Providing Access to the National Monuments Record of Scotland

Kate F. Byrne

Abstract

For more than a decade, RCAHMS has been using computer databases to manage its data holdings, in particular the National Monuments Record of Scotland (NMRS). In the past the computer applications have been designed principally for staff use, with the emphasis on ease of data capture and management. Flexible retrieval functions have always been important, but it was not always possible, with earlier software tools, to combine flexibility with ease of use; so visitors to the NMRS usually required staff help to get useful information from the database. Technology has moved on, and this is no longer the case. This article looks at the public access facilities already available in the NMRS, and those planned for future development.

1 Introduction

The Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) has three central aims:

1. to *survey and record* the man-made environment of Scotland;
2. to *compile and maintain* in the National Monuments Record of Scotland a record of the archaeological and historical environment; and
3. to *promote an understanding* of this information by all appropriate means.

This article is concerned with the third of these: promoting understanding of the National Monuments Record of Scotland (NMRS) by making access to it more straightforward. It is based on a presentation made at the CAA97 Conference, as part of the session entitled 'Making History: the once and future role of the Royal Commissions'.

The NMRS database developed over a period of years, as computer technology improved and made new functions possible. It is still developing continuously, as we move towards the goal of integrating related datasets which exist in different formats, and making the total repository as accessible as possible. As well as the core textual data, which has been held in computer format since the 1980s, there are, for example, digital maps and plans, field and aerial survey work, and various other spatial datasets - all of which can now be interrogated from a single point of entry. The large collections of photographs, plans and manuscripts in the NMRS are indexed in the database, and the next step is to start making them available electronically, alongside the related textual and spatial information.

The focus of this paper is on methods rather than content. The datasets are considered primarily according to their type: textual, spatial or image, since these are handled differently, irrespective of what the data is about. The aim of course is to present the user with logically connected pieces of information and make the underlying mechanics invisible. But the mechanics are interesting when considering the problems and opportunities for data access.

2 Database development

Computerisation of the NMRS database started in the late 1980s, with the scanning of the Ordnance Survey card index to archaeological sites in Scotland. The text management system first used did not provide sufficiently flexible management and updating facilities, and the data was later transferred into a specially developed Oracle database application, completed in 1990. Part of the development project was to examine overlaps with the data holdings of Historic Scotland, for Scheduled Ancient Monuments and Listed Buildings. Rather than trying to merge separate datasets, it was decided to build links between them, and this has led to the present set of inter-related databases. This arrangement has proved very satisfactory: each organisation maintains its own data but the records are linked so that users of, for example, the NMRS database, can look up the statutory Scheduling or Listing details, where applicable, at the press of a button.

The next significant change was in 1994, when the Oracle databases were moved from the Scottish Office's IBM mainframe to local machines, and upgraded to use graphical interfaces. Although the data management techniques were unchanged, the new interfaces made a big difference to the ease of use of the systems, and the change of platform (to Unix) made links to other types of application feasible. The first major project undertaken after the move from the mainframe was to link the NMRS database to a GIS application based on the Genamap package. By 1995 a bridge was in place to allow data insertion and updating from either end, i.e. records in the textual database can be added or amended via digital maps in the GIS, and vice versa. Using a GIS makes integration of other spatial datasets simple, so the NMRS database has now effectively expanded to include spatial data such as aerial photograph transcriptions and survey maps produced by RCAHMS field teams.

Also in 1995, the database structure was altered to incorporate maritime archaeology. The following year a major extension of the NMRS textual database was completed, to allow architectural data to be integrated

seamlessly alongside the archaeological material. Data capture on the architectural side is still on-going, and of course cataloguing of new material is a continuous process, but the NMRS database now integrates both textual and spatial material across its main subject areas. The next obvious step is to incorporate image data, by digitising the collections of photographs, plans and drawings.

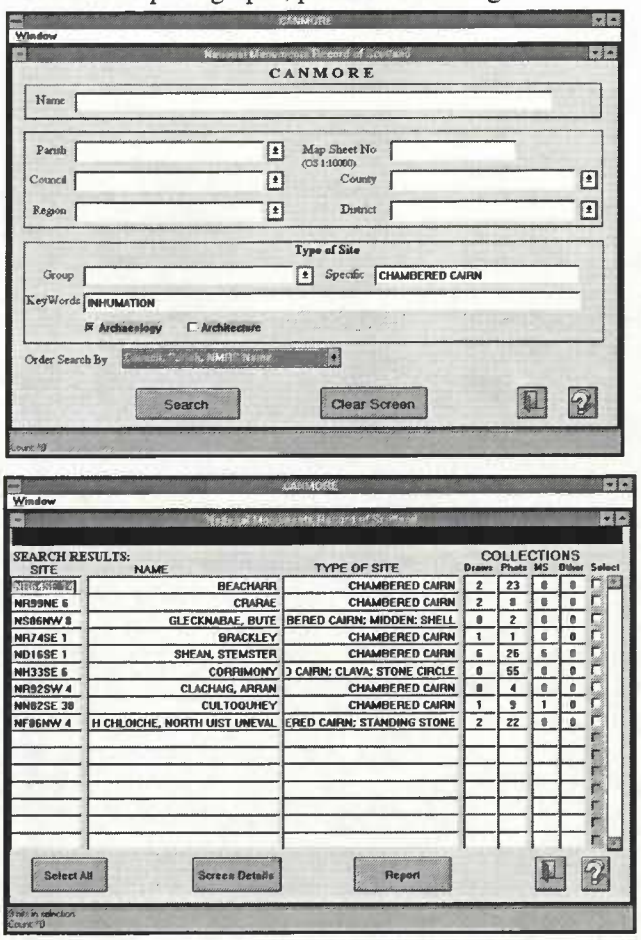

Figure 1. Two of the CANMORE screens, showing a simple query and the summary of search results.

3 Text-based enquiries - CANMORE

Once the major task of integrating the Archaeological and Architectural Records was finished, development effort was directed towards making access to the NMRS database more straightforward for the general user. Querying of the central database was very flexible, but required some knowledge of the software and of NMRS cataloguing procedures. A major drawback was that a significant amount of information is contained in text notes and commentaries, which cannot be searched using the standard tools. Part of the requirement for the new query application was to remove this limitation. This has been achieved using Oracle's TextServer software, and the system now permits searching both within formatted fields and across free text. To keep things simple, the number of query fields is limited, but each of them searches a selected group of relevant database fields. The question of what should be returned from a web of interrelated data in response to, for example, a single keyword query, is a very interesting one; so far we are only scratching the surface of what is theoretically possible with tools like TextServer.

The user enters his or her query on the first screen, using as many of the query fields as required. A summary list of hits is returned, showing basic identifying information for each record found: site name, location, classification, and a summary of the holdings in the NMRS for the site. From this list the user can go on to see details either on screen forms or in a formatted report, for all sites of interest on the list. They can be picked one at a time by double-clicking on the name, or a group can be selected by checking a box against each record wanted in the set (see Fig. 1).

The new application was christened CANMORE (*C*omputer *A*pplication for *N*ational *MO*nument *R*ecord *E*nquiries) - one of our more successful attempts at a snappy acronym, and particularly appropriate for the Scottish national record because Malcolm Canmore (crowned King of Scots in 1058) was so significant a figure in Scotland's history. The development of CANMORE has been described elsewhere (Collison Owen Forthcoming). CANMORE is available for use by visitors to the NMRS at John Sinclair House in Edinburgh.

A sister application, CANMORE-Web, is currently under development. This is being written using Oracle's Web Server, and will allow queries of the NMRS database from WWW pages. It will provide very similar functionality; the same set of query fields search the database in the same way, but the formatting of the response is necessarily slightly different. This application is being developed as part of a project with the Archaeology Data Service (http://ads.ahds.ac.uk/ahds/) and the SCRAN (Scottish Cultural Resources Access Network) Millennium Project (http://www.scran.ac.uk/), called 'Accessing Scotland's Past'. This pilot project will also be looking at ways of managing distributed queries across multiple databases, over the WWW, using metadata as an intermediary.

4 Spatial queries

Over the last few years RCAHMS has developed a suite of GIS applications, which are used by staff throughout the organisation for a range of data management and research functions. Details of the GIS development are available (Murray and Dixon 1995). The four main applications are:

1. *Artemis,* for general purpose analysis and querying of spatial and textual data;
2. *Icarus,* which is an index to the collections of air photographs of Scotland;
3. *Pandora,* for maintaining the two-way link to the Oracle text database; and
4. *Midas,* for importing spatial data from a range of sources.

As users of GIS applications will be aware, the benefits include greater clarity of presentation, faster access to information and new functions that only become possible when data is analysed spatially. The NMRS database is essentially a site-based record and so lends itself naturally to spatial interpretation. The single most significant advantage we have derived from using GIS applications is the

automatic correlation of varied datasets. For example, when the work of the Scottish Office Air Photographs Unit was transferred to RCAHMS in 1993, we acquired an enormous collection of material, and had to develop the *Icarus* application to deal with it. The very fact of the index being held in the GIS now makes it possible to cross-reference NMRS sites with aerial photographs dating from 1941 to the present day. This correlation was never a specific objective, and would certainly not have been attempted when the two databases were in text form only, but it is a very useful by-product. There are similar examples for the range of spatial datasets we now hold, in particular land cover data, and of course the field survey material produced in-house.

As yet, the GIS applications have been designed for use primarily by trained staff. They include functions for combining spatial and textual queries and deriving plots accompanied by formatted text reports, and these can be produced by staff to answer enquiries. But the mechanisms for achieving a useful result are not straightforward enough to be used directly by the average visitor. This is one of our goals for the future.

5 Next steps

We hope to be able to develop the GIS as the primary entry point for NMRS database queries. This would involve designing an interface for the casual user, trying to achieve that difficult balance between high flexibility and low apparent complexity, which is the target for all successful computer systems. The interface would be linked to CANMORE for combining spatial and textual queries. The logical next step would be to make a GIS query interface available over the WWW, which is already theoretically possible using the Genamap Web Broker linked to our applications.

The third significant type of data RCAHMS holds, alongside the textual and the spatial, is image-based. The NMRS database currently incorporates an index to around 270,000 items of archive material, well over half of which is photographic. At the present rate of data capture and new accession, this figure will be approaching one million by the end of the century. The dream of having this material available on screen automatically has been with us for several years, but the cost is prohibitive. However, as a founding partner in the SCRAN project, RCAHMS is now starting to digitise selected items from its collections to contribute to the SCRAN resource base, and it is hoped that this will provide a seed for gradually building up a digital image collection.

RCAHMS is privileged to maintain a wonderful resource. One of our core aims is to make it more accessible to the interested public, and each new generation of technology provides new tools to do this. It is traditional at this point to say we are limited only by our imaginations, but I think, alas, the more significant limitations are likely to be time and money.

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Contact details

Kate F Byrne
Information Systems Manager
RCAHMS
John Sinclair House
16 Bernard Terrace
Edinburgh EH8 9NX
SCOTLAND
email: rcahms.jsh@gtnet.gov.uk