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Has 25 Years of Computing Provided Greater Physical and Intellectual Access to Archaeology?

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Abstract

This paper reviews the last quarter century of data collection, management and curation in archaeological computing, and briefly notes the main developments from the 1970s use of 'off-site' University mainframes through to more recent usage of networked microcomputers and integrated software packages. The main achievements of the last 25 years are outlined: the development of data standards and terminology control, cooperation and collaborative ventures by national bodies such as the MDA, RCHME and EH, as well the growing realisation of the strategic importance of information and the need to secure its intellectual property rights. Areas for further work aredentified: the impermanence of digital data, and the need to avoid excavation-to-museum duplication in data management systems. Longer term issues such as the bipolarity of increasing public access versus the need for copyright and site/monument security and other such issues relating to power and control are briefly addressed, as well as the central issue as to whether 25 years of computing now provide greater physical and intellectual access to archaeology.

1 Introduction

As noted by Peres de Cuellar (1997, 10), anniversaries are always privileged moments: celebrations such as this 25th Anniversary Conference can stimulate thought on the ground which has been covered, as well as pointing out possible new directions. This paper will briefly survey the last quarter century of archaeological data collection and management as represented by the conference proceedings of CAA ('Computer Applications in Archaeology' and its younger sister, 'Computer Applications and Quantitative Methods in Archaeology'), and then highlight some achievements as well as identifying areas for further work.

It has been common to define a sequential pathway, a form of the Great Chain of Being in archaeological computing, moving inexorably in logical stages from data collection, through to data management, leading to data manipulation and analysis, finally arriving at dissemination (often paralleled with the possibly arcane distinction of raw data into meaningful information leading to (shared) knowledge). However archaeological use of IT and information systems (IS) is now more of a complex, converging, multistranded web (or Web), rather than a linear feature on the computing landscape. Despite this complexity and interrelatedness, some areas of computing endeavour have had to be excluded in this brief survey: quantitative methods, statistics and classification, archaeometry, visualisation (including imaging, CAD, multimedia, and virtual reality), expert systems and artificial intelligence. Geographic Information Systems (GIS) as a combination of database management, graphic applications and statistical analysis have not been covered here (but see for example, Kamermans and Fennema's preface to the CAA 1995 conference and the fifteen articles devoted to GIS at that conference (Kamermans and Fennema 1996). Education and publication through computerised means will be touched on briefly, where appropriate to the central theme.

2 History

The history and development of archaeological computing, both IT and IS, have been well documented in CAA (Booth 1995a; Hansen 1993; Lock 1995; Webb 1986). Reilly and Rahtz (1992) provide a comprehensive and world-wide perspective of archaeological IT and IS. In the early days of 'off-site' processing of data on large University mainframes in the 1970s, a favourite phrase to describe this activity was 'information retrieval': an interesting connotation as the activity was neither information nor retrieval (in 1990s' parlance): it would now be termed data analysis.

In 1978 John Wilcock, in one of the earliest articles of its kind, was to consider the application of personal computing and microcomputers to site recording and the retrieval, analysis and publication of excavation material (Wilcock 1978). By the early 1980s, the first articles describing the use of microcomputers and the new relational database management systems for excavation material were being published (Booth 1982; Stewart 1980a). The term 'databanks' with all its mainframe connotations had been superseded by 'databases' with several units running BBC or Amstrad home computers (for example, Moffett 1986). By this date there were also the first references in CAA to Sites and Monuments Records (Moffett 1984) and their databases, the issues of which have been comprehensively covered by various authors (Lang 1992; Clubb and Lang 1996; Lang this volume).

By 1989, the youngish discipline of archaeological computing felt it had come of age and marked this transition

by codifying its activities, as seen in Ryan's bibliography of publications on computer applications in CAA and in other sources (Ryan 1988). Ryan classified over 700 articles into 11 categories: data collection and curation (including SMRs, education, publication and museums) numbered less than 200.

By the early 1990s, the shift away from large scale, text-based, off-site data processing was complete, with a wider diversity of articles on the issues concerning the management of data: SMRs and cultural resource management, GIS, metadata, imaging via videodiscs and visualisation, electronic journals, as well as the first reference in CAA to condition surveys of museum collections (Keene and Orton 1992). Few articles, though, considered the bigger picture, or reflected on the wider issues of computer archaeology. This was left to publications such as Ucko's thought-provoking article on the impact of IT on archaeology (Ucko 1992). However articles such as Cheetham and Haigh (1992) were beginning to question the purpose of all this computerisation activity. While accepting that archaeological database systems were poor contenders to bridge the gap from data into information, they voiced the common concern that the discipline could be tarred as '...[the] manipulation of ambiguous data by means of dubious methods to solve a problem that has not been identified' (Cheetham and Haigh 1992, 13). Hansen's amusing article with cartoons was a timely paper to describe and map out the state of European archaeological databases and SMRs, and especially the problems in the exchange of data (Hansen 1993). In recent years the trend has been to use industry standard relational database management systems (RDBMS) and standard office applications for excavation material, such as the use of Microsoft Access for the IDEA project (Andersen and Madsen 1996).

This period also saw several government organisations beginning to assess the wider, strategic implications of data management and collation (Booth 1995b; Clubb and Startin 1995; Clubb and Lang 1996; Murray 1995), although in fact the strategic issues had already been discussed ten years earlier by Cooper (1985). In the same period, a change in emphasis shift was discernible, away from data collection to increasing public access to the results of archaeological computing (Booth 1996).

3 Achievements

After 25 years of endeavour in archaeological computing what are the main achievements? The major development in data management has been the development of standards: whether as the Royal Commission on the Historical Monuments of England (RCHME) data standards (1993) or controlled vocabulary such as the RCHME Thesaurus of Archaeological Terms (RCHME 1986), or in partnership with English Heritage for the Thesaurus on Architectural Terms (RCHME and EH 1989), the Thesaurus of Archaeological Site Types (RCHME and EH 1992) or the Thesaurus on Monument Types (RCHME and EH 1995). The real issue for the coming years will be how to ensure standards such as these continue to work as the metaphorical glue, rather than becoming the concrete in the systems.

Collaboration on a national scale has been both a challenge and a lasting achievement: SPECTRUM, the product of museum cooperation organised by the Museum Documentation Association has provided the first ever national (if not international) documentation standard (Grant 1994). The LASSI (Larger Scale Systems Initiative) consortium of the Museums and Galleries Commission and eight museums now has a standardised database system for the management of collections, as well as electronic access and exchange of information (Grant et al 1996). SCRAN (Scottish Cultural Resources Access Network) project in Scotland (Royan 1997) is building up a networked multimedia resource for the study of history and material culture in Scotland and may well act as a catalyst for other such public access ventures.

Cooper (1985) was one of the first to identify information as a resource, to be managed strategically to deliver the business needs of the organisation, and with this realisation came the need to secure this resource through the establishment of intellectual property rights (Beagrie this volume). With increasing dissemination via electronic means, this will continue to make this an important factor to address in the coming years.

The maturity of archaeological computing, if not of data management and dissemination, has been demonstrated by Lock in his cogent description of contextualisation, (Lock 1995) making sense of the complexity of the subject by showing the linked development of the technology and the archaeological theory 'drivers'. He highlights and contrasts the current trend towards data-enriching environments with the emphasis on visualisation, multimedia, integrated software and increased access, compared with the 'data minimising' systems of the 1970s which concentrated on reductionist quantification, and limited access and exchange of information on mainframes which provided little scope for creative theorising.

4 'Could do better'

However, identification and addressing other key issues has not been so rapid in other areas: the impermanence of the results of all this data management, the digital archives, is only now being considered at a national level (for example, with the work of the Archaeological Data Service).

The need to avoid the duplication of excavation and museum recording so that excavation generated records should be absorbed and utilised in the museum's documentation system was identified as an issue at least 15 years ago (Stewart 1980b), but still requires realisation in the late 1990s. Ryan's suggestions on the excavation archive as a hyperdocument may assist here (Ryan 1995).

5 Future issues

One senses for the future a bipolarity of several issues, such as the provision of democratic access versus the interests of copyright, security and the protection of sites and monuments, and individuals. The slow increase in user-centric approaches to access may be constrained by issues of power and control in electronic dissemination (see Section

5), if not threats of what the media have called the 'dumbing down' of information. The degradation of what information scientists call 'disintermediation' or the use of intermediaries is eroding the rise of the archaeological knowledge worker. Murray notes the increasing demand for access to archaeological data without the intervention and interpretation by professional archaeologists (Murray 1995). And finally, the rise of the World Wide Web, (see, for example, the European Archaeological Heritage Web (van Leusen et al 1996)) while increasing potential access to archaeological collections via on-line imaging and electronic catalogues, and via electronic journals (Heywood *et al* 1996), may also make us question the quality of disseminated data. As Murray has noted, systems such as GIS, based on selections of data, may give a false sense of uniformity as the means to assess the quality or accuracy of data, such as source data, have been removed (Murray 1995).

6 Conclusion

The central issue has been whether more than a quarter of a century of computing now provides greater physical and intellectual access to archaeology (landscapes as well as artifactual and information collections). Improved access to archaeological sites, monuments and landscapes requires to be addressed elsewhere, but access to museum and information collections has already been briefly assessed. Despite 25 years of endeavour have we really moved museums from 'junkyards to Aladdin's caves' as the Museums Association itself termed it (Museums Association 1994)? While there have been some success stories (Museums Association 1994; Stewart 1984, 1995), the backlog and curation problems so familiar from the past still seem to haunt us in the digital age, and this impression requires further research and analysis. Virtual, or surrogate access, to archaeological information collections has dramatically increased (Stewart 1996), as have all the caveats surrounding its access, as noted in section 5.

It may not be possible for us to address the issue as to whether we now have greater access to archaeology, because although information is the answer, we are still unclear on the question. And that question reinvents itself according to the tenets of the time: the 'Audit Culture' of the eighties pushed the emphasis in archaeological computing, at least in museums, into collections management, data standards and automated inventory (Roberts 1985, 1988). A parallel development can be seen in the government organisations charged with cultural resource or cultural information management (Clubb and Startin 1995). In the nineties, the mantra of egalitarian access and dissemination is repeated, perhaps a little too often, without the intellectual rigour of questioning what is required and how can we provide it (but see for example the Catechism project at the National Museums of Scotland (McCorry and Morrison 1995), as well as Booth's analysis of access requirements for visitors to the Science Museum (Booth 1996)).

And as for archaeology at the eve of the twenty first century, computing may well help redefine our values and beliefs, who we are and our role in the Information Age and in the global information society. At the 1995 G7 Ministerial Conference on the Information Society, the group identified the acceleration of the multimedia digitisation of museum collections and their accessibility to the public and as a learning resource as a prime requirement to aid the realisation of the global information society (National Computing Centre 1995).

However, in the era of democratising archaeological knowledge (as noted by Reilly and Rahtz 1992; Huggett 1995) we also need to address the issues of power and control when disseminating information (Ucko 1992) and thus avoid Burke's early realisation (1978) of a world divided into information 'haves' and 'have-nots', or Reilly and Rahtz's concerns about 'intellectual colonialism' (Reilly and Rahtz 1992). Will, for example, access to virtual museum collections dissolve away the intractable problems in the restitution of cultural property – I think not.

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