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COMPUTING AND THE VICARAGE

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Abstract

Following recent discussions of the roles of computing archaeologists and computer specialists in Archaeology, this paper presents an example of the evolution of a computing strategy for the exavation of the Mediaeval vicarage at Wharram Percy. The paper concentrates on the strategy adopted, its execution and the degree of success achieved. Some ideas for the future evolution of this strategy are also outlined. The emphasis of the paper is on the methodological and human implications of the use of the computer, rather than on the details of the implementation.

Introduction

The original impetus for the work described here arose during the planning of the excavation of the Mediaeval vicarage at Wharram Percy. Small-scale excavation on the site in 1971 revealed evidence for the presence of a series of substantial stone walled buildings of Mediaeval date, lying on the terrace to the west of the Post-Mediaeval vicarage within the Mediaeval glebe. Their position and scale suggested that they formed part of the Mediaeval rectory. It is likely that the latter was established to the north of the church in the early 14th century, replacing an earlier vicarage to the south, suggested by the excavations there in 1982 and 1983. This move may have followed the acquisition of the advowson of the church by Haltemprice Priory in 1321/2. The nature of earlier occupation on the site remains uncertain, although an Iron Age burial and traces of Romano-British occupation have been found immediately to the south. The possibility of a Saxon manor on the terrace remains unresolved (Hurst 1984: 90).

The walls found in the 1971 excavations were set into a series of terraces cut back into the hillside, with building platforms extending to the east on made-up ground. Although the evidence was limited, it was enough to suggest that there was a complex sequence of development, with structures of a number of distinct phases running on different alignments. If this is the site of the Mediaeval rectory, it would be likely to contain a number of outbuildings and boundary features as well as the main dwelling. Such a complex is clearly described in 16th century documents relating to the vicarage.

Hardware constraints

The initial concern in contemplating the introduction of computerised recording was the availability of hardware. We were fortunate in being able to borrow a Sirius microcomputer from the Department of Computing, North Staffordshire Polytechnic. Attention was then focussed on the problems of designing an

appropriate system.

There were several initial constraints on the system design:

> Manual recording forms would still have to be used on site and in the finds shed. This was obviously desirable for the initial season, when teething trouble could be anticipated, but was also necessary thereafter since neither the site nor the finds shed provided a suitable computer environment.
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> The forms used could not be changed significantly because of the need to maintain compatibility with existing records.
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> The organisation into which the system had to fit is one which operates under great pressure for 3-weekly periods, therefore computation could not impose many additional burdens. Some of the extra work was acceptable since the longterm gains from computer assistance outweighed the initial investment of time. This realisation was crucial to the initial acceptance of the system.

Database design

Proper analysis and problem definition are essential to the success of any database management system. The literature on this subject is vast and no attempt to summarise it will be made here. This is primarily an account of our experiences in implementing one particular system. A useful introductory guide to some of the problems of data analysis is provided by Veryard (1984). The first phase of the design of the Wharram Percy DBMS was to discuss in detail the initial archaeological questions that would be asked of the site and the sorts of information that could usefully be recovered from it. It was possible to do this initial analysis in some depth since a reasonable amount was already known about the general character of the site from previous and current excavations and documentary sources. These initial questions were formulated at several scales. At the most general level we were interested in discovering more about the pattern of daily life of the vicars and how this compared with what we already knew about the material life of other individuals and groups in Mediaeval society, particularly at Wharram. At another level the area had been very intensively used. There is a large number of building sequences. The way these reflect the history of the village and in particular the church, raises another set of questions. A third level of questions is related to site formation and preservation processes. Here we are looking at the preservation characteristics of finds made in different raw materials, the identification of intrusive and residual material and the characteristics of different forms of chalk wall.

In order to examine these questions it was necessary to have an accurate picture of the distribution of different artefact types within the site. The volume of finds was likely to be considerable. However, there is sufficient disturbance to the original sequence of deposition, largely through the importation of material from other parts of the village, that it was considered inappropriate to record every find three dimensionally at this stage of the excavation. Instead a system of small grid squares was adopted. Other methods will be used when they can provide more useful information. Our system is sufficiently flexible that such changes are easy to make. The problem when devising the DBMS design was to capture this information in a way suitable for subsequent spatial analysis while not imposing unrealistic burdens on either the finds processing or site recording systems. Previous experience indicated that, if it were to be useful, the recording system must be robust, simple and unambiguous. The reconciliation of the

conflicting requirements of detailed recording for statistical manipulation and robustness so that information would not be lost under extreme conditions, could only be achieved with the co-operation of everyone concerned. Only thus were we reasonably certain of obtaining a workable system understood by everyone.

Virtually every item of information that might be recorded was examined in detail. The effects of this detailed analysis were a much greater general awareness of the potential and limitations of the information available. The nature of this examination can best be demonstrated by two examples.

The context number is the primary key around which all the other information is organised. The problem arises in defining exactly what is meant by a context. Is it the finest recorded level of stratigraphy or the finest unit of stratigraphy that is used to interpret the site or is it something entirely different? For instance, are the individual tip-levels in a make-up deposit individual contexts or is the deposit the context? The permutations are obviously enormous, but the important point is that however a context is defined there must be ways of incorporating information at both the finest and coarsest levels of interpretation. It is vital that everyone on the site uses the term in the same way, since otherwise it is impossible to generate a consistent set of information about the contexts and to analyse it in a meaningful way.

It is absolutely essential to have a common context unit which forms the basis for both the finds and stratigraphic records. The other entities which these systems record and discuss will vary, but without some clearly defined basic common unit the possibility of integrated analysis becomes remote.

A second off-shoot from this analysis was that the utility of some detailed soil records which had previously been routine was questioned. Examination showed that this information was useful in determining geological soil formation processes but was inapplicable to the sort of anthropogenic deposits found at Wharram. It was, therefore, possible to modify the recording strategy to collect only information relevant to understanding anthropogenic soil formation factors, rather than the effects of subaerial and periglacial weathering processes.

The same detailed analysis was applied to the finds processing system, again with beneficial results since it resulted in the identification of some activities which were restructured more efficiently.

The foregoing account should give some indication of the benefits that accrued to the excavation, even before the first character was typed on a keyboard. However, it must be emphasised that this only happened because the people concerned wanted to improve their recording systems and came to the problems with open minds. The introduction of a computerised recording system was the stimulus and vehicle for re-examination of recording at Wharram, it was not essential to the excavation. Although, it did provide the necessary focus and context for the examination of recording methods.

Database structure and uses

The next stage when designing the system was to consider the principal uses to which the database would be put. A rough and somewhat arbitrary distinction can be made between databases for research use and those for production use, although in practice most databases are used in both ways. The distinction is

made because when implenting a DBMS trade-offs must be made between differing requirements. How these trade-offs are made will have profound effects on the user's view of the system. Research databases can be characterised as having many one-off enquiries, whereas in production databases most of the enquiries can be clearly specified in advance. There are considerable differences in design strategy between the two. In a research environment there are likely to be many novel requests for information from small groups of users, most of whom have a considerable vested interest in maintaining the integrity of the data and who are intimately connected with the representation of some archaeological reality in that data. In this instance, while ensuring that indiscriminate modification of the data is impossible, the emphasis in implementation is slanted to allow users the maximum flexibility in data access, its selection and combination in novel ways.

The analysis of what information should be stored in the computer and how, was the next logical stage in designing the system, the core of which is an integrated database. A relational model was adopted for both the physical and conceptual schema. The attractions of a relational model for the conceptual scheme were its rigour and simplicity. That the physical scheme was also relational was an advantage, because it allowed discussion of what was to be recorded in the database to be conducted at a fairly detailed level by all concerned, since its principles were readily understood. This meant that the providers of data have a much clearer idea of why each item of information is needed and how it relates to other items. The benefits of this understanding are principally in the ease with which appropriate queries can be devised to extract the desired information from the database.

Implementation

The problems involved in defining relations, updating and access strategies for a simple database are easier to foresee and manage than for a more complex one. It was decided that the initial implementation of this database should contain the basic finds and context record information. The initial aims were:

> to provide a good user interface for all routine functions
> to provide fast data capture, with basic data verification. More comprehensive verification was not implemented because it carries a speed penalty
> to provide hard copy output duplicating the existing manual records
> to provide simple stratigraphic analysis. The development of a comprehensive stratigraphic analysis program was not justified at this initial stage. It obviously has high priority in later developments.

These aims were achieved after two weeks of programming effort and the basic system put into operation. A more comprehensive initial implementation was not attempted because it was not clear exactly how the system would be used most profitably. It became apparent within a week of the system going live that the introduction of a database managed recording system at Wharram was having several effects that had not been fully anticipated.

First, everyone concerned with recording, not just those who had been involved at the design stage, was much more aware of the recording process. The reason for this seems to have been the general discussions which were prompted by the introduction of the computer and the sobering effect of having a daily update available of the printed context book. Seeing one's words in print seems to promote a much critical appraisal of them.

Secondly, the ease with which complex questions could be asked allowed a much more critical examination of the tentative interpretations that arose during the course of excavation. Thus, instead of having to wade through mounds of recording sheets in order to examine a suggestion, the relevant information was available at a few minutes notice. The ability to examine the basic finds data and link it to the context data was also very valuable, although its potential will not be realised until a later stage in the excavation.

During the course of the season's excavation approximately another week was spent in programming. The bulk of this effort was expended in adding more facilities for stratigraphic analysis and writing additional report generators. During this period several changes were also made to the conceptual scheme of the database. The use of a DBMS allowed these changes to be implemented without affecting existing applications programs. By the end of the second week of the excavation the developmental process had stabilised and the system was performing well.

It is worth mentioning briefly some features of the implentation. The system is menu-driven for basic functions and query-driven for all non-routine enquiries. Most of the data are stored as text and there is currently no data compaction, although this may become necessary in the future. The use of appropriate defaults is useful in highlighting any omissions in the recording. It also allows deficiencies to be rectified immediately. These features have provided a user interface which is easy to use and satisfies all user requirements.

Conclusions

In summary, we can see that the human and organisational context in which the DBMS was implemented was of crucial importance to its success. A system will never be successful if its users are not happy with it and do not believe that it offers useful advantages to them in their work. Nor is a database a panacaea that will solve organisational problems concerning the structure and flow of information, although its introduction can often provide the necessary focus for people to examine these problems seriously.

The principal advantages of a DBMS that we have found are: the ability to look for possible relationships and patterns in the data, the increased ease of access and the relative ease of ensuring consistency. The problem of several incomptabile versions of the same data usually in the phrasing information or something equally crucial, so frequently found in post-excavation analysis, should disappear with the introduction of any reasonably well-designed DBMS. We have also found that the introduction of a DBMS provides a great impetus for people to look critically at their data and to examine in detail what exactly they are recording, how well they are recording it and for what purpose. Our success so far has led to further plans for using computers at Wharram, particularly for graphical applications.

The close co-operation between the different members of this project has meant that there is a considerably increased quantity and quality of information available and more time to utilise it during the excavation. The division of responsibilities coupled with close co-operation and rapid feedback represents a real gain in the quantity and quality of information available for site interpretation. However, it must be remembered that data collection is not an end in itself but only a part of the process of understanding and interpreting the development of the site. It is in these terms that the success of the computing work must ultimately be judged.

References

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