SOME PROJECTS TO STORE AND PROCESS DATA FROM SURVEY AND EXCAVATION WITH THE AID OF A COMPUTER

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Introduction

This paper reviews some recent work by the author and his colleagues, and outlines some possible future developments. It is not intended to describe the workings of each scheme in detail; but it is hoped to give an impression of the breadth of possibilities available to the 'automated archaeologist' (Wilcock, 1978).

Small and potentially highly effective projects are underway to process data from large scale survey, small scale survey, and excavation. In each case it is intended that as much as possible of the data which have been collected should be stored by the computer; thus making the totality of information available for comparison, analysis and abstraction by computer.

The potential for using the computer to manipulate archaeological data has long been recognised (Chenhall 1971; Cutbill 1974; Graham 1976). It is only recently that microcomputers have made such facilities a serious possibility for field archaeologists. It is hoped that the availability of such machines, with software to drive them, and some agreement on the structure of the data to be recorded, will make a useful contribution to the recovery and dissemination of knowledge about our past.

Maxey - The prototype suite of programs

Nearly a decade of excavation on the site at Fengate (Pryor 1980a, with refs.) has produced a recording system well suited to large gravel sites with little vertical stratigraphy. Pottery from Fengate was analysed with the aid of a microcomputer (Pryor forthcoming), and this machine is at present being used for data from the multiperiod gravel site at Maxey, Peterborough. Pryor (1980b) has written an assessment of the system from the archaeologist's viewpoint; and there is a detailed description of the development of the programs, and the rationale behind the use of the micro- computer (Booth, Brough & Pryor forthcoming).

Out of the total data derived from excavation (Fig. 1), it was decided that stratigraphy, artifacts and animal remains should be stored by the machine; they would be cross referenced to all other sources of information (Fig. 2). These three files for storing data on stratigraphy, artifacts and animal remains have now been in use for a year. Four programs are needed to service each file: to set the file up on disk; to send data to the file; to edit the file; and to print out the contents of the file. Although this is a cumbersome arrangement the programs have proved to be robust when used by inexperienced operators, and there have been no major breakdowns or losses of data. Programs have also been written to produce sorted indices to these files; but further development has been suspended pending the purchase of a hard disk. This disk, employing 'Winchester technology' would be able to store about a hundred times the volume of data stored on an Apple 5 inch disk. At present it is possible to produce sorted indexes

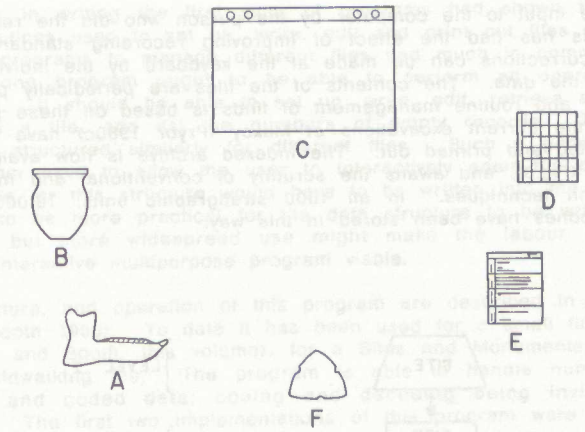

Figure 1: Diagram showing types of data recovered from excavation at Maxey: a: animal remains; b: artifacts; c: drawings; d: photographs; e: written records; f: environmental evidence.

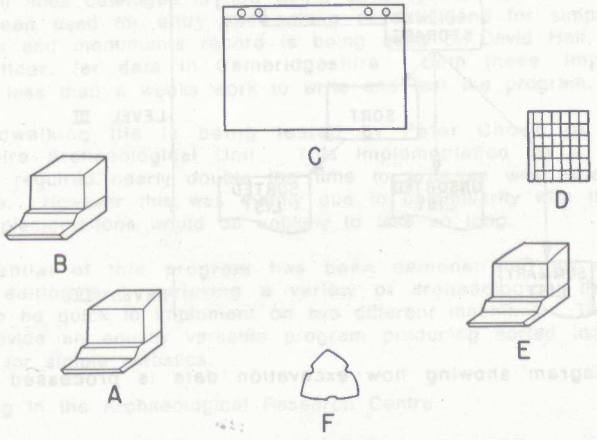

Figure 2: Diagram showing categories of data stored by the computer. Labelled as Fig. 1.

using the floppy disks, but this has proved to be an extremely tedious process, beset by problems with the hardware and system software. In all other respects the Apple II microcomputer has been found to be very satisfactory. The microcomputer was supplied by Digitus, 9 Macklin Street, London WC2B 5NM, who have been most helpful. A description of the system is to be found in the MDA publication (Stewart 1980).

The data are input to the computer by the person who did the recording in the field: this has had the effect of improving recording standards in the field , and corrections can be made at the keyboard by the individual most familiar with the data. The contents of the files are periodically printed out for checking, and routine management of finds is based on these printouts .

Data from the current excavations at Maxey (Pryor 1980c) have now been typed in, edited and printed out. The indexed archive is now available from the machine (Fig.3), and awaits the scrutiny of conventional and mechanised post-excavation techniques. In all 1000 stratigraphic units, 16,000 artifacts and 10,000 bones have been stored in this way.

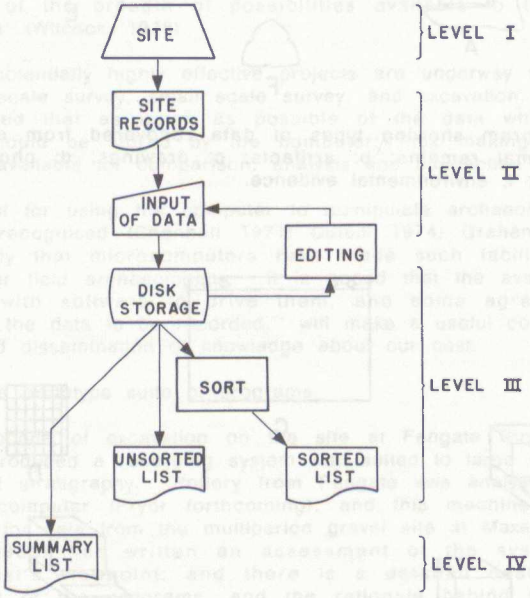

Figure 3: Diagram showing how excavation data is processed by the computer.

General purpose program

After a year's use the initial suite of programs had shown their potential, but some modifications had to be made, and additional files were needed. The computer was to be used to store data on small finds, sites and monuments, fieldwalking, pottery and plant remains. The files for this information would have to have available all the facilities of the initial programs, as well as better editing and retrieval facilities.

Experience in writing the first suite of programs had shown that many of the subroutines used to set up, write, edit and print out files were shared; and that programs to manage different files had much in common. It was felt that one program ought to be able to perform all operations for a single file. It should be able to set up, write, edit, retrieve and print out data from a file, and list the numbers of empty records. This program would be structured similarly for different files. Such a general program would either have to allow the user to interactively enter the data structure for the file, or this structure would have to be written into the program. It was felt to be more practical for the data structure to be written into the program, but more widespread use might make the labour of writing a properly interactive multipurpose program viable.

The structure, and operation of this program are described in detail by the author (Booth 1980). To date it has been used for a small finds catalogue (Crowther and Booth, this volume), for a Sites and Monuments Record, and for a fieldwalking file. The program is able to handle numeric, alpha-numeric and coded data; coding and decoding being invisible to the operator. The first two implementations of this program were on an Apple II microcomputer, whilst the third (for fieldwalking data) was on a PET. The Apple utilises random access, fixed length records. The PET uses sequential files. The program is capable of being adapted to both situations - sequentially arranged files make better use of disk storage, but are less convenient to work with interactively. The relatively low cost of floppy disks makes the less space-efficient random access files preferable.

The small finds catalogue is now being used by the Welland Valley Project. It has been used for entry and editing of data, and for simple retrieval. The sites and monuments record is being used by David Hall, the Fenland Field Officer, for data in Cambridgeshire. Both these implementations required less than a weeks work to write and test the program.

The fieldwalking file is being tested by Peter Chown of the South Lincolnshire Archaeological Unit. This implementation on a PET micro-computer required nearly double the time to write as was experienced with the Apple. However this was mainly due to unfamiliarity with the PET, and future implementations would be unlikely to take so long.

The potential of this program has been demonstrated as a means of storing, editing and retrieving a variety of archaeological data. It has proved to be quick to implement on two different machines. The next stage is to provide an equally versatile program producing sorted indexes, and a program for simple statistics.

Computing in the Archaeological Research Centre

The National Maritime Museum makes use of the GOS program package supplied by the Museums Documentation Association (MDA 1980; Stewart, this volume). Information retrieval policy in the museum is directed towards incorporating all departments within a comprehensive system. The Archaeological Research Centre is only responsible for a small number of objects, but holds a large amount of data which it is intended will be incorporated into the system (Fig.4). There has recently been published a brief outline of project PETREL, the documentation of the collections of the National Maritime Museum (Roberts 1980).

In the Archaeological Research Centre PETREL will provide catalogues and

cross-referencing for all sources of information. It will be possible to store the complete records for conservation, samples, and excavation staratigraphy on the computer; and catalogues of files, drawings, slides, photographs, negatives, objects and bibliographic references will be produced.

It is planned that excavation data collected in the field will be directly integrated within the system. In this area it is important to consider the requirements of the excavator on site, and at the post excavation stage, and of course the data collected on site must be compatible with information storage in the Museum. It is likely that work on site will investigate the use of a microcomputer, and of links with a larger machine elsewhere. Consideration will also be given to direct data entry on site, thus dispensing with the traditional soggy forms. The vastly improved availability of the collected data is likely to provoke fresh thoughts about the analysis of these data, and how they should be integrated within already tried methods of boat analysis (McGrail and Denford, forthcoming).

At present project PETREL makes use of the implementation of GOS on the Cambridge University IBM 370, but Dr. Jonathan Cutbill is now implementing it on a microcomputer. Eventually it is inteneded that most of the work in the museum will be done on microcomputers; in the short term much less will be done over the telephone to Cambridge - resulting in a significant reduction in the cost of computing. The approach adopted in the National Maritime Museum has the advantage of using a powerful package like GOS, combined with the economy and convenience of using a microcomputer. It is also possible to communicate with the larger computer to use other packages. In using a planned comprehensive approach it should be possible to take the records from site to museum archive within one system, with the data available for abstraction, analysis and publication at any stage.

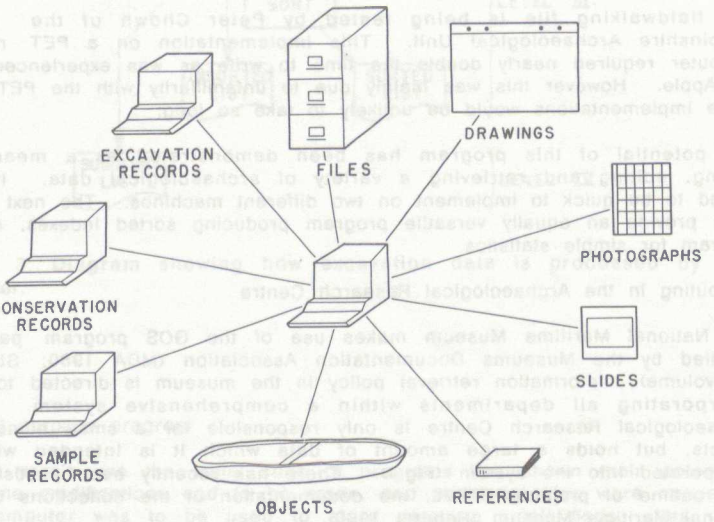

Figure 4: Diagram showing information in the Archaeological Research Centre, types stored by computer, and cross-referencing.

Conclusion.

The microcomputer used by the Welland valley project has shown its usefulness as a means of storing and retrieving archaeological data from an excavation. By using a more general program it has been possible to apply these techniques to a variety of data. None of these ventures has yet tried on a large scale to sort and index the data. Both these tasks are within the capabilities of the microcomputer.

On a much larger scale project PETREL in the National Maritime Museum makes use of the powerful GOS program package to manage the documentation of a large museum. This scheme will be able to take the excavated data from the site through all its stages of processing.

In the short term it seems likely that simple, effective and cheap programs like that described above (general purpose program) will prove to be extremely useful to archaeologists. Such programs can be quickly implemented on the minimum of hardware. They are easily adapted to the numerous different systems of documentation to be found in British Archaeology. The Museum Documentation Association has demonstrated the advantage of a professional approach to information storage and retrieval, and it is intended that current work in the National Maritime Museum will show how excavation data can be similarly processed. There are obvious advantages to a powerful, comprehensive system, which is available to all archaeolgists; but for such a system to become a reality the interest already shown by the Museum Documentation Association has to be echoed by the archaeological profession, and there has to be some agreement on the structure of data to be recorded. The potential of the computer to handle all archaeological data needs to be realised, and efforts to achieve this aim need to be properly coordinated.

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