

COMPUTERISATION OF SITES AND MONUMENTS RECORDS:
THE DEVELOPMENT OF POLICY

David Evans

Institute of Archaeology, 31-34 Gordon Square, London WC1H 0PY

Objectives

The objective of this paper is to define areas of policy and strategy for those who analyse, develop or work with archival systems in the curation of the National Heritage, especially in the public service. This work forms of the basis of my doctoral dissertation and comments will be welcomed. The areas of policy presented aim to provide:

- a sound knowledge of the theory of system analysis, its development and day-to-day use in archival services
- properly conceived, executed and reported studies which are based on professional standards and result in documented policies
- Heritage-wide assessment of the potential effectiveness of these services
- adherence to professional codes of practice
- competant staffing, training and optimisation of projects
- well-presented and feasible reports
- more detailed strategies, based on standard approaches, with which to attack these objectives

This paper concentrates more on effectiveness than efficiency. It does not attempt to suggest detailed strategies for management or to discuss specific problems.

NATIONAL MONUMENTS RECORDS
(for England, Wales and Scotland)

COUNTY and DISTRICT SITES and STRUCTURES RECORDS

NATIONAL and LOCAL MUSEUMS and GALLERIES

PUBLISHED REFERENCE WORKS

REFERENCE LIBRARIES
(for more specialised local records)

RECORDS OFFICES

CURRENT PUBLIC SERVICE RECORDS

RECORDS or NOTES of INDIVIDUALS, BUSINESSES and SOCIETIES

PRIVATE and EDUCATIONAL COLLECTIONS

Figure 1: The range of bodies which curate Sites and Structures Records

Introduction and terms of reference

This paper derives from a study of information centres in England which deal with historic environment related material (see Fig. 1). These I have broadly termed Sites and Monuments Records (SMRs). It will form the basis for a more detailed analysis of these centres with reference to the National Monuments Record of the Royal Commission on the Historical Monuments of England.

SMRs may contain information relating to any place or structure which has ever existed. The emphasis may range from historical to natural environmental, from social historical to archaeological or architectural (see Fig. 2). The requirements for what an SMR should contain, as well as other elements of its operations, are dependent upon the prevailing working policy. The effectiveness of this policy is dependent upon the SMR providing certain services to certain sets of users. The efficiency of the policy depends on cost and the effectiveness of the facilities available. Effectiveness and efficiency (Krone 1980) form the key objectives of any public service.

| | |
|---------------------------|------------------------------------|
| ARCHITECTURE | |
| ARCHAEOLOGY | |
| TOPOGRAPHY | |
| NATURAL ENVIRONMENT | (soil, geology, flora and fauna) |
| HISTORY | |
| SOCIAL HISTORY | |
| BIOGRAPHY | |
| PLANNING & ADMINISTRATION | (for development control) |
| MANAGEMENT | (staff and task relations) |
| OFFICE RECORDS | (old correspondence, now outdated) |

Figure 2: Range of information types in SMRs.

Such policies differ widely between different organisations while within large organisations they are sometimes contradictory, as in United Kingdom Listed Buildings Legislation. They emphatically do not unite the Heritage into an organisation with overall objectives.

In the case of SMRs, our key goal must be that:

We should, as professionals, produce, retain and present information as relevant to working policies, which are based on the objectives of service to the public.

This is a goal echoed in the code of practice of the Institute of Field Archaeologists (IFA), the Royal Institute of British Architects (RIBA) and the British Computer Society (BCS).

The relevance of computerisation to this goal, and to publication, field recording, cataloguing, etc., is that unless based on structured policy, information retrieval capability may fail to be effective in meeting user needs.

I shall develop below the areas of policy which need to be decided upon when analysing, developing and working with SMRs. Strategy areas which should be approached in such policy development will also be proposed. The aim is not to produce a cumbersome checklist for the development of an SMR from scratch, but an analytical tool for:

- comparative assessment
- monitoring of effectiveness

future development
of SMRs by setting out clearly national and local objectives.

Policy in the analysis of archival services

There has been, to my knowledge, no publicly stated policy on how to structure a systems analysis project in an archiving body in the public service. Various methodologies are available to complete different parts of an analysis (Orna & Pettitt 1980; Orna 1982; ACAO 1978). There is a large literature on the management and business analysis procedures available (Thomas et al 1983). However, this literature has been dominated by the intuitive and analysis-not-required schools.

The intuitive view suggests how the results of analysis should look, or which major users or aspects of the system should be considered (BLR&DD 1977; CBA 1975; 1984). What they do not suggest are practical strategies for implementing these opinions.

The analysis-not-required view considers that typical problems are either too simple for analytical consideration, or that the system will slowly lurch into shape over the course of its life (Flude 1984; Graham 1980; DoE 1981). These approaches may be seen as practical in workplaces with a limited budget or untrained staff. Many of the proponents of the lurch approach also feel that they know their problems adequately enough to solve them without formal analytical methods.

Neither of the above methods demonstrates the effectiveness of any system, gives it firm policies for change or relates it to profession-wide objectives. Failure to provide an analysis may be symptomatic of a failure completely to understand the system itself.

There is also a largely unpublished series of analyses prepared by in-house or consultant analysts. These are most often devoted to management information systems or cost effectiveness monitoring.

Suggested mandatory policies:

Gain an overview of systems analytical theory and practice:

If it is necessary to know the impact of any decisions or actions on a system, then an introduction at least is needed to systems theory and presentation. I would be pleased to hear of examples where systems analysis has been used as a tool in the Heritage. In practice, it is essential to be aware of the experience of other bodies which have analysed their own requirements and systems.

Follow standard procedures for the formulation and achievement of goals in analysis:

Systems analysis may recommend changes in policy or procedure. We have therefore to step aside somewhat from existing working policies and set standards for the future. These methods are well established in commerce and industry (see Cleland & King 1983; Campbell 1980; Teorey & Fry 1982). Each method, for example user requirements study or procedural study, should draw on a different standard methodology for procedure and presentation.

Ensure that goals are compatible with professional codes of practice:

There is probably too little profession-wide consideration of the public and professional pressures in system design. Systems analysis must consider external variables, especially in the Heritage, where functions are spread across so many diverse but closely related bodies. This aim is echoed in the codes of practice of all major professional Institutes, as well as in the policies of places of work and the rules of amateur Societies.

Ensure that goals are technologically, economically and politically feasible:

Feasibility study ensures that goals are attainable and budgetable and that the proposed strategies will be acceptable. Its theory and practice are well-defined in Krone (1980) and UNESCO (1981).

Include the following in the list of strategies for analysis:

Policy study

It is essential that current policies are made plain, especially to determine what may and what may not be changed. One must also remember that:

'the more powerful, authoritarian and doctrinaire the leadership and the more insecure the policy advocate(s) the higher the probability that the boss will be given not only the policy he is known to prefer, but none other' (Krone 1980:31).

It pays to look at the effects of extra-rational factors. For example perception, dislike, faith, can have a devastatingly erratic effect on policy implementation. I would recommend that policy study strategy be based on the work of Krone (1980), with interview methods drawn from the user requirements study outlined below.

User requirements study

Many sources emphasise this as of prime importance in analysing the effectiveness of an archive. Methods for the definition of users and key questions are provided in several sources (Orna & Pettitt 1980; Thomas et al. 1983) but the design methods for these studies are only given in (UNESCO 1981; Teorey & Fry 1982; Ford 1977; CRUS Guides 1984).

User studies in the Heritage are rare. Several have been conducted with rather limited aims for limited purposes (NMM 1984; Benson 1984; Greene 1978). Libraries are well advanced in such work (Lubans & Chapman 1975), but not specifically in the Heritage field. The only major work on the information requirements of an SMR to my knowledge is by Joyce Copeland (1983) for the West Yorkshire Archaeological Unit. This work, although theoretically advanced, suffered from poor response and lack of support in testing. Other work (see Gaines 1984) has analysed requirements in a more ad-hoc way. I would be pleased to hear of other experiences, especially in the USA.

Commercial or media studies for publishers, television, etc., may provide large quantities of information, but its orientation may not be relevant to our requirements. I would recommend that any user requirements studies be based upon the CRUS Guides (1984) or Teorey and Fry (1982).

Archive and procedures study

It is obviously necessary to perform a behavioural study of current practices and the archive related to them in any institution. This will include a list of the current working and archival documentation and an interview programme to determine working procedures.

The archive components which should be analysed are not, unfortunately, discussed by Cook and Grant (1984) nor by the Museum Documentation Association in any of its works. Orna and Petitt (1980) make no reference at all to how museum material should be assessed. Usefully UNESCO (1981) does show how archival description relates to key analytical decision issues. This is obviously a useful starting point. The feasibility of a study and its recommendations obviously depend on the resources available.

Entity modelling

The totality of the information outlined above may be expressed as a MODEL (Krone 1980) of the system being analysed. The methods for presenting this model are varied (Gough & Spikantaiah 1978: 56). Teorey and Fry (1982) present a state-of-the-art system for modelling the relationships between procedures, data, as entities and attributes, and working policy. The interpretation of these models provides a summary of the analysis and offers recommendations and proposed data structures for a computerised system.

The Ordnance Survey Archaeological Division used such a model for its Management Data System as do several other institutions with larger staff complements. However, they lie outside the scope of an SMR.

A modelling standard needs to be chosen and its relevance to our needs ensured. It should not be too complex, be readily understandable as a diagram, etc. Any wider use of models within the analysis would require some managerial input (see Cleland & King 1983; Orna 1982). This is best undertaken by trained and experienced staff.

Some of the key supporting strategies for the development of the analysis policies outlined above will now be described.

Operational environment

Project management covers several strategy areas, including team compatibility, co-operation between the departments or institutions being studied, discussion and feedback of interim results, reporting to schedule and reward. It is essential that controlling policies, that is decisions about the duration of the study, who is responsible, etc., do not fluctuate. This could lead to analytical problems. Resources policy should also remain stable during the study, but is critical mostly in the development phase.

Data collection

The various problems of sampling, error, pilot and full studies are all dealt with in the CRUS Guides (1984). Changing requirements are either an example of feedback (Cleland & King 1983) or a management problem. If the latter, guidance is needed on how to relieve stress in work.

Expertise, training and communication

I cannot over-emphasise the necessity for training for all staff involved in these

projects, whether in liaison or primary system development. On-the-job training is inferior to structured courses, as most commercial firms have realised. Staff need to know the importance of all policies and strategies if they are to be managed within British Institute of Management guidelines (BIM 1984). An internal newsletter is a good way to disseminate that information.

User studies targets

I have developed a method (Evans 1986) which relates user requirements to behavioural and normative policy both at present and in the future (see also Krone 1980). It provides a rapid monitor of the effectiveness of archiving policies both present and suggested. It is therefore a mini-model for discussion.

Policy in the development of archival services

After a system has been designed an analysis should be carried out, producing a model of the service. There will probably be associated recommendations for changes in working practice. Their impact will merit careful negotiation with staff and others, at an early stage.

In order to make these recommendations into reality, assuming a convincing report is presented, a development plan needs to be formulated. This should be based on the areas of development policy discussed below. As we have seen, correct systems analysis has rarely been advocated for the historical environment. Development methodology has been discussed in terms of basic requisites in equipment selection by Thomas, Schubert and Lee (1983) and Orna and Pettit (1980) and in terms of data or form design by Teorey and Fry (1982) and the Museum Documentation Association (1981). However, there is still a complete lack of a development policy which would allow what we do to be well documented, professionally executed and fulfill a perceived need. Cost effectiveness is often called for at this stage, due to the long term implications of development plans.

The following section draws heavily upon the analyses outlined above for justification of the different policy areas.

Mandatory policy

Gain an overview of system development theory and practice:

The dual problems of system design and implementation throw up complex managerial tasks. The CCTA Management Guides (CCTA 1984) give an outline introduction to these problems, integrating them with the tasks of data design and system selection. It is essential to be familiar with the experiences of others in these fields.

Follow standard procedures for formulation and achievement of strategies in analysis

Besides the more general CCTA work, there are more detailed guides (CCTA 1983; Hoskyns 1984). Most consultants will recommend such a work. For database design, the modelling (Teorey & Fry 1982) and database theory (Date 1976) aspects must both draw upon the systems analysis. For system selection, BIS Applied Systems (1980) have produced a very weighty tome for LAMSAC, which guides the buyer through the details of testing, contracting, etc., in addition to any internal regulations which may exist in your own institution. Text

management systems (Hamilton et al. 1985) may be considered at this stage. They are ideal for the user who does not know what (s)he wants from a system, or how to get it.

The following should be included in the list of strategies for development:

Changeover, retraining and acclimatisation

Existing systems must keep working while new procedures are being developed. Some organisations are permanently in a state of flux.

Market analysis

It is essential to know what is available as office equipment, hardware, software, consultancy, etc. Many magazines, for example Office Equipment Index, Computing Computer Weekly, address this need. However, some of the more serious companies providing equipment prefer a low-profile. Software and hardware directories (Hoskyns 1984) list most of these, but there is also a mass of reviews, manuals, product marketing data and user experience that remains to be sampled to get the full picture. I have just completed such an analysis for the National Monuments Record (E) and would be glad to advise any confused purchasers on further sources of information.

Selection of system components

After the system has been designed, and reaches the selection and procurement stages, then a more problem-oriented approach to the market is needed. A list of mandatory and desirable requirements will have been prepared according to the standard procedures. Products will be assessed against this. Different types of test are possible: quantitative testing (benchmarking); maximal and minimum capabilities (in cost, response time, storage capacity, backup time, etc.); qualitative testing as in Figure 3.

BIS Applied Systems (1980) have prepared a checklist for selection, a form of which I followed when detailing the specific requirements of the National Monuments Record (E).

RELATION TO MANDATORY and DESIRABLE REQUIREMENTS
SECURITY
PORTABILITY and APPLICABILITY to other ENVIRONMENTS
COMPATIBILITY
DEVELOPMENT TIME (including modification)
DEVELOPMENT SKILL
STRATEGY for SECURITY COPY (including BACK-UP strategy)
USER FRIENDLINESS FACTORS
LONG-TERM MANUFACTURER SUPPORT
RANGE OF SUPPORTING or COMPATIBLE SOFTWARE PRODUCTS

Figure 3: Examples of areas of importance in system selection

Data design is an area which requires trained staff or a great deal of personal experience.

Strategies for the development of policies

Feedback, discussion and change

A developing system requires continual review, to ensure that it is both on target and also meeting the user requirements determined above. The needs of the model of system function must be met and the model must correctly reflect the policies if they change. This is a management problem, and should involve trained staff able to understand the system (Cleland & King 1983).

Working policy in archival services

Working policy covers the day-to-day functioning of an archival service. It does not attempt to monitor or change its methods or the policy itself. These areas of analysis and development are dealt with above. There has been much study of working policy in archives, but little on how to examine and develop its effectiveness. The intuitive school wins out here. There are opinions on what standards are available (Cook & Grant 1984; Orna & Pettitt 1980; CBA 1975; Cleere 1984) and there are examples of how different people have used them in institutional cataloguing systems, (Chalmers 1981; Foard 1978) but there are no guidelines for development methods. In order to develop working policy, or to compare the policies of different institutions, we must make decisions in the following areas, and document them.

It should be mandatory policy to:

Gain an overview of working theories and practice

Standard works on documentation ethics (Jenkinson 1966) and practice (MDA 1981) as well as the wisdom of professional bodies: ASLIB, Society of Archivists, Society of Indexers; should be explored. This should be complemented with a visit to several bodies to compare their experiences.

Follow standard procedures for formulation and achievement of strategies in working policy

It should be mandatory to analyse and develop correctly a working system, using the standards selected. The tested standards must then be adopted into work practices. This is discussed in more detail below.

The following should be included in the list of strategies for working policy

Cataloguing: description and detail

Quantity of description and level of detail are critical determinants of efficiency of form-filling and effectiveness of information imparted. The conciseness, clarity and general style of descriptive text should therefore be defined, depending on the user or purpose to which the material is put. The value of controlling description has been well demonstrated (HBMC 1984; Cook & Grant 1984). These emphasise the utility of description, especially as a finding aid for archives. It may prove more effective to eliminate the cataloguing of books and text in preference for photographic or graphic representation in some subjects.

Indexing

The finding-aid, whether implemented on computer, card index or filing cabinet, must allow fast access to information (Cook & Grant 1984; Thomas et al 1983; Roberts et al. 1980).

Cross-referencing

The intrinsic structure within the data being curated requires that these relationships be made explicit in the finding-aid by referential integrity (Date 1976: 89)

Procedures must be defined to enforce the policies on standardisation and compatibility decided at the initial analysis.

Terminology

Standards in thesaurus construction have been introduced by Orna (1983) and Adams (1984) for museums' cataloguing. Keyword lists have also been introduced by many institutions (NMR, Museum of London, JP Getty Trust) for use with these structures, and others.

The major current problem is the different interests of each of the organisations concerned. The following major issues must be approached before solutions may be obtained to thesaurus implementation. Observation of them will ensure that each implementation matches thesaurus needs and possibilities:

nature and function of the recording institution determines what it is trying to achieve, what its policies are and what its information looks like. It also sets relevant limits on the terms used and their relationships.

relation of any observations to national or local policy sets the degree of overall standardisation. It also relates this record to other records and recording standards.

method of compilation of the thesaurus sets the representativity of the terms for the topic and decides whether we accept all the available terms, or we restrict them.

source for contents of the thesaurus sets the scope of the terms which have been collected and determines whether we are just interested in certain subjects, only modern sources, or any sources. Should their original terminology be retained?

conceptual structure of the thesaurus sets the pathways and nature of terminology linkage. It also determines whether we include plurals, broader terms, narrower terms, synonyms, related terms. How are related terms defined?

physical structure of the thesaurus sets the feasibility of various implementations and decides whether we can afford a computer, how powerful it needs to be, and whether we can afford somebody to find and type in the information.

Accuracy and quality

The effectiveness of working policies will depend upon the proportion of correct and useful information in the archive. The attachment of a note (MDA 1980) or further description to a keyword or index entry may eliminate confusion and hence improve quality.

Coverage

The quantity of information in the catalogue or finding-aid will depend, not only on the number of items catalogued and described, but also on the number and depth of different subjects or areas covered.

Currency

The up-to-dateness of a catalogue, index or archive material may effect its usefulness in certain administrative tasks. Information drawn from these may be misleading if it is out of date or classified according to old systems. For example, a computer system may indicate that a building is not statutorily listed. If this information is out of date and has now changed, then certain statutory procedures may unfortunately not come into effect.

Access and enquiry

Availability of the archive, and its attendant catalogues, etc., will condition its usefulness to different users. Trained staff or special facilities may be needed for access to the information: to answer the phone or letters, interrogate the computer, etc. Finding aids in general in Libraries and Museums, that is signs, colour coding, etc. are a separate topic. Introductory or summary booklets may be needed before the enquirer really knows what they want. Many of these problems have been considered above.

Publication, exhibition and publicity

The number of people who come to be aware of the service and its usefulness to them, will condition the demand and nature of enquiries for access to the information.

Interim system development

A strategy must be laid down for the incremental, or short term, development of the system. The analytical model which has been developed should be continuously used for this purpose. It must be guided by a properly constituted and informed management, analysis and development team, who consider, at least in sub-committee, all changes or increments to the existing system. These must then be implemented on the model.

For example, a change in economic circumstances may allow computerisation to be considered for the first time. Drastic reworking of office practice will then probably be required. Alternatively, accessioning new bodies of archive, or new terms for the thesaurus, should be procedures catered for in the model and therefore involve no restructuring unless they lie outside the types or volumes previously defined.

Strategies for the development of working policy

Operational environment

Day-to-day management must, of course, monitor the effectiveness of practice as against policy. This can be done via management information systems. Most of the above work is long-term and may be boring. It is therefore absolutely essential to follow the precepts of motivation and career development. It also requires specialist staff in cataloguing, indexing, handling enquiries, system management, typing, etc. These should be recruited or trained according to feasibility.

Mixtures of manual and computerised systems are, of course, to be expected. The willingness of an institution to accept and control computer development must be considered in the policy analysis. Economic considerations may, of course, rule out such developments.

Planning for the unexpected

Occasionally, a user may require an unusual output format, or a cataloguing mistake could prove disastrous for cross-indexing purposes. Developed systems must be flexible enough in their organisation and staffing to respond to these problems. Procedures for verification of integrity, spot and systematic checks, may cut down the mistakes and are essential.

Summary and conclusions

Above I have given an indication of where decisions must be made, in the setting up and running of an SMR. I have tried to outline reference standards and general strategies to follow in deciding what these policies should be.

Overall, my main concerns are:

- the lack of integrated policy throughout the Heritage
- the failure to work towards an integrated policy
- the lack of perception, in the Heritage as a whole, of archiving as a profession, with common standards and practices
- the lack of monitoring of the effectiveness of Information impact in the Heritage

I hope that this paper has gone some way towards solving these problems. A detailed analysis using these policies and strategies will be presented in due course. For the moment, consider your services in the light of what they might be doing and who they should be doing it for, because unless we aim for the future we will probably end up with things that we do not want: less money, users, public education and enjoyment than we could give.

Acknowledgments

This work has been partially funded by the SERC and the RCHM(E). I wish to thank the staff of the NMR especially Roger Leech and Simon Grant for their help and cooperation, also those SMR staff who have trudged through their procedures with me.

References

- A.C.A.O. 1978 A Guide to the Establishment of SMRs. Association of County Archaeological Officers.
- ADAMS, A. 1984 Manual for Computer Database: some principles of recording/cataloguing/indexing data. Unpublished Report, Museum of London.
- BENSON, D. 1984 Data Entry and Retrieval for SMRs. Paper presented at Conference of the Association of County Archaeological Officers, Society of Antiquaries, London.
- B.I.M. 1984 Code of Conduct. British Institute of Management, London.
- BIS Applied Systems 1980 Data Base techniques: software selection and systems development. BIS Applied Systems Ltd. OED Information Services Ltd., Wellesley, Mass.
- B.L.R. & D.D. 1977 Problems of information handling in Archaeology - report on a seminar. British Library Research Report 5329, London.

- CAMPBELL, L.J. 1980 Case study in management information systems and corporate structure in Krone (op cit). 138-148
- C.B.A. 1975 Report of the working party on Archaeological records. to the RCHM(E) Council for British Archaeology, London.
- C.B.A. 1984 Possible outputs from a national Archaeological database (NADB) Council for British Archaeology, London.
- C.C.T.A. 1983 PROMPT II methodology series. HM Treasury, H.M.S.O., London
- C.C.T.A. 1984 Information Technology (IT) guide HM Treasury, H.M.S.O., London.
- CHALMERS, R. 1981 Computer Indexing in the Public Records Office Journal of the Society of Archivists 6(7): 399-413.
- CLEERE, H. 1984 Only connect in Martlew, M (op cit.), 9-20
- CLELAND, D.I & KING, W.R. 1983 Systems Analysis and Project Management, 3rd Ed. McGraw-Hill Series in Management, New York
- COOK, M & GRANT, K. 1984 A Manual of Archival Description Draft 7, Archival Description Unit, University of Liverpool.
- COPELAND, J.M. 1983 Retrieval Systems for Archaeological data: full report No 2 Unpub Report, Leeds Polytechnic
- C.R.U.S. 1984 CRUS Guides Series, Centre for Research on User Studies, University of Sheffield.
- DATE, C.J. 1983 An Introduction to Database Systems, vol 1, 3rd Ed. Addison-Wesley, Reading, Mass.
- DOE 1981 Ancient Monuments Manual and County Sites and Monuments Records DoE Inspectorate of Ancient Monuments, Advisory Note 32, H.M.S.O., London.
- EVANS, D.M. 1986 The human factor in machine-assisted information management. in Parker, S (ed) Proc Int Symp on Data Management and Mathematical Methods in Archaeology, Denver, Colorado
- FLUDE, K. 1984 Setting up an archaeological computer system in Martlew, M (op cit.), 31-4.
- FOARD, G. 1978 The Northamptonshire Sites and Monuments Record: Part (I) Archaeology Northamptonshire County Council, Northampton.
- FORD, G. 1977 User Studies: An Introductory Guide and Select Bibliography B.L.R & D.D Research Rept 5373, CRUS Occ Paper 1, London.
- GAINES, S. 1984 The impact of computerised information systems on American Archaeology: an overview of the past decade. in Martlew, M. (op. cit.), 63-76
- GOUGH, C & SPIKANTAIAH, T. 1978 Systems Analysis in Libraries - a question and answer approach. Clive Bingley

- GRAHAM, I.D.G. 1980 Microcomputers for Archaeological Excavation Recording. Rept to B.L.R. & D.D. (SI/G/216), unpublished typescript
- GREENE, J.P. 1978 A visitor survey at Norton Priory Museum. Museum Journal 78(ii): 7-9.
- HAMILTON, C.D., KIMBERLEY, R. & SMITH, C.H. 1985 Text Retrieval and Directory of Software. Gower, Aldershot
- H.B.M.C. 1984 HBMC Manual of Instructions: Section 3.3 part 3: guidance notes and office practices. Historic Buildings & Monuments Commission (England), H.M.S.O., London.
- HOSKYNs 1984 Systems Development Methodology (SDM): introductory guide. Hoskyns Group Ltd, Martin Marietta.
- JENKINSON, Sir H. 1966 A Manual of Archive Administration Percy Lund Humphries, London
- KRONE, R.M. (ed) 1980 Systems Analysis and Policy Sciences: theory and practice John Wiley, New York.
- LUBANS, J & CHAPMAN, E. (eds) 1975 Reader in Library Systems Analysis Microcard Editions Books, Englewood, Colorado.
- MARTLEW, R. (ed) 1984 Information Systems in Archaeology. Alan Sutton Publishing, Gloucester
- M D A 1980 Data Definition Language and Data Standards. MDA, Duxford, Cambridgeshire.
- M D A. 1981 Practical Museum Documentation MDA, Duxford, Cambridgeshire
- N M M 1983 User Requirements Study Unpublished discussion paper prepared by the National Maritime Museum, London.
- ORNA, E. 1982 Information Management in Museums: there's more to it than Documentation Museum Journal 82 (ii): 79-83.
- ORNA, E. 1983 Build yourself a thesaurus, a step by step guide Running Angel, Norwich.
- ORNA, E. & PETTITT, C. 1980 Information Handling in Museums Clive Bingley Ltd.
- ROBERTS, A., LIGHT, R.B & STUART, J. 1980 The Museum Documentation Association Museum Journal 80(ii): 81-85.
- TEOREY, T.J. & FRY, J.P. 1982 Design of Database Structures Prentice-Hall, New York.
- THOMAS, V.S., SCHUBERT, D.R & LEE, J.A. 1983 Records Management: systems and administration John Wiley, New York.
- UNESCO 1981 UNISIST - Guidelines on Studies of Information Users (Pilot Version) UNESCO Rept PG1/81/WS/2, UNESCO, Paris