INFORMATION RETRIEVAL SYSTEMS FOR ARCHAEOLOGICAL DATA.
J.M. Copeland
Leeds Polytechnic, School of Librarianship,
Leeds, West Yorkshire, LS6 3QS.

Background to the project.

This paper describes work undertaken by the author at Leeds Polytechnic, School of Librarianship in conjunction with the West Yorkshire County Archaeology Unit towards a higher degree. The project began in October, 1981 with the following aim :"To investigate the information needs of the users of the sites and monuments record at the West Yorkshire County Archaeology Unit and to design and implement a retrieval system capable of satisfying these needs."

The data held at the Unit.

The bulk of the information forming the sites and monuments record (SMR) takes the form of some 30,000 5x8" record cards arranged by their grid coordinates. Further information is also stored as maps, aerial photographs, slides, files of notes, committee minutes and so on.

The problem.

The only access to the SMR is via the grid coordinates of sites. There is no facility to cross reference from the record cards to the rest of the information any attempt to retrieve information is therefore slow, inflexible and error prone.

Progress so far.

Much of the work done since October, 1981 falls into three main areas : a survey of retrieval systems already in use for archaeological data, a survey of the information needs of archaeologists and a review of the computer hardware and software available.

The information gained from these activities has been used to produce in outline the design specification of a system recommended for use at the West Yorkshire County Archaeology Unit. In this paper I intend to concentrate on the survey of retrieval systems already in use for archaeological data in the U.K. and to discuss how the proposed West Yorkshire system will fit into the existing pattern.

Survey of archaeological recording systems.

The aim of the survey of retrieval systems for archaeological records was to gain an overall picture of archaeological documentation in the U.K., what standards, if any, exist and whether a retrieval system is already in use that might be appropriate to the needs of the West Yorkshire County Archaeology Unit. It was suggested that one means of obtaining this information would be to distribute a questionnaire to other archaeology units asking about their record retrieval systems.

Methodology.

In November, 1981 a short postal questionnaire was drawn up and sent to 99 archaeology units, planning departments and museums. (Names and addresses were taken from the "Standing conference of unit managers, 1981" and "Survey of Surveys. (RCHM, 1978) to ensure as complete a list as possible. A small number of organisations did not receive a questionnaire as personal visits had already been planned.

The questionnaire consisted of a covering letter, explaining the origin of the survey and a short list of questions. Questions asked related to the number and type of archaeological records units hold as well as the methods of retrieval available. The final question tried to discover whether units were using or intending to use computers to aid record retrieval. Recipients of the questionnaire were also asked to enclose any additional information or documentation on their particular record retrieval system.

The intention of the survey was to very general in its initial approach to enable a short, simple questionnaire to be designed, which would not deter recipients from responding. These general replies woulds then give sufficient information to determine which units should be contacted again for further details.

The response rate after the first distribution of questionnaires was 76% and a very encouraging 91% after a follow-up mailing.

Use of computers.

22% of respondents are using computers to mainpulate records now and 41% hope to in the future. It may be of interest to compare these figures with those obtained by the Royal Commission on Historical Monuments in "Survey of surveys, 1978). (RCHM,1978) At that time 7% of the units surveyed were using computers and 13% hoped to do so in the future, indicating an increase of 15% and 28% respectively. Possible reasons for this will be discussed later in this article.

Of those contacted by letter using computers now 9 are using mainframe computers, 4 are using microcomputers and 2 are using hybrid systems. Of those hoping to use computers 10 intended to use local mainframe computers and 6 microcomputers. Obviously these figures do not give a true reflection of present computer use by archaeologists. From attempts I have made during the past year to discover any changes it has become apparent that rather more microcomputer systems have been set up than mainframe and this is not surprising. From my current records I would estimate that there are now about 15 systems based on mainframe computers and 19 micro/minicomputer systems. These figures include organisations I visited not included in the survey but not universities involved in research into archaeological databases.

Trends in information handling.

Software.

As far as software for storing and retrieving archaeological data is concerned four broad categories predominate.

(1)In-house packages on mainframes.

Most of the mainframe systems tend to use in-house software packages, which have been written by resident computer programmers according to the requirements of the archaeologists. A lot of these systems run in batch mode with its consequent slow response time. However an increasing number of systems are changing over to online access for at least a few hours a week. The characteristic most of these have in common is a lengthy development time. A number of archaeologists found that their system did not really meet their requirements, which resulted in either the system having to be changed or in a total lack of confidence in the system on the part of the staff. It should be pointed out that the above criticisms do not apply to all of the mainframe systems, there are some which have been very carefully designed and therefore run very successfully.

(2) D.O.E. Software.

For some years now the Central Excavation Unit and Dyfed Archaeological Trust have been using software written by Joe Jeffries and Don Benson for excavation and sites and monuments records. This software is also used for a national catalogue of Scheduled Ancient Monuments. During November, 1981 the D.O.E. issued Advisory Note 32 entitled "Ancient Monuments Record manual and County Sites and Monuments Records". This document recommends that organisations without "operational manuals" of their own adopt the guidelines for the catalogue of Scheduled Ancient Monuments and offers to give advice on computer hardware and software. According to my survey 11 organisations said they may adopt these guidelines in the future. However as far as I am aware, apart from the organisations previously mentioned no others are currently using this software.

(3) Museum Documentation Association - GOS Package.

Three organisations in the survey said they had adopted or would adopt in the future MDA recording techniques in conjunction with a computer-based system. It must be pointed out that these are all museums. As the GOS package itself has tended to be a package for mainframe systems, requiring some expertise to run, its use has not been widely taken up by archaeologists. The aspect of the MDA's work which will no doubt become more important to archaeologists is their proposed advisory service on microcomputer systems.

(4) Software developed at the Institute of Archaeology.

The fourth type of software for archaeological recording is being developed at the Institute of Archaeology, London by Ian Graham and Jonathan Moffett. This software is currently being used in various ways by 3 archaeology units for excavation and sites and monuments records. For use with both micro and minicomputers this software is based on a very powerful database management system which allows very flexible data retrieval to cater for all types of enquiry and a rapid response time. Most systems which provide this kind of retrieval capability are very difficult to utilise. However, this software is being developed specifically so that any archaeologist can obtain the results he or she may require without a previous knowledge of computing. A further advantage of this software is the planned option to produce output compatible with the Museum Documentation Association Data Standards. This could be particularly useful where archaeology units have close links with museums.

Reasons for use of computers.

Over the past few years computers have become smaller,cheaper and at the same time can achieve many more tasks. This has lead to an increase in the use of computers in many areas and therefore a greater familiarity with the concept of computers in most of the population. The mass media have particularly helped to foster the greater acceptibility of computers, although there is still work to be done to dispel the mysteries of computers and encourage ·their use as just another tool to aid whatever work is being done. This increase in the availability of computers has coincided with a realisation on the part of archaeologists as well as others of a need for more efficient methods of storing and retrieving records.

A computer-based recording system gives the potential to relieve problems of lack of space, lost data, inaccuracies in recording and to provide a flexible and efficient retrieval system, therefore relieving staff time for other work. It must be realised of course that the installation of a computer system will not immediately produce all these advantages. If computer applications are carefully designed then they should be successful. This may seem obvious but there are countless stories of organisations buying computers (not only in archaeology) without due consideration which then have either gone unused altogether or an unprecedented length of time has been spent getting the system to work.

A systematic review of data kept and actual information needs can be of great value even if a computer system is not installed. It can be surprising to realise how much data is kept that is never used or how recording methods could be improved without too much effort.

In ᐧorder to put the substance of this paper into perspective I will now try to explain the criteria that has been applied to the design of a record retrieval system for the West Yorkshire County Archaeology Unit. It has been said that there are already more than enough "systems" in archaeology without creating anymore. However it is hoped that by very careful design and planning and a thorough understanding of the work already being done in this area, any new record retrieval system developed for the West Yorkshire Archaeology Unit will serve as a useful complement to other systems rather than an addition to the confusion.

Design of a retrieval system for the West Yorkshire County Archaeology Unit.

The system design is based on the results of the survey described in this paper, a survey of user needs and a review of hardware and software available.

Basic requirements.

The first requirement was for software to set up a datbase management system with a network or relational structure so that items occuring more than once are only stored once, thus reducing the amount of disc storage necessary. The package should also allow user friendly input of data, retrieval on all fields and combinations of fields, cross-references to other material, a validation procedure for data input, including the use of thesaurus terms, a simple editing facility and some degree of compatibility with other systems. As far as hardware is concerned the minimum requirement was a Z80 based microcomputer with 64k RAM and 20MB hard disc running CP/M.

The proposals.

Software.

It was decided very early on that existing software should be used rather than trying to create something new. Of those already in use, the package which comes closest to the theoretical requirements is the software developed at the Institute of Archaeology, London. The reasons for this choice are as follows:
(1) The software has been written by archaeologists for archaeological records, whilst being sufficiently flexible to accommodate other kinds of records as necessary.
(2) A great knowledge of computing is not required by its users.
(3) The software is used and recommended by other archaeologists.
(4) The package allows data to be retrieved in a form compatible with the Data Standards of the M.D.A.
(5) The software may be adopted by a national organisation concerned with archaeological records.

Hardware.

Two proposals for hardware were presented, one based on a Z80 based microcomputer for the use of the West Yorkshire Archaeology Unit alone and a second based on a minicomputer running a Unix-like operating system for the use of the whole Division of Recreation and Arts.

Implementation.

It is hoped that a computer system fitting one or other of the above recommendations will be purchased later this year and a pilot Sites and Monuments Database set up. This will include implementing data standards, a program of training for the users of the system and possible variations in help levels available to professional and amateur archaeologists. It is hoped that by recommending the use of tried and tested computers with widely used operating systems, software already in use by archaeologists, which is compatible with the M.D.A. Data Standards the West Yorkshire system will go some way to achieving the aim of complementing existing systems and perhaps providing a pattern which other units could follow.

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