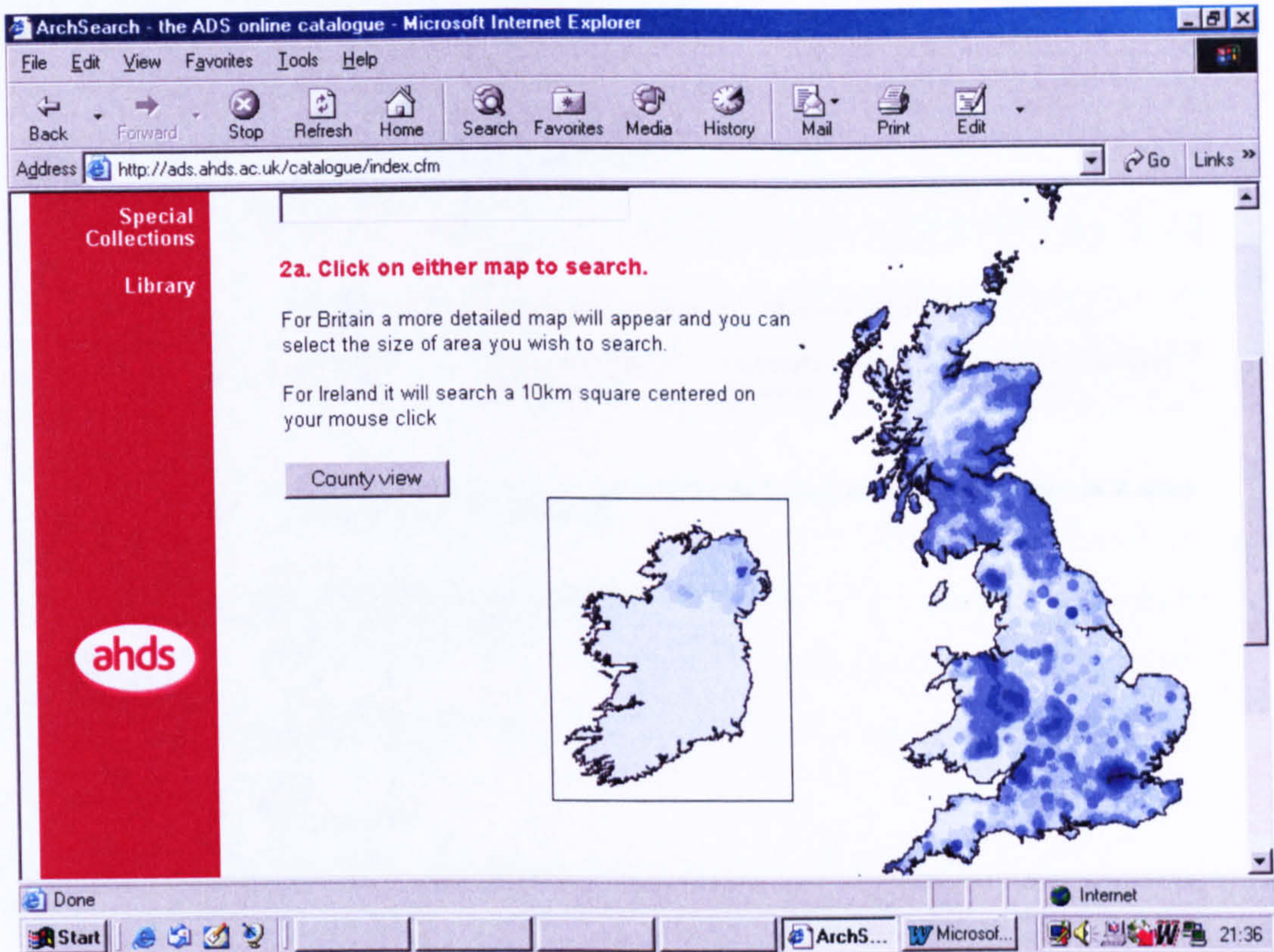


Figure 67. ADS ArchSearch map search screen shots. Original in colour.

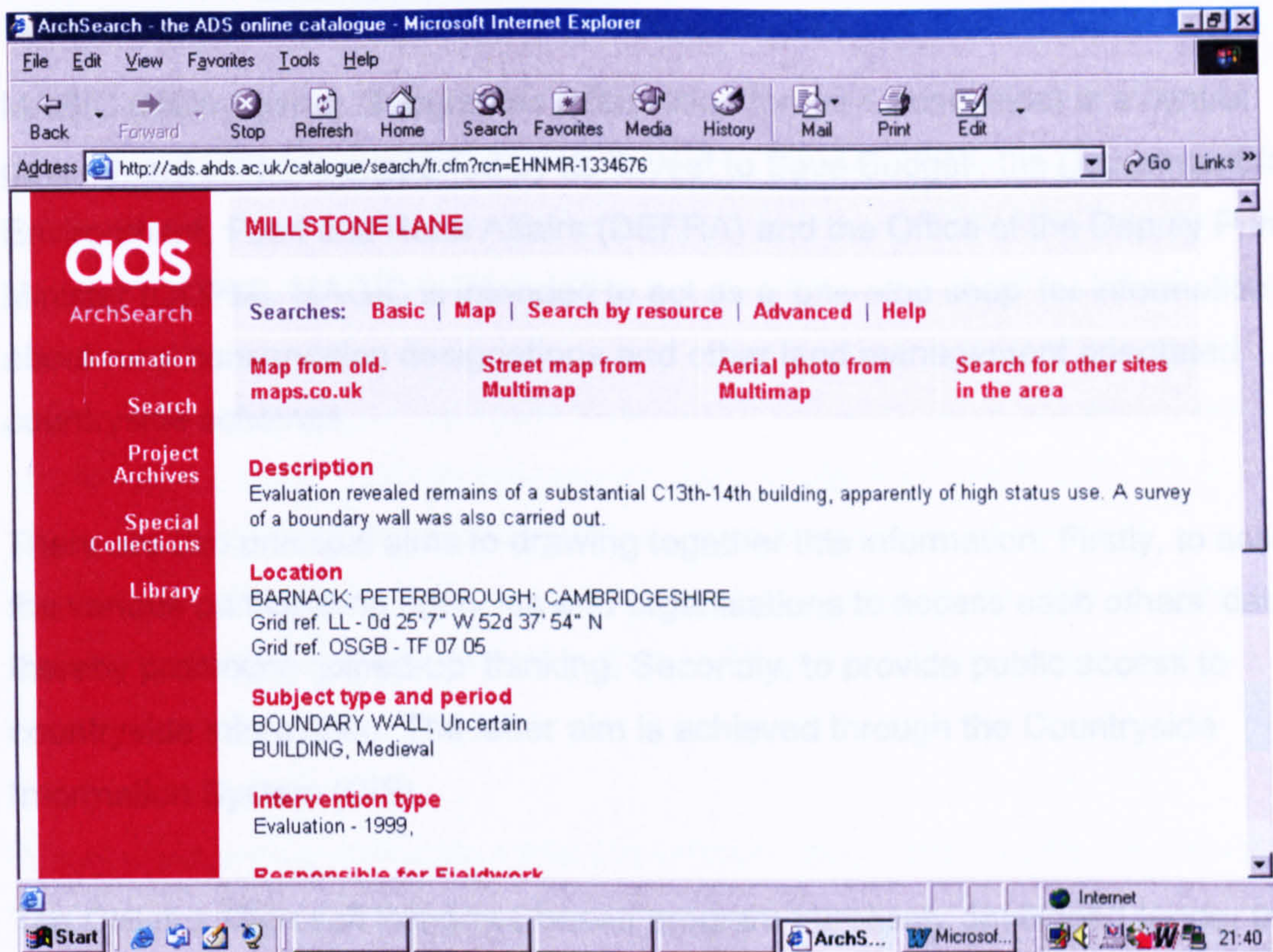


Figure 68. ADS ArchSearch results screen shot. Original in colour.

A.8.5 MAGIC (<http://www.magic.gov.uk>)

MAGIC (Multi-Agency Geographic Information for the Countryside) is a central government initiative supported by its 'Invest to Save Budget', the Department for Environment, Food and Rural Affairs (DEFRA) and the Office of the Deputy Prime Minister (ODPM). MAGIC is intended to act as a 'one-stop shop' for information about rural conservation designations and other land management orientated countryside schemes.

There are two principal aims to drawing together this information. Firstly, to assist the various participating agencies and organisations to access each others' data, thereby promoting 'joined-up' thinking. Secondly, to provide public access to countryside information. The latter aim is achieved through the Countryside Information System (CIS).

The CIS is a Microsoft Windows based program purposely developed (under the leadership of DEFRA's Geographic Information Unit) to manage spatial information about the British countryside. Other project partners include English Nature, English Heritage, the Countryside Agency, Forestry Commission and the Environment Agency. At the time of writing, over 50 data sets are accessible through the CIS Web portal.

The Web portal provides access to interactive maps, a tutorial, and information about the reference datasets used. There are links to the organisations responsible for maintaining the reference sets. Incidentally, it is possible to download boundary data sets maintained by English Nature (SSSIs, RAMSAR listed sites, Ancient Woodlands etc.) and RSPB for use in GIS, from their respective web sites.

Each MAGIC data set is described by a metadata table that includes the data set name, an abbreviated name, a short description of the character of the designation type, the data set 'owner' and organisation responsible for its upkeep. This is complemented by information regarding the integrity and currency of the data within the CIS (the version of the data set, its date of issue, update frequency) and its qualities generally (for example, method, scale, and accuracy of capture). Finally, the method of display within the CIS portal of the data set is described (labelling conventions, and whether points, multi-points, or polygons are

displayed).

The data sets are organised under a series of headings or topics designed to assist user selection of relevant data. These comprise 'Administrative Areas', 'Classification of Countryside', 'Habitat Inventories', 'Joint Character Areas', 'Rural Designations' (statutory and non-statutory) and 'Rural Land-Based Schemes'. The descriptive qualities of these topic titles are variable, but a 'What's In This Topic?' button adjacent to the selected topic heading reveals a list of the data sets that the topic contains. The topic 'Administrative Areas', for example, includes county boundaries, unitary authority boundaries, English Heritage regions, DEFRA regions, parishes etc. 'Rural Designations (statutory)' includes Areas of Outstanding National Beauty, Environmentally Sensitive Areas, Protected Wreck Sites, World Heritage Sites, Sites of Special Scientific Interest and Scheduled Monuments.

The first stage of a search requires the selection of a topic and the selection (via check boxes) of the required data sets (Figure 69). As an alternative to the selection of related datasets through topic headings, it is possible to define a customised 'topic' of individual selected data sets.

The second step of a search requires the user to select a geographic area on which to display the selected data sets. This may be either based on a postcode, place name, county, government region, or grid reference.

The results of a search are delivered via an interactive map . This uses Javascript and is accessible using Internet Explorer (version 4.0 or higher) and Netscape Navigator (version 4.6 or higher). The results are displayed as either coloured symbols, or filled polygons against a grey Ordnance Survey map backdrop (Figure 70). Scheduled Monuments were initially represented by star symbols, but now appear as coloured polygons.

The interactive map is accompanied by a variety of GIS-type 'map tools'. The Ordnance Survey backdrop map may be turned on or off, there are zoom facilities (zoom in, out, or to map extent), a pan function, distance and area measures, and various means to interrogate mapped data. These include the ability to select mapped data within a user-defined polygon, along a line, nearest to a point, or within a circular search area. It is also possible to undertake simple keyword searches on the information fields of the selected mapped data.

Selecting mapped information provides a very brief summary of results displayed in table form. This includes the data set to which the items belong, object identification codes, reference numbers (such as Scheduled Monument numbers), and item names (for example, the site name or title of Scheduled Monuments). There are links to more descriptive PDF documents for certain records (Figure 70).

It is possible to change the geographic search options and search topic from the map interface. Search results and maps may be printed.

The MAGIC web portal provides a very neat and easy to use mechanism for searching and displaying a wide range of environmental data. The data sets are limited in scope, only very basic text tables accompany the mapped boundaries, and the text search is far less advanced than text searches provided through 'ArchSearch'. Overlaying too many spatial data sets creates inevitable problems in distinguishing individual item boundaries, but on the whole the presentation of data is clear. It provides a fine example of the presentation of simple spatial data sets via the World Wide Web.

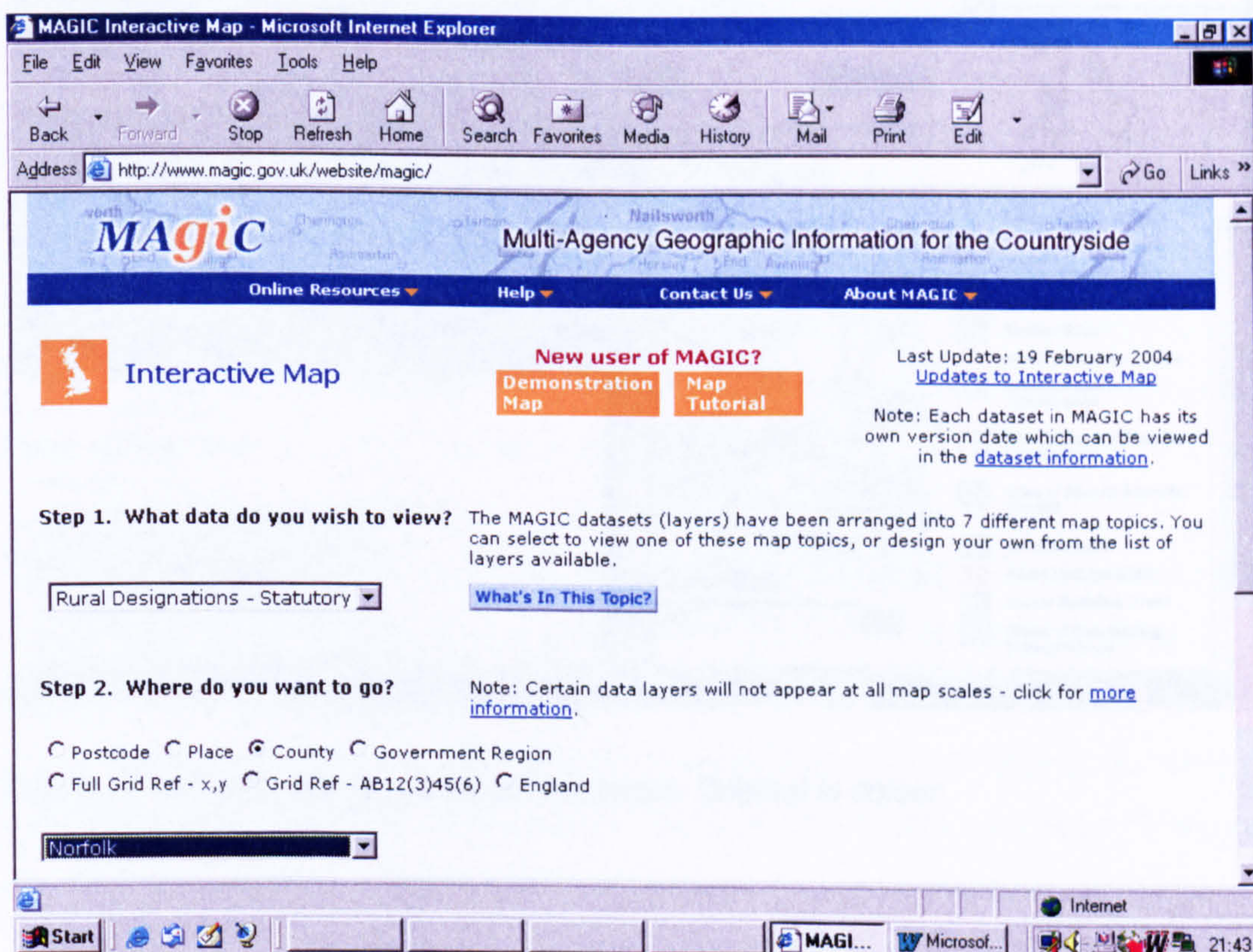


Figure 69. MAGIC search screen shot. Original in colour.

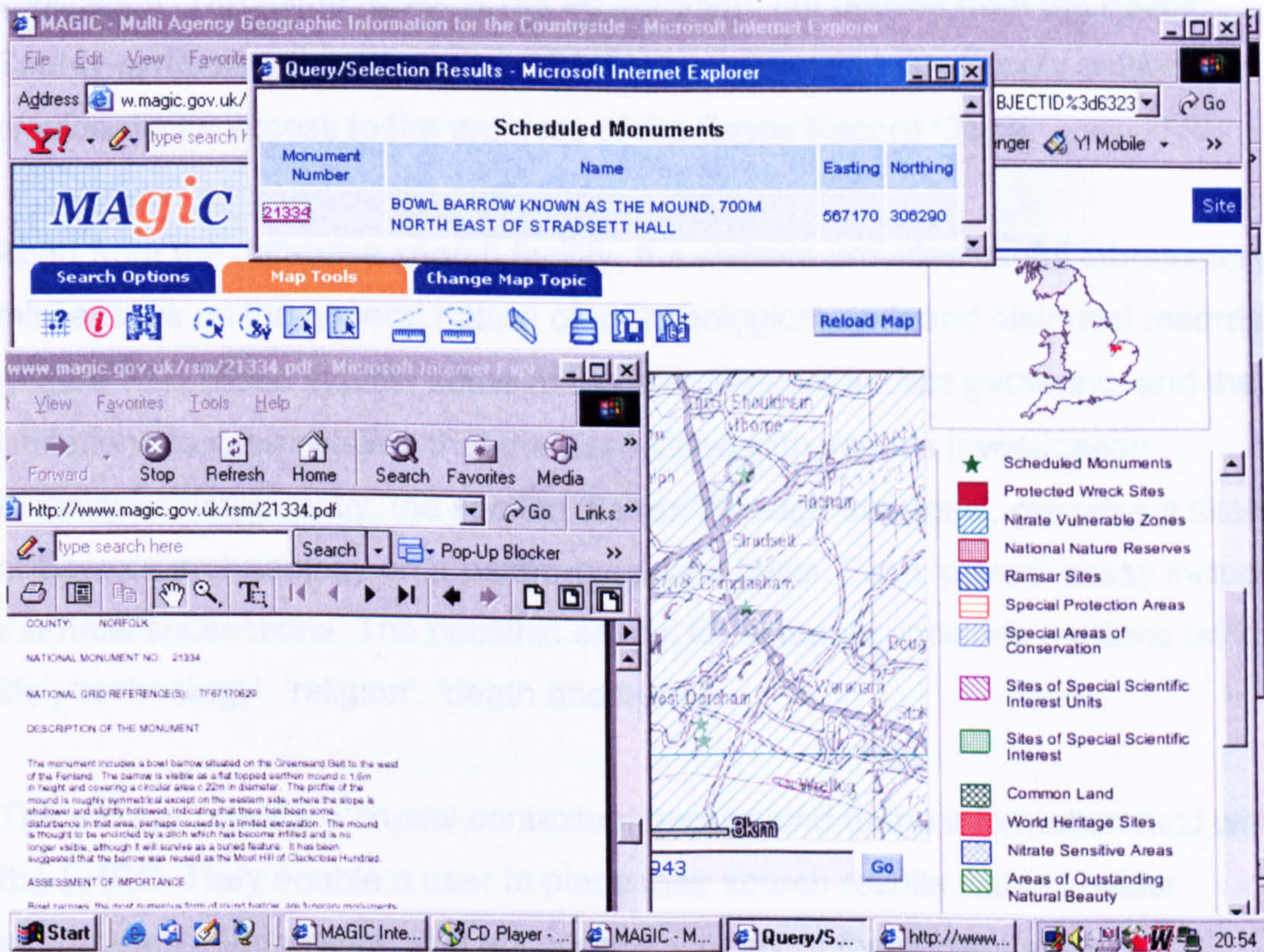
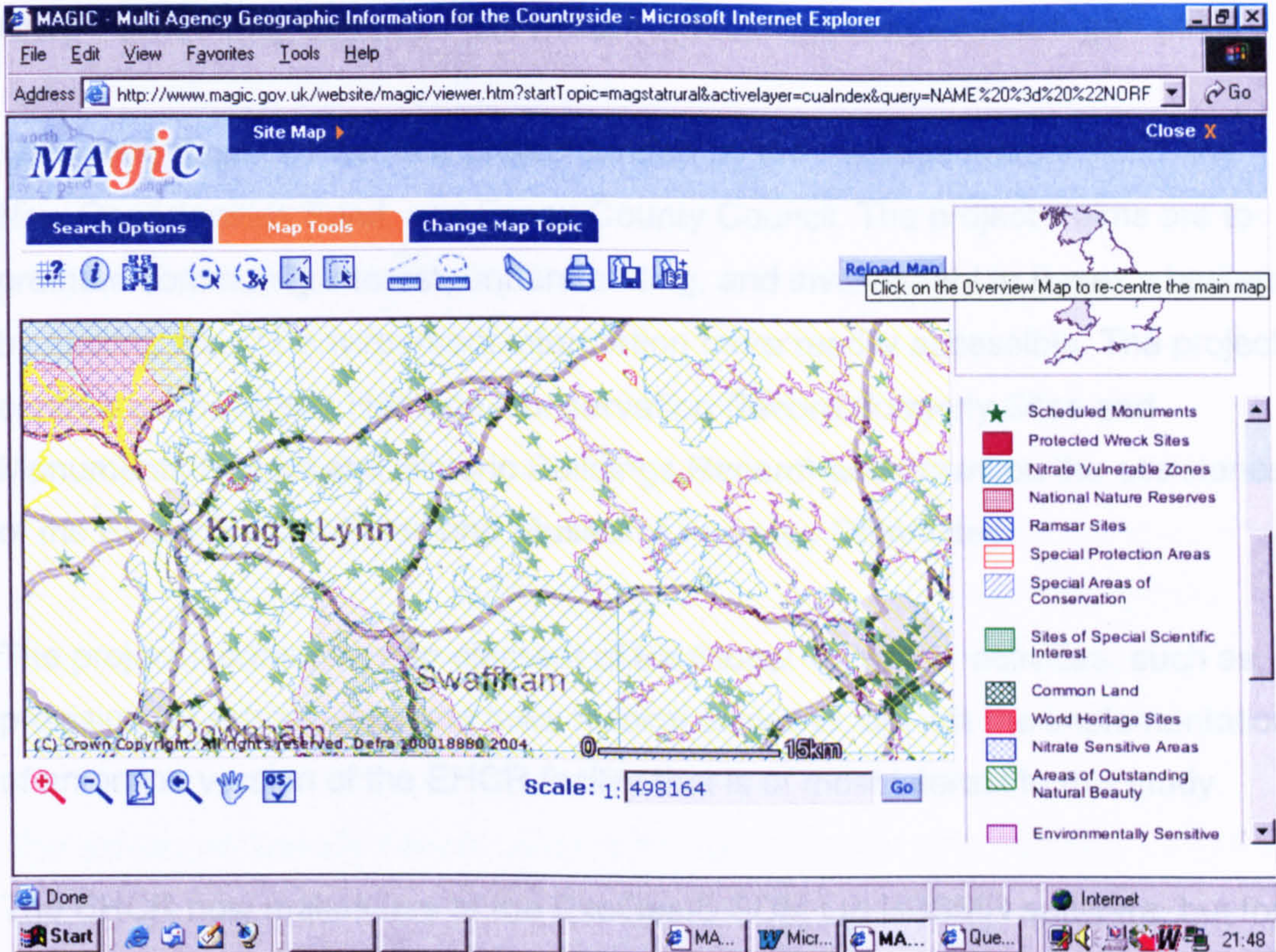


Figure 70. MAGIC search results screen shots. Original in colour.

A.8.6 Unlocking Essex's Past (<http://unlockingessex.essexcc.gov.uk>)

'Unlocking Essex's Past' is a project funded by the Heritage Lottery Fund, the New Opportunities Fund, and Essex County Council. The project's aims are to promote community interest, understanding, and involvement in Essex's heritage by making historic environment information more readily accessible. The project is centred on the Essex Heritage Conservation Record (formerly Sites and Monuments Record and Historic Buildings Record) and draws on the assistance of the Essex Record Office and Museums in Essex Committee.

The project incorporates an element of traditional 'outreach' activities, such as provision for school visits and talks to local societies, but it is the implementation of an online version of the EHCR facility that is of most interest to this study.

The EHCR now makes use of the ExeGesIS SDM Ltd HBSMR software, but for the purposes of 'Unlocking Essex's Past' use is made of the 'SEAX' archaeology application. The name SEAX is not an acronym, but derives from the Essex County symbols – three swords. SEAX is an application specifically written to provide digital access to the archives of the Essex Record Office.

Apart from the database search facility, the website provides useful introductory mini essays on the general nature of archaeological work and historical records (Figure 71). These explain some of the bias inherent in data gathering, and the limitations to interpretation that are associated with various investigation techniques. Importantly, the section 'Essex Through the Ages', provides a sketch of Essex's archaeology on a period-by-period basis. Each 'period' essay includes thematic subsections. The neolithic essay, for example, includes sections on 'daily life', 'technology', 'religion', 'death and burial'.

The essays provide a crucial contextual background to the information held within the EHRC. They enable a user to place their search results within a wider interpretative framework, and encourage scrutiny of the current state of knowledge. This feature is often entirely absent from on-line databases, which more often than not simply assume that the user has sufficient understanding of the archaeological context in order to make appropriate use of the database information.

The default search is a simple keyword search. However, tick boxes allow the user to invoke 'find type', 'find material', 'monument type', and 'monument class', indexes and to make use of standard terminology (Figure 71). The searches, therefore, may be 'free-form' or wholly framed within the INSCRIPTION data sets employed by the EHRC. Ticking the 'monument class' box, for example, presents the user with a second search screen and the ability to select a term from a drop down list of INSCRIPTION monument class headings ('Agriculture and Subsistence', 'Defence', 'Transport', etc.). Searches based on these indexes may then be constrained by administrative area, selected from hierarchical drop down word lists (county, district, parish) and by broad period terms or date ranges. In practice, I found that selecting period terms does not constrain any of the searches to specific periods.

The 'advanced search' allows users to introduce certain other qualifiers into the search. Searches can be defined that include ALL keywords, ANY keywords, or a particular PHRASE. Users can also choose to exclude keywords of their choice from the search. This search cannot be combined with the INSCRIPTION indexes. Again, I found minor inconsistency. With bombing decoys in mind, a search for the term 'decoy', excluding the word 'duck' did not exclude duck decoys from the list of record returns.

'Media search' allows an 'advanced search' of the indexed aerial photo collection, virtual models, or video holdings. Other searches, incomplete at the time of this study, included those with the title 'my town', 'my area', 'my family' and 'my house'. The intended GIS map-based search also had not yet been implemented.

Successful searches produce a table of SMR record summaries ('SMR no'. [sic], 'Monument Name', 'Summary'). Clicking on links attached to either of these fields produce a fuller record organised under the fields 'Monument Name', 'SMR Number', 'Summary' (short free text description), 'Description' (longer free text description), 'Monument Types', 'Monument Classes', 'Period', 'Administrative Area', 'National Grid Reference', 'Sources' (Figure 72).

Search returns are restricted to a maximum of 500 records, which may be a drawback for researchers seeking a very large sample of monument types. The searches that require users to select from hierarchical drop down lists may be seen as restrictive by some, but they do at least ensure that the appropriate

terminology is used to assist the search. Searches on terms not supported by a database clearly are pointless.

The records presented to the user comprise the field names and information provided by the table summaries (see above) along with a longer free text 'Description' field, a 'Monument Type(s)' field, a 'Monument Class(es)' field, a 'Period' field (date range and broad period), 'Administration Area' field, a 'National Grid Reference' field (map square and numeric grid reference) and a list of 'Sources' (aerial photographs, publications, etc.).

'Unlocking Essex's Past' is unique amongst the online monument inventories reviewed in this chapter in its adherence to the INSCRIPTION term lists (however, see 'HITITE' below; section A.8.7). The dataset is created and maintained by one organisation (Essex County Council's Heritage service) who can ensure conformity with such standards within each record. This has enormous potential benefits for the integrity of searches – users do not have to guess the appropriate search terms.

It is interesting to note that the fully relational (event-monument-archive/source) data structure implicit in the adoption of MIDAS and HBSMR, is not reflected in the records returned by searches of 'Unlocking Essex's Past'. One SMR number may cover many monument types (for example a crop marked site comprising, enclosures, trackways, ring ditches, etc.). Investigative 'events' only seem appear within 'sources' directly attached to 'monuments', rather than as records in their own right.

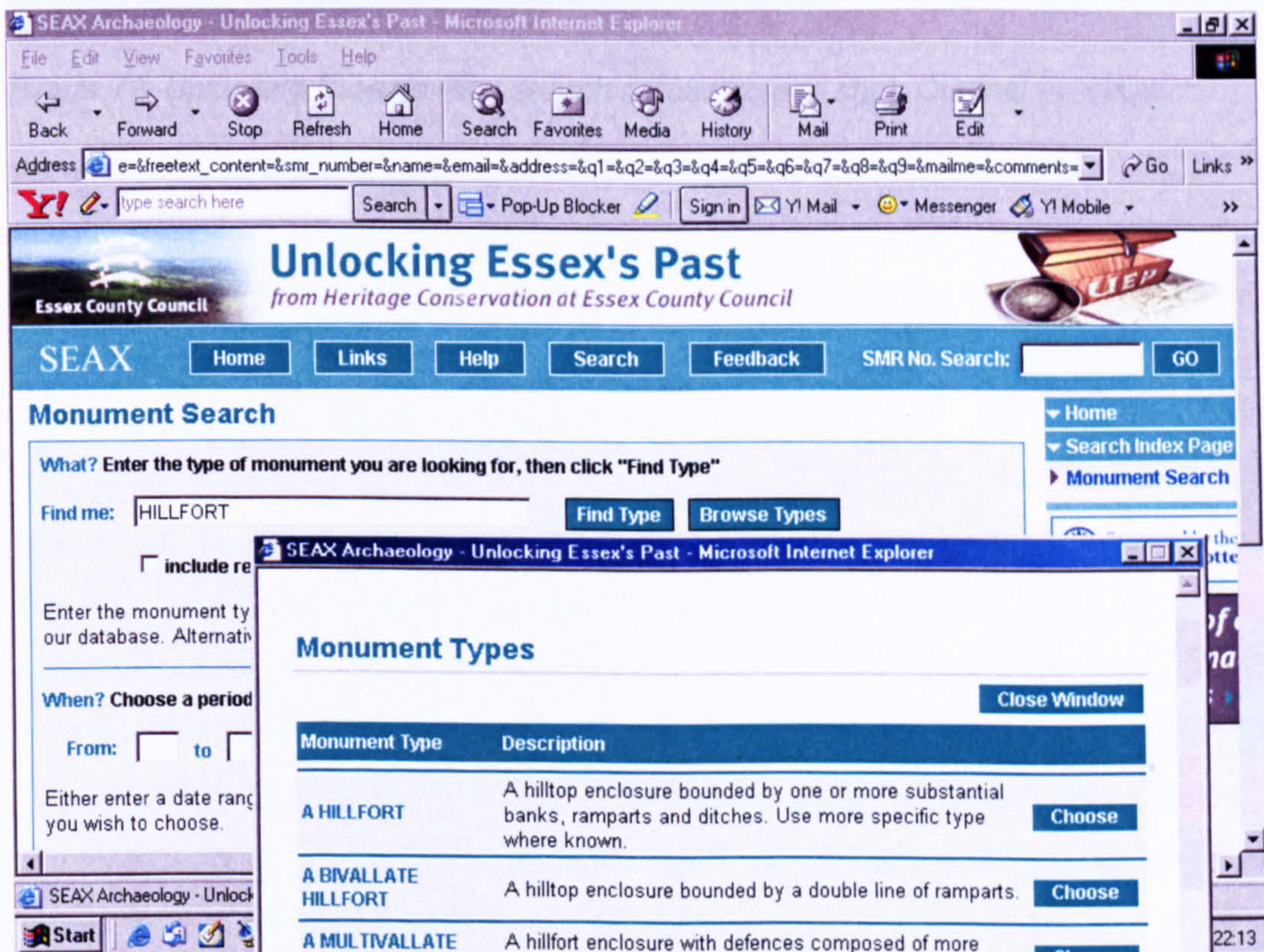
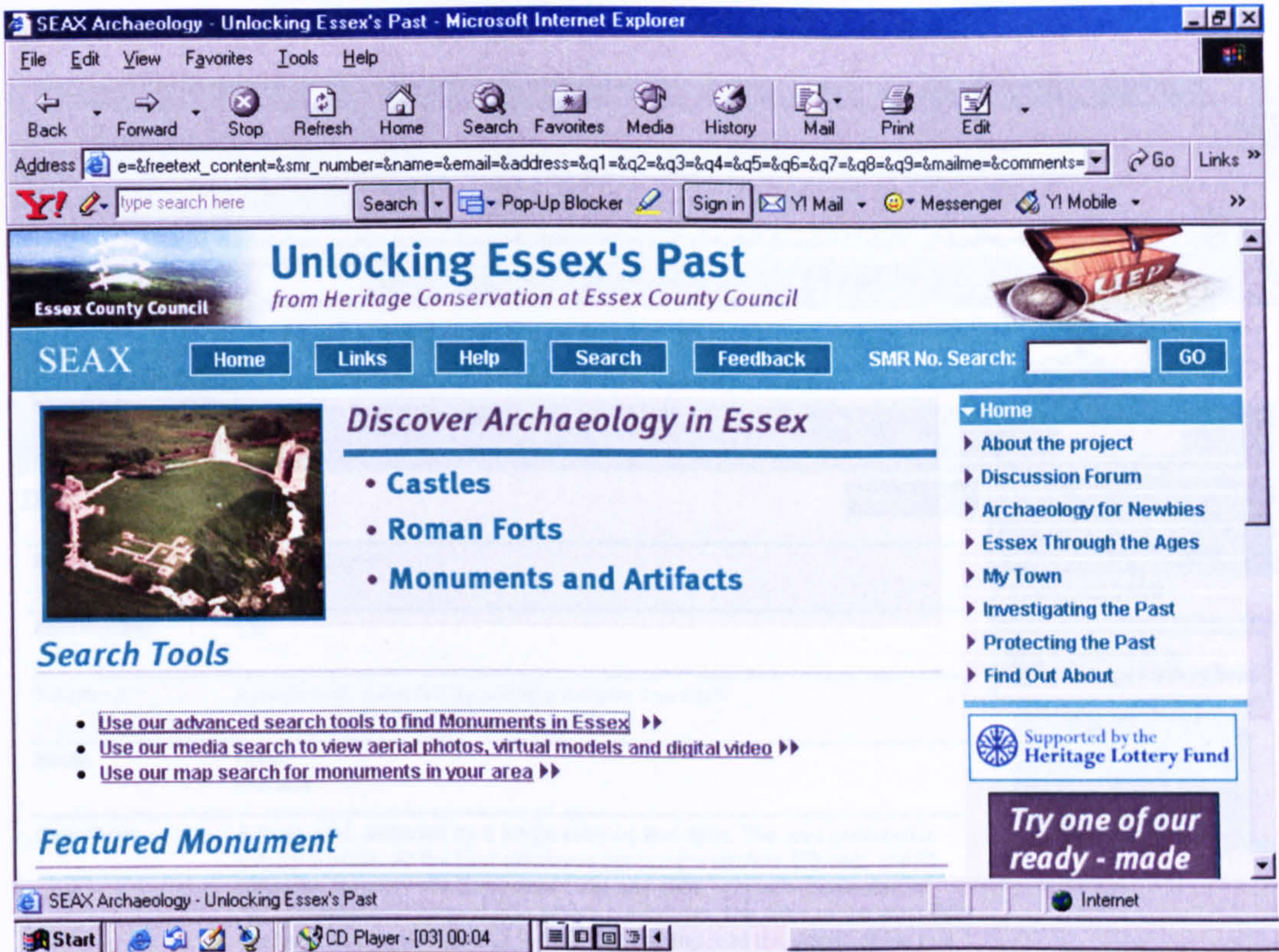


Figure 71. Unlocking Essex's Past screen shots. Original in colour.

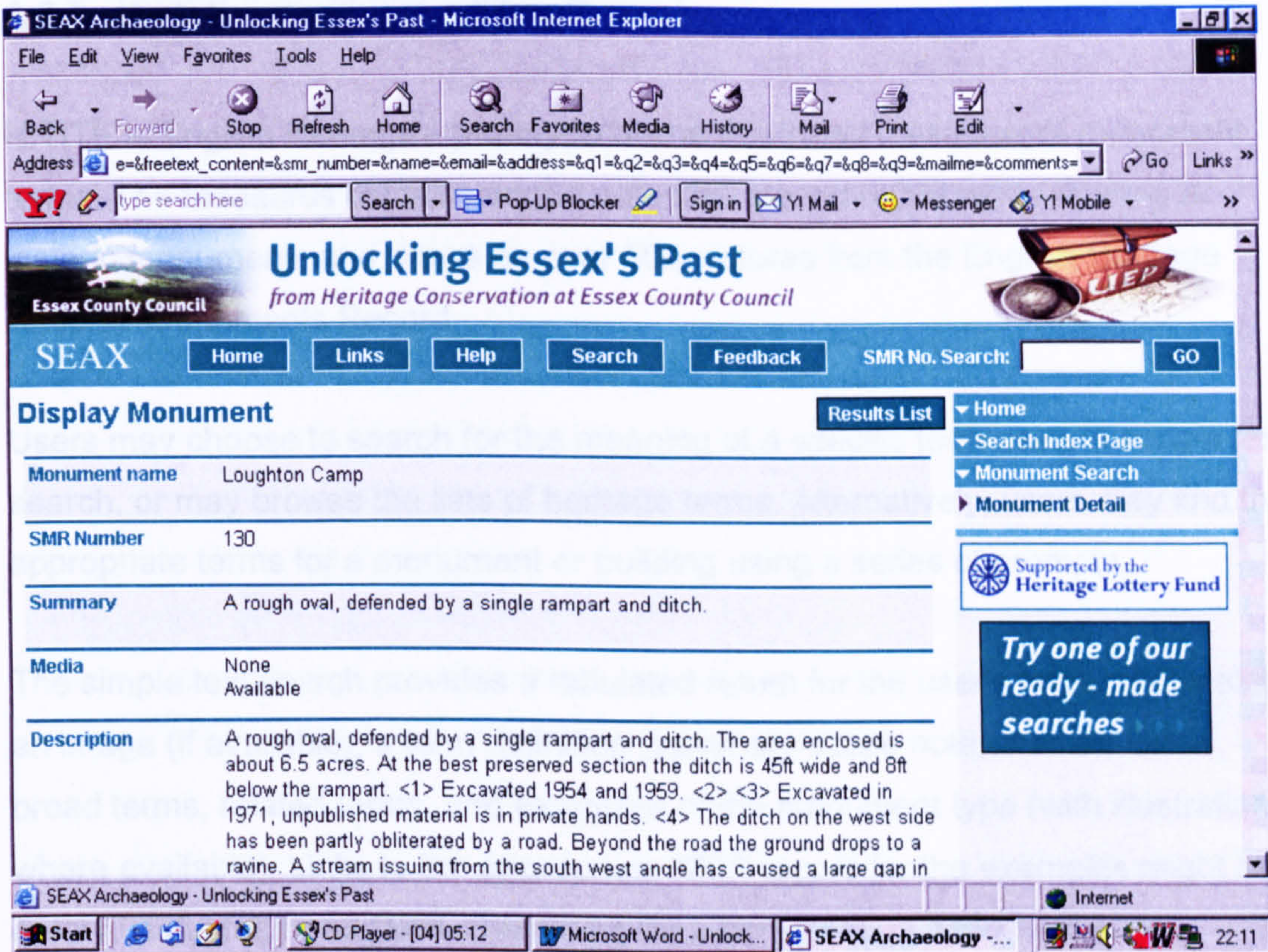


Figure 72. Unlocking Essex's Past search results screen shot. Original in colour.

A.8.7 HITITE (<http://hitite.adlibsoft.com>)

HITITE is English Heritage's prototype online illustrated thesaurus of monument terms. The thesaurus contains scope notes for around 6,000 terms relating to historic monuments and draws on over 500 pictures from the English Heritage National Monuments Record.

Users may choose to search for the meaning of a specific term using a simple text search, or may browse the lists of heritage terms. Alternatively, users may find the appropriate terms for a monument or building using a series of prompts.

The simple text search provides a tabulated return for the user's term, comprising an image (if available), a term definition (summary scope note), narrow terms, broad terms, related terms, and examples of the monument type (with illustrations where available). Links to the appropriate NMR record for the examples might be a very useful future addition. Searching for a non-thesaurus term, however, produces a slightly ambiguous result in that an incomplete table is returned and there is no emphatic indication that the term falls beyond the scope of the thesaurus. For the purposes of encouraging the adoption of the preferred thesaurus terms, it might be helpful to include non-preferred terms present in the current full version of the English Heritage NMR Monument Type Thesaurus. Users searching for such terms would not be discouraged by their absence, and could be nudged in the direction of preferred terms.

Users may browse the thesaurus of monument terms by clicking on small cartoon like images that represent monument classes (Figure 73). 'Farming' (represented by small picture of a barn), for example, equates to the 'agriculture and subsistence' monument class. 'Religion' (picture of a church) equals the 'religious ritual and funerary' class. The user is then presented with a long list of terms, organised under a broad term/term/narrow term hierarchy. Clicking on any term brings forward the term's definition, as above.

The unique feature of this online facility is the 'illustrated term search'. The user is prompted by a series of questions ("Which period do you think the monument belonged to?", "Do you have any idea what it was originally used for?", "Which shape(s) best match the monument?", "What is/are the main construction materials?", etc.) that are linked to sets of choices represented by images (Figure

73). In answer to the question, “Do you have any idea what it was originally used for?”, for example, the user may select from the monument classes hitherto described. The user may choose to answer as many of the prompts as necessary, and their choices are displayed in a box at the bottom of the screen. These terms are then used as the basis for a search of the monument thesaurus, and a list of potentially relevant monument definitions (with illustrations) is returned (Figure 74).

The results from this kind of search can seem obtuse, in that they often provide a liberal interpretation of the user’s choices or seem to miss the emphasis of the search. For example, a search for a monument of probable prehistoric date, used for defensive purposes, comprising ‘lumps and bumps’, mainly built of earth, returned ‘long barrow’, ‘chambered tomb’, and several other ‘religious ritual and funerary’ monuments in addition to the ‘hillfort’ or ‘rampart’ that I had in mind.

I was unable to find the term ‘sconce’ or ‘fieldwork’ (thinking of a Civil War period fieldwork) despite answering the questions with a variety of relevant permutations. I did, however, eventually obtain a list of terms that also incorporated an image of a later, more permanent, brick built fort with similar spearhead bastions. This would have provided a close enough approximation to provide a useful lead to a user unfamiliar with the monument type.

Clearly, however, my search method is not the one that ‘illustrated term search’ was designed for. Most users wishing to put a name to a monument or building they have seen, by definition, are unlikely to have a specific term in mind! The development of HITITE was aided by the use of an evaluation group comprising professionals, general public users, and the Wiltshire Branch of the Young Archaeologists Club. A questionnaire was developed that helped to assess the images and features that are most useful to identify particular monuments (Carlisle 2002). Continuing reference to such evaluation groups no doubt will help to refine the search mechanisms.

HITITE, specifically the ‘illustrated term search’, is unique amongst the online facilities reviewed herein, in that it leads the user by the hand by providing definitions of search terms and thus enables the user to make informed choices about their search parameters. Other systems chiefly rely on the knowledge and judgement that a user brings to the search to ensure integrity in the search terms they use. HITITE obviously has been designed with users who are less familiar

with the historic environment in mind. Nevertheless, the 'intuitive' path to assisting illustrated term searches appears to have important implications for the development of HERs for more specialist research users.

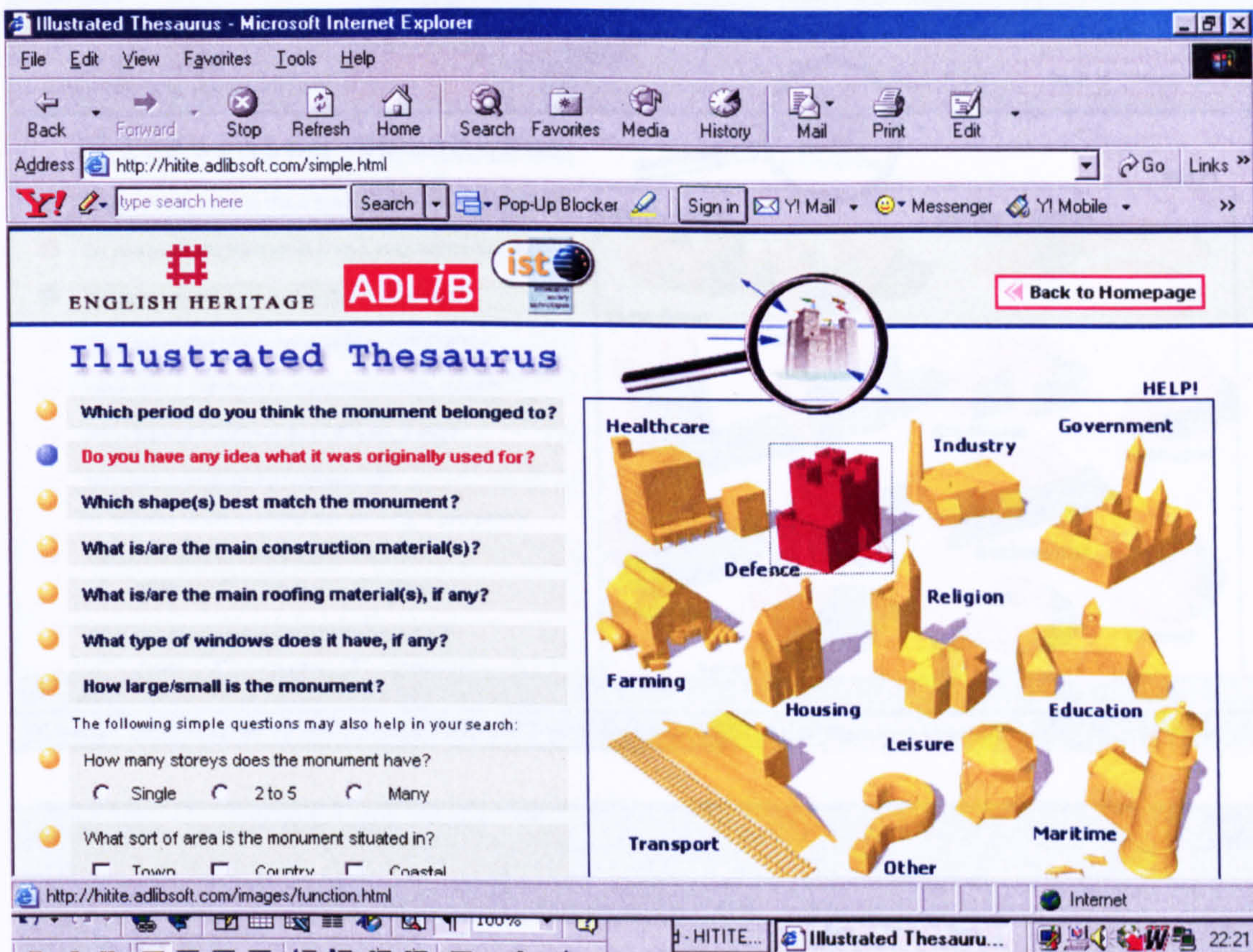


Figure 73. HITITE search screen shot. Original in colour.

Illustrated Thesaurus - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit

Address http://hitite.adlibsoft.com/simple.html

Y! type search here Search Pop-Up Blocker Sign in Y! Mail Messenger Y! Mobile

ENGLISH HERITAGE ADLIB ist

Back to Homepage

Illustrated Thesaurus

HELP!

- Which period do you think the monument belonged to?
- Do you have any idea what it was originally used for?
- Which shape(s) best match the monument?
- What is/are the main construction material(s)?
- What is/are the main roofing material(s), if any?
- What type of windows does it have, if any?
- How large/small is the monument?

The following simple questions may also help in your search:

- How many storeys does the monument have?
 - Single
 - 2 to 5
 - Many
- What sort of area is the monument situated in?
 - Town
 - Country
 - Coastal

Multi-winged Lumps & Bumps

Cylindrical Arched

Cruciform D-shaped

Multi-sided Triangular Rectangular

Square Other




Start CD Player - [07] 03:18 Microsoft Word - HITITE... Illustrated Thesauru... 22:24

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit

Address http://hitite.adlibsoft.com/wwwopac.exe

Y! type search here Search Pop-Up Blocker Sign in Y! Mail Messenger Y! Mobile

| | |
|---|---|
|  | <p>Term: HARD STANDING</p> <p>Description: An area of hard material for aircraft to stand on when not in use.</p> <p>Class: Defence</p> |
|  | <p>Term: GARDEN BUILDING</p> <p>Description: Includes some structures that are not strictly buildings. Use a more specific term where possible.</p> <p>Class: Gardens Parks and Urban Spaces</p> |
|  | <p>Term: PILLBOX</p> <p>Description: An often squat building with thick, loopholed walls and a flat roof, designed to accommodate a variety of weapons, usually strategically positioned to cover a vulnerable point in a defensive system.</p> <p>Class: Defence</p> |

Done Internet

Figure 74. HITITE search results screen shots. Original in colour.

A.8.8 PASTSCAPE (www.pastscape.org)

'Pastscape' is another English Heritage initiative that has been designed with the general interest user and children in mind. The online prototype project provides a user-friendly interface to basic information drawn from the National Monuments Record database ('AMIE') of around 400,000 entries relating to buildings and monuments. Searches do not rely on users' knowledge of the complex data structures and thesauri that underpin the database (Bryne & Pringle 2003, 3). The development of 'Pastscape', since 1999, has been informed by experiments with various user groups, and it is anticipated that further evaluation information will be gathered from use of the online prototype.

The 'Pastscape' interface provides users with three search methods: a text only facility, an image based facility, and an animated search facility. The first of these allows the user to select combinations of 'where' (location - region, county, place-name) 'what' (monument classes or types), and 'when' (broad time period, or range between dates). Searches are assisted by selection from simple lists of options, but unassisted keyword searches are allowed in order to refine place-name and monument type searches.

The second search method provides a visual representation of the 'where', 'what' and 'when' search criteria using simple cartoon-like clickable models of a map of the country (with its regions, and counties); monument classifications ('defence' is represented by a castle and a pillbox, for example), and the broad period terms accompanied by images of buildings or monuments that characterise the period. The animated facility allows the user to 'fly' through a 'landscape' populated by these clickable models. The emphasis is on making the search as interactive and inviting as possible for those without knowledge of monument types or extensive ICT experience (Figure 75, Figure 76).

An estimate of the number of monument types that fit the search criteria is provided throughout the selection process. Successful searches are rewarded by a list of monuments that fit the search criteria, and hypertext links to more information about the monuments. Very brief text descriptions are supported by links to short thematic essays organised by period and monument classification (for example, defence in the Iron Age, religion in the Roman period) that provide an archaeological and historic context for the monument.

Internet links to maps and aerial photos produced by streetmap.co.uk and getmapping.com have been included. In the future, it is anticipated that the text record information (Figure 76) will be amplified and complimented by multi-media resources such as sound files, video, and computer graphics.

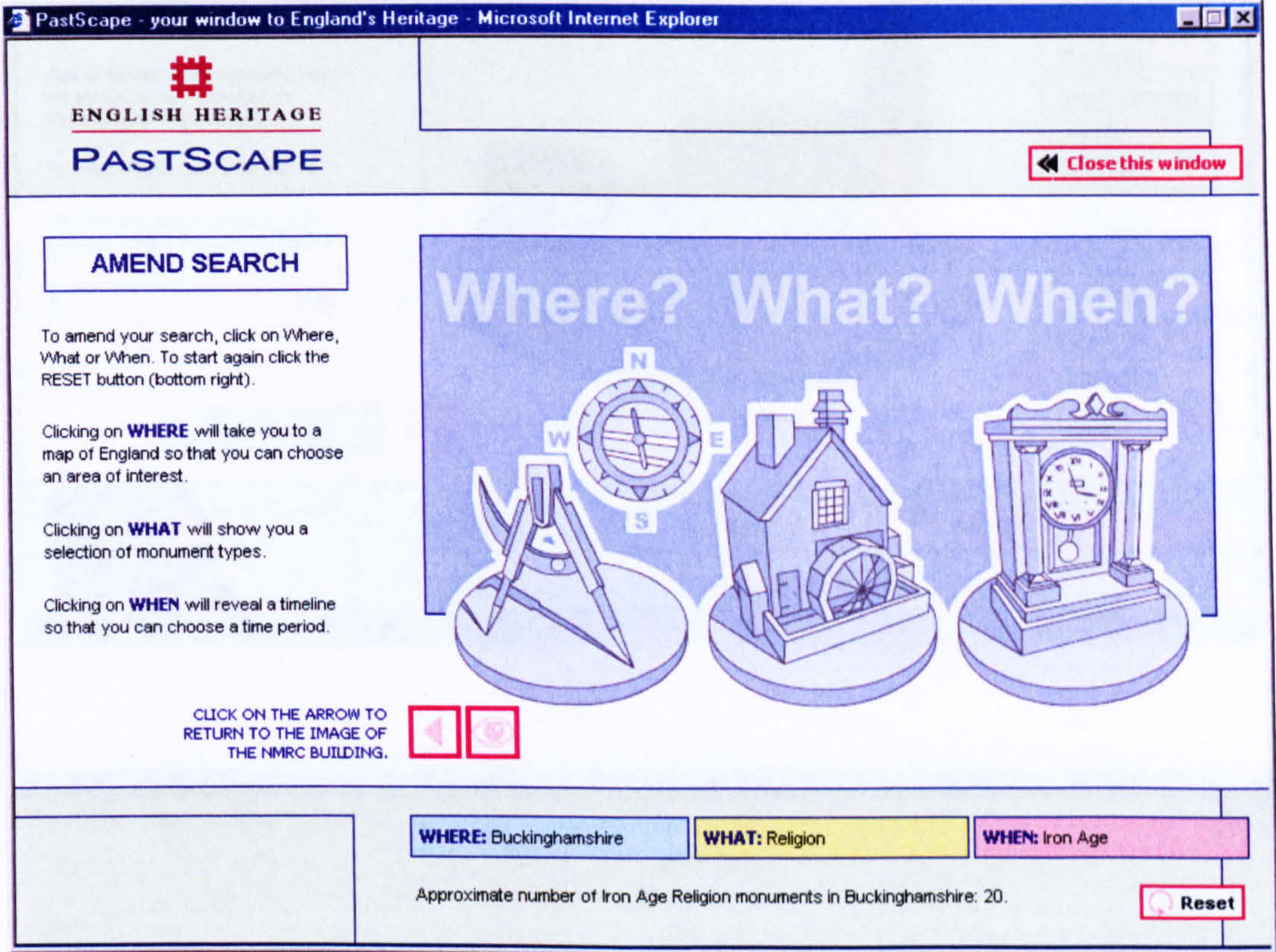


Figure 75. PASTSCAPE search screen shot. Original in colour.

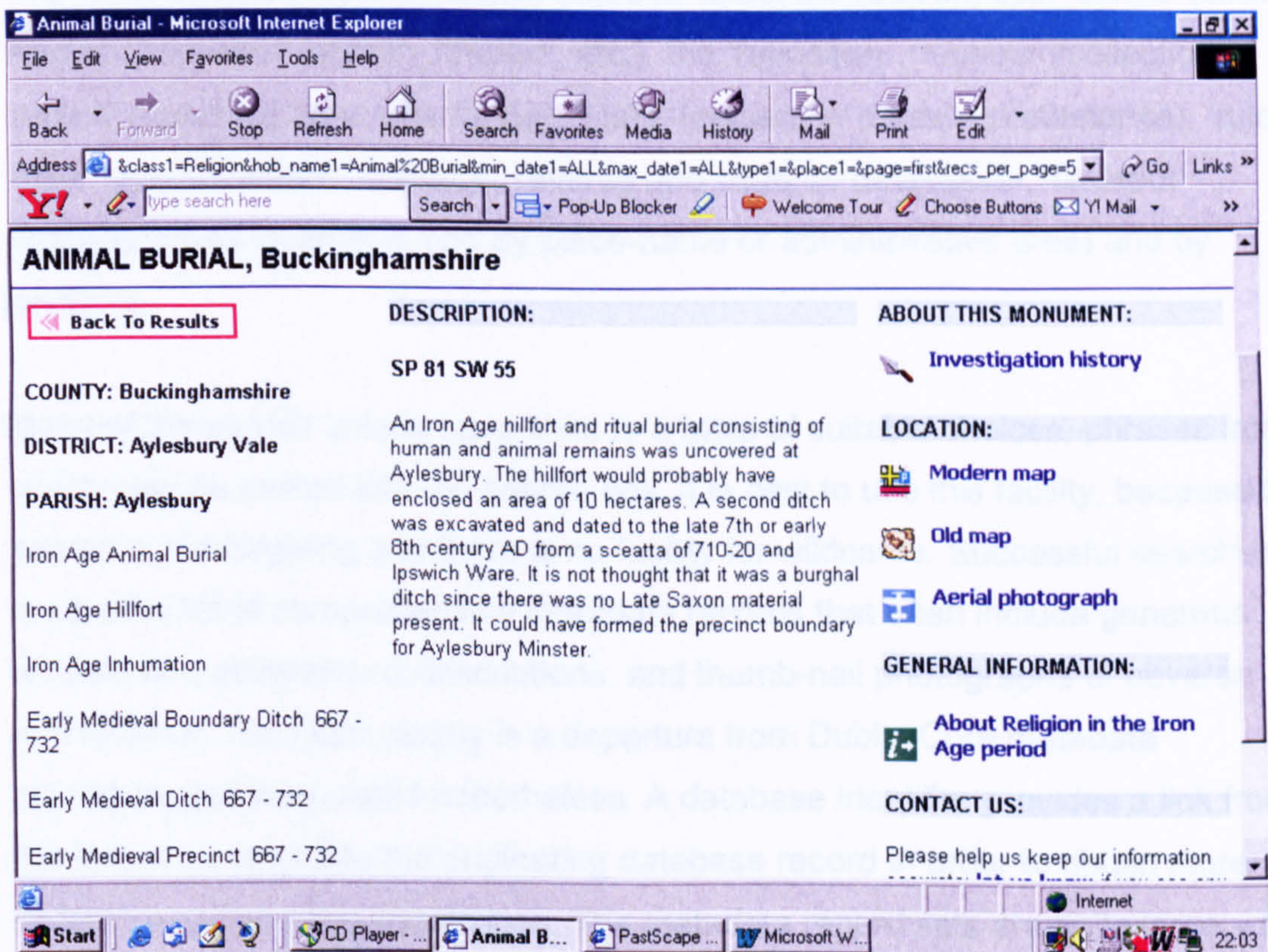
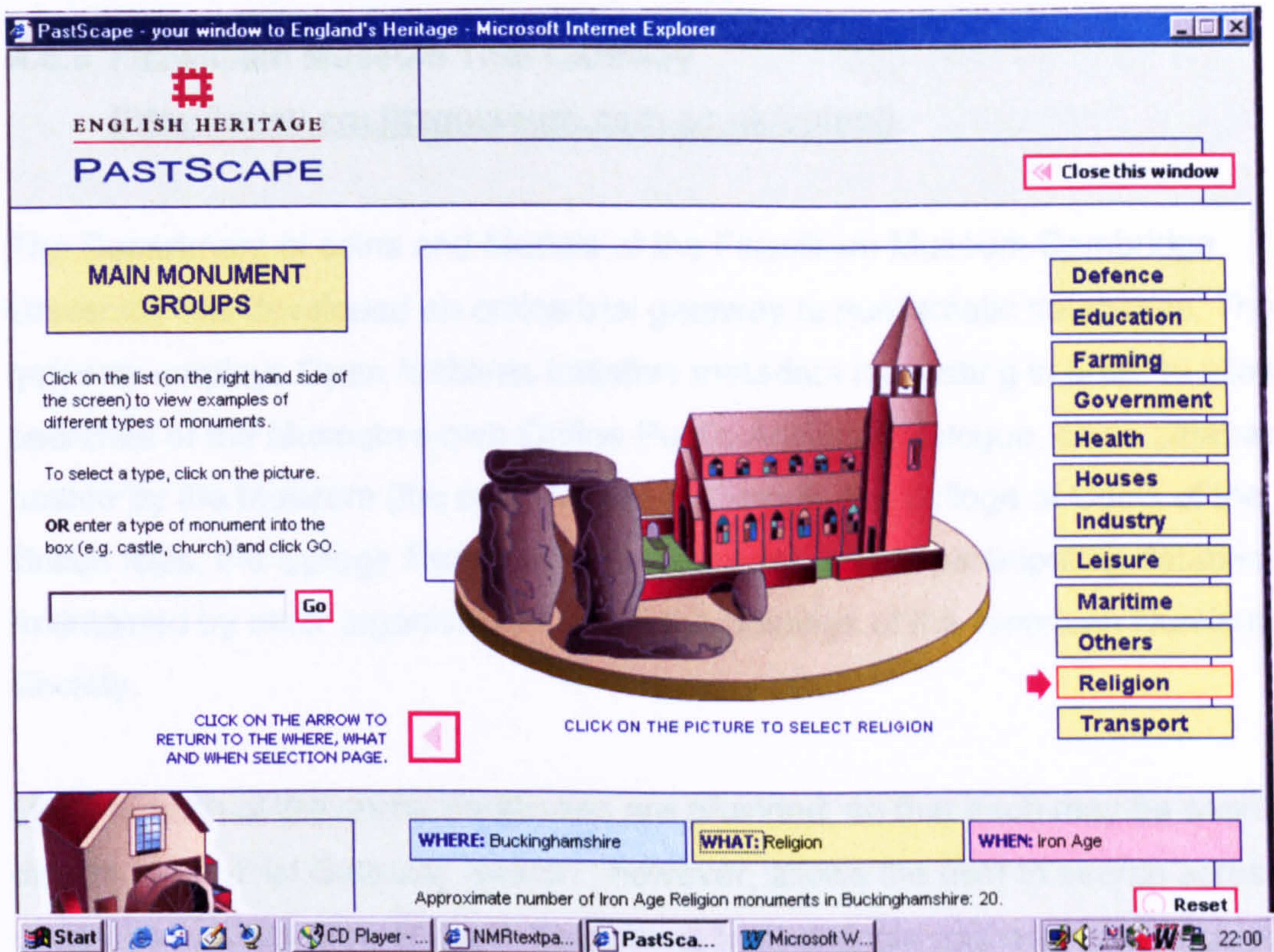


Figure 76. PASTSCAPE search results screen shots. Original in colour.

A.8.9 Fitzwilliam Museum Trial Gateway

(<http://www-cm.fitzmuseum.cam.ac.uk/coins/>)

The Department of coins and Medals at the Fitzwilliam Museum Cambridge University has developed an online trial gateway to numismatic databases. The gateway employs Open Archives Initiative metadata harvesting in order to allow searches of the Museum's own Online Public Access Catalogue, coins databases hosted by the Museum (the early Medieval Corpus, the Sylloge of Coins of the British Isles, the Sylloge Nummorum Graecorum), and to participating databases maintained by other organisations, such the holdings of the American Numismatic Society.

Links to each of the online databases are provided, so that each may be searched directly. The 'Trial Gateway Search', however, allows the user to search across metadata records from all these databases from a single gateway search page.

The 'Trial Gateway Search' allows users to select the relevant coin 'series' (Greek, Roman, Medieval, Islamic, Modern, etc.), the 'repository' (museum/collection), 'period' (specified as a date range), 'state' (ancient or modern provenance), 'ruler', 'mint', denomination', 'material', reverse and obverse description, 'findspot' (actually broad location of find by place-name or administrative area) and by keyword.

Many of the search criteria have links to a table of suitable choices, phrases from which may be pasted into the search box. It is best to use this facility, because the search is not forgiving and there is no facility for wildcards. Successful searches produce a list of comprehensive metadata records that often include generous reverse and obverse text descriptions, and thumb-nail photographs of obverse and reverse. The latter clearly is a departure from Dublin Core metadata standards, but very useful nonetheless. A database identifier provides a link from the metadata record to the originating database record in order to obtain more detailed and complete information. The metadata record sets are quite large – the three deriving from the coin databases hosted by the Fitzwilliam comprise around 6000, 45,000, and 12,500 records respectively. Searches via a dial-up 56k modem, however, were perfectly acceptable.

As a further service, the Coins and Medals Department has encouraged the trial metadata harvesting of these records by other facilities (under the terms of a license agreement), and has offered sample code for the OAI protocol.

APPENDIX 9 - ADS CIE DEMONSTRATOR SCREEN SHOTS

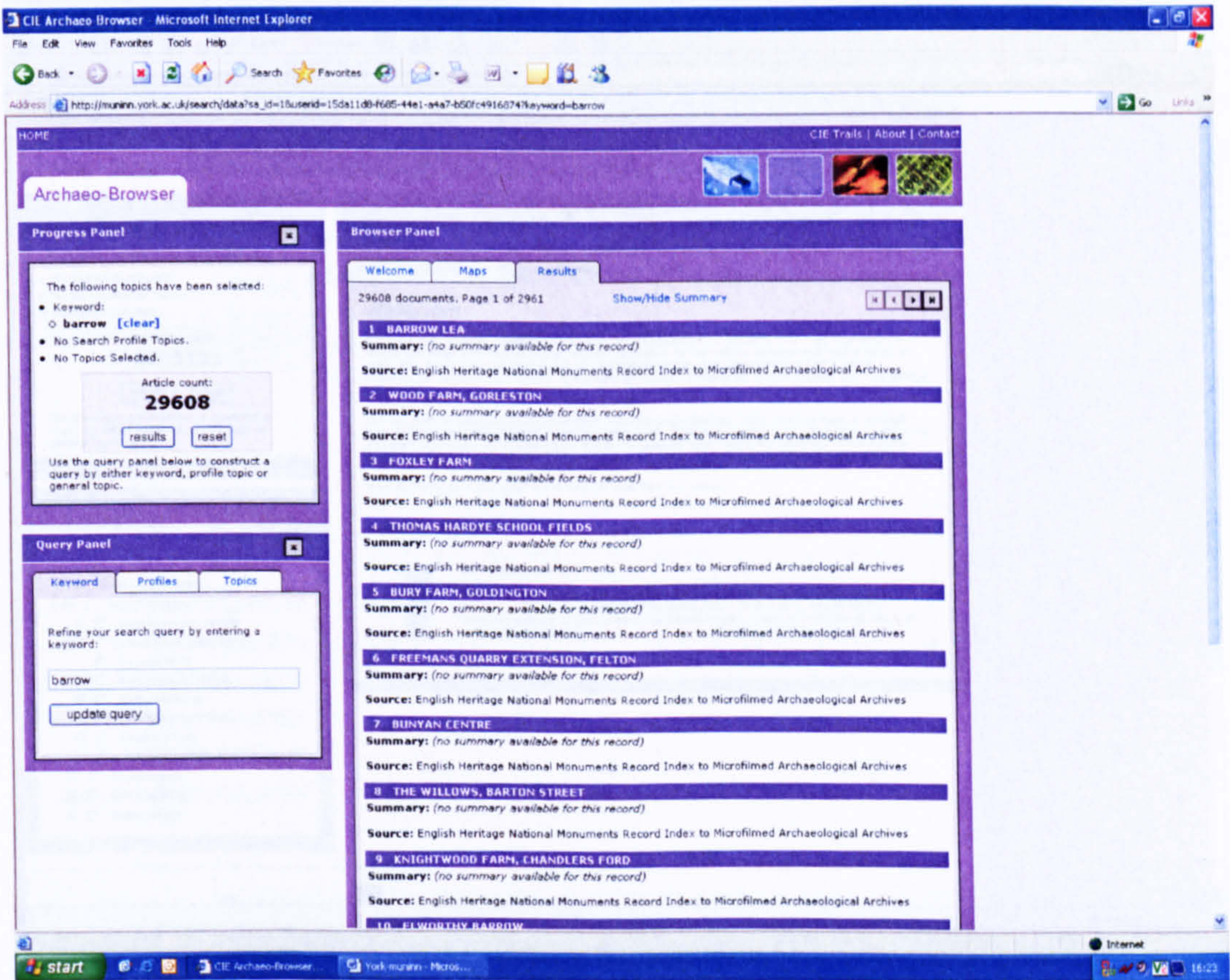
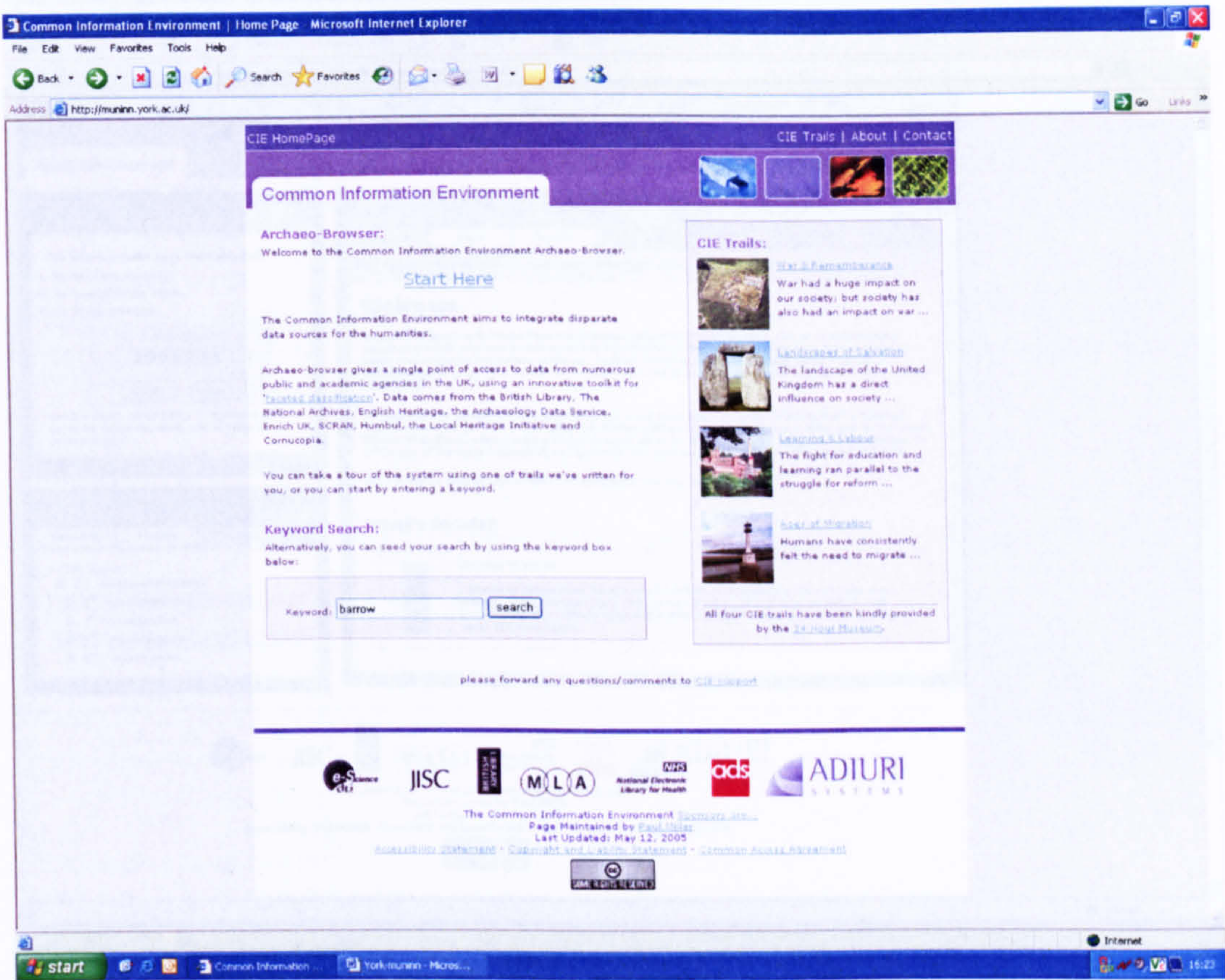
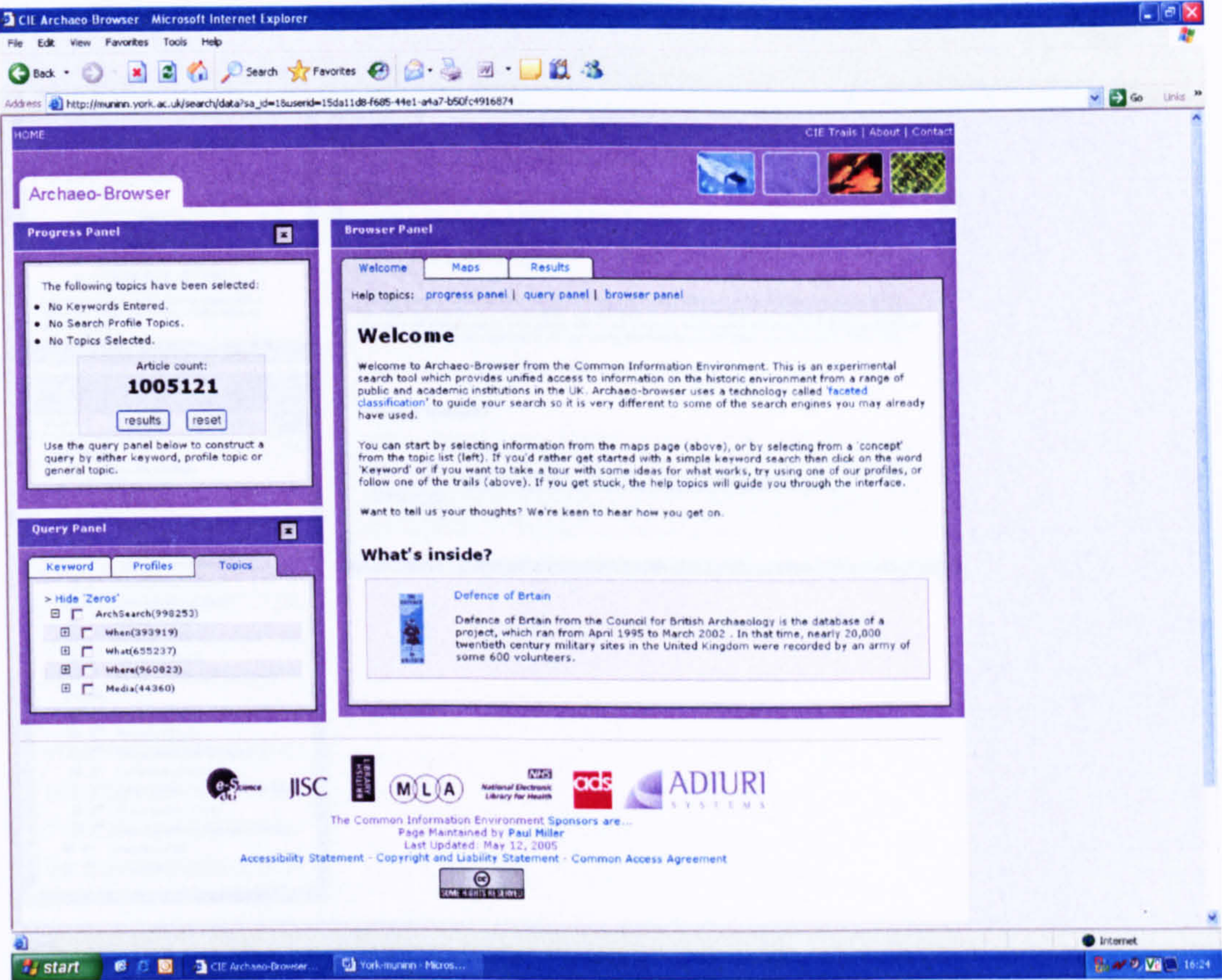


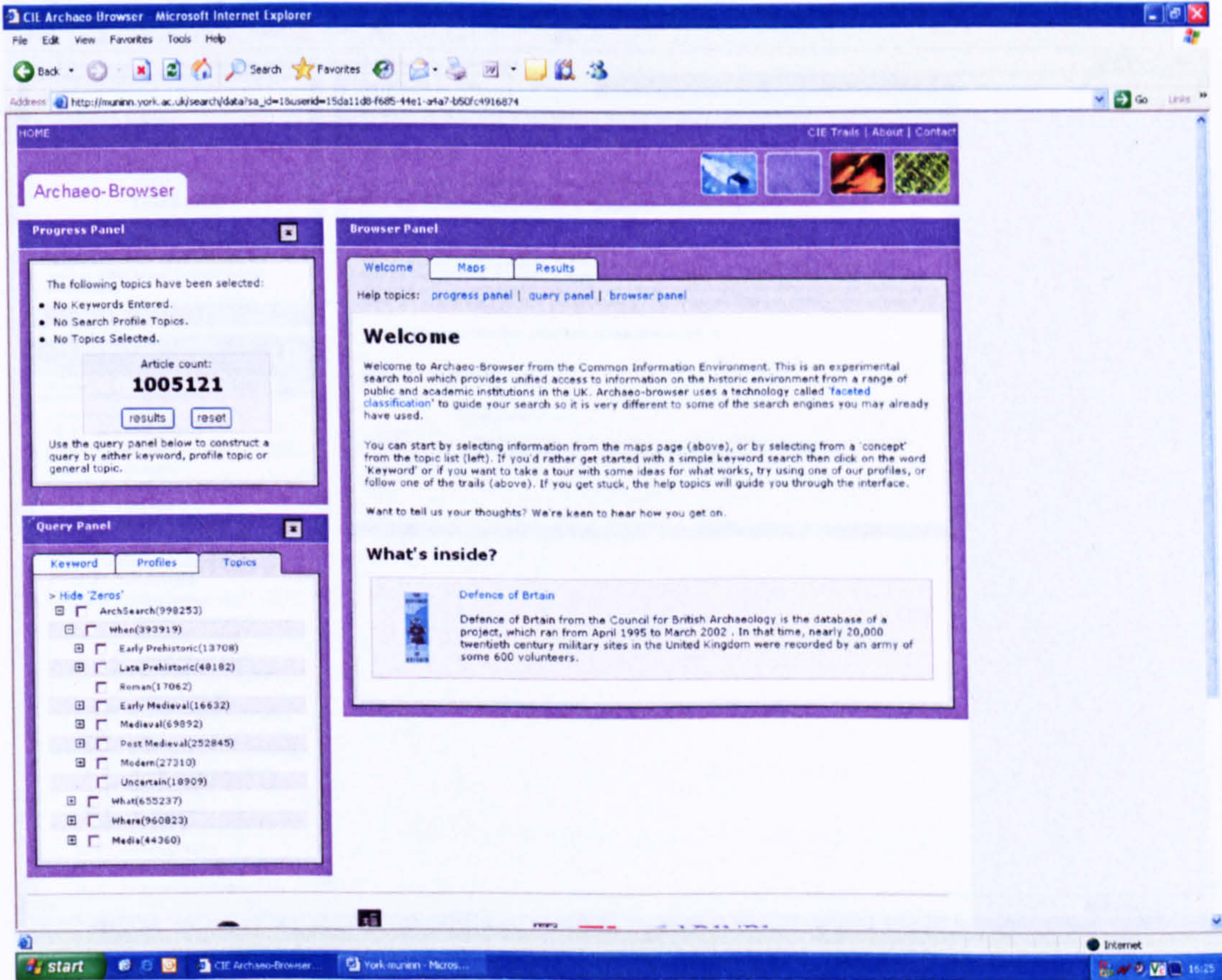
Figure 77. ADS CIE demonstrator keyword search. Original in colour.



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Figure 78. ADS CIE demonstrator 'When' facet selection. Original in colour.

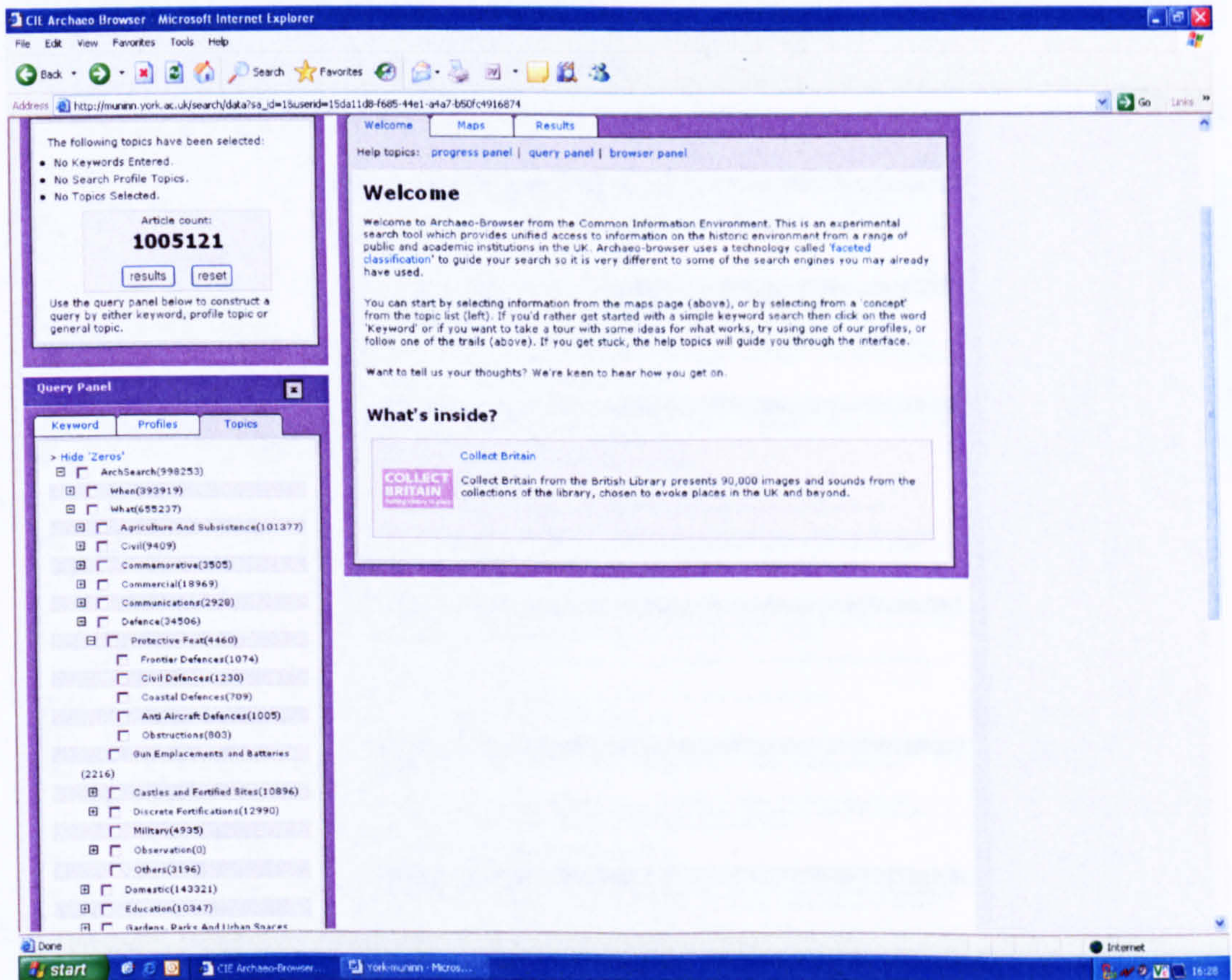
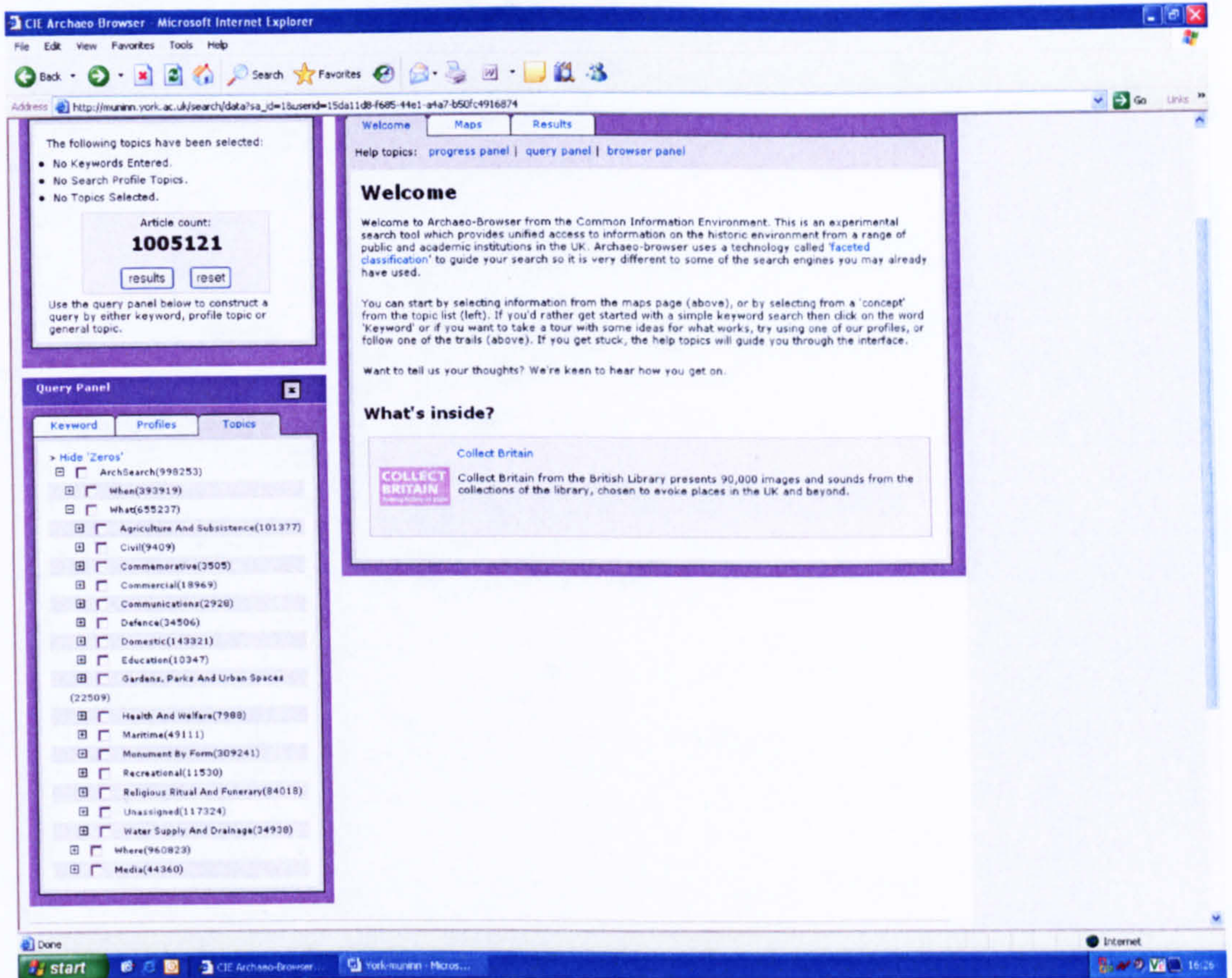


Figure 79. ADS CIE demonstrator 'What' facet selection. Original in colour.

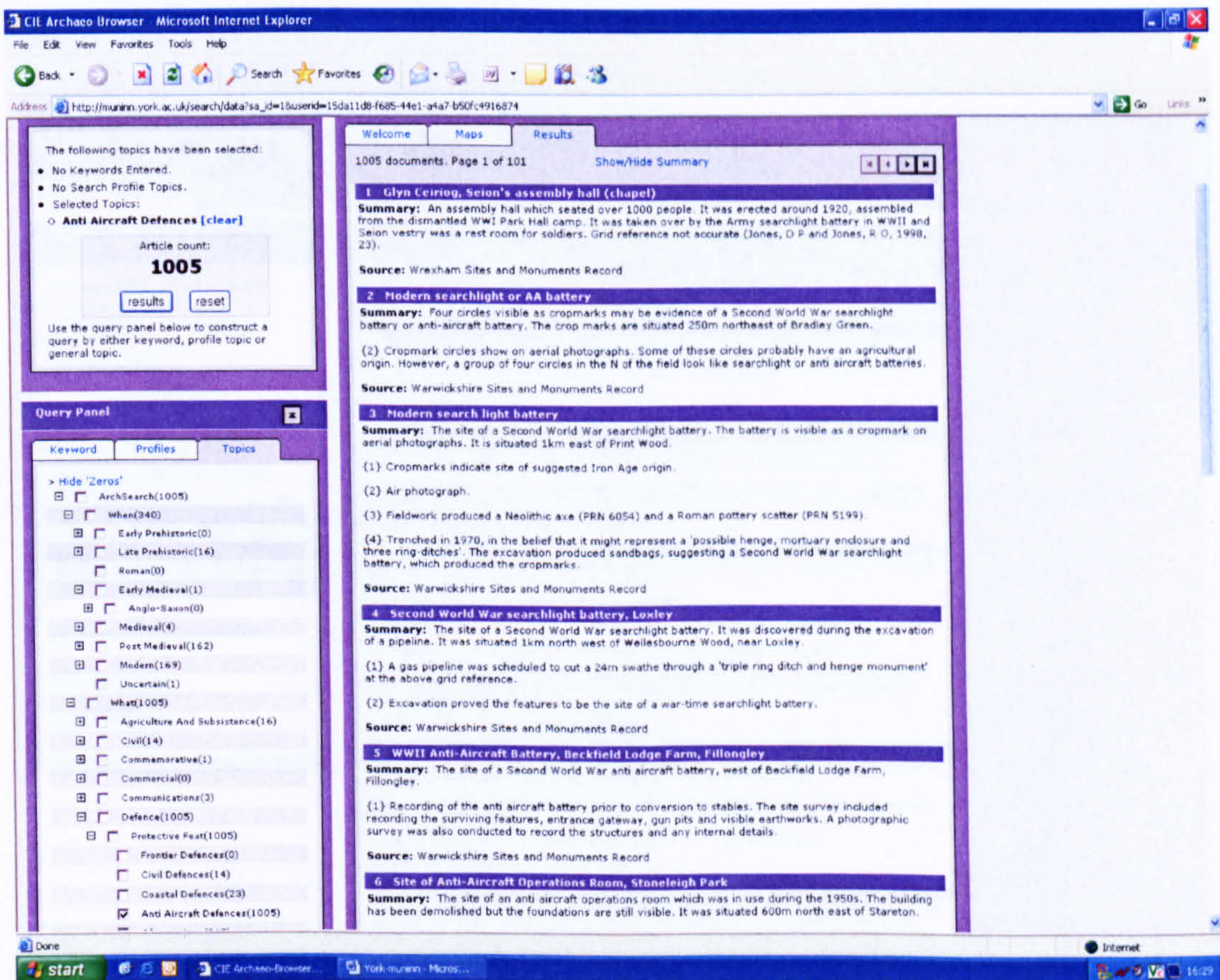
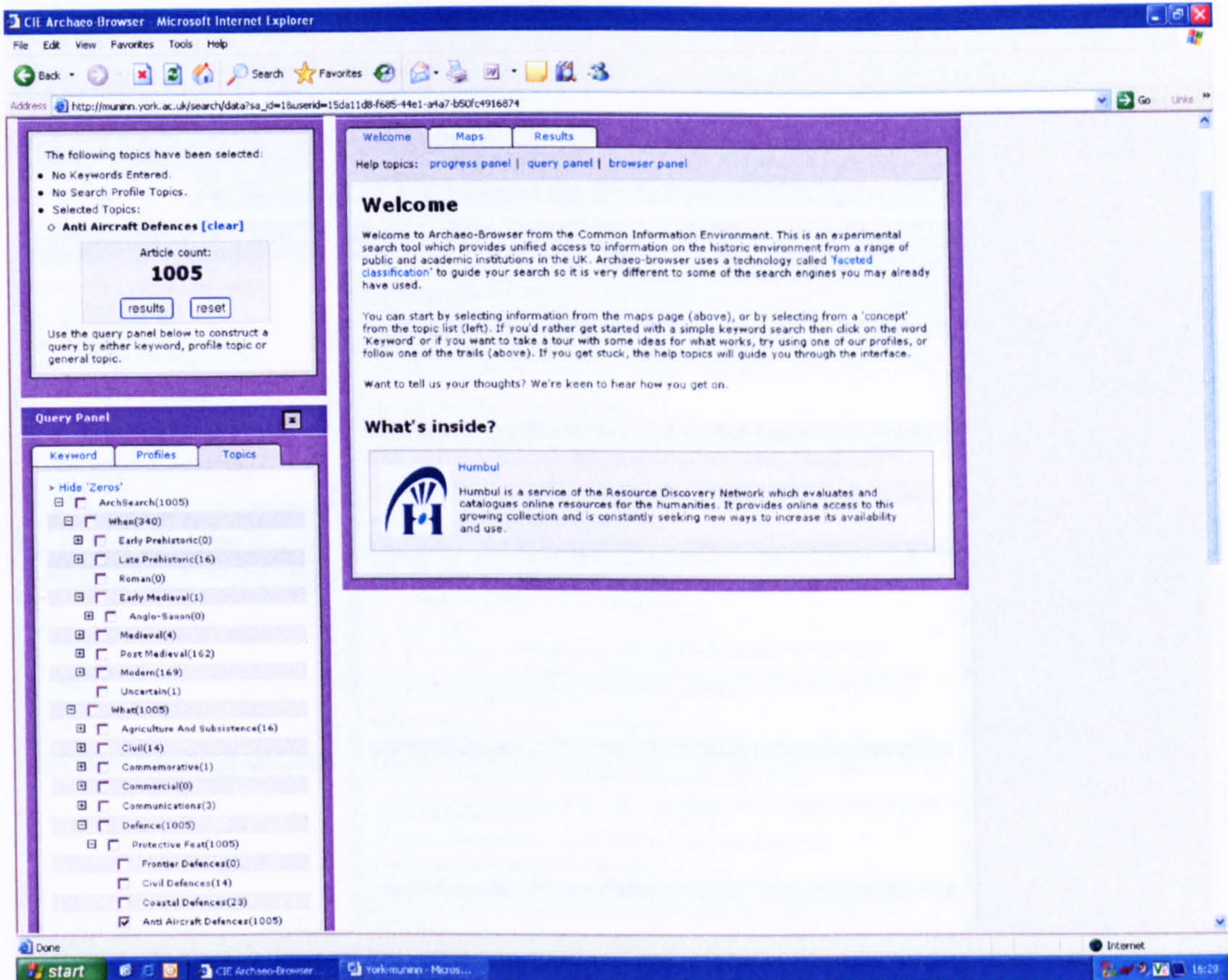


Figure 80. ADS CIE demonstrator sub-concept selection. Original in colour.

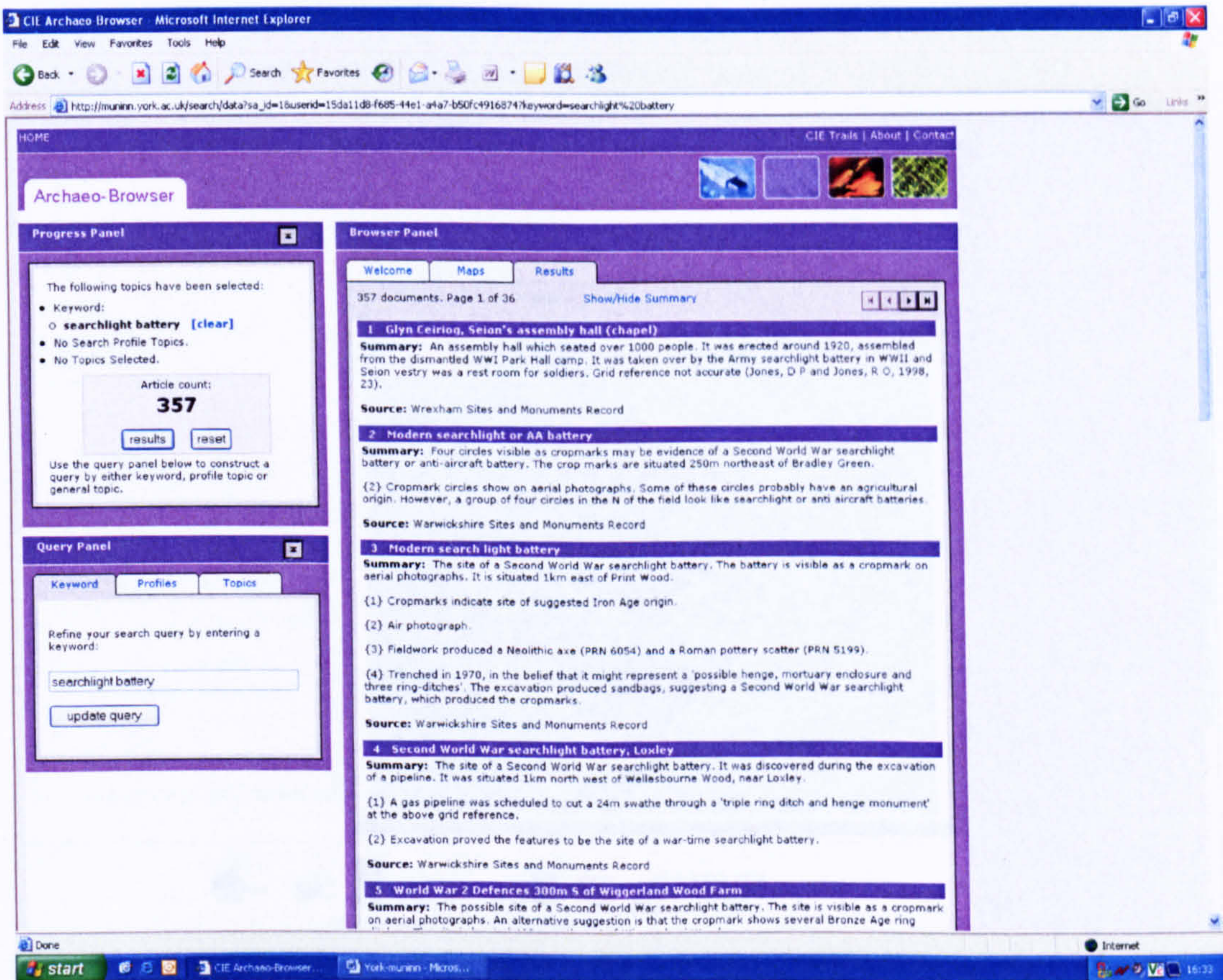
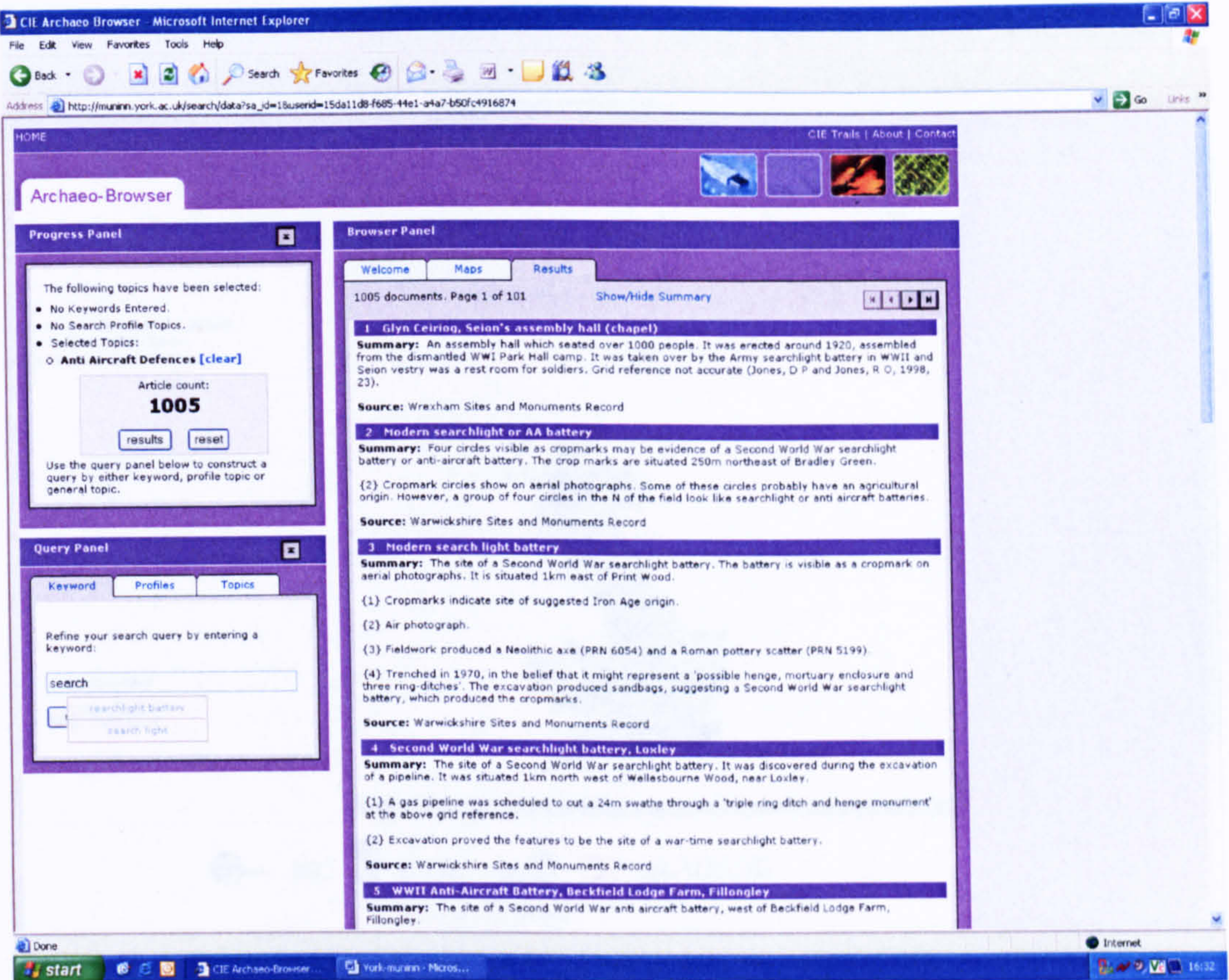


Figure 81. ADS CIE demonstrator refining search selection. Original in colour.

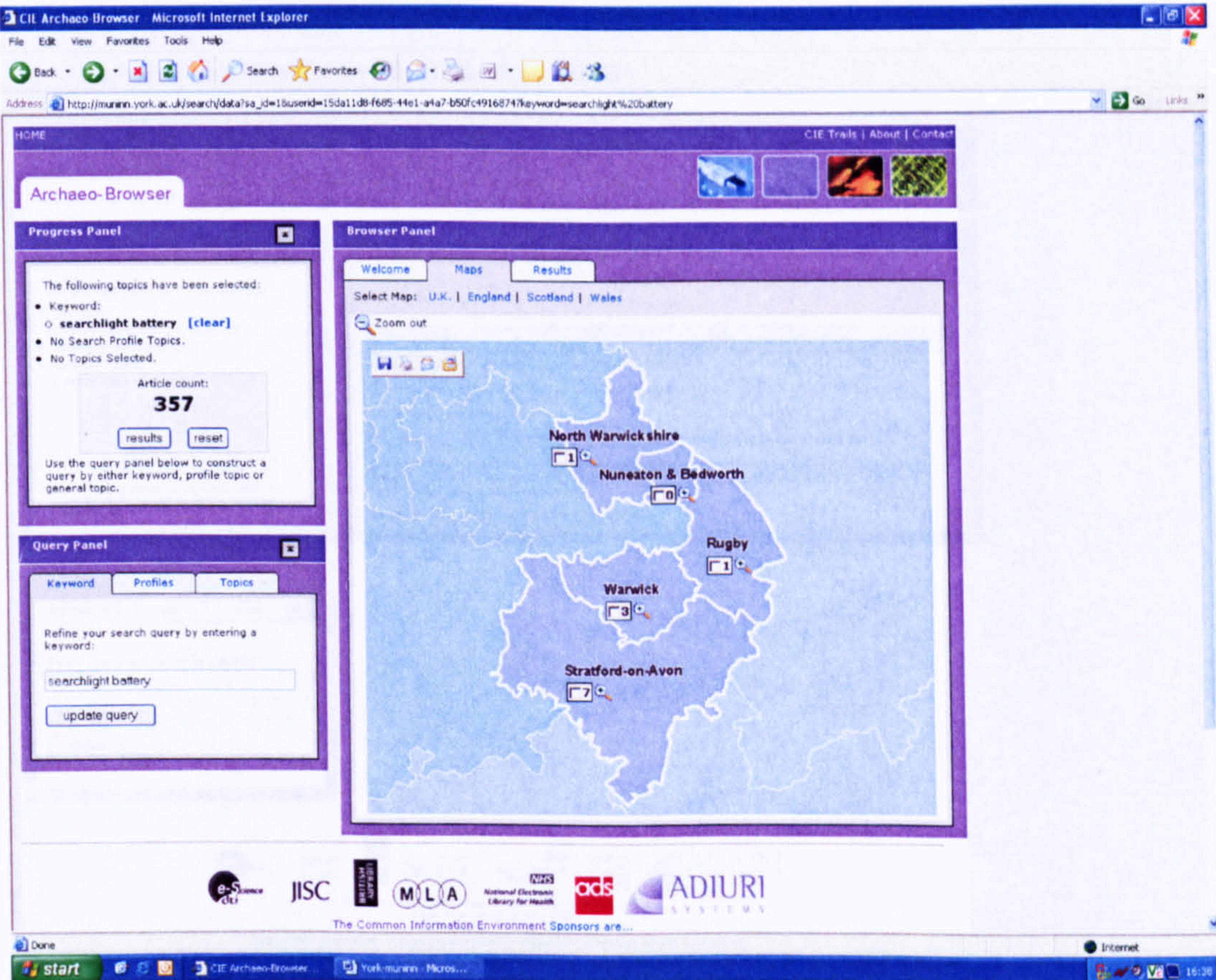
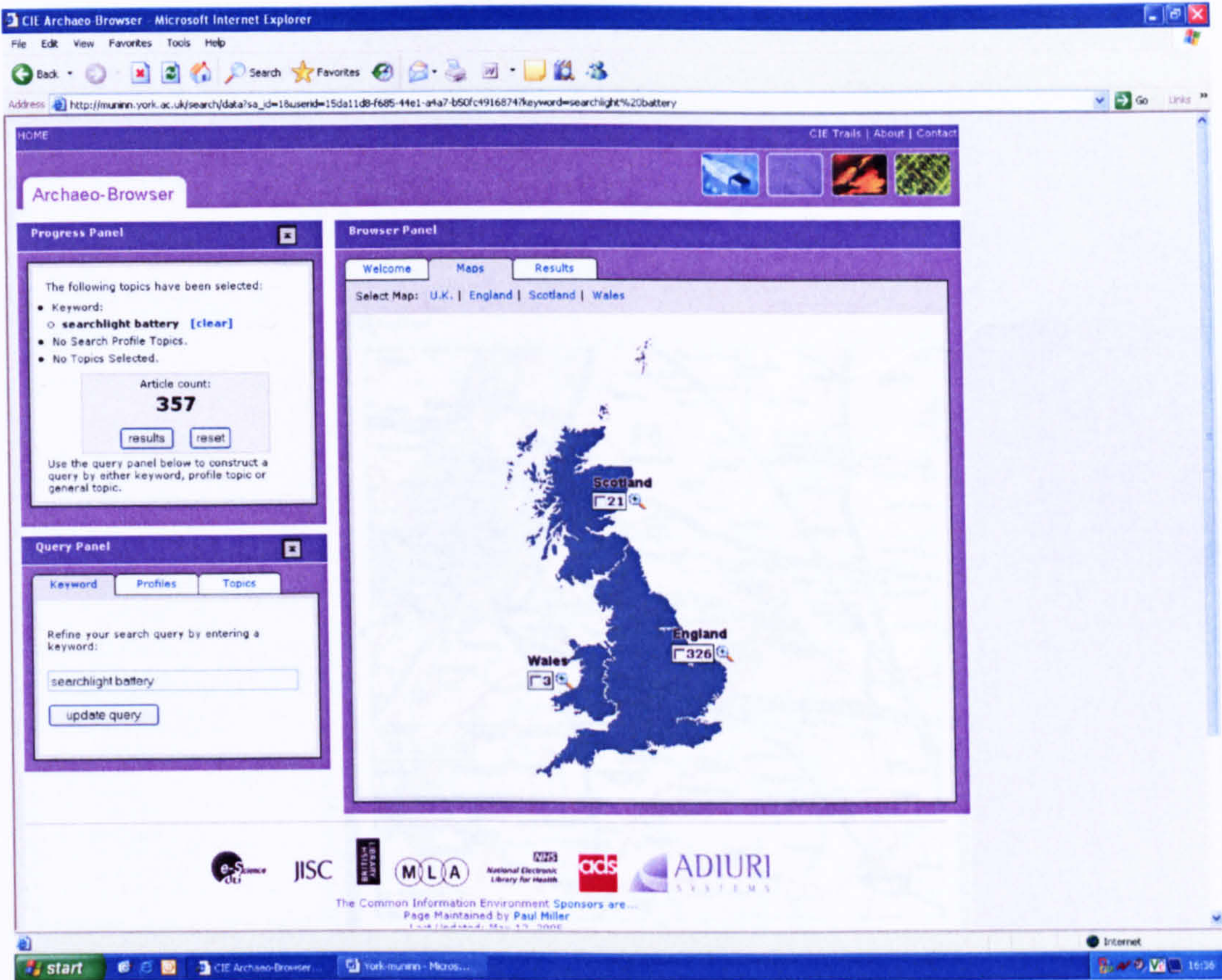


Figure 82. ADS CIE demonstrator mapped search results. Original in colour.

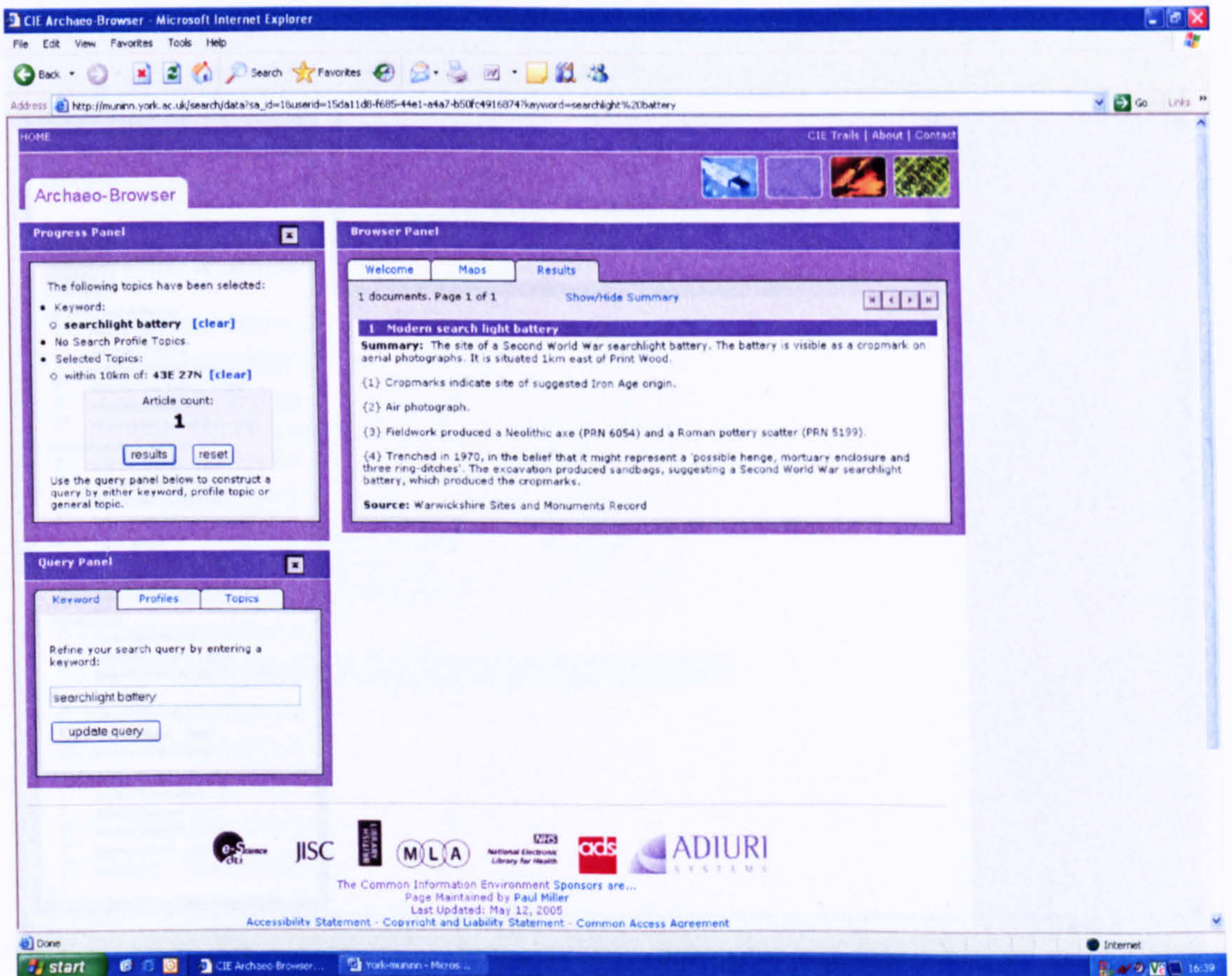
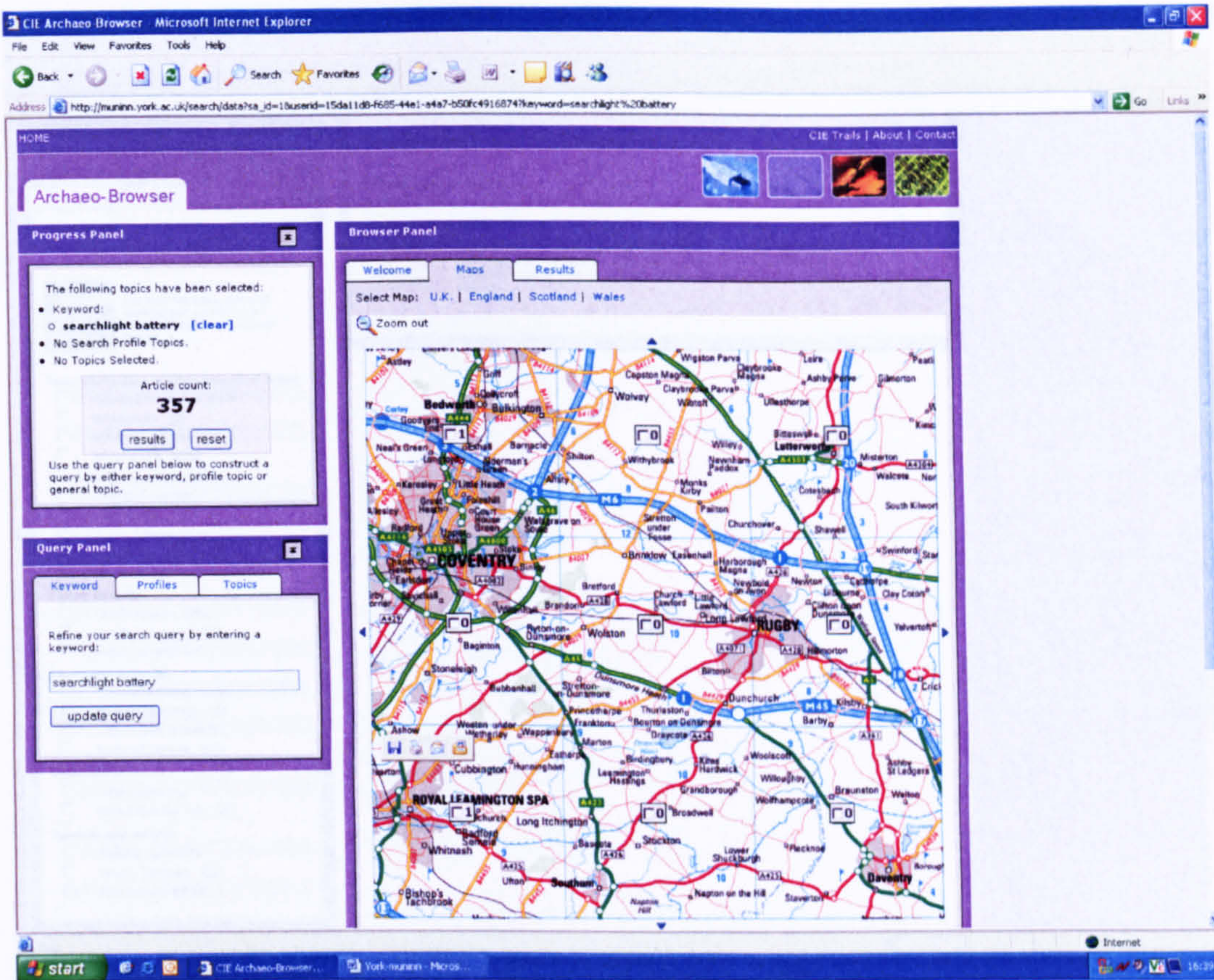


Figure 83. ADS CIE demonstrator mapped search results. Original in colour.

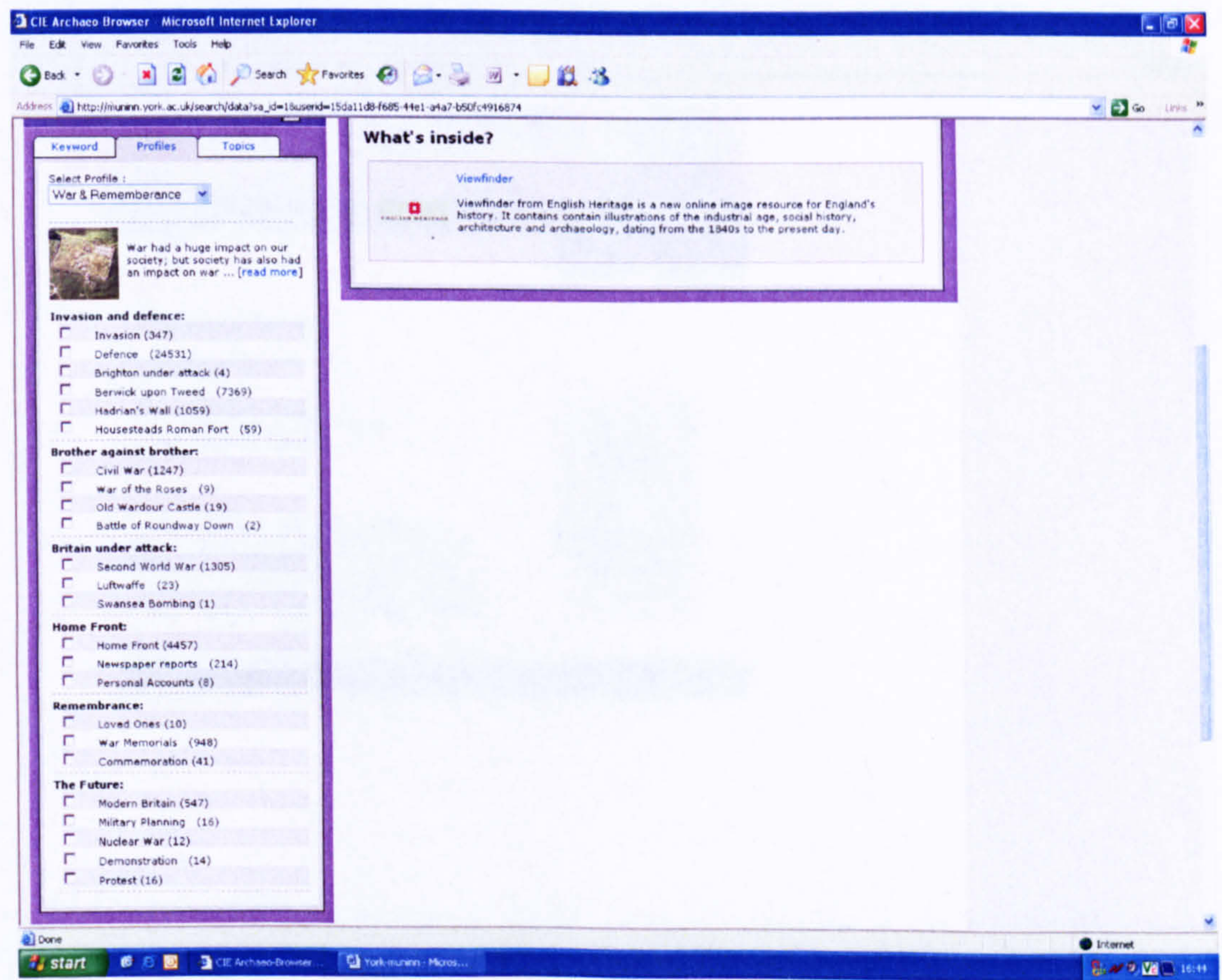
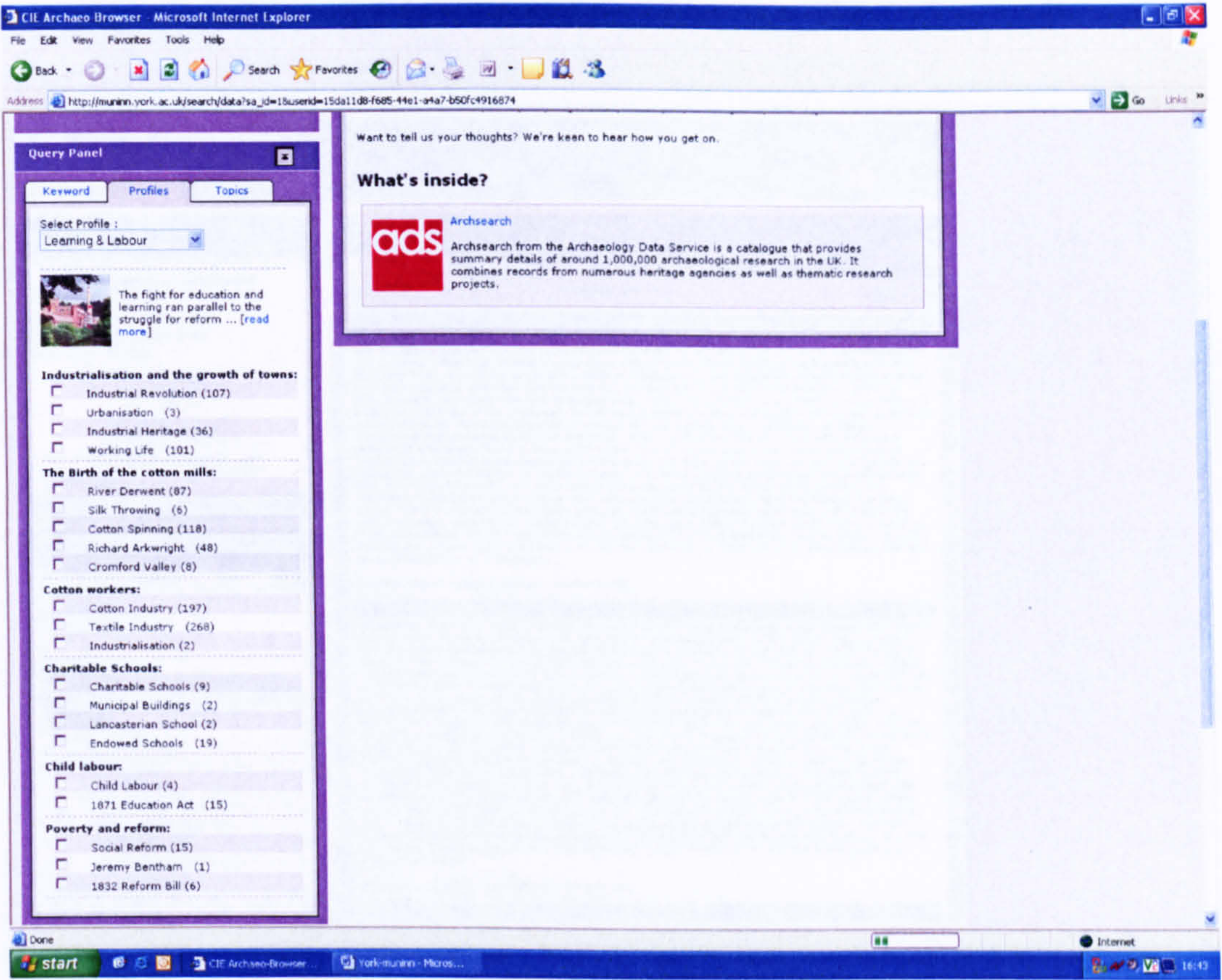


Figure 84. ADS CIE demonstrator topic profiles. Original in colour.

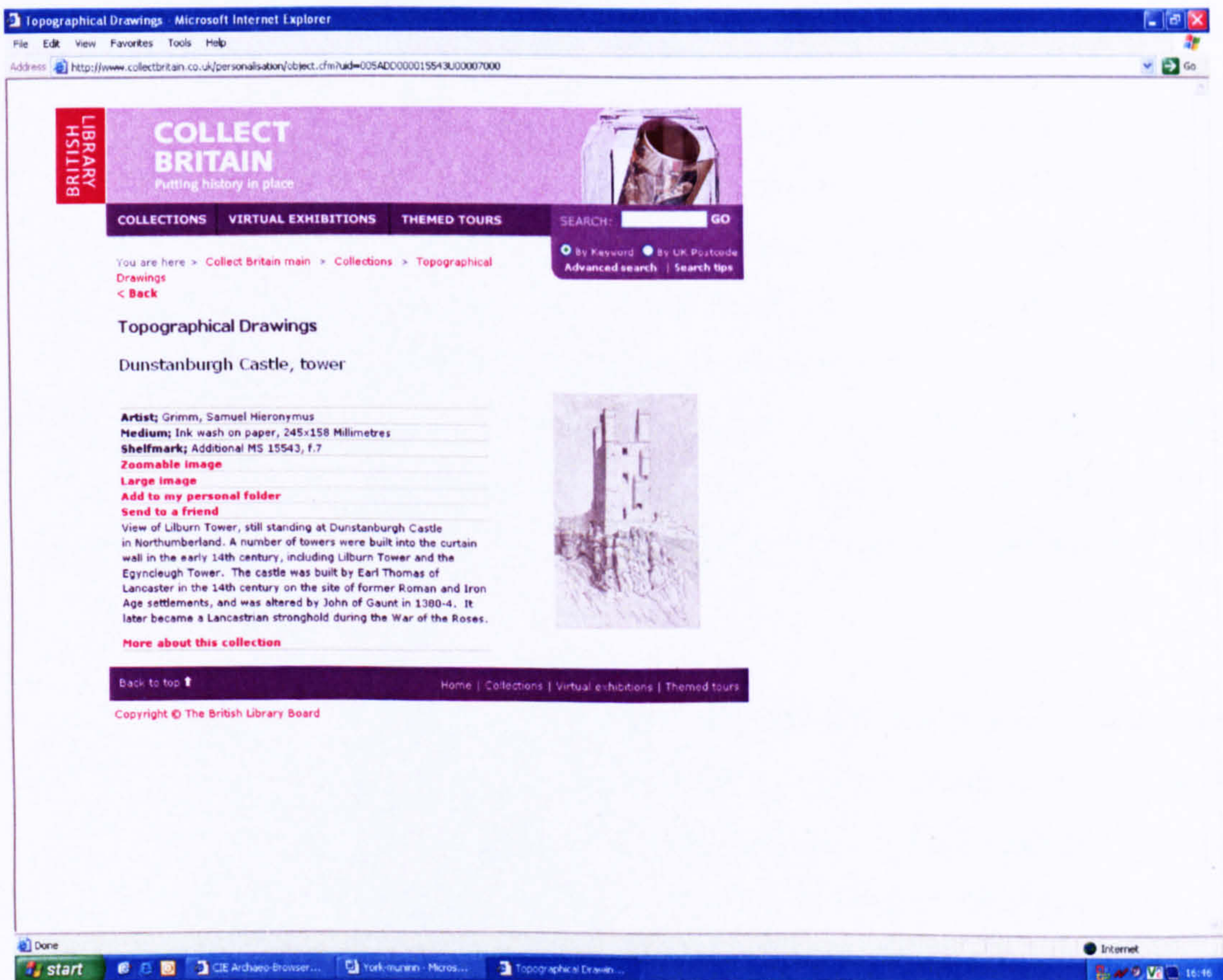
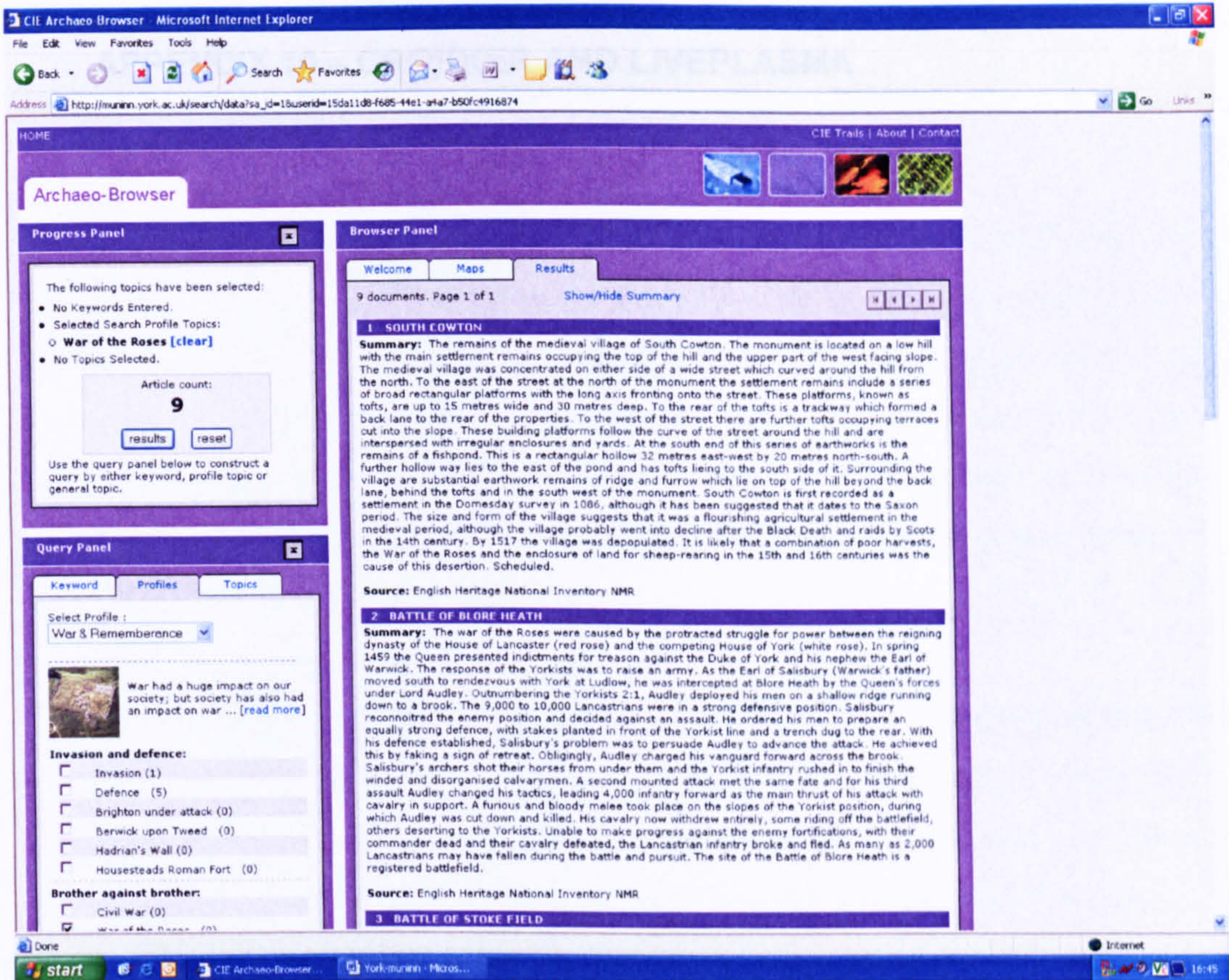


Figure 85. ADS CIE demonstrator search results. Original in colour.

APPENDIX 10 – GROKKER AND LIVEPLASMA

A.10.1 Grokker

Groxis Inc (<http://www.grokker.com/>), a San Francisco-based company “populated with creative individuals who love the challenge of bringing visual search to the web”, has produced a commercial search application named ‘Grokker’. Its clients include Sun Microsystems and the University of Michigan. Grokker is designed to make the process of searching for relevant information from a variety of Web-based sources easier, by managing the presentation of search results to the user.

Grokker interrogates metadata contained within Web-based data sources, such as those available through open search engines or by subscription. The data sources quoted for the ‘academic library’ search type, for example, include The Library of Congress, Academic Search Premiere, The RLG Union Catalog, Factiva, LexisNexis, and others. Grokker amalgamates the information that each of the sources contain, and organises it into clusters or topics.

The entry point for the search mechanism is a simple keyword entry box (Figure 86). The user can then choose between two main forms of output. The first is a tree-like structure of topic headings of the type used by the ADS CIE demonstrator. Like the CIE demonstrator, the tree can be expanded by the user where sub-topics are present. The number of items that the search has generated is given alongside each topic heading (Figure 87). The search can be refined by entering further qualifying keywords. The tree structure, and count of relevant records, changes accordingly. An ‘Advanced Search’ option organises the results by source, then category.

The second form of output is very different. An abstract ‘map’ of results is formed of circles that reflect category headings within the main subject area. The larger category circles contain more search results (Figure 87). Each category can be selected in order to view specific source documents (Figure 88, Figure 89).

The use of a graphical method to display search results, rather than text trees, is interesting. Like the expandable text trees, the user is provided with important information regarding the relationship between categories and sub-categories of data. Personally, however, I am not convinced that the Grokker maps are entirely

successful in presenting an instantly understandable summary of search results. This perception may stem solely from my lack of familiarity with this form of output, in contrast to the more usual text summaries. Nevertheless, the graphical depiction of search results could be of great relevance to online historic environment data applications. Most archaeologists acquire a good understanding of the importance of reading spatial relationships (between features, sites, landforms, etc.), and therefore might be expected to be especially receptive to this kind of graphic output.

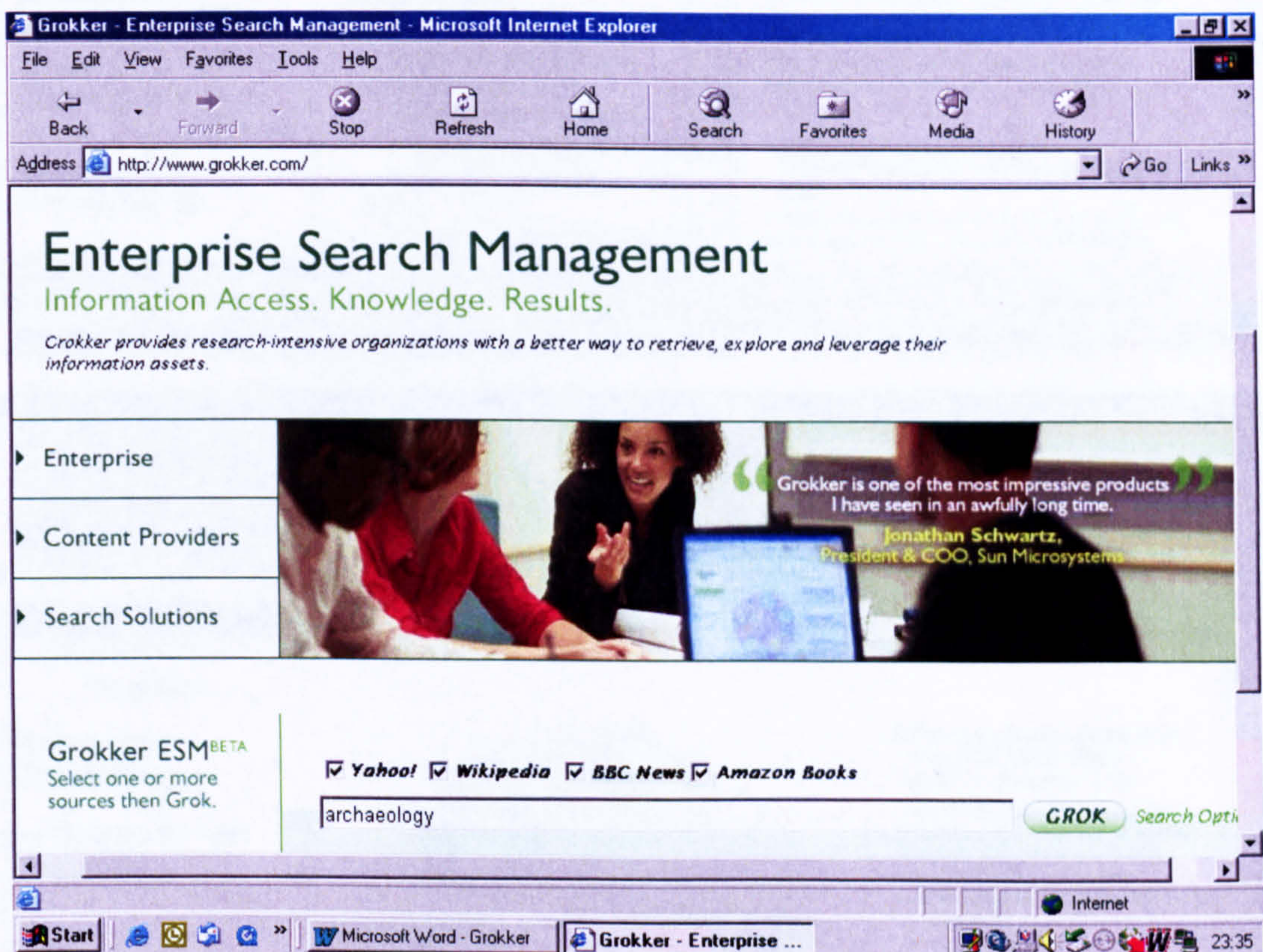


Figure 86. Grokker keyword search. Original in colour.

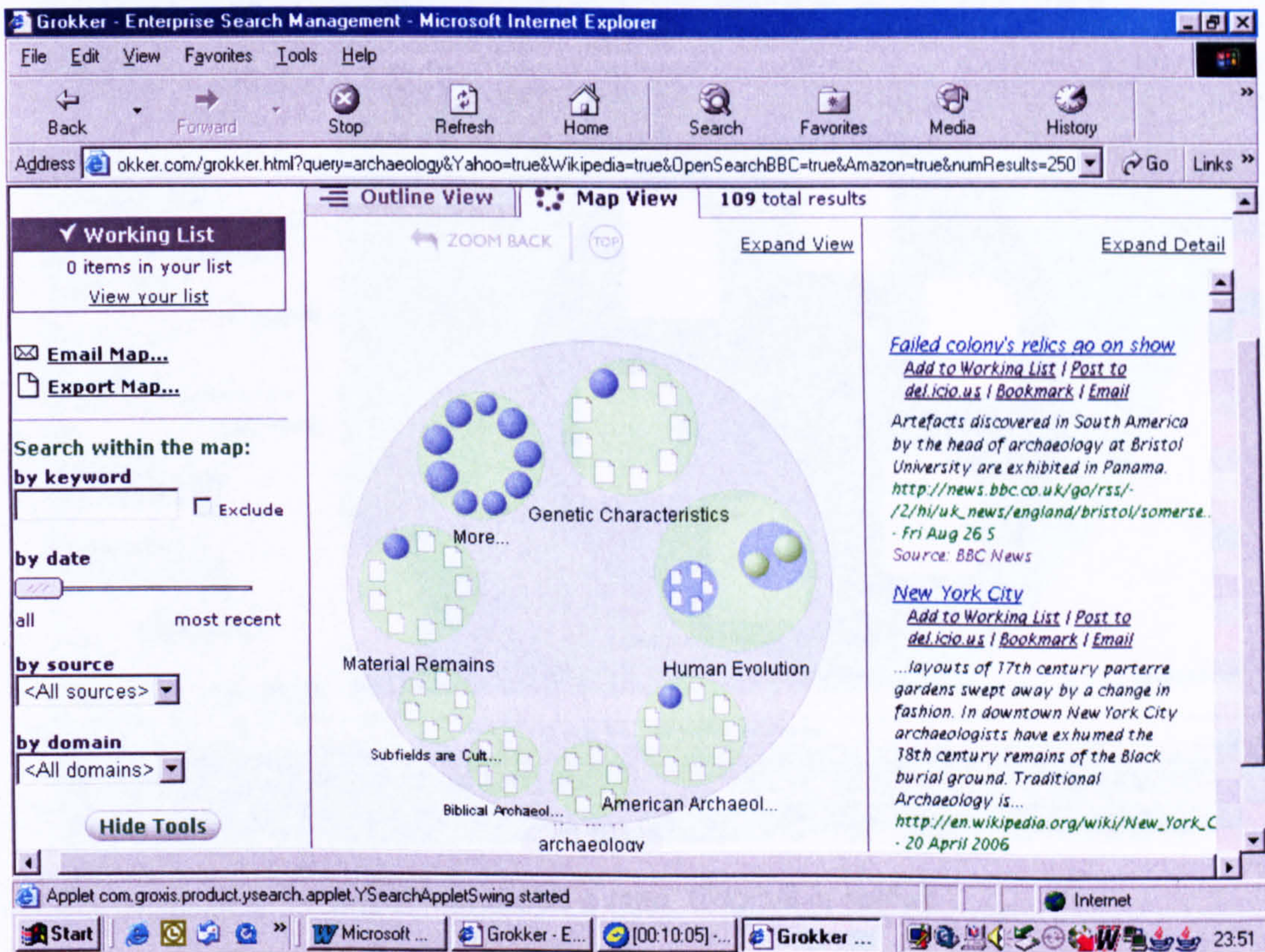
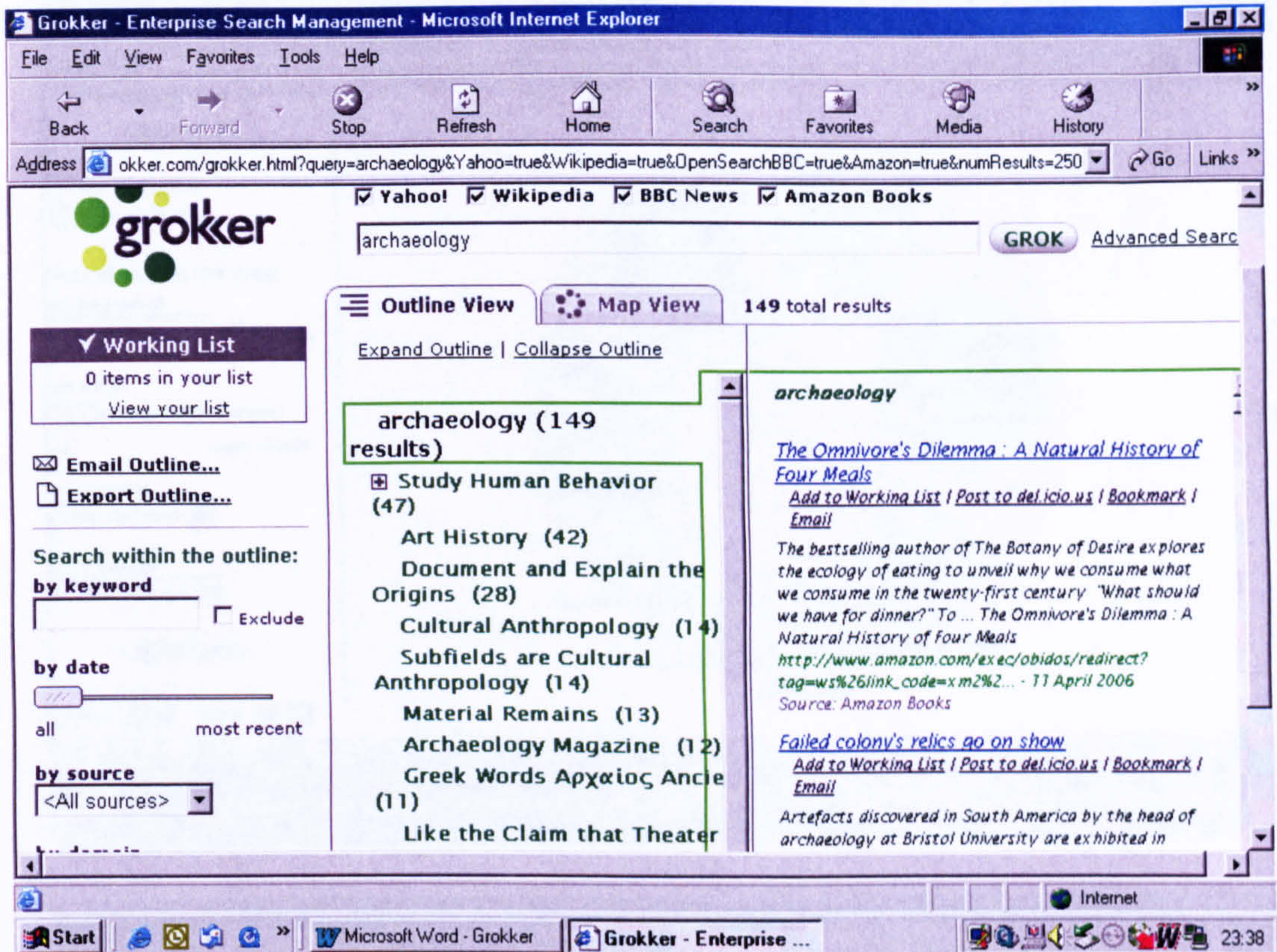


Figure 87. Grokker search results. Original in colour.

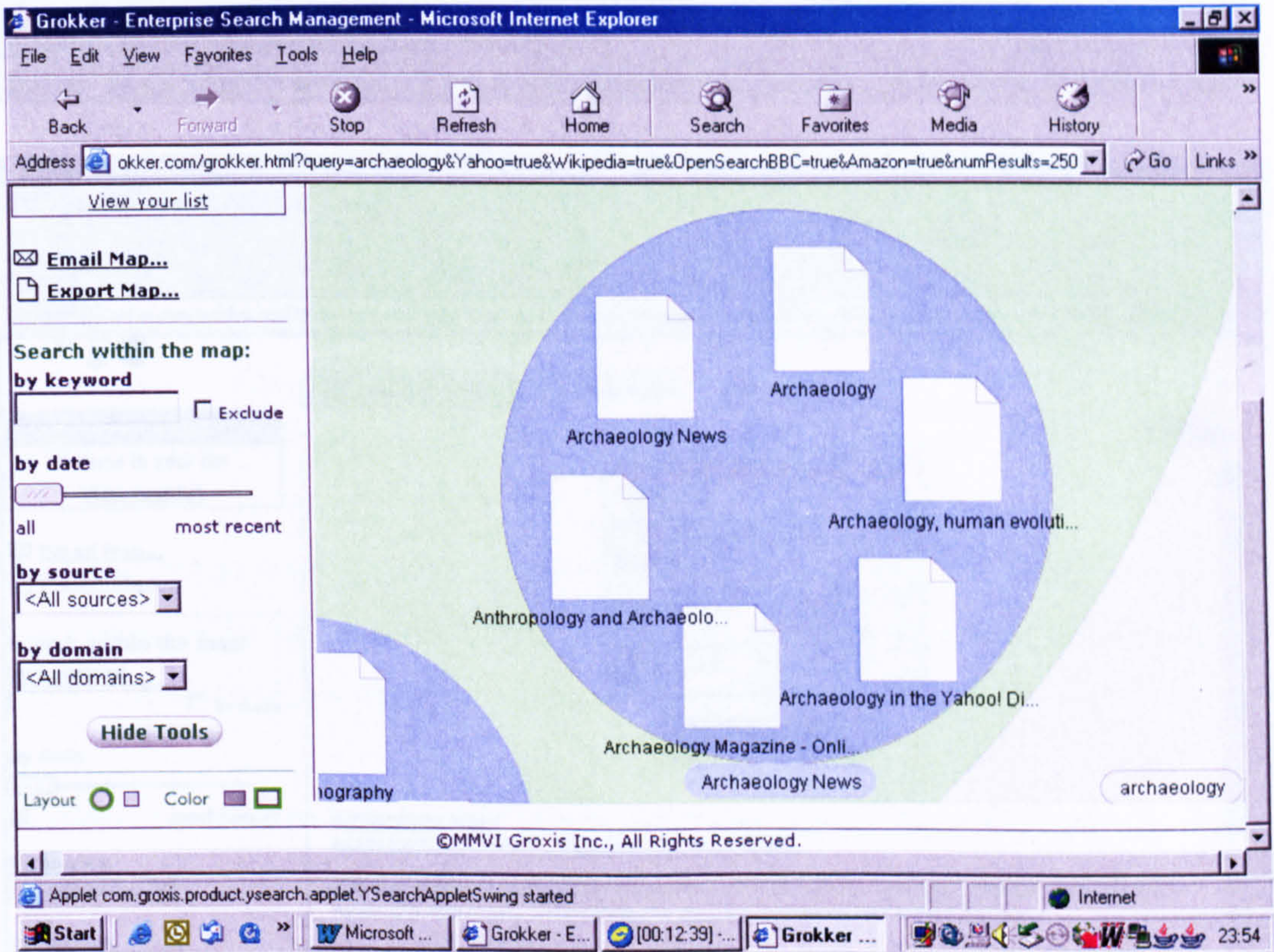
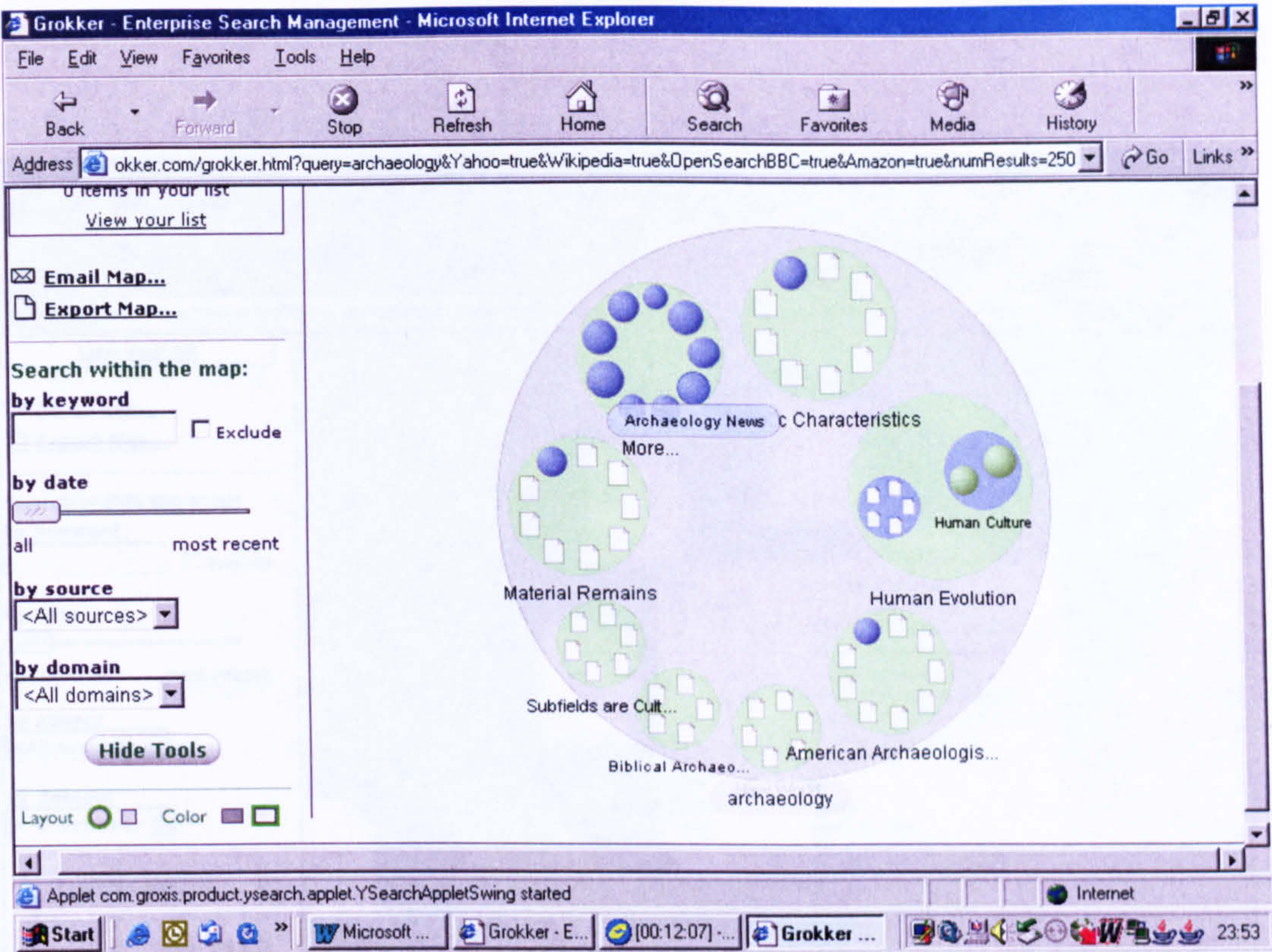


Figure 88. Grokker search results as a map. Original in colour.

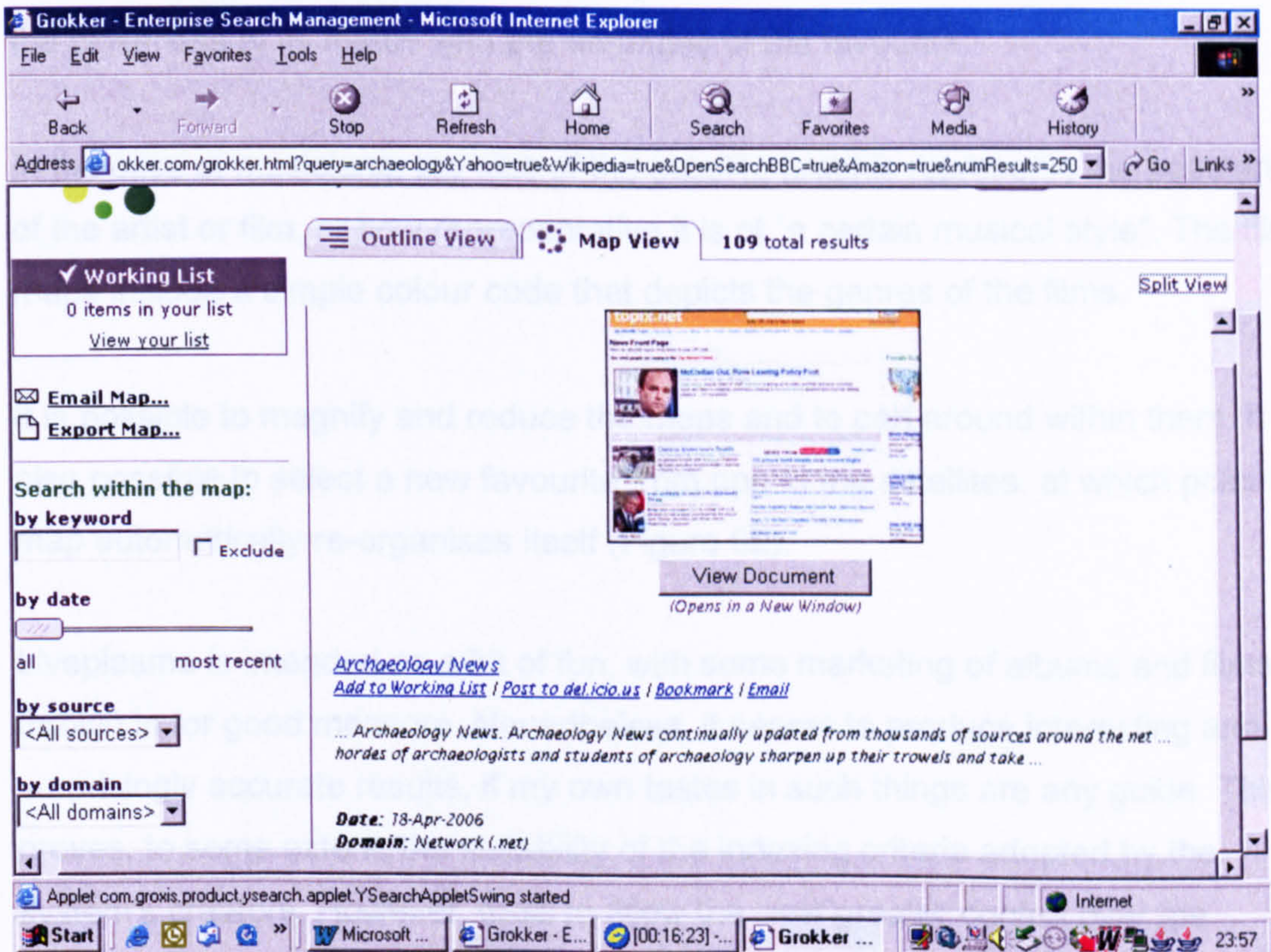
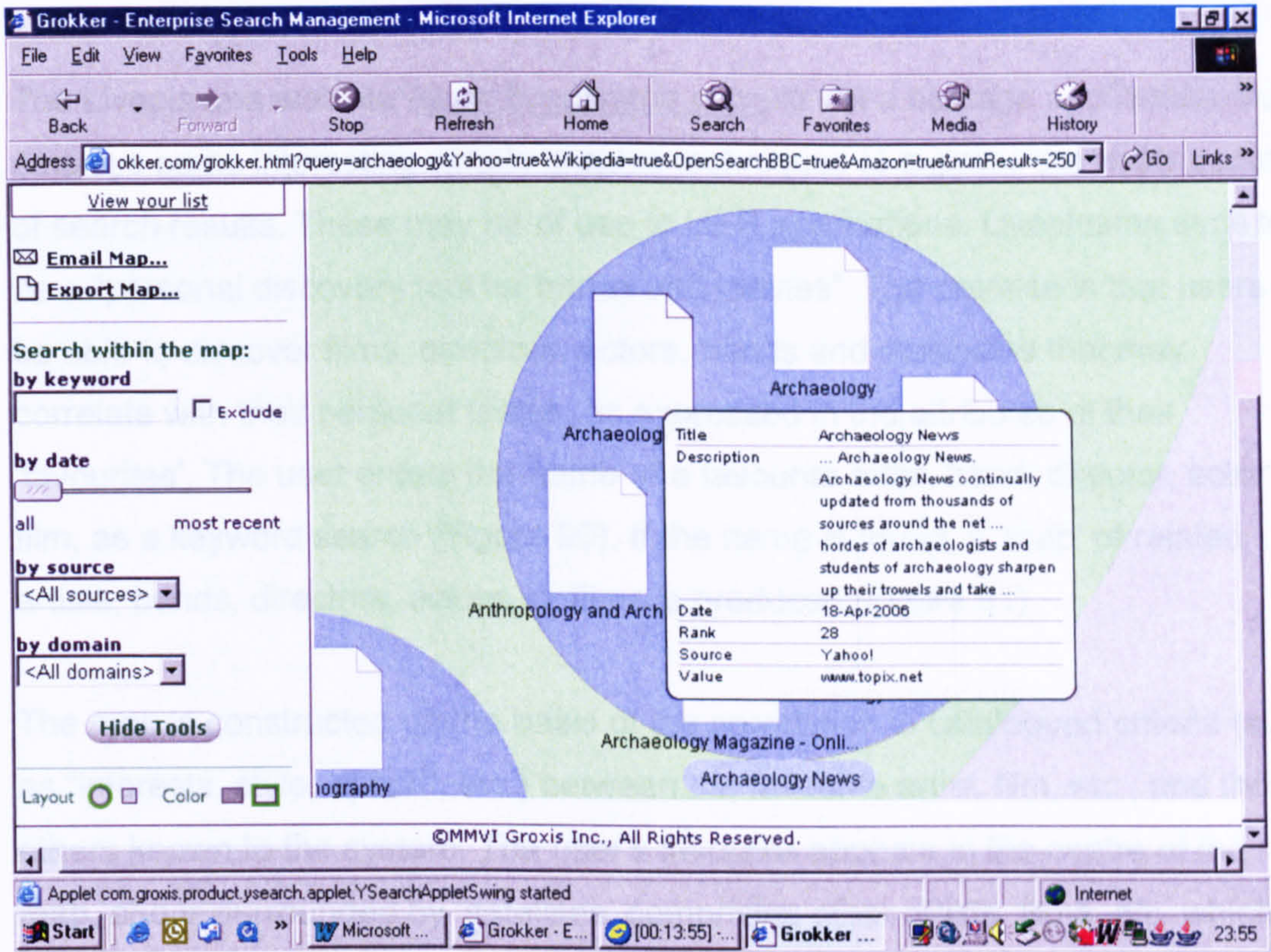


Figure 89. Grokker - found document selection. Original in colour.

A.10.2 Liveplasma

The Liveplasma website (www.liveplasma.com) is not a heritage application, but employs some interesting simple graphic techniques to express the wider contexts of search results. These may be of use to HER applications. Liveplasma aims to be a “personal discovery tool for bands and movies”. The premise is that users will be able to discover films, directors, actors, bands and musicians that may correlate with their personal tastes, as expressed in the attributes of their 'favourites'. The user enters the name of a favourite artist, band, director, actor or film, as a keyword search (Figure 90). If the name is found, a 'map' of related artists, bands, directors, actors, or films is produced (Figure 91).

The map is constructed on the basis of the correlation in catalogued criteria (such as “interests, style, epoch”, etc.) between the favourite artist, film, etc., and those others known to the system. The user's favourite appears in the centre of the map, and is surrounded by 'satellites' comprising other artists, films, etc. which are considered to share similarities. The physical proximity of a satellite represents the closeness of its match with the attributes of the favourite.

In the case of musicians, the size of the satellite graphic represents the popularity of the artist or film, or how representative it is of “a certain musical style”. The film maps include a simple colour code that depicts the genres of the films.

It is possible to magnify and reduce the maps and to pan around within them. It is also possible to select a new favourite from one of the satellites, at which point the map automatically re-organises itself (Figure 92).

Liveplasma is intended as a bit of fun, with some marketing of albums and films thrown in for good measure. Nevertheless, it seems to produce interesting and surprisingly accurate results, if my own tastes in such things are any guide. This proves, to some extent, the suitability of the indexing criteria adopted by the system's creators. However, tools to allow the user greater control over the selection process would have to be included if the application were to be developed as a serious aid to research. Currently the background criteria upon which the map is based is not expressed to the user, and the structure and size of the database of artists and films also remains hidden.

Nevertheless, the methods Liveplasma use to depict the relationships between information items within highly subjective subject areas are simple, readily readable, and possibly adaptable to more sophisticated heritage data applications.

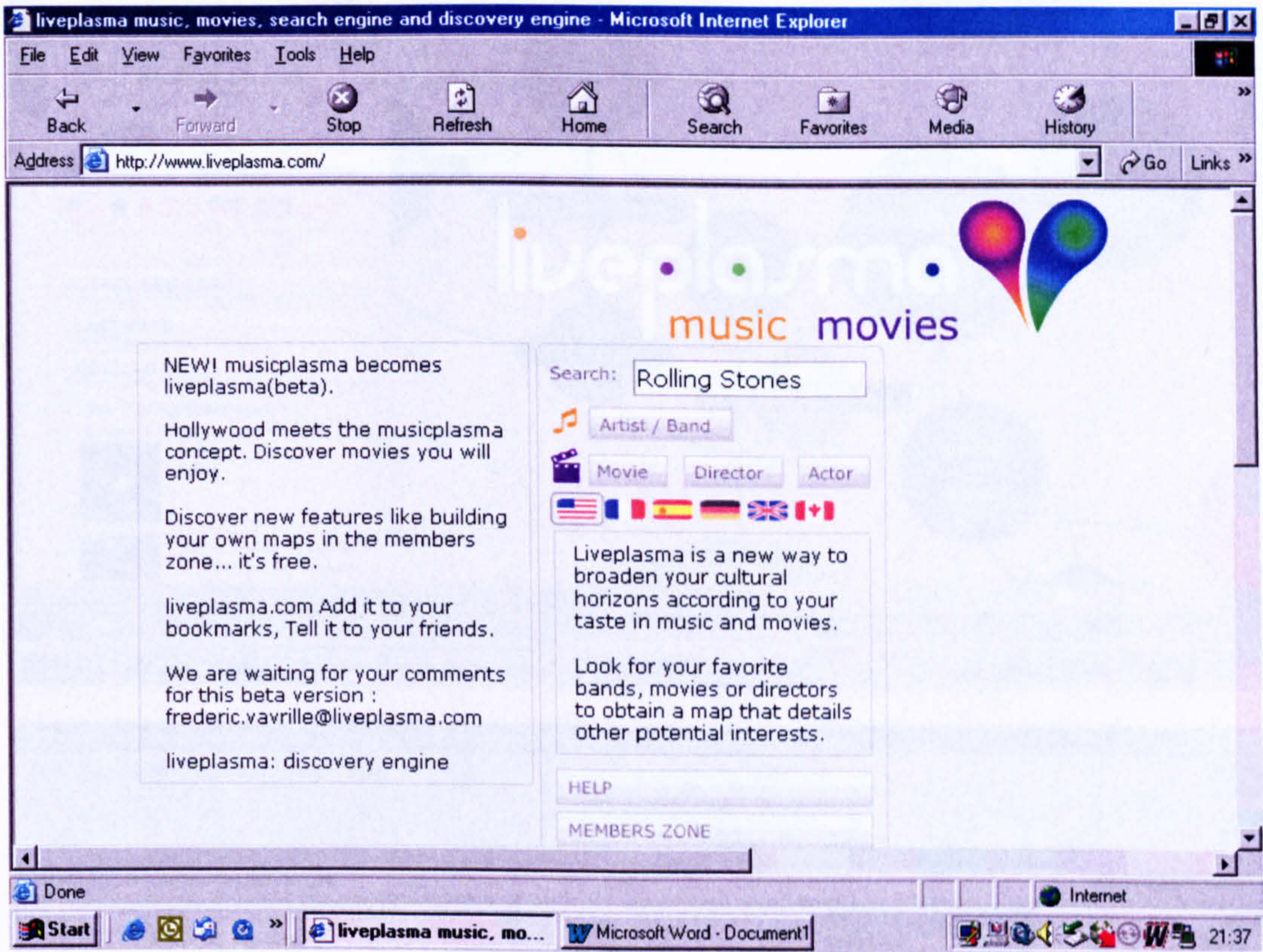


Figure 90. Liveplasma keyword search. Original in colour.

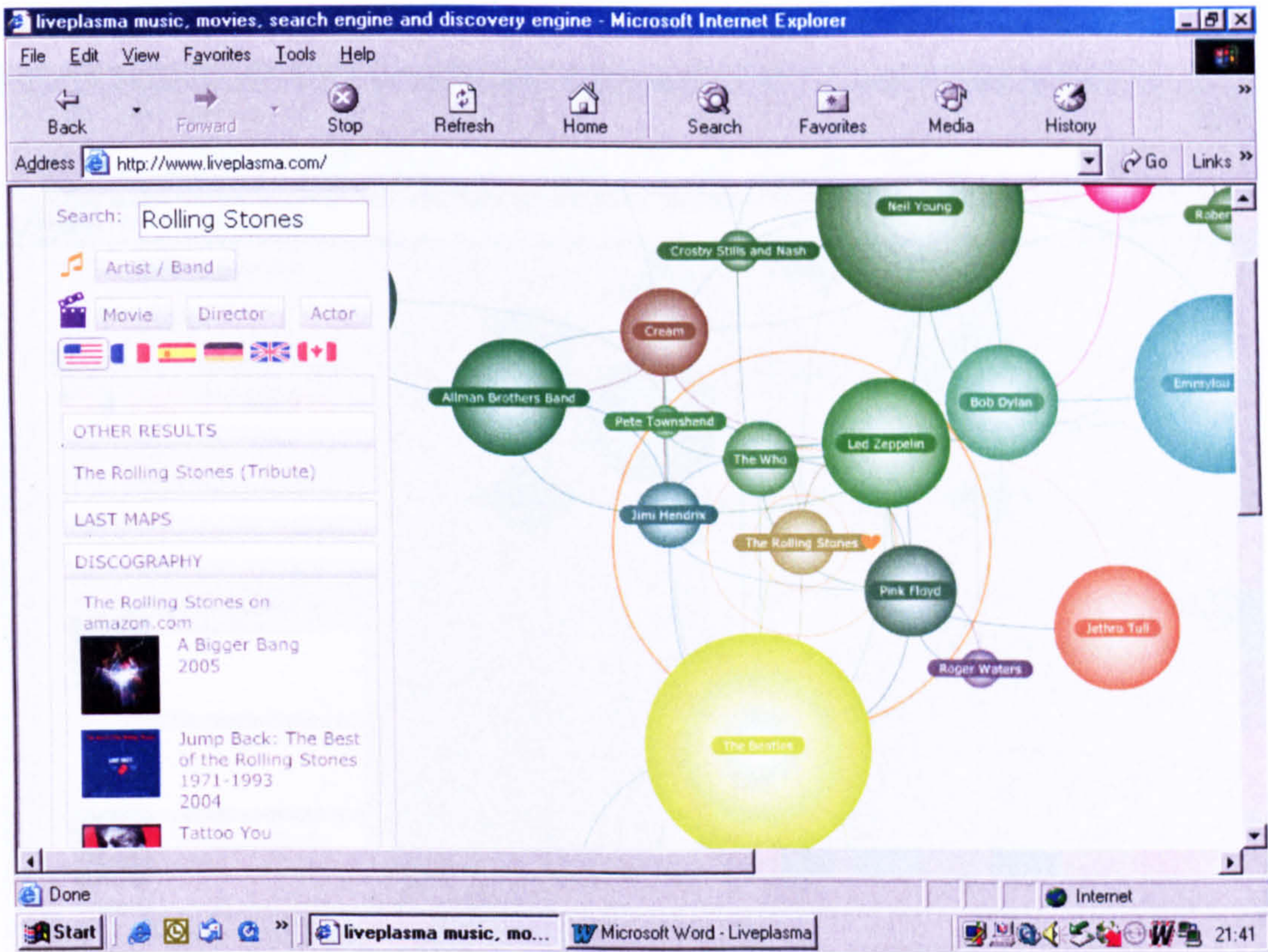
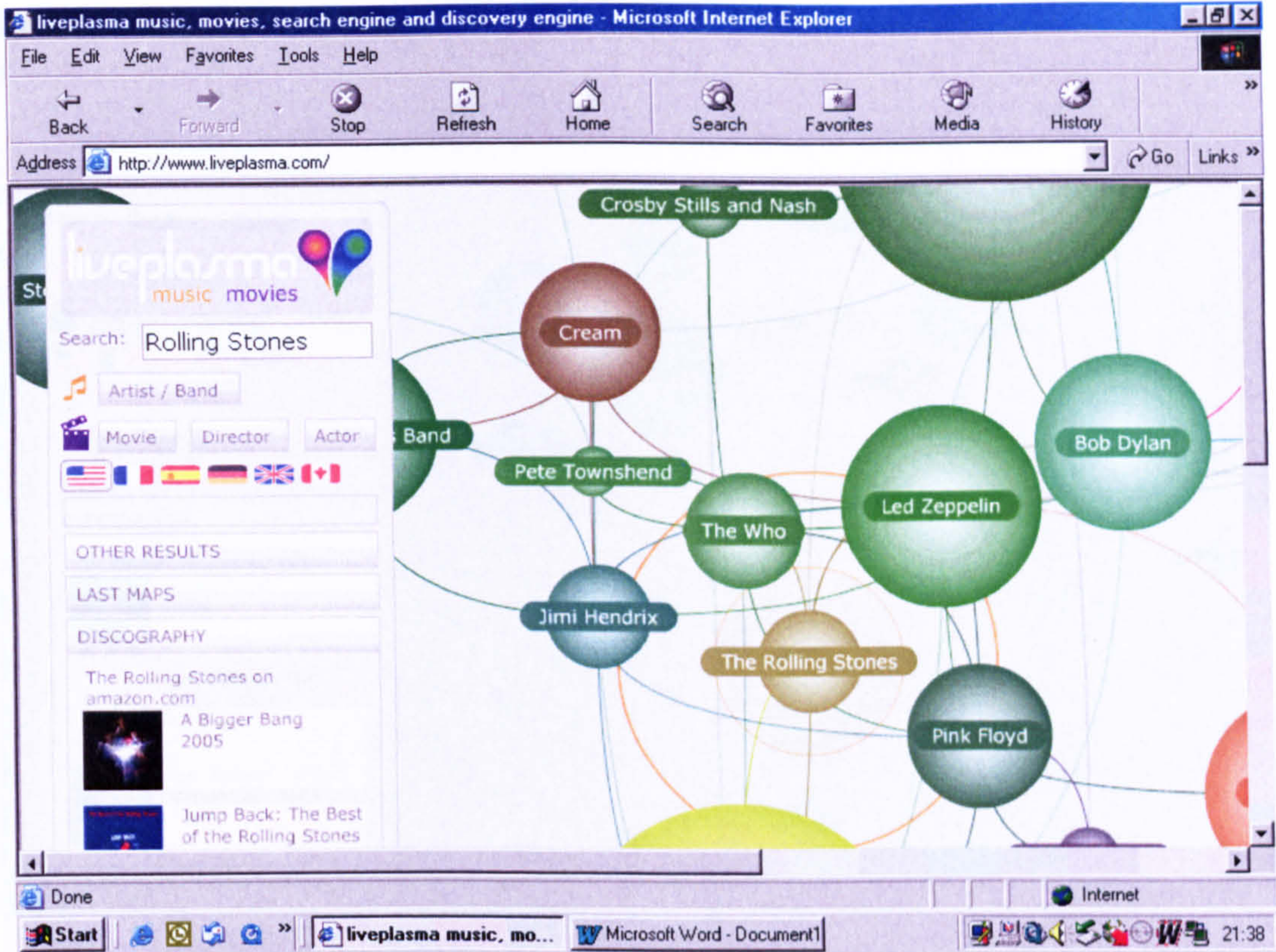


Figure 91. Liveplasma search results map. Original in colour.

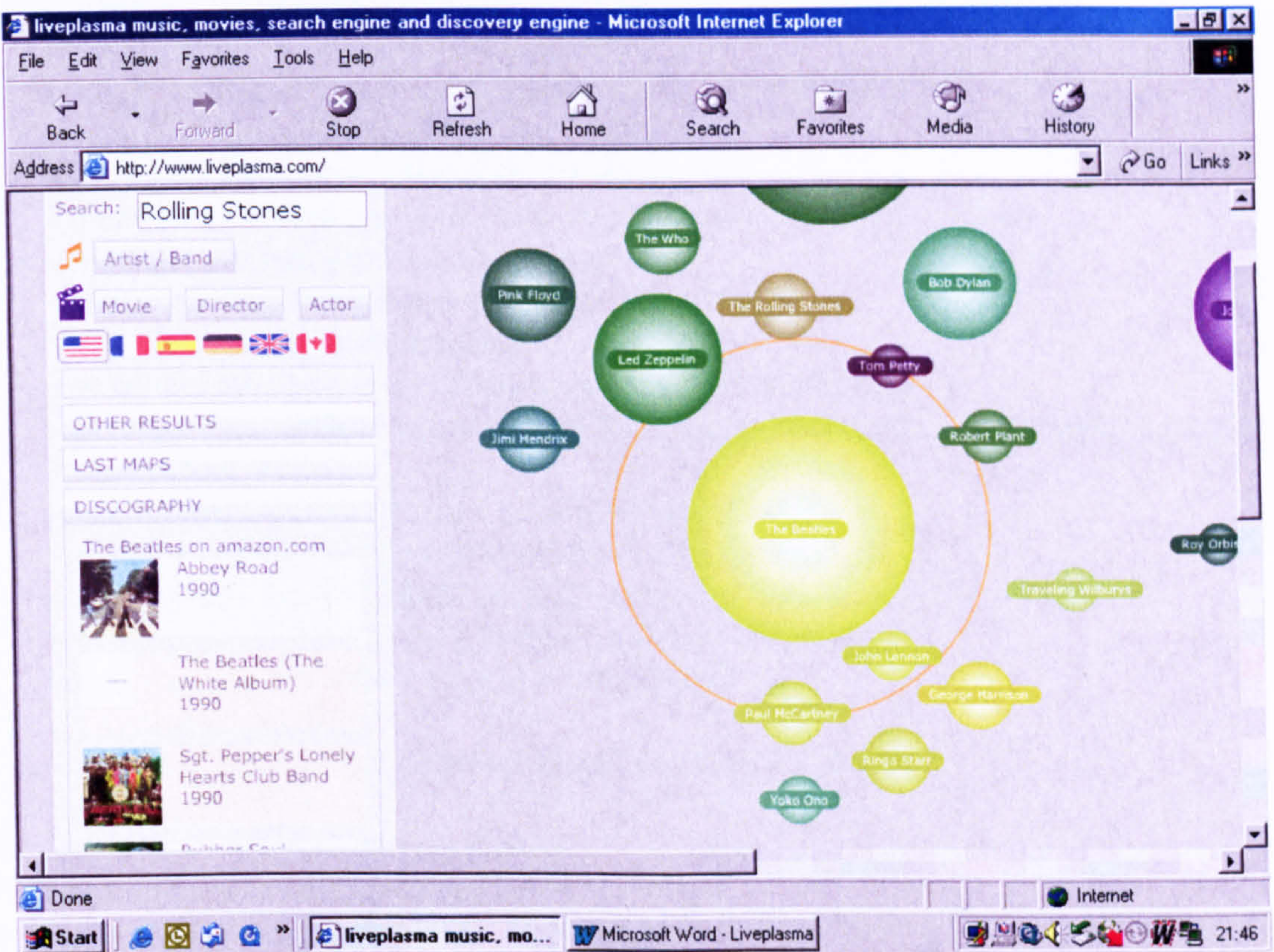
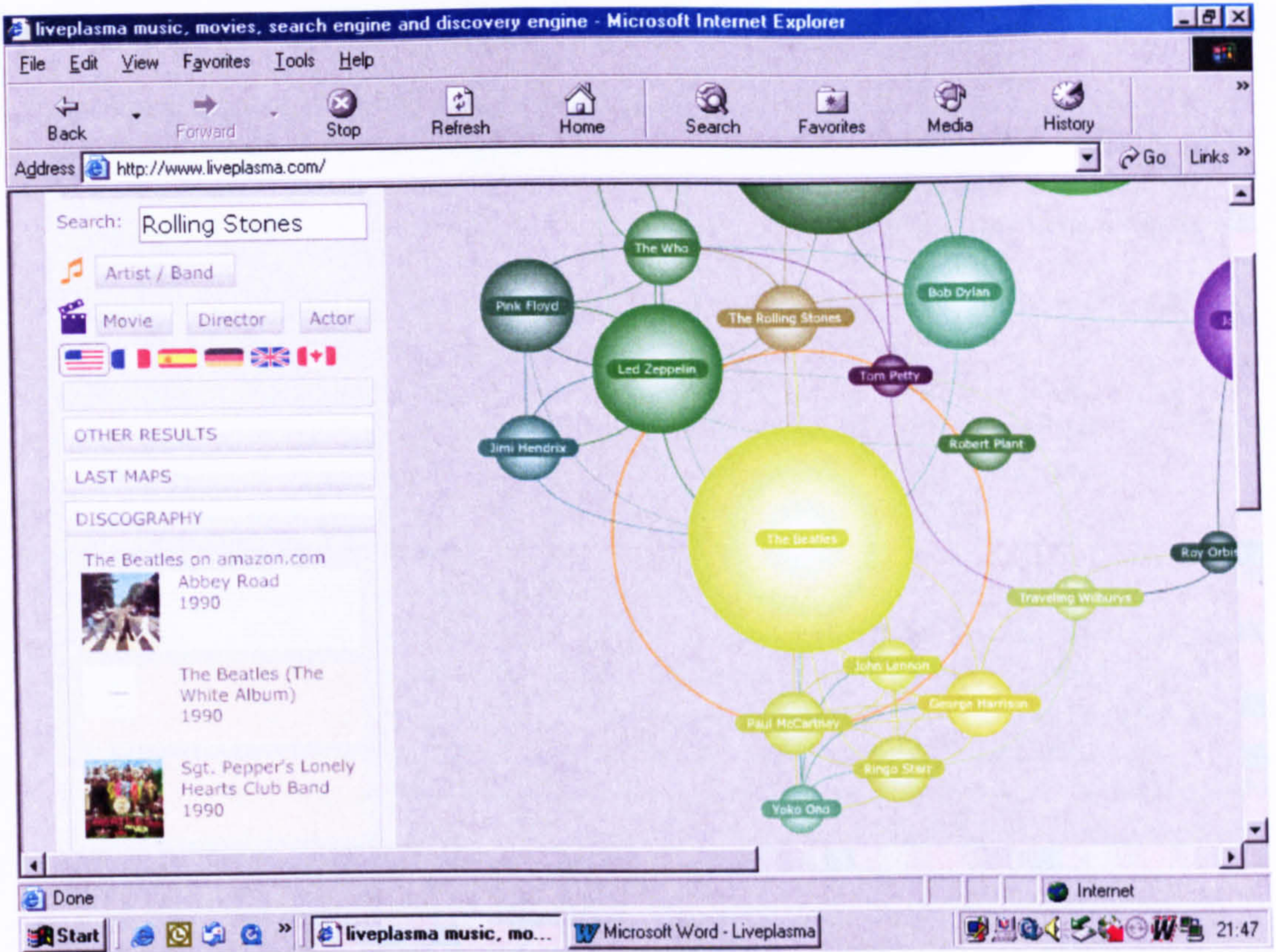


Figure 92. Liveplasma - navigating around the search results map. Original in colour.

APPENDIX 11 - OASIS PROJECT REPORT FORM IN XML

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- <oasis xmlns="http://ads.ahds.ac.uk/project/oasis/schema/1_2/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ads.ahds.ac.uk/project/oasis/schema/
  1_2/
  http://ads.ahds.ac.uk/project/oasis/schema/1_2/oasis.xsd">
  <download_on>02-Mar-2007</download_on>
  <download_by>peterbor1</download_by>
- <oasis_id id="archaeol7-6892" created="01-Mar-05" created_by="Jon
  Murray" last_edited="04-Mar-05" edited_by="Jon Murray"
  status="HER still to validate (record 1 month old)">
- <project_details complete="Yes" validated="No">
  <project_name>The Limes, Barnack</project_name>
  <project_desc>In September 2004 Archaeological Solutions carried
  out an additional archaeological evaluation at the Limes Farm,
  Barnack, Cambridgeshire. The investigation was carried out to
  augment the results of a previous phase of archaeological
  evaluation (Cooper 2004), and to additionally inform a mitigation
  strategy for the site. The additional evaluation trenches revealed
  further archaeological features of medieval and later date,
  including a boundary ditches, further masonry foundation of
  probable medieval date and evidence of possible timber structures
  or fence-lines.</project_desc>
  <project_dates start="01-Sep-2004" end="30-Sep-2004" />
  <work prev="Yes" futr="Not known" />
  <assoc_id type="Contracting Unit No." id="P2340" />
  <assoc_id type="Sitecode" id="AS856" />
- <project_type type="Field evaluation">
  <dev>Urban residential (e.g. flats, houses, etc.)</dev>
  <method>Metal Detectors</method>
  <method>Documentary Search</method>
  <method>Sample Trenches</method>
  <planning>Not known / Not recorded</planning>
  <prompt>Direction from Local Planning Authority - PPG16</prompt>
  </project_type>
  <monument type="WALL" period="Medieval" />
  <monument type="DITCH" period="Medieval" />
  <monument type="POST HOLE" period="Medieval" />
  <monument type="POST HOLE" period="Medieval" />
  <artefact type="POT" period="Medieval" />
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- <location>
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  <county>CAMBRIDGESHIRE</county>
  <district>PETERBOROUGH</district>
  <parish>BARNACK</parish>
  <sitename>The Limes, Barnack</sitename>
  </location>
  <postcode>PE9 XXX</postcode>
  <area size="1.00" units="Hectares" />
- <coordinates>
- <grid_refs mapcode="TF" easting="0809" northing="0508" type="Point">
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  <pb_originator>Wilbraham Associates Ltd</pb_originator>
  <pd_originator>Jon Murray</pd_originator>
  <director>Jon Murray</director>
  <supervisor>Dan Eddisford BA</supervisor>
  <funding>Burghley House Preservation Trust</funding>
  </project_creators>
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  <title>The Limes, Barnack</title>
  <author>Eddisford, D.</author>
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  <place>Hertford</place>
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**APPENDIX 12 - THEME AND CONCEPT METADATA RECORDS FOR THE
FENLAND HISTORIC ENVIRONMENT**

A.12.1 A template metadata schema for user-defined HER themes, based on the Dublin Core

HER theme contributor: Person or organisation responsible for maintaining the theme.

HER theme coverage (temporal): Based on MIDAS general period terms.

HER theme coverage (spatial): Physical location expressed as location names - counties, and parishes. Could be expanded by geographic metadata schema.

HER theme creator: Person or organisation primarily responsible for forming the theme.

HER theme date: Date theme was formed in dd/mm/yyyy format. Helps to gauge currency.

HER theme description: Brief description of premise.

HER theme format: Medium through which theme was first expressed, such as a report, book, monograph, journal paper, lecture, unpublished thought, project design, research agenda, etc.

HER theme identifier: unique alphanumeric, within sequence: HERtheme1 etc.

HER theme language:

HER theme publisher: Person or organisation responsible for recording and disseminating the theme.

HER theme relation: A related or complementary source, such as a report or book.

HER theme right: Information regarding intellectual copyright and citation rules.

HER theme source: The reference to the source from which the theme derives. Could use this field to point to URL, database identifier, etc. for source record.

HER theme subject: Usually expressed as a monument term, artefact term, etc. using standard thesauri, and class or sub-class.

HER theme title: Title that summarises the theme concept.

HER theme type: Valid HER theme types include: 'landscape theme', 'monument theme', 'artefact theme', 'historic event theme', 'people theme', 'other theme', etc.

A.12.2 Examples of metadata records for use-defined HER themes

Example 1

HER theme contributor: Peterborough City Council Archaeology Service
HER theme coverage (temporal): Modern
HER theme coverage (temporal): World War Two
HER theme coverage (spatial): Thorney
HER theme coverage (spatial): Cambridgeshire
HER theme creator: B.Robinson
HER theme date: 01/02/2005
HER theme description: The GHQ line, one of the principle World War Two anti-invasion stop lines, comprised a chain of fortifications and natural and constructed obstacles running approximately north from London, through the Fenland region, terminating in Lincolnshire. Both north and south of Thorney village the GHQ line makes use of drainage ditches and is still marked by a chain of pillboxes. However, no evidence of fortifications has yet been noted within the village of Thorney itself. Did the military authorities plan to use the infrastructure of the village itself as a strong point in the event of an invasion, or have the remains of fortifications simply been destroyed or hidden by subsequent development?
HER theme format: project design
HER theme identifier: HERtheme1
HER theme language: English
HER theme publisher: Peterborough City Council
HER theme relation: Osborne, M. undat. *Twentieth Century Defences in Britain - Cambridgeshire, including Peterborough and Huntingdon*, Concrete Publications
HER theme right: Peterborough City Council
HER theme source: Robinson, B. 2006. 'A Project Design for a Built Environment Survey of Thorney Village', Peterborough City Council
HER theme subject: Defence
HER theme subject: Protective measure
HER theme subject: Pillbox
HER theme subject: Anti-tank cube
HER theme subject: Anti-tank ditch
HER theme subject: Machine gun pit
HER theme subject: Anti-aircraft site
HER theme subject: Road block
HER theme subject: Spigot mortar emplacement
HER theme title: Thorney village as an anti-invasion strong point
HER theme type: landscape theme

Example 2

HER theme contributor: Peterborough City Council Archaeology Service

HER theme coverage (temporal): Neolithic

HER theme coverage (spatial): Borough Fen

HER theme coverage (spatial): Cambridgeshire

HER theme creator: D.Hall

HER theme date: 31/12/1987

HER theme description: The drainage pattern of the neolithic period in Borough Fen interpreted from roddons mapped from aerial photographs and field observation.

HER theme format: monograph

HER theme identifier: HERtheme2

HER theme language: English

HER theme publisher: East Anglian Archaeology

HER theme publisher: Cambridgeshire Archaeological Committee

HER theme relation: Waller, M. 1994. The Fenland Project, Number 9: Flandrian Environmental Change in Fenland, East Anglian Archaeology 70.

HER theme right: Cambridgeshire Archaeological Committee

HER theme source: Hall, D. 1987. *The Fenland Project, Number 2:*

Cambridgeshire Survey, Peterborough to March, East Anglian Archaeology 35: 21-26

HER theme subject: Wetland landscape

HER theme subject: fen

HER theme subject: watercourse

HER theme subject: fen edge

HER theme subject: island

HER theme title: Borough Fen Neolithic drainage pattern

HER theme type: landscape theme

Example 3

HER theme contributor: Peterborough City Council Archaeology Service
HER theme coverage (temporal): Roman
HER theme coverage (spatial): Thorney
HER theme coverage (spatial): Cambridgeshire
HER theme creator: D.Hall
HER theme date: 31/12/1987
HER theme description: The environmental character of the fen at Thorney during the Roman period.
HER theme format: monograph
HER theme identifier: HERtheme3
HER theme language: English
HER theme publisher: East Anglian Archaeology
HER theme publisher: Cambridgeshire Archaeological Committee
HER theme relation: Waller, M. 1994. The Fenland Project, Number 9: Flandrian Environmental Change in Fenland, East Anglian Archaeology 70.
HER theme right: Cambridgeshire Archaeological Committee
HER theme source: Hall, D. 1987. *The Fenland Project, Number 2: Cambridgeshire Survey, Peterborough to March*, East Anglian Archaeology 35: 51-53
HER theme subject: Wetland landscape
HER theme subject: fen
HER theme subject: peat fen
HER theme subject: watercourse
HER theme subject: roddon
HER theme subject: fen edge
HER theme title: Thorney Roman period fen environment
HER theme type: landscape theme

Example 4

HER theme contributor: Peterborough City Council Archaeology Service

HER theme coverage (temporal): Bronze Age

HER theme coverage (temporal): Early Bronze Age

HER theme coverage (temporal): Middle Bronze Age

HER theme coverage (temporal): Late Bronze Age

HER theme coverage (temporal): Early Iron Age

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Lincolnshire

HER theme creator: D. Yates

HER theme date: 31/12/2000

HER theme description: Bronze Age structured landscapes have been identified along the fen edge between the River Nene and River Welland. They may have originated in early Bronze land divisions marked by funerary monuments, but were first enclosed by ditch systems during the Middle Bronze Age. These extensive landscapes seem to have been associated with large-scale stock management. They do not appear to have been maintained long into the Iron Age, which suggests a radical shift in agricultural and social structure early in the Iron Age.

HER theme format: journal article

HER theme identifier: HERtheme4

HER theme language: English

HER theme publisher:

HER theme relation: Yates, D. 2005. 'Bronze Age Structured Landscapes in Southern England', *The Archaeologist*, no.56

HER theme right: Cite D. Yates.

HER theme source: HER enquiry

HER theme subject: agriculture and subsistence

HER theme subject: field system

HER theme subject: enclosure

HER theme subject: ditch

HER theme subject: drove road

HER theme subject: barrow

HER theme subject: cremation

HER theme subject: inhumation

HER theme subject: ring ditch

HER theme title: Bronze Age structured landscape

HER theme type: landscape theme

Example 5

HER theme contributor: Peterborough City Council Archaeology Service

HER theme coverage (temporal): Post medieval

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Lincolnshire

HER theme coverage (spatial): Norfolk

HER theme coverage (spatial): Suffolk

HER theme creator: N.James

HER theme date: 31/12/1992

HER theme description: The archaeological reconstruction of the early post-medieval drainage Fenland landscape is limited. It requires further investigation in order to develop better models, and to assess the relationship between drainage initiatives and local society.

HER theme format: monograph

HER theme identifier: HERtheme5

HER theme language: English

HER theme publisher: Fenland Research

HER theme relation:

HER theme right: Cite N.James, Fenland Research

HER theme source: James, N. 1992. 'Post-medieval' in *Fenland Research* no. 7

HER theme subject: wind pump

HER theme subject: drainage mill

HER theme subject: drainage system

HER theme subject: drainage ditch

HER theme subject: drain

HER theme subject: culvert

HER theme subject: sluice

HER theme subject: sluice gate

HER theme subject: canal

HER theme subject: flood relief canal

HER theme subject: water channel

HER theme subject: flood defences

HER theme subject: bank (earthwork)

HER theme title: Fenland's post-medieval drainage landscape

HER theme type: landscape theme

Example 6

HER theme contributor:

HER theme coverage (temporal): Bronze Age

HER theme coverage (temporal): Late Bronze Age

HER theme coverage (temporal): Iron Age

HER theme coverage (temporal): Early Iron Age

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Lincolnshire

HER theme coverage (spatial): Norfolk

HER theme coverage (spatial): Suffolk

HER theme creator: English Heritage

HER theme date: 31/12/1997

HER theme description: Changes in the landscape over this period have often been associated with theories of population pressures. However, it is difficult to examine the basis of such theories due to the paucity of well-dated settlement sites, particularly from the early Iron Age, and the lack of information regarding the development of field systems and land boundaries...A priority for investigation must be colluvial and alluvial sequences, which offer the potential of stratified sequences over this period, complemented by information drawn from broader environmental work, such as that derived from the pollen record.

HER theme format: research agenda

HER theme identifier: HERtheme6

HER theme language: English

HER theme publisher: English Heritage

HER theme relation:

HER theme right: Cite English Heritage

HER theme source: English Heritage 1997. *Draft English Heritage Archaeological Research Agenda: 47-48*

HER theme subject: settlement

HER theme subject: round house (domestic)

HER theme subject: field system

HER theme subject: aggregate field system

HER theme subject: celtic field system

HER theme subject: coaxial field system

HER theme subject: enclosed field system

HER theme subject: boundary

HER theme subject: boundary bank

HER theme subject: boundary ditch

HER theme subject: field boundary

HER theme title: The Late Bronze Age Early Iron Age landscape transition

HER theme type: landscape theme

Example 7

HER theme contributor:

HER theme coverage (temporal): Iron Age

HER theme coverage (temporal): Middle Iron Age

HER theme coverage (temporal): Late Iron Age

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Lincolnshire

HER theme coverage (spatial): Norfolk

HER theme coverage (spatial): Suffolk

HER theme creator: C.Evans

HER theme date: 31/12/1992

HER theme description: The relative absence of definite Late Iron Age settlements and the apparent late dates of a Middle Iron Age tradition in the region, suggest cultural backwardness. Does the lack of wheel thrown pottery in the region at that time, for example, suggest this is a Fen-wide phenomenon? Alternatively, does it suggest that some Fenland settlements did not participate in wider trade networks? Emphasis must be placed on the absolute dating of later Iron Age sites. We also need further knowledge concerning the extent and chronology of flood episodes at that time.

HER theme format: monograph

HER theme identifier: HERtheme7

HER theme language: English

HER theme publisher:

HER theme relation:

HER theme right: Cite C.Evans, Fenland Research

HER theme source: Evans, C. (ed.) 1992. *'Fenland Research - Fieldwork and Research in the Fenlands of Eastern England'*, *Fenland Research*, no. 7, University of Cambridge: 8-10

HER theme subject: settlement

HER theme subject: unenclosed settlement

HER theme subject: enclosed settlement

HER theme subject: round house (domestic)

HER theme subject: field system

HER theme subject: aggregate field system

HER theme subject: celtic field system

HER theme subject: coaxial field system

HER theme subject: enclosed field system

HER theme subject: boundary

HER theme subject: boundary bank

HER theme subject: boundary ditch

HER theme subject: field boundary

HER theme title: Cultural backwardness in Fenland during the Iron Age

HER theme type: landscape theme

HER theme type: artefact theme

Example 8

HER theme contributor:

HER theme coverage (temporal): Roman

HER theme coverage (temporal): Early Medieval

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Lincolnshire

HER theme coverage (spatial): Norfolk

HER theme coverage (spatial): Suffolk

HER theme creator: B. Bates

HER theme date: 31/12/2002

HER theme description: "The people of historical Middle Earth believed that it violated the sacred presence of spirit to separate it from the natural world within masonry walls... The real connection with divine forces for these people was with more intimate spirit beings which were invisible from natural phenomena like great oaks, running streams and wild animals. This is why the engineered environment of the Romans was rejected in favour of their own traditional buildings... To divorce oneself from nature would have been, for the people of real Middle Earth, to divorce oneself from the spirits. Their avoidance of the Roman villas and towns was also due to the feeling that the buildings violated the deepest beliefs and taboos of Middle Earth."

HER theme format: book

HER theme identifier: HERtheme8

HER theme language: English

HER theme publisher: Pan Books

HER theme relation:

HER theme right: B.Bates

HER theme source: Bates, B. 2002. *The Real Middle Earth. Magic and Mystery in the Dark Ages: 73-75*

HER theme subject: settlement

HER theme subject: house

HER theme subject: sunken feature building

HER theme subject: villa

HER theme subject: farm

HER theme subject: building

HER theme title: Early Medieval (Middle Earth) people avoid using Roman buildings

HER theme type: landscape theme

HER theme type: other theme

Example 9

HER theme contributor: Peterborough Historic Environment Record

HER theme coverage (temporal): Medieval

HER theme coverage (temporal): Norman

HER theme coverage (spatial): Cambridgeshire

HER theme coverage (spatial): Peterborough

HER theme creator: B. Robinson

HER theme date: 31/12/2005

HER theme description: On the appointment of the Norman Abbot Turolde in 1070AD, a Danish force joined with a local landholder named Hereward (later known as Hereward the Wake) to attack Peterborough Abbey. Opinion is divided about whether this was a misguided attempt to save the abbey's treasures from Norman appropriation, or a cynical move to exploit a temporary weakness in the abbey's defences. The raiders struck before the arrival of Turolde and his army. The abbey was vigorously defended by the "monks' men" and a fight developed at the "Bolhithe Gate", which seems to have been associated with the Bull Dyke. This watercourse led from the River Nene to the south side of the abbey's defensive circuit. The raiders gained access to the abbey precincts after starting a fire. No physical evidence has yet been found for the gate, or battle.

HER theme format: book

HER theme identifier: HERtheme9

HER theme language: English

HER theme publisher: Peterborough Museum Society

HER theme relation:

HER theme right:

HER theme source: Mellows, W.T. (ed) 1980. *The Peterborough Chronicle of Hugh Candidus*

HER theme subject:

HER theme title: Hereward and the Danes attack Peterborough Abbey at Bolhithe Gate

HER theme type: historic event theme

HER theme type: people theme

ABBREVIATIONS/ACRONYMS

| | |
|----------------------|--|
| ADS | Archaeology Data Service |
| AHDS | Arts and Humanities Data Service |
| AI | Artificial Intelligence |
| ALGAO | Association of Local Government Archaeological Officers |
| AMAA Act 1979 | Ancient Monuments and Archaeological Areas Acts 1979 |
| AM107 | Ancient Monuments Record form |
| AM12 | Field Monument Warden Report form |
| AM7 | Ancient Monuments Record form |
| APPAG | All Party Parliamentary Archaeology Group |
| ArchSearch | Archaeological Holdings Search System |
| BVPI | Best Value Performance Indicator |
| CANMORE | Computer Application for National Monuments Record Enquiries |
| CARN | Core Archaeological Record Index |
| CBA | Council for British Archaeology |
| CIDOC | Comite International pour la Documentation |
| CIE | Common Information Environment |
| CRM | Conceptual Reference Model |
| DCMS | Department of Culture Media and Sport |
| DEFRA | Department of Environment Food and Rural Affairs |
| DNH | Department for National Heritage |
| DOE | Department of Environment |
| EHCR | Essex Heritage Conservation Record |
| FE | Further Education (16+, college level education) |
| FISH | Forum on Information Standards |
| FRC | Fenland Research Committee |
| GCSE | General Certificate of Secondary Education |
| GIS | Geographic Information System |
| HBSMR | Historic Buildings Sites and Monuments (ExeGesIS SDM Ltd software package for SMRs/HERs) |
| HE | Higher Education (university level education) |
| HER | Historic Environment Record |
| HEIR | Historic Environment Information Resource |
| HEIRNET | Historic Environment Information Resources Network |
| HEIRPORT | Historic Environment Information Resources Portal |
| HLC | Historic Landscape Characterisation |
| HLF | Heritage Lottery Fund |

| | |
|---------------|--|
| HSIS | Heritage Spatial Information System |
| HTML | Hyper Text Mark-up Language |
| ICT | Information and Communications Technology |
| IHBC | Institute of Historic Building Conservation |
| MAGIC | Multi-Agency Geographic Information for the Countryside |
| MDA | Museums Documentation Association |
| MIDAS | Monument Inventory Data Standard |
| NMP | National Mapping Programme |
| NMR | National Monuments Record (of England, unless otherwise specified) |
| NMRE | National Monuments Record of England (in tables etc.) |
| NMRS | National Monuments Record of Scotland |
| NMRW | National Monuments Record of Wales |
| OASIS | Online Access to the Index of Archaeological Investigations |
| OS | Ordnance Survey |
| PPG15 | Planing Policy Guidance 15: Planning and the Historic Environment |
| PPG 16 | Planing Policy Guidance 16: Archaeology and Planning |
| RAMSAR | Ramsar Convention listed Wetland of International Significance |
| RCAHMS | Royal Commission on the Ancient and Historical Monuments of Scotland |
| RCAHMW | Royal Commission on the Ancient and Historical Monuments of Wales |
| RCHME | Royal Commission on the Historical Monuments of England |
| RSPB | Royal Society for the Protection of Birds |
| SMR | Sites and Monuments Record |
| SSSI | Sites of Special Scientific Interest |
| UAD | Urban Archaeological Database |
| URL | Uniform Resource Locator (Internet address) |
| VCH | Victoria County History |
| Web | World Wide Web |
| WWW | World Wide Web |
| XML | Extensible Mark-up Language |

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