DUST TO DUST

Field Archaeology and Museums Conference Proceedings Vol.II

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Society of Museum Archaeologists

DUST TO DUST?

Field Archaeology and Museums

Papers read at a Conference on the Creation and Care of Excavation Archives held at Leicestershire Museums and Art Gallery, Leicester, 9-11 November 1984.

Cover: Portable computers are joining traditional methods of archaeological recording; what does this mean for storing the information in the future?

Photo: Jon Bailey, Museum of London

Foreword

This is the third publication of the Society of Museums Archaeologists' conference proceedings and follows Archaeological Storage and Archaeological Display which have already had a wide sale and become standard works for both museum archaeologists and others working in kindred fields. We hope that this volume will do likewise.

A.J. White

(Hon. Editor)

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Setting the Scene

Mark Davies

When the society's committee met in autumn 1983 to determine the subject of this conference at Leicester, it needed very little thought or discussion before the idea was accepted of looking in depth at the excavation archive, as it is called nowadays. After all, this is the one subject which commands the special attention of all archaeologists in one way or another, whether we are involved in its creation, interpretation, care or presentation to the public. Nevertheless it does seem a little strange that such an important subject has not received the concentrated attention of a conference like this before. Plenty of consideration has certainly been given to its various elements in the past, although usually from the individual specialist standpoints of the excavator, the museum curator and so on. But it is only now that the various strands of interest have become so firmly interwoven into a common thread as to be able to attract a gathering of almost a hundred archaeologists to discuss it.

By way of introduction, I should like to look at the major developments which have occurred over the last decade and a half in relation to excavation archives, particularly from the museum archaeologists' point of view. To begin at the beginning, it is worth recalling the first of the objectives whichare enshrined in the Society of Museum Archaeologists constitution:-

"To promote active museum involvement in all aspects of archaeology and to emphasize the unique role of museums within the essential duty of the archaeological discipline".

A number of activities were defined whereby this objective should be fulfilled, the two most relevant in the present context being -

(a) "To campaign for and give support to increased museum involvement in field archaeology, either in close collaboration with archaeological units or by assuming responsibility for the totality of the field programme in their area", and

(b) "To ensure museums develope a positive attitude towards the acceptance, conservation and preservation of archaeological material and associated documentation, and to this end prepare a set of guidelines".

I shall return to the question of guidelines later. Suffice it to say for the moment that it is confidently expected that the following papers will in themselves give much useful guidance to those who are involved in creating and caring for excavation archives as part of a continuous process.

The above-mentioned principles on which the Society was founded are still, as they ought to be, entirely relevant to its purpose today. But they were formulated at a time of development and change, bringing also some uncertainty, for archaeologists in museums. Having in many cases borne the brunt of the burden of rescue excavations, museums then found themselves in the early 1970's being tossed along, as it were, on the swelling tide of Rescue Archaeology, which in due course attracted increasing injections of public funds and the concomitant creation of numerous excavation units.

Whereas some of these units were established in museums, the great majority were not, such being the official trend, and it was by no means certain whether museums would ever receive realistic support, if any, from national resources to help them properly fulfill their basic curatorial role of housing the archives that were produced. When a ministerial statement was made in September 1973 by the

Secretary of State for the Environment announcing a substantial increase in grants for excavations and the appointment of an Under Secretary "to implement the new proposals for rescue archaeology and to review existing powers in this field", the Museums Association was moved to adopt a policy statement on Museums and Field Archaeology at its following annual general meeting.

This statement emphasized the role of museums and the need for their close involvement in the development of policy and resources both nationally and in their own areas for field archaeology. At the same time it recognized that the extent of involvement would depend upon the policy of individual institutions and the resources available to them. Particular stress was put on the need to recognize "that the recovery element of rescue excavation represents a short intensive financial commitment only to be followed by the long-term care, storage and usage of the finds recovered". It was recommended, therefore, that "in addition to giving funds for excavation and publication as part of the field archaeology programme, grants should also be available to museums for conservation and storage". These conclusions were in fact complementary to the relevant findings published in the Wright Report in February 1973, whose originating committee, appointed two years earlier by the Paymaster General, Lord Eccles, had carried out a survey of 46 provincial museums with significant archaeological collections.

There were at that time strong calls for a national structure, such as the C.B.A.'s paper 'Archaeology and Government: a Plan for Archaeology in Britain.' This document was produced during the presidency of our chairman, Nicholas Thomas, who took as the theme for his presidential address the inseparable relationship of Museums and Rescue Archaeology, in which he convincingly argued the need for the two to establish a partnership rather than running in parallel, as had increasingly tended to happen.

Such then was the general climate in which, with expectancy and determination tempered with a certain degree of caution, the Society of Museum Archaeologists sprang into life at its inaugural meeting in December 1975. Several other disciplines within the museum profession had also been establishing their own corporate identities, and that gave added stimulus to the archaeologists to establish a common forum.

However, as it so happened, a change in the course of Rescue Archaeology was already being charted by means of the Frere Report, which had just been published in October 1975. Over the previous few years more and more effort and resources had been put into excavation so that the burden of publication was clearly becoming intolerable. Refined publication at Level IV was now to be the objective, but with certain essential conditions -

"(i) that all the original records of the excavation, properly organized and curated, are housed in readily accessible form in a permanent archive.

(ii) that data at Level III are readily available on request".

Standardized recording systems were thus suggested for overcoming the major problems involved in the creation, publication and use of excavation records. However, the immediate effect of these recommendations was a considerable increase in the post-excavation commitment since the archive had to be produced in much greater detail "to a very high standard of preparation ... equal to that required for publication itself".

The Frere Report also underlined the desirability of housing all the original records of fieldwork and post-excavation studies and data with the finds, and a recommendation was made to the effect that museums accepting custody of the excavated finds should also undertake the proper custody and maintenance of the excavation records.

Three years later general principles for the storage of archives from Rescue Archaeology were defined in greater detail in the final chapter of the Dimbleby Report. This stated that

"1. It must be recognized that the creation, housing and use of an archive is a single continuous process.

2. All archives should be housed in a museum or museum-controlled building.

3. Ideally no excavation should take place until arrangements for the adequate future storage, conservation and maintenance of the archive have been made" and so on.

Another three years elapsed while the implications were assessed. Then, in October 1981, the Department of the Environment issued Advisory Note 31 which announced its momentous scheme of grants to approved museums for the "Storage of Finds from Grant-Aided Rescue Excavations". It is no doubt significant that six years previously the Frere Report had started with these words -

"Archaeologists and those who employ or sponsor them in undertaking excava- tions have an obligation to publish their work; they also have the responsibility of seeing that the significant excavated material and the full original records of the work are preserved for reference by future scholars. The two aspects of publication and preservation of the records are inter-related".

Despite all the progress that has been achieved, the question still arises as to how long it will be before all those bodies which fund excavations automatically accept a share of the financial obligation for housing the resultant archives. This thought applies particularly to those local authorities that are responsible for, or contribute towards, the excavations of non-museum units in their areas, but neither provide nor support the necessary museum services. More effort is needed to press this point home.

Advisory Note 31 confirmed that "no museum should accept or request anything other than the complete archive". The grant would take the form of a once-and-for-all payment at the time that an archive is handed over. Accordingly, the then Standing Commission on Museums and Galleries drew up a set of criteria for the selection of approved museums which was made on the advice of the seven English Area Museum Councils, who assessed appropriate museums in their own areas. In order to achieve approved status a museum had to "have a permanent staff complement of at least one specialist archaeological curator; provide adequate standards of curatorial care; have or be prepared to obtain adequate storage capacity to receive any archive that might reasonably be entrusted to them (with room for expansion); and provide adequate standards of security, environmental control and access".

But which museums might reasonably expect to attain approved status? There are over 900 museums in Britain many of which contain archaeological collections. But only about 120 of these, ranging from national to county, district, university and charitable trust museums, employ archaeological staff, of whom there are at least 330 in fully established posts. The membership of S.M.A. accounts for just half this number.

Only 35 museums have more than 3 archaeological officers, including the national museums and local authority museums with the more significant archaeological collections, some of which have field sections. However, most institutions employ only one or two archaeologists, whose duties often extend into the broader aspects of Human History.

In England there are something like 100 museums with archaeological staff, but these include only about 19 of the 24 museum services with countywide funding and functions. As there are 46 English counties, such a total represents a relatively small proportion of the potential number of county museum services that could be established in accordance with the provisions of the Local Government Act 1972. However, by far the highest number of museums with archaeological collections and staff are funded by district councils.

Some 49 museums were initially chosen as being eligible for grant-aid, and that number has since risen to 54, the general intention being that each county should have at least one approved museum (fig. 1). Of the 24 museum services funded by county councils some 15 have been approved. There are 4 major university museums with important British archaeological collections and 2 of these have been approved. The remaining 37 approved museums are made up of 31 district councils and 6 charitable trust museums. A total of 10 counties are left without an approved museum, although 3 of them have county museum services (Buckinghamshire, Isle of Wight and Lancashire). Of the 100 or so museum services in England with archaeological staff, at least 20, all local authority-based, put excavation as a high enough priority to employ field archaeologists, and 7 of these museums have county functions. All presumably receive grants from H.B.M.C., but 5 of them have not achieved approved status for the archives that they produce.

There are currently in England about 65 bodies receiving public funds to carry out excavations, although of course this figure tends to fluctuate. Of these, 9 are based in Universities, 15 in local authority departments (mainly county planning departments where there are no county museum services) and 22 in museums (9 at county level). The rest are independent trusts, with areas of responsibility ranging from regions down to individual towns.

A quick glance at the geographical spread of these excavating bodies gives some idea of where archives are being generated, and thus in general terms of where they need to be housed, if one accepts that they should be kept in the areas to which they relate. The comparative numbers of the different types of excavation unit and approved museum are set out in the accompanying list by way of illustration (fig. 2). Provision is particularly inadequate in the south-east area where 7 of the 16 counties have no approved museum of any kind, although they all have county units. While only 2 other counties in the rest of England are as yet without an approved museum the overall situation is far from being as satisfactory as it might at first sight appear, particularly when proper account is taken of collecting areas.

The picture just painted of the distribution of approved museums is deliberately a gloomy one so as to show in particular where provision for the storage of excavation archives is lacking. But this is not to ignore the success of many museums in providing a proper home for the archives that they have received, nor to forget about the achievement of the units concerned in being able to hand them over.

The storage-grant scheme started slowly in early 1982 with a total of £31,727 being allocated to only 4 museums in March of that year. During the following financial year 13 museums received £73,547 between them, the individual sums ranging from £14 to £54,209. In 1983-84, 7 museums received £108,994.22p out of which the lowest grant was £58.80p and the highest £59,665. While these figures may be of interest to those who receive them, they are of little general importance compared with one particular requirement regarding their acquisition. This is the need for a working programme to be agreed by all concerned so that the appropriate approved museum is prepared and ready to receive an archive as soon as it can be transferred from the unit, while H.B.M.C. is in a position to receive the necessary application for a grant.

The present inadequate and varied distribution of approved museums has to some extent been attributed to the differing interpretations of the criteria which the area museum councils used in the selection process. However, there should be changes shortly when the Museums and Galleries Commission's detailed standard criteria are brought into effect. These specify requirements for the environmental control of funds and records, security, building structure and access to the archive, and will be used by the Area Museum Councils for assessing future eligibility. A significant innovation is that museums which fail by a small margin to meet the prescribed minimum standards may still be recommended for approval if they undertake to make any necessary improvements within 3 years. An approved museum's standards will then be reviewed at the end of the 3 year period and thereafter every 5 years. However, for the sake of consistency in assessment Area Councils will need to adopt common procedures and museums failing to gain even conditional approval will need to be given a constructive report by way of guidance for the future. On the other hand, some museums will doubtless have difficulty in meeting the new criteria so that assistance from the Area Councils and the Museums and Galleries Commission will be needed to bring them up to the required standard.

Clearly the current network of approved museums is inadequate in the long term since the locations and areas of interest of the different types of museum already on the list do not provide a consistent coverage for the country as a whole. If a realistic pattern of approved museums is to be developed to cope with the increasing availability of archives from the units and to provide a proper basis for the future, perhaps S.M.A. should take the positive step of identifying those museums which it thinks ought to be on the list. The outcome might indicate a different formula from the present very loose structure, but at least it would help to identify where serious deficiencies currently exist.

Consideration also needs to be given to the question of collecting policies. Whereas some museums have had a written statement of their collecting policy for some time, many are only now formulating theirs for the first time in accordance with the terms of the UNESCO convention. Others remain to do so. Such a policy should include a definition of the geographical area covered, and therefore neighbouring museums have a duty to consult one another and to reach agreement where necessary, if the dangers of overlapping interests are to be avoided. If collection is extended beyond normal boundaries in order to cater for excavation archives for which there is no obvious recipient museum, this might be done on the understanding that, should a more appropriate museum achieve approved status, the archive will be transferred with the necessary authority.

Although Advisory Note 31 states that no museum should accept or request anything other than the complete archive, there is provision that "in the interests of scholarship, sample study material may be extracted from individual excavation archives and made over to a scholastic institution". If, with the landowner's agreement, this takes place before an approved museum comes into the picture, the latter has to decide whether or not to accept the rest of the main archive. If it decides not to do so, the whole archive goes to the scholastic institution. Alternatively extraction may be made by agreement with the approved museum after it has accepted the whole archive, in which case several alternative solutions are possible, including giving or lending the objects or transferring the whole archive. But, whatever solution is adopted in the end, it would seem sensible that the principle which should appear paramount to the landowner is that the archive ought to be housed in a museum. The question of which museum should be a matter for the institutions concerned to decide on the basis of mutual understanding. In other words collecting policies need to relate vertically as well as horizontally, and no doubt they will when there is a proper framework for archaeological museums.

Apart from the National Museums, something like 40 museums in England have conservation staff dealing with archaeological material. Nevertheless, 5 of the 20 museums with field sections have no conservation staff of their own, although all are approved under the storage-grant scheme. In fact, a total of 19 approved museums have no immediate conservation facilities. Although technically all museums have access to the services of area museum council laboratories, many cannot readily afford their share of the cost to the extent that is necessary.

The Dimbleby Committee, like several others before them, drew attention to the difficulties that museums face in conserving excavated material and, as a result of their recommendations, the D.o.E. and now H.B.M.C. have over the past few years accepted a measure of responsibility for conservation by maintaining regional facilities based mainly in museums. These are at Bristol, Manchester, Newham, Kent, Wiltshire, Durham University, Yorkshire and Lincoln. It is worth remembering that the system is geared to publication needs, and is thought to deal with only 15-20% of the total amount of excavated material needing to be treated. Since the recipient museum will have to cope with the remainder, as well as the future needs of the whole archive, early contact by the excavation unit is essential for the efficient planning of both parties. Furthermore, the cumulative long-term effects of excavation archives on the already overstretched conservation facilities of manymuseums poses a problem for the future which cannot be ignored.

In addition to giving treatment the regional conservators also help to ensure that sensitive finds are properly packed, and they are able to give advice on correct methods of storage, if not otherwise available, when the material is waiting to be studied for publication. In fact the whole range of questions relating to the documentation, arrangement, conservation and storage of the archive during the post-excavation process calls for the full co-operation of both excavation unit and museum in laying the proper foundations for its permanent well-being. This is the time when finds are at their most vulnerable and when decisions are being made about the archive which should not be unnecessarily reversed at the next stage. An agreed policy on this part of the operation needs to be established and appropriate resources provided.

The Cunliffe report, in its guise of Advisory Note No. 40, lays down the current official requirements for the creation of excavation archives by means of 'excavation designs' and 'research designs for post-excavation and research', and so on. There are many matters on which excavation directors and archaeological curators need to consult during this process. Perhaps, therefore, all concerned should be thinking, in the parlance of the Cunliffe report, of an 'archive design' which will prescribe the necessary steps that should be taken. At least some guidelines should be formulated to ensure that an excavation archive's progress from design to creation, to housing and use will be a smooth and continuous one in the interests of all who may be concerned with it both now and in the future.

Fig. 1. Approved Museums

Map showing Area Museum Councils

1 Cornwall	33 West Midlands
2 Devon	34 Salop
3 Somerset	35 Clwyd
4 Dorset	36 Gwynedd
5 Hampshire	37 Cheshire
6 Isle of Wight	38 Staffordshire
7 West Sussex	39 Derbyshire
8 East Sussex	40 Leicestershire
9 Kent	41 Nottinghamshire
10 Greater London	42 Lincolnshire
11 Surrey	43 South Yorkshire
12 Berkshire	44 Greater Manchester
13 Wiltshire	45 Merseyside
14 Avon	46 Lancashire
15 Gwent	47 West Yorkshire
16 South Glamorgan	48 Humberside
17 Mid Glamorgan	49 North Yorkshire
18 West Glamorgan	50 Durham
19 Dyfed	51 Cleveland
20 Powys	52 Tyne & Wear
21 Hereford & Worcester	53 Northumberland
22 Gloucestershire	54 Cumbria
23 Oxfordshire	55 Dumfries & Galloway
24 Buckinghamshire	56 Borders
25 Bedfordshire	57 Lothian
26 Hertfordshire	58 Strathclyde
27 Essex	59 Central
28 Suffolk	60 Fife
29 Norfolk	61 Tayside
30 Cambridgeshire	62 Grampian
31 Northamptonshire	63 Highland
32 Warwickshire	64 Western Isles

Approved Museums

County
District
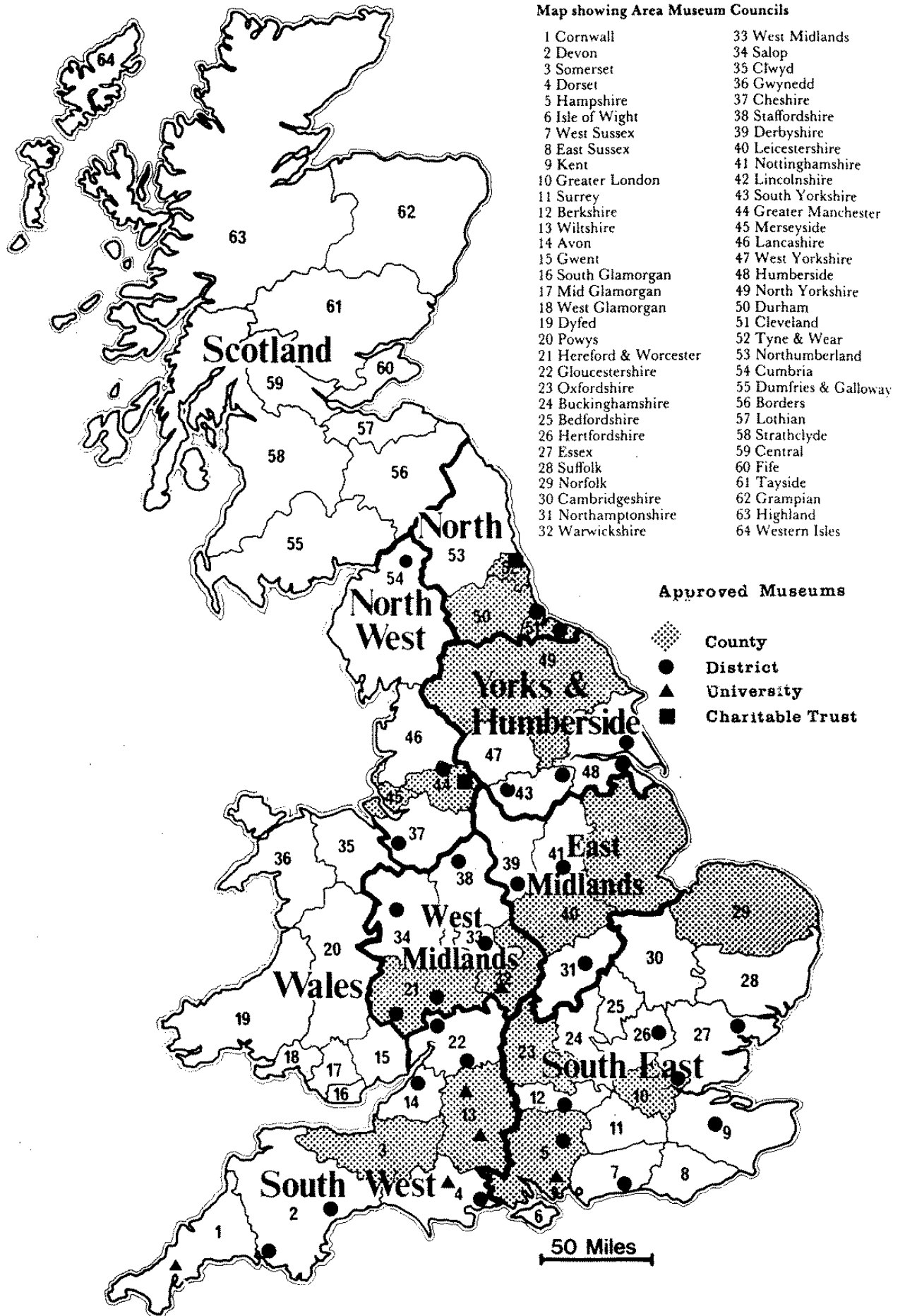University
Charitable Trust

50 Miles

Fig. 2. Comparative numbers of excavation units and approved museums in each English A.M.C. area

A.M.C. AREAS	COUNTIES	EXCAVATION UNITS		APPROVED MUSEUMS	
North	4	3	1 University 2 County	6	1 University 3 County 2 District
North-west	5	6	2 University 2 County 2 District	5	1 University 1 County 3 District
Yorkshire and Humberside	4	4	3 County 1 District Trust	5	1 County 4 District
East Midlands	5	6	1 University 2 County 1 County Trust 1 District 1 Developt. Corp.	5	2 County 3 District
West Midlands	5	5	1 University 2 County 1 District 1 District Trust	8	2 County 5 District 1 Trust
South-West	7	13	1 Regional Trust 2 County 2 County Committe 5 District 2 District Trust 1 University Project	13	2 County 7 District 4 Trust
South-East	16	27	1 University 7 County 3 County Trust 1 London Borough 7 District 1 Developt. Corp. 7 District Trust	12	4 County 1 London Borough 6 District 1 Trust
	46	64		54	

8

Rescue: By which route to what end?

P.J. Fowler

'... as I travelled (today) through mile after mile of rolling landscape, past deserted medieval villages, Norman castles, the occasional Roman site, and square mile after square mile of ridge and furrow, all still preserved as earthworks, it was extremely difficult to realise that the situation about which I wish to talk really exists and is getting worse ... The threat to and destruction of our archaeological heritage in town and country are closely linked and basically stem from our problem of living in an overcrowded and on the whole affluent island.

An immediate problem is that archaeology as a social factor has not hitherto been taken seriously - at best it is regarded as of minority recreational value, at worst as antiquarian obstructiveness. For too long the conservation world, or the preservation lobby as it is being called, has been over-represented by the cranky, and seemingly concerned only with the beauties of our floral, faunal, and furry heritage, overlooking the fact that man himself is one of the most important factors in the natural environment, both influencing it and being influenced by it. And of course the study of man through his works, whether they be a flint scraper, a medieval castle, or the total existing landscape, is the province of archaeology. So in this respect the archaeological voice has, I believe, an important contribution to make to any discussion, and indeed any solutions proposed, about the future of our environment generally and about the countryside in particular...

Next I would like to turn to the nature of the problem which faces our field archaeology now and for the next 10 years. Apart from lack of money, the main trouble from our point of view is the enormous increase in the amount of commercial activity resulting in the disturbance of the land .... Within the same economic field the other major threats are coming from the extractive industries, particularly gravel extraction .... [another] economic development is, of course, construction work - not only the destruction of urban archaeology by the removal of all levels down to sub-soil for concrete monstrosities, but also the seemingly endless blanketing of about 50,000 acres per year of our countryside by houses, factories and motorways. But I think, in addition to destruction arising from normal economic developments such as these, we should also recognise that there are other threats to our field monuments - namely widespread ignorance that they exist at all - and this applies particularly in Local Government and planning circles; simple physical neglect; deliberate vandalism, so far relatively infrequent in this country though now being encouraged by the advent of cheap metal-detecting devices and the commercial promotion of treasure-hunting; and the "threat" of all this ample leisure which is supposed to be just around the corner - and has been for the last 20 years as far as I can remember.

Finally there is a threat of our own archaeological making and that is the failure of archaeology to record what is there, let alone protect what is recorded. This matter of unrecorded field antiquities has now become a problem of major proportions - an ironical situation to arise just now when the whole tenor of our argument is that sites are being destroyed, lost, at an unprecedented rate ....

Now if we as archaeologists, if we as a society, are going to do anything about this, certain assumptions have to be made and certain choices about what we do have to be made. My basic assumption is that it is worthwhile making an effort for the good of scholarship and the benefit of society to preserve some of our field monuments as they are now and record as much as possible of what is being destroyed before it disappears forever. To do this we need three things:

(1) **Public sympathy and interest:** a realisation above all that the subject matter of archaeology is not just an irrelevant pastime pursued by the kinky but is in fact an integral part of our history and environment, and therefore closely bound up with general questions of urban and rural countryside conservation and an amenity.

(2) **Money:** some would say that this should come first but unless we have the climate of opinion in which archaeology is seen to be relevant and worth-while we will not have the means to do the work .... At one and the same time, therefore, we must increase expenditure on field survey and recording and on rescue excavation, and we must also raise extra cash from private sources.

(3) **Legislation:** we must have the legal backing even if this only has the effect of preserving a small proportion of sites and increasing the number of reported finds from, say, the present 5% level to 10% ....

Granted those three conditions, I think we might do something, though I am not too optimistic. If we have the public interest, then money becomes a key factor because I am quite certain that we have in this country enough resources of willing and skilled personnel to carry out the work. On the other hand, the universities are now producing far more graduates in archaeology than can possibly hope to be employed in an archaeological job; and on the other hand there are many part-time archaeologists who are at the moment wasting their enthusiasm and skills in non-archaeological jobs and who would be only too pleased to be recruited as field workers ....

It seems to me that there is a chance that we could achieve more in the next decade or so by forming some sort of independent national antiquity service, able to apply for and receive public money but also free to raise money where and how it could, rather than by just continuing to grouse about Government inadequacies .... There are several models on which we could base such a national organization .... (it) might have to have some snappy name like OGRE (Organization for Ground Rescue and Excavation), EASE (Emergency Archaeological Survey and Excavation) .... or perhaps just 'Rescue' ....'

It might well be felt that all this has been said before. Indeed it has: verbatim, on the 21 January, 1970, at a public lecture in Bristol City Museum that I gave, under the title 'The Past in the Future : conservation and field archaeology', some six weeks before the first Barford Meeting from which the Rescue movement began. Realising that a rich vein had been tapped, I had my manuscript, written in the train en route from Bangor where I had lectured the night before, typed up for further use - as it turned out, four times in the next 12 months, - and, just in case, for the archive.

Half-way through the 30 years in which, when Rescue was set up, it was envisaged that most archaeological sites would be destroyed, it might be useful to pick out some milestones along the route that has been travelled so far and some signposts towards AD 2000.

In reviewing the mass of documentation that has been produced over the last 15 years on 'rescue archaeology', I am struck by the evidence of a certain barrenness of thought. With but one or two exceptions, every single thought written down 1970-84 was already present in 1970. Even in 1970, few ideas were new. Most had already been highlighted at the 1943 conference on the 'Future of Archaeology' (Institute of Archaeology 1943); in 1970 we just applied those original ideas with a little more vigour. It is also perhaps salutary to remember that the concept of an archive and its purpose was already in the enquiring mind of John Aubrey some 300 years earlier: of fieldwork records, 'I deemed it worth the little labour to pricke down in a Mappe these Remaines of Antiquity .... peradventure by this means some .... may retrieve the places ....'; and of coins and other such material dug up in

Gloucestershire, 'Mr. Kingscot .... hath their names book't, which is a good way; I wish others would doe the like'(Hunter, 1975, 171, 69): information storage and retrieval in the 17th century.

The first Barford Meeting was reported at some length in **Current Archaeology** (Fowler, 1970a). The main recommendations to emerge were:

(i)   A National Antiquities Service, rationally managed, adequately funded, well staffed, properly equipped and legally sanctioned.

(ii)   A comprehensive national register of field antiquities as easily accessible to all land-users as to archaeologists.

(iii)   A national portfolio of selected monuments which, together with their associated environment, should be preserved by the State or other bodies putting into practice the concept of field museums in situ, of archaeological conservation areas, relevant not only to scholarship but also to amenity and tourism.

(iv)   Greater provision of institutionally-based, full-time field archaeologists and of professional, independent excavation teams to work on contract for Government, Local Authorities, developers or anyone else with excavation responsibilities.

(v)   The combination of rescue excavation with research, with University Archaeological Departments, for example, taking on major excavation projects well in advance of planned development.

(vi)   The formation of a British Archaeological Trust, offering individual membership to all and sundry, to act as a fund-raising organization ... and to use its funds to acquire or otherwise protect specifically archaeological sites and areas for permanent preservation where official protection was not forthcoming.

Sadly, the absence of museum personnel was a feature of our early deliberations; some archaeologists bent on presenting a united front argued that already museums were showing themselves to be the weak link. At the Museums Association Annual Conference, in July, 1970, under the title 'Museums and British Archaeology, 1970-2000 AD' (abbreviated version in Fowler, 1970b), I drew attention to this.

A year later, in an article in **Antiquity**, Charles Thomas (1971) took matters a stage further. He drew attention to:

(i)   the impact of Natural and Social Sciences on conventional archaeological thought and method

(ii)   the potential decline in the supply of primary material for study

(iii)   the rate of destruction of ecological evidence, and our inability to cope with this destruction.

To this, and most significantly, he added a further ethical dimension of archaeological responsibility: the moral duty 'that every generation inherits ... to examine, to record in advance of destruction, and selectively to preserve, all such remains. At the end of his paper, Thomas opined that 'Archaeology has become a social problem [which] can produce conflicts of views over intangible values - the values we place on the visible past as a social or tourist amenity, and the values attached to rural as opposed to urban living ... conflicts with subsistence economics ... with the profit motive and the entire capitalist system [and] with the individual's ... right to do as he wishes with his own property ...' Heady stuff: the stakes, quite properly in my view, had been raised philosophically and the much-delayed Rescue Pelican, when it finally hatched (Rahtz, 1974), was already a bit long in the bill.

The next marker along the way came in 1976 with a seminal Presidential Address to the CBA (Thomas, 1976). Nicholas Thomas highlighted the crisis that had occurred just because there had been a relatively large influx of Government funds into rescue archaeology. He saw this as resulting in an immediate need for quick, managerial co-ordination of the whole essentially academic process from choosing a site and its excavation team to bringing out the final publication. He stressed the need for training archaeologists and the help that could be provided in this area by a professional institution similar to that which by then existed in America (Cleere and Fowler 1976). The burden of his theme, however, was 'that the almost complete separation of units and other organizations for rescue digging from museums is a disaster for British archaeology'. The formation of the Society of Museum Archaeologists was a recognition of this need to close the gap between excavators and the holders of the archive. That archive, Thomas pointed out, was the full product of the excavation allied to the information and material already existing in the Museum and elsewhere. He took trouble to emphasise that such a complete, properly assembled archive was far more valuable than a published excavation report based upon it. The finality of the publication imperative was seriously questioned; archival consciousness had been raised.

At a Southampton conference, in 1977, two years after a retrospective seminar at Bristol had assessed developments in rescue archaeology since 1970, Wainwright (1978) delivered a paper called 'Theory and Practice in Field Archaeology'. In it he identified three themes which had emerged at the Bristol seminar:

(i)   'That the fundamental nature of archaeological activity ... was a research activity with an academic basis ....'

(ii)   'That such an academic basis was essential for the practical demands now being made increasingly of archaeology and archaeologists'.

(iii) 'That it was vital to formulate policies for the best use of archaeological resources based on correctly identified academic priorities'.

Wainwright drew attention to the necessity for implementing project-orientated fieldwork within a research framework and for the adoption of sampling procedures. Taking up the baton from Nicholas Thomas, he proclaimed that the first responsibility of excavators is to produce an archive from which material for publication should be selected. However, such archives were still frequently inadequate and inaccessible; as he realistically remarked, 'It is necessary to make an effort to produce a good archive that one knows will not be published. It also requires an effort by the scholar to consult it ....'

The funding of 'rescue' projects from inception to publication did not come until 1980 (English Heritage, 1984). Then, following Section 45 of the Ancient Monuments and Archaeological Areas Act, 1979, DoE/HBMC or any Local Authority were empowered to 'undertake, or assist in, or defray or contribute towards the cost of, an archaeological excavation of any land in England which they consider may contain an ancient monument or anything else of archaeological or historic interest'. English Heritage, the new Historic Buildings and Monuments Commission set up by the National Heritage Act 1983, recognised the need for investigation of areas in 'multi-disciplinary landscape projects' rather than of a single site and the desirability of developing preservation and management policies within such a landscape format. Furthermore, considerable funds are now being set aside, up to March 1986, for preparing archives of and reports on pre-1973 rescue excavations.

The same significant document recognised the validity of a number of the recommendations made independently but at the same time by the Prehistoric Society (1984) in an archaeo-political document which would have been impossible ten years earlier. The Society highlighted the need for:

(i)   a management policy for sites and landscapes including an increase in the Schedule of protected monuments

(ii)   increased funding for prehistoric archaeology with additional emphasis on landscape studies

(iii)   a nationally compatible machine-based recording system

(iv)   improved facilities for conservation

(v)   the publication of old excavations

(vi)   the improved presentation of the results of archaeological research

Implicit in that last point is the recognition that archaeological sites can be a tourist asset.   Figures in the latest **English Heritage Monitor** (English Tourist Board 1984) indicate that in 1983 some 167 million 'heritage' visits were made, nearly a third of them to historic buildings;   about £84 million revenue was produced.   Three of the top four sites were the Tower of London, Bath Roman baths and Stonehenge, together visited by just over 3 million people.   In 1980 3.8 days per person (in the British population) were spent visiting historic buildings, a rise from 2.9 days per person in 1977;   and that was pre-Jorvik!   About 17% of British adults had visited monuments in the month before the 1980 survey. The capability of our sites and monuments to generate not only interests but income and employment should not be underestimated;   and indeed, given the increasing economic importance of tourism to Britain, one could question whether the national investment in its surviving past is actually adequate on purely financial grounds.   It is, after all, irreplaceable.

To round off this retrospective selection, I would like to evaluate briefly the failures, the successes, and the 'grey areas' between, of some of the ideas about archaeology and its records that have been put forward in the last 15 years.   A summary list would look something like this:

FAILURES:

(i)   To prevent archaeological destruction by ownership of land through a National Archaeological Trust: no funds were raised for this at all.

(ii)   To protect archaeology in the countryside and develop an appropriate response to its destruction.

(iii)   To establish archaeology in the conservation consciousness as is the case with Historic Buildings and Nature, cf in Hansard, for example, debates on the National Heritage Bill 1983 with those on the countryside and wildlife.

(iv)   To provide a career structure and training in rescue archaeology.

(v)   To provide adequate Antiquities legislation: the 1979 Act is better than previously but disappointing with regard to Areas of Archaeological Importance in particular;   portable antiquities remain outside the law.

(vi)   To develop private archaeological agencies cf architectural practices.

(vii)   To promote archaeology adequately on television and in other popular media.

SUCCESSES:

(i)   The establishment of a network of County Archaeologists, of SMRs as part of Planning procedures, and of the Society of Museum Archaeologists: all this has taken much of the heat out of the rescue situation that existed in 1970.

(ii)   The application of the concept of landscape archaeology to preservation as well as to projects, both within an environmental framework.

(iii)   The concept of the ethic of conservation as a duty, at least within the profession.

(iv)   The foundation of the Institute of Field Archaeologists, with a code of practice bringing professionalism rather than professionalization.

(v)   The concept of selectivity as basic to rescue archaeology and funding.

(vi)   Urban archaeology.

(vii)   The British Archaeological Awards.

(viii)   The compilation of facts and figures about the heritage estate and its management, now readily obtainable and updated.

(ix)   The development of better excavation techniques and some examples of excellent fieldwork.

(x)   The resolution of the silly DOE/DES dispute about the museum storage of excavated material.

IN BETWEEN: the grey areas

(i)   By and large archaeological destruction has not been halted despite some considerable success in mitigating it. New, or intensified familiar, threats still find us wanting, e.g. in the Uplands where the archaeological concern has simply not registered with other interests. Ironically, help could well be forthcoming from nature conservation in pursuing its prime interests, though simultaneously Government and EEC policies also threaten.

(ii)   Resources have been gained but they remain inadequate for the task (perhaps they always will be?):

    (a)   Resources are probably not yet organised in the most efficient way, nationally or locally or along the many interfaces, e.g. Units/museums; NMR/SMRs.

    (b)   Legislation: already in need of improvement.

    (c)   Public finances have been generally held but have not increased; private sources produce mostly ad hoc sops and are only patchily significant; much depends on MSC funding.

    (d)   Project-based programmes of work have not so far always been grasped for what they should be, have created administrative difficulties, and largely remain to be judged by their long-term results.

    (e)   New technology: the adjustment to IT is proving painful; some progress has been made but the full potential is not yet realised though a national data-base is in prospect.

(f) Conservation and scientific facilities: there are still not enough laboratories or posts to man them.

(g) Aerial photography: excellent reconnaissance has been done and important developments in interpretation and mapping have occurred but the information-potential locked up in air photographs has yet to be released.

(iii) Archaeology in public, museums and education: could do better, and the execution of the statutory duty in this field now laid on HBMC will be watched with interest.

(iv) Publication: the proliferation of monographs has disseminated much data but may have long-term adverse effects on the quality of local, and even national, journals; great, and expensive, efforts to 'shift the backlog' are in hand but the proof of the pudding will be in the later '80s; similarly the preparation and deposition of many archives are in hand, begging questions of their value and use.

The ends of all this archiving remain the same: to bring about greater understanding of ourselves as social animals in circumstances changing through time, and to communicate such knowledge to our fellow beings. We know that as curators we shall continue to be faced with - I would say, are privileged to face - considerable challenges to our intellect, to our patience, to our probity. As we grapple with digitization, inputting, keying, print-out and all the other symptoms of modern archival professionalism, let us remember that it is our unique power to articulate thought about our predecessors and their significance for us through speech, that is, in the end, the whole point of the creation and care of archaeological archives.

Footnote

This paper does not attempt to be comprehensive. Its selection consciously avoids other key documents discussed by Davies [above]; numerous events and developments of the sort contained in both Rahtz (1974) and Jones (1984) are also excluded. In keeping close to the archive theme of the conference, neither is it possible to discuss two of the most significant post-1970 developments, respectively the linking of Britain's archaeological crisis with the growth and politicisation of a general environmental/landscape concern (Shoard 1980) and with the international dimension of cultural heritage management (Cleere 1984).

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Designing the Excavation Archive for Long-Term Use

M.W. Ponsford

The main problem discussed in this paper is the establishment of suitable conditions for an adequate excavation archive to be prepared. What will not be considered is the criteria by which sites should be presented duly threatened and research-designed for approval for HBMC grants : few new projects of 'national importance' are likely to be funded by them in the immediate future. Most of the aspects considered here are more, but not exclusively, relevant to urban rather than rural sites since this is where my experience lies. The clue to the effective setting-up of an archive lies in taking advantage of the public, legal and financial resources which are available, not only to the local authority unit director but to the institutional or independent units. Without these, the creation and preservation of a permanent archive can be fraught with unnecessary difficulties.

If a unit director wishes to succeed in obtaining backing for his projects, he should take his local planning officer(s) out to lunch. Archaeologists have virtually no legal powers at all as you may have been painfully aware and can only really influence events by using the existing legislation relating to planning functions. Should you think that the Ancient Monuments and Archaeological Areas Act 1979 is of use in the rescue situation, then you are sadly mistaken. While scheduling is to be stepped up according to HBMC Executive Peter Rumble, there is little sign of this happening at present and Part I of the Act will remain ineffective while English Heritage fails to take offenders to court. Preservation, however, is nearly always preferable to excavation. It is far cheaper and the storage and archival problems minimal!

Part II of the Act is equally disappointing. In addition to the red tape involved in designation and effecting delays, the time allowed for excavation is about six months at most. Only a few urban places are likely to be designated apart from the six or so at present designated, or nearly so. In other words, Part II is irrelevant to most of us. The most effective way to proceed is to use the Town and Country Planning Act 1971 and in particular Section 52. Section 52 is a clause under which a planning authority can delay development for any reasonable planning purpose and enter into an agreement with the applicant to effect some sort of gain. Archaeological work has been seen as one of these gains. It is possible to effect a Section 52 agreement between the local authority and the developer whereby the latter is given planning permission and covenants not only to afford archaeologists the facility of investigating the site but also to contribute financially to this end as well as conforming to all the conditions and advices attached to the planning approval. It is obvious that a close relationship must exist between the archaeologist and planners to enable such agreements to be made. Better still that the archaeologist be employed by the relevant authority in a museum or planning department. Problems may remain in convincing a planning officer that he should take these steps. I do not think that there are many <u>district</u> planning authorities with archaeologists; they are usually employed at county level to prepare SMRs and to respond to county matters such as mineral rights and road schemes. They often have no full-time excavation role. Since the revised 1980 Planning Act, district councils handle most planning control and all applications pass through district councils and their committees.

County councils of course retain responsibility for county matters such as quarrying, mineral extraction, waste disposal, educational facilities involving playing fields and roads. A county archaeological unit such as Leicestershire's would need to monitor the county's and each district's planning applications.

The activities of some statutory undertakings remain a problem. British Rail, for example, can claim 'operational use' on their land and do exactly as they like on it.

The monitoring of planning application lists has been carried out for some years in Bristol. These lists represent material for a basic preliminary archive of threatened sites and listed buildings. The process is a relatively simple one. 'Sites' are chosen on the basis of whether they are in the historic town, on or close to other known sites (including buildings) within the district and whether they are large developments, e.g. housing developments. The list is compiled and sent to the chief planning officer with the request that an advice (not a condition in this sense) be attached to the notice of decision, i.e. approval.
An example used in Bristol is :-

'The Director of the City Museum should be contacted at the earliest opportunity before development, including demolition, takes place, to afford him the facility of examining the site in order to record features of archaeological and historic importance. A minimum period of three months is desirable, but it is not intended to delay development.'

The aim of these advices is to ensure that developers contact the archaeologist before anything happens. The advices have the same apparent force as fire regulations, building regulations and conditions about roads, sewers and so on. They also have their own computer reference.

In addition, regular meetings with local authority planners and estate officers ensure that many sites are in the pipeline for examination before planning applications are made so that the procedure and amount of money to be sought can be understood by all concerned well beforehand. This applies, for instance, to all sites within the historic town. There may be some problems, however, if a developer is not immediately available to obtain money from. There will, on the other hand, be more time than usual to undertake the excavation since development is delayed.

If your town is one which has designated areas of archaeological importance then that is a mark of failure simply because good relations with planners can achieve more sensible and long-lasting arrangements in terms of money and time. Section 52s can, of course, be inserted for any site for which planning permission is sought although agricultural usage presents difficulties which no one has yet resolved and which government ignores; ploughing remains the largest and most inexorable threat to our historic landscape.

Having, with luck, lined up the developer, there remains the organisation of the work to an agreed time-scale. Remember, too, that if an agreement has been reached, all the advantages and indeed the timetable [within reason] are in the hands of the archaeologist. On most urban sites a year or more may be required to do justice to the site, far in excess of that allowed by the Act.

The next stage is the organisation of finance for the work, not only the excavation but on-site sampling and post-excavation. In the present climate of project funding, it is unlikely that HBMC will be contributing to new projects until a large hole has been made in the backlog. There are virtually no new HBMC projects this year. Potential funding can be summarised as follows :-

1. Local authority or other institution's budgets - under continual attack by government.

2. Developer's money - through Section 52s in the main.

3. MSC schemes.

4. Charitable funds : all units should either have charitable status or have a charitable wing to receive donations, encourage sponsorship, produce saleable materials such as booklets and ephemera and simply carry money from one financial year to the next.

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5. HBMC : probably for surveys, SMRs and backlog in the main, plus archive and storage grants, and AMC work. The role of the Central Unit remains unclear. Other back-up may come from HBMC environmentalists and conservators scattered throughout the country.

MSC funding has become vitally important to rescue excavation. Although conditions vary with their regional boards archaeology should come high on the list of community projects. The part-time concept is a nuisance and unsuitable for strictly excavation survey projects. Try, however, combining fieldwork with an indoor back-up and post-excavation project where the part-time element causes fewer problems and which allows for a fuller complement of full-time excavators.

In my view MSC schemes only work successfully if the Director is a full-time member of staff. This should ensure that a follow-up post-excavation scheme can be organised for his further direction. Many local authorities are now set up as agencies with the administration run by a central MSC administrative section within the authority. Continuity of funding is therefore more likely since MSC allocates places to each agency which they are keen to see filled. Supervisory staff usually have to be imported, but reasonable rule-waiving on eligibility seems to be quite common.

Developers' monies can then successfully be used to fund post-excavation. In Bristol a computer has been purchased with some of the money and draughting, faunal, floral and sedimentary projects set up to deal with the post-excavation problems of some waterfront sites.

By taking advantage of those resources available, the establishment of a long-term usable archive is assured. This is not the place to argue about the shape of the archive or the nature of the data to be retrieved. It is sufficient to say, as an example, that a large warehouse provided by a developer as a contribution towards the work provides more opportunities for on-site form-filling, draughting, sieving, storage of wet wood and finds processing than the single local authority mobile caravan which was all that could be afforded a decade ago.

The single important subsequent action is to give the site a museum accession number. This will be the prefix for the whole archive even before it arrives at the museum's doors and before material leaves the ground. The number can be used for everything from the site including preliminary surveys, plans, photographs, samples and paperwork. There is nothing more exhausting or frustrating than trying to fit a pre-marked data-set into an existing museum or record office system. Whether the owner of the material wishes it to go to a museum permanently is irrelevant – the material has to be marked with something for study purposes and if special, could have a label attached or be known by a number like anything else. Finds can of course be on loan to museums if the owner prefers; even if the finds do not finish up in a museum, the paperwork inevitably must. It is the responsibility of all archaeologists to see that the accession number is allocated before the dig commences, as well as an exchange of letters to ensure that the status of the finds (and their archive) are not in doubt. Strangely this stage tends to be left until the end of an excavation by which time marking of material is so well-advanced, it could be counter-productive to change it.

Also essential is the arrangement of conservation and storage facilities through the museum in receipt or AMC according to SMA guidelines. Current MSC schemes in Bristol incorporate conservators to deal mainly with waterlogged material.

Finally, although my title invites a discussion of research designs and record systems, these are legion and often dependent on academic and local needs : HBMC decides which are of national importance. Rescue archaeology is, however, becoming more locally inspired as a result of HBMC's reluctance to fund new projects. MSC is providing the bulk of resources, but local and civic pride can also be an important factor in stimulating archaeological work.

To conclude, I leave you with a site duly funded, accessioned and ready to be recorded and archived by whatever system is currently in vogue. Without anticipating the resources necessary for their acquisition, the data from a site and its archive will always be at risk.

Excavation Archives in London

John Schofield

The importance of the preparation of a full and accessible archive of site and finds information within the Museum of London should be stressed; all records are maintained within a permanent organisation committed to their care and general use. It is the existence of this archive source which forms the base upon which a selective publication programme can be constructed. We should therefore be concerned with two separate, but connected, matters: the preparation of archive reports to a common standard, and the storage and especially manipulation and interrogation of the archive.

The archive of records of excavations in the City of London falls into two parts: excavations before 1973, when the Museum of London's predecessor the Guildhall Museum set up the Department of Urban Archaeology, and excavations from late 1973 conducted by the DUA. The records of excavations prior to 1973 are being processed by Peter Marsden, the officer responsible for excavations in the 1960's, and will gradually be added to the main archives. My paper, and that of Mike Rhodes which follows, will be concerned with the records of the 136 sites excavated since late 1973.

These sites were excavated under a variety of conditions, imposed by factors of time, accessibility and finance. It is necessary to design an archive which, while straining to observe common standards in recording, takes account of the differences in reliability, amount of detail and finds productivity of large-scale excavations such as Billingsgate, watching briefs among earth-moving machines, and building recording work. We can only roughly calculate the material which has to be archived; probably over 100,000 archaeological contexts from the last eleven years alone, and several millions of artefacts.

We have interpreted the Frere report (1975) to mean that our primary duty is to set up and maintain in accessible form the record, both the finds and information on paper and film of each excavation, and thereafter to draw from this archive for publications. We have agreed with HBMC a publication programme to be produced in seven years from 1984/5. It is therefore a corollary of our publication programme that by the end of the seven year period, the appropriate archive reports will be finished, accessible, properly indexed, and available for reproduction on request, at a suitable charge.

At the same time, even though HBMC is not funding new excavation in London for the time being, we continue with a programme of excavations as hectic as before, funded totally by developers. We excavate between twelve and fifteen sites every year; the building boom is still as vigorous as ever in the City. Thus we must also take into account the two further problems: (a) the archive is always increasing at a terrific rate, and (b) some of the new material will be of superior quality to that already being worked upon for publication; we must always be refining our assessment and research by introducing new material.

We start with the division of records into levels made by Frere in 1975: levels 1 to 4. Level 1 is the physical object of the site, usually destroyed; and the actual finds retrieved from it. The physical care and conservation of the finds, which might be called level 1 of the archive, I leave to other speakers.

Level 2 records include the context sheets or site notebooks, and the Harris-Winchester matrix; the finds records at the same level include accession lists, photos and X-rays. Here I do recommend standardisation of record system within a Unit and preferably links between Units, since comparisons now should be at least regional and preferably nationwide. We scrutinise and compare pottery fabrics over a region; there is no reason why we should not compare the minutiae of layer formation or building construction over long distances also. For this we need standardisation of terms, just as the pot specialists are issuing thesauri and guides.

The site records comprise context sheets, context plans and other drawings on light permatrace, the matrix and indexes. During the post-excavation process these records are microfiched for security purposes. This usually occurs after the archive report has been written, since the individual sheets are divided into stratigraphic groups to facilitate writing up. There are two current problems with the microfiching of site data: the quality of reproduction of black and white photographs, and the reproduction of colour - the context plans incorporate a battery of colours to distinguish the many kinds of inclusions in urban strata. In our admittedly limited experience adequate quality for either of these is beyond either the present commercial technology or our price-range; but we continue colouring in the inclusions in the hope of cheaper and adequate methods in the near future. Perhaps the newly-available video discs are worth examination as one method of picture storage.

We have also experimented at all levels of the archive with computers. The Museum of London's computer facility was set up by Kevin Flude, with advice from Ian Graham, in late 1981. The specific stimulus was the immediately forthcoming Billingsgate excavation, which lasted 13 months from January 1982 and provided a testing-ground for the development of excavation and finds recording by computer. The system presently comprises a PDP 11/23 minicomputer with XENIX operating system and 8 Shelton Sig-Net microcomputers placed at workplaces throughout the Museum, including its satellite offices, for data collection and word processing of reports. We have recently also acquired two Epson PX-8 lap-held computers for the same purposes in situations where conventional disk-based machines are inappropriate, i.e. on site or in far-flung Museum stores. This data collection function was extended to the excavation site on Billingsgate, where strata were input during site recording - but not masonry features or timbers because of constraints of time. This experiment in recording context straight into the computer - and in effect duplicating the paper record - has yet to be evaluated fully, since the increased effectiveness of analysis by the computer must be tested by all departments using the archive - the supervisor in writing up, the finds and environmental analysts. First impressions suggest that for medium and large sites (over 3000 contexts), the computer can save time in analysis of information which would otherwise be represented by considerable piles of context sheets and plans.

The Level 3 structural archive report is the most extensive description of the layer by layer history of the site. Again, the procedures in its compilation should be standardised within the Unit, and we have prepared an archive report-writing manual (DUA, 1985b) to match our Site Manual (DUA, 1980). Some sites, or parts of sites, will only merit publication at level 3, and in extreme cases, or when funds do not permit it, an ordered level 2 archive will either suffice or have to suffice until more funds are available. But the majority of the level 3 archive reports will be the solid basis both of an actively curated archive and the conventional level 4 publication programme.

Besides conventional publication, there are three general methods of dissemination of the archive information: interim articles and annual summaries; periodic summaries of the contents of the archive; and a system of making the information available to researchers who either visit the archive or make a direct request for specific information in it. Annual summaries for period journals, and interim articles in those journals and in archaeological magazines, are useful in providing not only interim statements in advance of larger publication, but also in calling attention to the material in the archive where it may be consulted in fuller form. From time to time this indexing function is brought up to date by summaries of the available reports in an archaeological journal (for the first such roundup, see Schofield, 1981). These roundups will increasingly use a vocabulary of terms derived from an agreed thesaurus of terms for indexing purposes, both inside and outside the organisation.

Making the information directly available to the enquirer is the function at present requiring some further thought. An archive should be able to answer any question which can be asked of it. Thus questions may be of several kinds:

a. A request for a whole site report, perhaps running to several hundred typescript pages and 100 drawings;

b. More often, an enquiry ranging over several sites about a particular feature, e.g. 2nd century wells, medieval shoes, parish church stained glass.

c. A specific enquiry for the context of a single find or group, e.g. a notable pot assemblage or a single find.

There are two things the archive must provide: (a) guides and indexes of the material, and (b) methods of taking away copies of the required parts.

I do not wish to deal with the second question here since it seems to be an administrative problem, though great; resources will largely dictate what can be provided. To some extent the provision also follows from decisions about the tools of access into the material, indexes, and the use of computers both to store and especially to interrogate the material.

The first level of guide must be an Archive Directory, which briefly states the main findings on each site, lists the archive reports (site, finds, environmental) generated from its material, and the level 4 reports, both interim and comprehensive, which have resulted. It is hoped to have one for the DUA sites of 1973-82 ready in 1985 (DUA, 1985a). Many enquiries will be answered by consultation of the archive reports, without further resort to the level 2 archive material behind them.

The second level of enquiry, one not satisfied by the level of detail in the reports (which, particularly on the finds, are in summary form), wishes to interrogate the descriptions of the site data, especially the information on the finds. Although another experiment in recording stratigraphic data on site is possible in the near future, our current efforts are directed towards computerisation in post-excavation, and the main progress here has been in finds analysis. Information on all the finds from current sites is entered on the computer as a matter of course, and the record has been extended to cover some sites excavated before computers were available. A hierarchy of data types is available. The simplest list the broad artefact classes (Roman pottery, animal bone, post-medieval building material) or objects of particular interest (coins, metalwork) in each context, but more detailed information on some of these classes is also held; the exact types of pottery from a context, or detailed measurements of artefacts such as shoes. Where quantified data is compiled, tables and histograms showing differences between contexts or between sites are generated quickly and easily, as an aid to chronology and other fields of interpretation.

The most practical and indeed most required function for the computer at present is the construction of indexes. These enable the researcher, whether a colleague from the finds or environmental section or an outside enquirer, to examine material from a number of complex sites. There seems to be two options here: index the abstract or summary of the archive report, or index the actual text. We are about to experiment with the indexing of a trial run of archive reports to decide which is preferable; but with the word-processing of all reports a remote possibility, it seems more prudent to opt for the indexing of fairly full abstracts. This is currently being undertaken on an experimental basis, with a trial group of archive reports, by a qualified bibliographer attached to the Museum.

In this way we can begin to answer quite complex questions posed of the archive. The majority of the 100,000 contexts excavated since 1973 in the City have finds or samples, and all are capable of at least rudimentary interpretation. Researchers will shortly, and to some extent already can, ask questions such as 'What is the distribution of early 2nd century wells throughout the City?' or 'In what sort of contexts do you find parrot-beak Saintonge jugs - cesspits or building debris? In conjunction with other imports or not? On the waterfront or by the market areas in land? and so on. In this way the computer interrogates the archive to produce truly reliable research conclusions from large amounts of evidence. Here I think the possibilities of interrogating our files by advanced database managements programs such as dBase II (and now, dBase III) are an exciting future development.

Future possibilities include various kinds of transfer by computer - from computer to computer in fact. Although one might hope for rapid transfer via telecommunications networks (modems) we need to have many more compatible computers before this is remotely possible. Large scale data transfers can be conducted by means of disks or magnetic tape, and this seems more viable in the short term. The degree to which information can be sent in this way depends on the degree to which the computer was used during excavation or finds recording for level 2 and level 3 work. The level 2 data should be on computer - and our finds data is for all new sites - and the level 3 report should be typed up on a word processor. This not only allows easy revision - a very necessary item when up to twenty people are writing reports which often interlink - but allows the report to be sent on disk when required.

Transfer by disk is already happening in the printing of reports; an increasing number of printers will take a computer disk instead of a manuscript. If the author can type in certain control codes to specify type sizes, the manuscript can go straight to typesetting and galley proof stage with accompanying financial savings.

But this is to anticipate; what is a level 4 report, when such an archive forms a permanent background resource? Upon completion of the excavation, a research design for post-excavation work must be prepared (Cunliffe report, 5.3). We take this to mean that on completion of the level 3 archive report and hopefully completion of the level 3 finds appraisal, a research design is prepared. Because the primary record is being preserved, there is no need to synthesise all the aspects of the site immediately; the archive itself, during accumulation of its component reports, will generate or suggest new thematic publications.

It is not the objective of the publication programme to provide a definitive reinterpretation of the historical and topographical development of London in the light of all the archaeological evidence recovered in the last ten years. With a rapidly increasing number of sites and millions of finds in the most general sense this would be impossible. Rather, the publication programme is deigned to draw the attention of scholars to the main information regarding the archaeological development of the sites examined; to point out areas of the advancement of knowledge which are specially significant; and to suggest lines of enquiry that other scholars may find rewarding. To this end the programme contains a number of publications of a thematic nature: the grouping of related classes of site so that their topographical and functional development can be more easily understood; and the grouping of artefact and scientific evidence in ways useful not only for the city but for those working in other areas - for instance, the significantly improved dating of medieval ceramics and artefacts by dendrochronology.

This modest duty is also however coupled with detailed research on many fronts; a digest of the publication programme is available (DUA, 1984). Together with the maintenance of the archive for research enquiries, the level 4 programme

forms the natural culmination of the efforts which begin with data capture on site. This is the system we shall attempt to implement over the next few years in the Museum of London; and we would look to other institutions charged with the care of archaeological archives, particularly those of historic towns to move towards a federated structure in which information can be exchanged at increasingly specialised levels.

I am grateful to my colleagues Paul Tyers and Tim Williams for comments incorporated into the text.

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Preparation of the post-excavation archive in London, with special reference to the finds

Michael Rhodes

During the last three years, two new factors have influenced the way in which we prepare our archives. The first is a requirement of the H.B.M.C. that we should publish the most significant aspects of our unpublished D.O.E.-funded excavations in a series of thematic publications, to be completed by the end of seven years. The programme is made possible by transferring all H.B.M.C. monies which might previously have been allocated for digging to post excavation work. This means that the only funds available for excavation are provided by city developers, although at any given moment we have two or three small excavations or watching briefs in progress, and continue to acquire finds at a rate per annum of c. 11,000 registered objects, and 36 sq. m of Museum boxes.

Unfortunately, most developers are prepared to finance only the recovery and initial processing of the finds. A limited amount of financial support is available for immediate post-excavation analysis and archival work, but in general the developers regard finds research as the Museum's responsibility. Some of the most outstanding new finds are being incorporated into H.B.M.C. publications as comparanda, but the majority will remain unpublished for the foreseeable future.

The second significant factor has been the arrival of micro-computers and, no less important, a consequent rise in 'computer literacy' among the staff. 'Hands-on' experience has improved our awareness of what the present generation of micros does best, altering our approach in ways which would not have occurred had we merely designed a series of record cards to be computer-processed by others.

The impetus towards computerization began in December 1981, when a PDP 11 mini-computer using the Unix operating system, supported by three Z80-based micros, was purchased to store and process records from Billingsgate Lorry-Park excavation. The original plan was to use the micros to gather the data, which would be transferred to a central data-base on the mini for sorting, analysis and research. However, it was quickly discovered that the micros are a powerful tool in their own right and, in addition to word-processing, are especially suitable for processing pottery data. In consequence, a number of additional micros have been purchased from developer's grants. We now own or have access to nine micros; a ratio of about one to every three members of staff, which is adequate for current purposes.

Funding

To maintain a fair distribution of resources within the D.U.A., developers' grants are divided according to a set formula. A typical medium-sized excavation, on a budget of £35,000-£45,000, is provided with one Site Supervisor, four site staff, and one Finds Assistant. The Finds Assistant is employed for the duration of the excavation, and for one month thereafter in order to finish any processing backlog which may have accrued. A further month is usually provided to allow the Finds Assistant to write a preliminary report on the finds, known as the Appraisal Report. A month's salary is provided for a Finds Supervisor to oversee the Finds Assistant's work. This arrangement is sufficient to ensure that all finds are adequately cleaned, catalogued and committed to storage - our highest priority.

Two additional votes of developer's money are set aside for post excavation work. The figures are a fixed proportion of the total staff vote (i.e. excluding the cost of hiring earth-moving equipment and overheads). They comprise 5% for finds equipment (primarily storage materials, printed stationery, and computers), and 11% towards the preparation of Level III finds reports. The latter is insufficient to

research the finds adequately, so our priority is to provide sufficient information for the Site Supervisor to write the Level III excavation report. In practice, most of the money is spent on supplying provisional dating for the pottery and, in some cases, archival reports on the building materials or on small finds of exceptional importance.

Basic Catalogue

Our records fall into two broad categories, namely basic catalogues, prepared for every site according to a standard format, and non-standard records, prepared in the course of research on specific projects. Guides to the pottery archive have long been available (Orton, 1978; Tyers, 1983), and the other basic records and procedures have recently been described in a Finds Processing Manual (Groves, 1984). Documents of this nature are essential to ensure that everyone knows the latest procedures, the available sources of information and assistance, and produces records to a common standard.

Of central importance to any finds recording system is a means of referring finds back to their find spot and stratigraphic associations, and a unique registration system for individual finds. For the sake of simplicity, we have reduced our record numbers to three types, namely: Site Code, Context Number, and Registration Number. We retain the facility for sub-dividing the Site Code into areas, and for using traditional "small-find numbers" but they are rarely used.

The finds are divided into two main categories - "Bulk" and "Registered" finds. The Bulk Finds comprise generally standardized objects, found in large quantities, which are studied from a statistical point of view. The Registered Finds are individually numbered, and are usually studied and published as individual objects. A set of simple rules ensures that the same types of object are always included in the same category. These rules are rigorously applied, so that we know (for example) that every Roman shoe part will be individually accessioned, whereas medieval shoe parts (which are usually very standardized in comparison with Roman shoes) are included in the bulk finds, unless they belong to complete shoes, or are otherwise exceptional.

Finds Assistants and experienced volunteers make the Bulk Records while on site, ticking boxes on pre-printed A4 record sheets, one for each Context. The sheets employ a hierarchical ranking, so that the main details may be entered, even if there is uncertainty over some of the finer divisions. A list of Registered Finds from the same Context is recorded at the bottom of the sheet, creating a basic catalogue of finds by Context.

Registered Finds are recorded on pre-printed 6 x 4 inch record cards (fig. 1), which are filed in classified order by material and object keyword. A period keyword is inserted where known. The keywords are strictly controlled by use of a thesaurus. A card index lists approved alternatives for proscribed terms. One material and object keyword is usually sufficient, although in exceptional circumstances a second cross-reference card, with alternatives, may be inserted into the file. A brief description of the object and (where appropriate) a sketch is made on the card's reverse.

Other important information on the card includes the location code, which should enable the object to be produced for study in a matter of minutes. Previous location entries provide a brief history of the object since its recovery. A series of boxes in the lower right corner provide cross-references to other relevant records, and may be used to indicate future plans for the object. Such plans are often formulated at:

Monthly Conservation Reviews

These are attended by members of the Find Section, Conservation Department, and curatorial staff. Their purpose is to decide priorities for conservation and specialized forms of recording. The available options include:

i)   partial cleaning for identification purposes

ii) scientificanalysis

iii) full conservation

iv) controlled storage

v)   record illustration

vi) record photography

vii) radiography

Not infrequently, objects pass through a Conservation Review several times as more information is obtained.

Museum Accession No. 5811			Object	SHOE	Fig. 1	
			Material	LEATHER		
			Period	MED		

Location	Name	Date		Site		Context
Deep Freeze 1	P.T.	1/8/83	△	SWA 81		7042
Conservation Review Box	A.M.	2/10/83	See also			
Lab.	R.S.	10/10/83	LEAD BUCKLE			
AF /STO.	P.T.	12/1/84	Plan/Section			
			Publication			

				to do	done	Ref. No.
			Conservation	✓	✓	943561
			X Ray			
			Illustration	✓		
			Photography			
			Specs. report	✓		
						GM 3320

Spot Dating

During the course of an excavation, specialists examine the ceramic finds to provide dating evidence for the Site Supervisor. The resultant "Spot Dating" records comprise a list of Common Names by Context, with an estimated date for each variety. Where statistically-useful assemblages of building materials are recovered, details of form, fabric and quantity are recorded also, as limited storage space prevents their retention.

Appraisal Reports

At the end of an excavation the Finds Assistant writes an Appraisal Report on the finds, which is stored with the Level III excavation report. Its function is two-fold:

i)   To provide a summary of the principal finds to assist the Site Supervisor in writing the Level III excavation report.

In this way, the Appraisal Report goes some way towards meeting the Cunliffe report's requirement that results should be made available quickly (Cunliffe, 1983).

ii)   To provide basic information about the finds, highlighting groups and categories of special importance, in order to show the research potential of the archive, and to direct future scholars to the most profitable areas for study.

When devising our current publication programme, we became acutely aware of the inadequacy of mere catalogues for providing information of this kind, and had to rely instead on our personal knowledge of the collections. Hopefully, if we are one day invited to make suggestions for a further publication programme, the Appraisal Reports will reveal the potential for a variety of new thematic publications.

An Appraisal Report incorporates the following information:

i)   A digest of the principal features discovered on site, arranged by provisional phasing, with information of specific relevance to the interpretation of the finds (eg. provisional pottery dating, evidence of site function, etc.)

ii)   A summary of the general characteristics of the finds, arranged by phase, where appropriate.

iii) Details of key groups, including those of importance for dating or site interpretation.

iv)   Lists of individual finds of importance.

v)   Suggestions for future research, to be published at Levels III or IV, with estimates of how much time might be required.

vi)   Lists of finds requiring conservation, scientific analysis, radiography, photography, illustration etc.

Computerization of Records

The Finds Assistant is also expected to transfer certain categories of data from the paper records already described into machine-readable form. Micro-computers are used for data collection and its initial sorting and retrieval. Apart from its use as a central data-base, the mini-computer is reserved principally for larger and more complex operations; for example, those which

involve comparing data of more than one type, or from more than one site. Our current practices are largely the result of development work by Dr. Paul Tyers, who by adapting existing programs and writing complementary material, has provided us with some appropriate software.

There has been much thought and debate as to which categories of data should be computerized. Computer print-outs are obviously neater than hand-written records, so it is desirable to computerize the most important classes of information. However, the opportunity for creating a large database on the mini-computer, under the control of powerful software, spurred us to reconsider the structure of our existing records. Our response was to circulate drafts of new recording sheets, akin to M.D.A. record cards, which would allow numerous extra classes of data to be recorded. We soon decided against this approach for two reasons:

Firstly, whilst virtually all our records, including drawings, can be stored on computer, it is by no means convenient or cost-effective to computerize everything. The only terminals to the mini computer are inconveniently situated in the library, but in any case, the existing paper records are often a better source than on-line information. For example, rough sketches on the back of our record cards are particularly appreciated by visiting specialists, and often provide the most useful means of retrieval.Other classes of information, for example the object location records, change so frequently that they would probably be out of date by the time they were transferred to the mini computer. Furthermore, whilst neatly printed records are highly desirable, they are not essential and are likely to cost extra, even with computers. On the other hand, computers create real savings when they are employed to do what they are best at, namely sorting information and performing arithmetical manipulations on statistical data.

The second reason for our current approach stems from the discovery that much of the required sorting and "number-crunching" can be performed on disc-based micros, to which we have ready access. Micros have a strictly limited memory and disc capacity, and their speed and efficiency can be greatly reduced if records are cluttered with extraneous data. This realization has led us to simplify our records, reducing the number of fields within each record to a minimum.

All finds data are collected and stored in 'Sequential Data Files'. These are easier to edit, merge, split and sort than 'Random Access Files', and make for easy compatibility with the mini-computer, word-processing packages, and other computer systems. Data are collected using a program in compiled M BASIC called WRITER, written by Paul Tyers. During an input cycle, the program asks questions, and awaits a response, which is checked against acceptable keywords or responses held in memory. Obvious errors are immediately rejected. After all the data within one cycle has been collected, the completed line is displayed for confirmation and possible alteration. When the next cycle begins, the entries made for the previous record appear in half intensity, and can be written into the new line by pressing RETURN. This greatly speeds the input of long runs of similar records.

Data files are always site specific (i.e. records from different sites are stored separately). The questions are determined and the responses checked by easily amended 'Writer Control Files', listings of which are housed in the archive. We use six principal types of data file, each with its own structure. They record Bulk Finds, Registered Finds, Spot Dating information, Quantified Ceramic data, Building Material data, and Site Phasing information. The latter is stored separately as phasing is prone to frequent change during writing up. The simplicity of the records is illustrated by Fig. 2:

SPOT DATING

Context	Material	Size	Comment	E.Date	L.Date	Type	Type etc.
6938,	RPOT,	S,	L 2/3,	170,	230,	SAM DR33,	AMPH,

REGISTERED FINDS

Reg. No.	Context	Material	Object	Period	Completeness	Comment
5811,	7042,	LEAT,	SHOE,	MED,		
7549,	3475,	COPP,	LIGU,	ROM,	HALF,	

add phasing info. and sort on phasing

Context	Per.	Phase	Reg.No.	Mat.	Obj.	Period	Completeness	Comment
3745,	I,	2,	7549,	COPP,	LIGU,	ROM,	HALF,	
7042,	II,	6,	5811,	LEAT,	SHOE,	MED,		

Fig. 2. Details of data structures for Spot-dating and Registered Finds records, with sample entries.
The lower section of the diagram illustrates how phasing information is merged into a file and sorted to provide a list of finds by phase.

The task of inputing data is simplified by reducing all keywords to four-letter codes. Although at first sight these are rather incongenial, they present a number of advantages:

i) They are quicker to input

ii) Being one step removed from natural language, they facilitate standardization. For example "blue-grey ware" is reduced to BLGR, which prevents uncertainty about which of the following natural language alternatives might be correct: BLUE GREY, BLUE-GREY, BLUE - GREY, BLUE/GREY, Blue-Grey, blue - grey, etc.

iii) They are easy to remember, being derived from ordinary language

iv) They use less disc space, resulting in savings in cost, quicker sorting, and reduced access time.

The use of codes does not prejudice the ability to output information in natural language if required, since the use of look-up tables would readily allow them to be converted back into ordinary English.

In recent weeks, the process of obtaining Spot Dating records has been streamlined by the purchase of an Epson PX-8 portable micro-computer with added RAM, which permits data to be input directly, without being written down.

Manipulation of Data for Research Purposes

Once a print-out of the input file has been checked against the original records, the data may be manipulated using combinations of simple programs. These include procedures to merge and split existing data files in order to create new ones; to search for specific strings, and output the lines in which they occur; and to count and perform simple arithmetical operations on data in one or more specified fields. Most programs are invoked by typing the program name, followed by the file specification and a series of flags to indicate which of series of options have been selected. Complicated procedures may be undertaken by using sequences of these elemental commands, and these may be stored as standard procedures for further use in SUB(mit) files.

A comprehensive manual forms an essential part of the system. This provides details of the basic system commands and possible errors, and a guide to the programs and their function. The latter includes information on the program name, the syntax, with details of the various flags or parameters, an example followed by details of how the program might be used in combination with other programs, possible problems (e.g. extra disc space requirements), information about the source of the program, and sources of further relevant information.

The use of simple programming elements, supported by clear documentation, brings within the reach of every member of staff the facility for combining these elements into original programs to answer specific questions of the data files. Simple commands may be used to obtain lists of Contexts containing specific types of materials, which may be used to identify significant distributions. Phasing information may be merged into catalogue files, so that various materials including dated pottery may be sorted against the Phasing (Fig. 2). Histograms of pottery, quantified by EVES or weight may be obtained by Context or Phase, and the relative frequency of various common types determined. These programs not only make information more available, but have brought dramatic improvements in speed and efficiency, particularly in the fields of building material and ceramic research (Tyers & Vince, 1983).

Apart from quantified pottery data, the records produced during post-excavation research are generally less standardized than the basic finds records. A series of forms has been designed to record statistical information relating to the principal categories of Bulk Funds, namely building materials, bricks, wall plaster, glass, clay tobacco pipes, and medieval turnshoes. Data standards, describing what the various boxes are for, and what should be inserted, are being prepared. But ever more of our research records are being computerized as staff become aware of the possibilities. The programs just described should be adequate for future needs, provided we ensure that the structure of new records remain compatible.

Our approach may require some re-thinking as and when the Finds Section acquires a direct link with the Museums mini-computer and more software is written. We have already developed some useful programs, and when logging into the mini-computer, the user is presented with a menu of options, which include programs to facilitate the transfer of data from the micros, browsing through the files, and print-outs of various classes of data.

Serious consideration has been given to the organization of files within the mini-computer. Unix file directories are hierarchical, and reminiscent of a family tree. We have taken full advantage of this facility, arranging the records by type (e.g. Registered Finds), category (e.g. Coins), and Site Code. A sub-file at each directory level known as "data" includes information about the structure of the files, what each field contains, together with hints on retrieval (See Fig. 3).
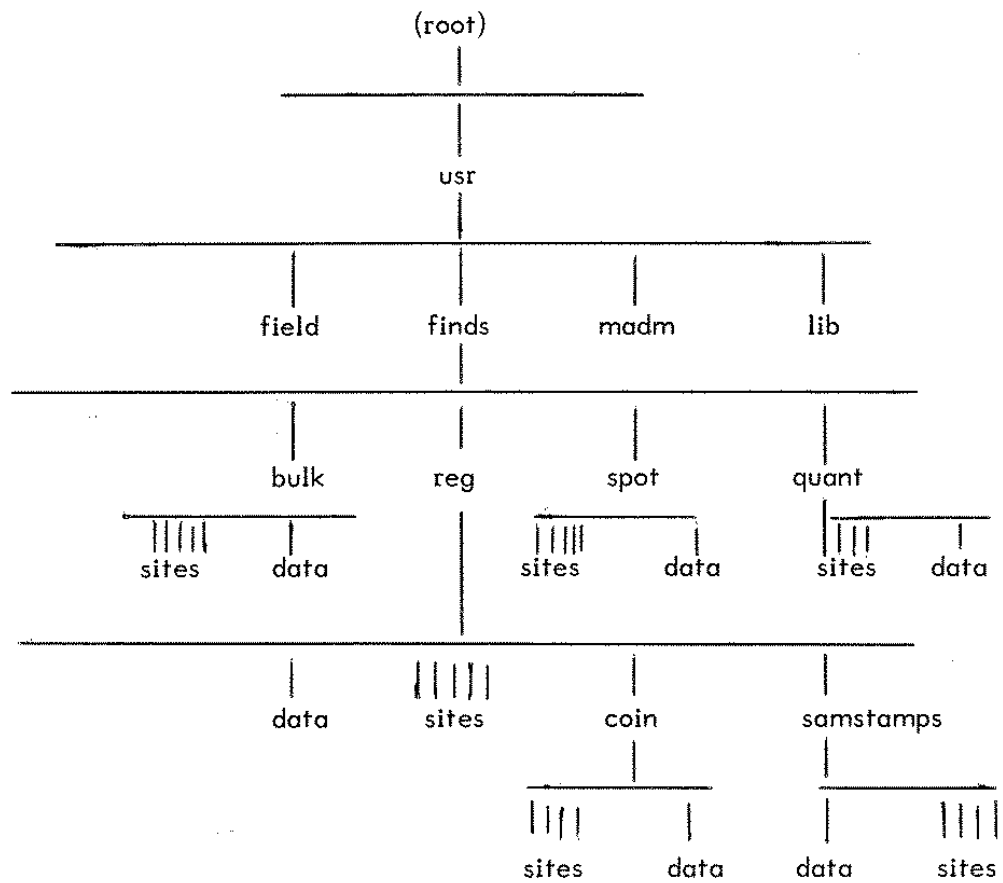
Fig. 3. Schematic diagram to show the hierarchical organization of data files within the
Museum of London's mini-computer. The files are held in the user (usr) sub-
directory, which contains sub-directories for various user groups (i.e. the field
and finds sections, museum administration section, etc.) Within the finds sub-
directory, the finds data files are arranged by type, (e.g. all bulk finds records
are in the same sub-directory, one file per site). More detailed records (e.g.
coin and samian stamp catalogues) are in sub-directories of 'reg' which holds data
files for the registered finds (one file per site).

Specialized Collections

A well-organized store which permits a degree of browsing is a valuable record in its own right. But ready access to the stores is not always possible or desirable. For this and other reasons it is often desirable to develop special research collections such as type series. These not only serve to support published definitions of various classes of find but, linked to a well-organized paper archive, can act as an index to various aspects of the collections. For both reasons it is important that type series specimens are readily available for examination. The Museum of London is fortunate in having the use of a series of cabinets designed for industrial tool storage, which permits objects to be stored safely, compactly, labelled clearly, and allows a large number of similar objects to be viewed and compared at the same time (Rhodes, 1977).

We have developed type series for pottery fabrics, pottery thin sections, bricks, tile fabrics, and clay tobacco pipes, and plan to establish a type series for London building stone. Pottery forms are often more easily understood when recorded as sectional drawings, and a corpus of numbered pottery forms is an important component of the archive.

Back-up Records

Following the completion of a research project, the paper records are stored (where possible) by site, and a brief list of available records for each site is prepared. At present, only records not committed to computer are copied onto fiche, so everything is backed up, if not in the same form. When finances permit, our computerized data will be copied onto Comp-fiche, so that it can be accepted by the N.M.R. It is possible that this may allow us to discard portions of our paper record.

Bibliography of Greater London Archaeology

There can be no justification for spending public money on writing archival reports or even publishing excavations unless there is some means whereby scholars and members of the public can retrieve the information they require. The problem of directing enquirers to relevant information is particularly acute in London, where the combined labours of generations of scholars have resulted in thousands of published notes, papers and reports, many of which are buried in obscure 19th century journals. Although the majority of post-war publications have been indexed by the C.B.A. Bibliography, this has recently been curtailed at the very time when there is an explosion of new publications, and an even larger number of unpublished reports.

The lack of some form of control over the literature is especially problematic for those who need to know about earlier discoveries in order to assess the archaeological threat of new planning applications, and for Supervisors who are trying to place their discoveries in a wider context. The problem is exacerbated because the Greater London region is without an S.M.R. (although preparatory work began this year). One of the stated aims of the Museum is to become a centre for research on London, and in the circumstances the Museum has decided to provide an index to the published and unpublished literature (including archive reports) in the form of a Bibliography of Greater London Archaeology.

A consultative committee was established in 1981, composed of representatives of the D.U.A.'s Field and Finds Sections, the Greater London Archaeology Department, the D.O.E., G.L.C., London and Middlesex Archaeol. Soc., C.B.A. and the N.M.R. It was agreed that the first priority was to engage a professional indexer. Miss Audrey Adams was appointed to this post in 1982, supported from a variety of sources, primarily the G.L.C. She is shortly to be provided with two part-time assistants, funded by the M.S.C.

The initial aim is to provide a list of the relevant literature and archive reports, with basic details about the contents, such as site location, date, the principal features, and major finds. A more detailed index may be attempted later. Forms have been designed, and two runs of journals, covering the 19th and 20th centuries have been indexed to assess the kinds of information which might be encountered, how this might be structured in a record, and the varieties of terms in use.

Classification problems and the use of thesauri

An examination of our particular problem and of other bibliographic indexing systems convinced us of three things. Firstly that any attempt to use a numerical classification rather than one based on natural language is doomed to failure. Numerical classifications are unnecessary, since modern computers can handle natural language. They are inflexible, since essential categories are always missed out and when represented by numbers in sequence cannot be inserted. They are also error prone, since a wrong digit entered onto the computer is unlikely to be noticed, and may result in information being lost for ever. Secondly, that any attempt to develop a strictly hierarchical system was also likely to fail as many artefacts and features cannot be allotted a function, while others have several functions. Thirdly, that any system would have to retain obsolete terms. Archaeological terminology is constantly changing, and it makes no sense whatsoever to keep updating past terminology; indeed it makes the bibliography less useful. Some obsolete terms, such as "celt", cannot easily be updated, having a unique meaning and associations which should not be lost.

These considerations have led us to adopt an extensive thesaurus, which is open-ended, allows for historic keywords whilst showing their relationship to modern terms, and provides extensive cross-reference to give different routes into the database. The latter is especially important, for without inbuilt cross-references, a person attempting to retrieve information is limited to the words he knows, and thereby may lose valuable references. It is therefore our intention to link key-words to synonyms (which will be pulled out automatically), and to parts (which can be pulled out on request). For example, anyone asking for forts, will be automatically referred to brochs; Buildings, fortified; Camps; Castles, etc., and on further request to the parts, such as ditches; gateways; parapets, etc. (Adams & Lavell, 1984).

The development of a system of this kind does not obviate the need to attempt to standardize current terminology. Experimental attempts to index some of our Level III reports have revealed that different Site Supervisors not infrequently use different terms for the same kind of object or feature. This not only makes indexing difficult, but can confuse the reader. A controlled vocabulary for current use is undoubtedly a desirable aim, and definitiions for keywords are being prepared. However, their use cannot be enforced and it is inevitable that terminology will continue to change.

Now that we have listed about 2,500 journal articles, we are beginning to pay more attention to the archival records, and have decided to confine our indexes to the discussion section of the site reports, since this includes a digest of the principal discoveries. We will include also the bulk of the appended specialist reports, which include the Level III finds reports. We are also ready to look for a suitable computer package, and to say what order of funding will be required for computerization (to be met from donations). Our requirement is for a sophisticated relational database, which should be sufficiently simple for a member of the public to use, given a minimal amount of instruction.

Having committed the records to computer, and demonstrated the potential of the Bibliography, we will turn our attention to generic terms which will be imposed at a higher level, and will be used to direct the user to suitable keywords lower in the system. It should for example be possible to input Roman sanitation, and be referred to bath-houses, drains, sewers, and so on. The same system will hopefully be linked into the excavation records, allowing it to pull out relevant finds such as strigils, wooden drain pipes, etc.

The success of this upper tier and gateway into the archive will depend not only on sophisticated computer software, but on the enduring character of the simple building blocks of which the archive is constructed, on the quality of the cross-referencing by which the parts are mortared together, and on the skilful analysis and synthesis of the records, upon which archaeological interpretations are based.

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Computerised Archaeology: The Dream and The Reality

Jennifer Stewart

The receipt into museums of huge collections of archaeological material generated by the heydays of Rescue excavation may be one of today's headaches. The receipt of the information about these vast collections, perhaps computerised on diverse systems which we as curators cannot utilise in the management of these collections, will be a future nightmare.

In this article, I would like to look at some of the dreams and the realities of computerised archaeology and show how some museums are setting their museological houses in order, to better manage their collections.

The dreams about computing use in archaeology not unnaturally include that of a quick, error-free, portable, preferably inexpensive system, capable of being used by several users simultaneously and also capable of amassing large amounts of information. The dream extends perhaps to video-disc applications where images of artefacts together with catalogue captions can be quickly accessed by microcomputer-based systems. Here museums not only in the United States but in Britain are heading the field in this new technology (albeit in the Fine Arts). In the future we may also be able to use these systems to off-load and archive vast amounts of information as text and images, not only in megabytes but also in gigabytes (thousands of millions). However, although the technical expertise and equipment exist to achieve these dreams, the reality of accessing this information is still very different. Two years ago at a meeting in Leicester on 'Information Systems in Archaeology' I cynically suggested that we did not have information systems in archaeology, we have the units busily inputting data in the field, the museums busy inputting the data into a slightly different form into museum documentation systems, and then along comes the earnest graduate researcher to reprocess the information into yet another system - a case of reinventing the wheel several times? - a case of independent invention, not the gentle diffusion of ideas or even the transfer of information across and between systems.

If we accept the inevitability of different field and museum systems - there may even be advantages to be gained in the different approaches by way of new technical and theoretical developments - then the way ahead may need to concentrate on these twin aspects of technical and theoretical points; firstly to ensure that the computerised records can be utilised by both units and museums (technical expertise to ensure data-transfer between systems) and secondly, that there is a basal level of agreement on the theoretical groups of information to be recorded for text records (compatible data standards).

These points were already being noted in 1980 when the MDA together with Dr. Graham organised a one-day seminar to discuss microcomputers in archaeology, to recommend hardware and software, data standards and the archiving of processed results. In the publication (Stewart, 1980) it was suggested we needed :

- frequent meetings to disseminate information on hardware and software:
- to monitor and investigate technical aspects relevant to archaeological usage of microcomputers, for example ruggedness for on-site use;
- to establish some form of users' group to act as a forum;
- lastly, to look into data transfer and the archiving of processed results.

Four years on what do we have in museums?

Computer meetings are held within the museum community, run by the MDA, the Museum Computer Group, and increasingly by the Area Museum Councils and the Federations. The technical aspects of systems are slowly being monitored and reviewed, see for example the MDA's publication **Microcomputers in Archaeology** (though however there is little on the data transfer from site to museum). No forum exists specifically for microcomputer users in archaeology, but increasingly articles appear in the museum literature such as **MDA Information,** the **Museums Journal** and the **International Journal of Museum Management.** On data transfer there have been both theoretical and practical experiments between users, and work by CIDOC (the Documentation Committee of ICOM)and MDA. The latter has increased its capacity to take a variety of 'floppy disks' to allow processing by a standard package (GOS). In the early 1980s one of the major problems in archaeological computing was the need to generate software from scratch for each archaeological application; however, there have been technical and programming advances which now mean an archaeologist can go to one of several systems which would be applicable. As noted by Dr. Graham (1984) two DBMS (Data Base Management Systems) are now commercially available, MDBS and dBASE, the other, GOS, has been transferred to a 68000 microprocessor-based system and is available to the archaeological community. These database systems allow one to develop programs to manipulate the information quicker than conventional computer files. Here the popularity of personal computers has helped by decreasing the cost of hardware such as Winchester disks but increasing the range of software, some of which, for example, word processing and accounts packages, can be utilised immediately in archaeology. However the inputting of information still requires considerable work by the user. Here there has been some pioneering work by museums with small hand-held micros for control documentation (noting the change of location of artefacts or loans information etc.) such as in the Museum of London, the National Maritime Museum and St. Albans Museum.

Technical and theoretical developments are slowly being achieved in computerised archaeology by the museum community in order to transfer information between systems, and to better manage archaeological collections. Advances are being made and we should not belittle them.

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Integrating Fieldwork and Museum Records - A Case Study

Benjamin Booth

Introduction

This paper briefly describes the system for archaeological documentation at the National Maritime Museum. The system encompasses a number of related areas; including maritime archaeology, related historical and ethnographic studies, conservation of material recovered during fieldwork, and research into the conservation of finds from maritime contexts. An initial examination showed that there were already a number of files of information, and several well defined classes of material requiring documentation. These were objects, slides, drawings, information files, samples, conservation records, contexts, photographic negatives, bibliographic references and carbon 14 dates. These totalled approximately 20,000 items. A survey of the use of these sources of information showed that they were all consulted quite frequently, except the contexts and carbon 14 dates, which which were rarely used. The system for documentation at the National Maritime Museum uses the GOS programme package (Museum Documentation Association, 1980), and a data standard developed in parallel with that produced by the Museum Documentation Association (Museum Documentation Association, 1980a). Archaeological records would have to conform to the data standard, and in computerised form would have to be capable of being formatted for transfer to the GOS package.

System design

The overall strategy was to set up a separate file for each of the classes of information described above. However bibliographic references and photographic negatives were already the subject of museum-wide projects, so it was merely necessary, when appropriate, to indicate a reference to them. Initially, because contexts and carbon 14 dates were rarely consulted, and there were only a few hundred records in each case, it was decided to make them low priority. However because contexts are central to the recording of excavations, and the carbon 14 date list was required for publication, these classes of information were included in the scheme.

The features of the documentation system are broadly similar for each class of information. These are:

1   **Number:** Each item which is documented has a unique number. This consists of a three letter code for the museum (NMM), an 'A' to show that the item is archaeological, the class of the item (e.g. 'O' for object), and the number (a letter followed by a four digit number - A1234). This is written NMM AO A1234.

2   **Computer file:** A computerised file containing salient information about the item, and references to all other sources of information about it.

3   **Data capture:** In the museum data may be directly entered to the computer using an interactive programme package. For convenience in collating the data a form is available, and for use in the field forms on waterproof paper are provided. Additionally an Epson portable microcomputer, also provided with an interactive data capture package, may be used at remote locations.

4   **Routine output:** Data from the file is routinely output in the form of catalogues of all or selected information about all or selected items. Data is also output onto floppy disks in a form suitable for transfer to the GOS package.

Linking mechanisms between files

The basic operation of the system illustrates the convenient division into discrete classes. However several classes of information may be relevant to one project. Three methods of linking are employed:

1 **Data standard:** All classes of information use a portion of the National Maritime Museum data standard for objects. This ensures that different classes of information are recorded to the same format, and that our data may be compared with that produced by institutions using the MDA data standard.

2 **Cross referencing:** It is possible to cross reference from any item to any other items, using the unique number which each item has. All items are cross referenced to the appropriate information file, and to the object record if this is relevant.

3 **Vocabulary control:** Short lists of permitted terms have been defined for a number of key attributes. These lists are common to all classes of information, and the terms thus used may be qualified with a passage of text.

Computer facilities

Hardware consists of a Cromemco CS-1H, with vdu and printer. This is a Z80 based microcomputer, with 64K memory, 400K floppy disk drive and 5MB Winchester disk (20MB is now fitted as standard). It was chosen because it is compatible with other systems in the museum, will run the large quantity of software which uses the CP/M operating system, and has proven reliability. Additionally it is easily upgradeable to a 16 bit (68000) processor. For data capture at remote locations an Epson HX-20 portable microcomputer is used, which may be interfaced directly to the CS-1H.

The software requirement was for a file management system which could accommodate long records (up to 2000 characters), with a large number of fields (up to 100). Interactive input, editing and output, which could be operated by inexperienced users, where necessary. The package would have to have the ability to reform, and transfer data elsewhere (for instance to the GOS package), and would have to be capable of performing simple manipulation of the raw data. At the time the project started there did not seem to be a commercially available package which would easily perform these tasks, so it was decided to use the software developed for the Welland Valley Project at Maxey (Booth, Brough, and Pryor, 1984) as a starting point.

The package produced (which is called MAXARC) consists of two sets of programmes. The first, SETUP allows the user to define a file, and vocabulary lists of words to be used by this and other files. The second, MASTER, performs operations on the file defined by setup, using any appropriate vocabularies. A wide variety of data input, editing, printing, retrieval and reformatting is available routinely with this system.

Conclusion

The bulk of the system has been in use for nearly two years, and some of the data is now to a high standard. It has proved to be flexible enough to be modified in the light of experience. The next stage is the transfer of significant quantities of data for processing by GOS, and the testing of the links between various parts of the system. Success so far can be attributed to consistent use of a well thought out data standard, and the development of workable and well documented procedures. Effective software for initial data input, coupled with good communication to the GOS package are also important.

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     Data Standard.</u>

Excavation Archives : The Relationship of Field Archaeologist and Museum

John Hinchliffe & Tim Schadla-Hall

The last decade has seen an increased awareness of the need to produce excavation archives capable of critical re-examination, an awareness arising to a large extent from our own difficulties in addressing the records of earlier excavations. The various elements which make up these archives are generally familiar both in terms of data and materials. In recent years there have also been two further developments which have added substantially to the volume and complexity of excavation records. The range of materials encountered on archaeological sites which may be regarded as informative has been substantially extended and at the same time there has been a general refinement of recording systems which tend to produce much more detailed and precise records of the site than was previously the norm.

A further factor to be considered here is the concept of 'preservation by record' whose underlying premise, arising to some extent from the background of rescue archaeology, is the recognition that the processes of excavation are essentially destructive and hence the purpose of the archive is to provide an effectual replacement for the physical remains. That is to say the soil, structures, artefacts and palaeoenvironmental material which constitute the site and the relationships between these various elements will no longer be available for study as an integrated whole and hence the archive, both materials and data, should be in a sufficiently coherent form to allow effective re-interrogation.

The relationship between the field archaeologist and museum may be seen as that of producer and consumer (Fig. 1). Field archaeology has become an increasingly productive industry and this productiveness, both in terms of quantity and variety, is placing a considerable burden on museums as consumers/receptacles of archives (Fig. 2). Whilst archaeologists have always produced archives of sorts, often of variable quality, the increased significance of archives in the light of the present emphasis on the publication of syntheses only in printed form presents both problems and opportunities.

Whilst what constitutes an acceptable archive in modern terms is broadly understood there are often problems concerning the form in which it may arrive at the museum. Such problems exist where an excavator in completing work on the final report decides for the purpose of this report to renumber contexts, modify drawings and change descriptions (Fig. 3). What the museum subsequently receives is an archive which relates closely to what came out of the ground and the manner in which it was recorded but has only a tenuous relationship to published report. In the past such a situation would not necessarily have been regarded as unusual in that the 'archive' and 'publication' were generally perceived as separate entities but more recently the former has come to be perceived as an internally consistent data base, ordered and capable of interrogation, from which the latter is drawn as a synthesis. A number of factors have led to this change of attitude;

1.   As more research on the archives of past excavations has taken place the need for greater accessibility to the data has become clear.

2.   Linked with this is the perceived need to devise systems to both speed up report production and allow interpretation on at least a pseudo-scientific basis.

3.   The onset in the 1960's of large complex excavations which forced a more systematic approach to all aspects of the work. For instance, the need even in the pre-computer era to codify responses saw the demise of the site notebook and the appearance of the ubiquitous recording sheet.

4.   The need to become more scientific was in any case upon us; even if we attempted to ape the so-called social sciences or soft sciences the need to produce a body of uniform statistics and data must become apparent.

5.   There is a genuine belief that just as today's archaeologists have been keen to work on yesterday's archives (with all their shortcomings) it is assumed that archaeologists in the future will wish to work on today's archives.

Clearly the production of large integrated archives has considerable implications for museums in their role as 'consumers' of this material. In the past the archives reaching museums were much smaller. For the most part few people were collecting tons of soil samples (Fig. 4), and most of the wet wood had dried out before it could get to a museum 20 years ago. We were unencumbered by the various forms of expert, and only 'the good bits' were kept. The same thing of course goes for the written archive. The increase in volume has placed a remarkable strain on many of the country's museum facilities and the lack of uniformity in paper archive production has meant that museums have not always looked after and catered for such a varied product. The need for both the field and the museum archaeologist to co-operate in allowing entry to the archives will become increasingly difficult unless co-operation is developed.

The separation of many museums and field archaeologists does not help towards a process of coherence; individual museums and museum authorities with their own units have in some cases managed to create systems which suit them. Elsewhere the picture is not so satisfactory; we both know of museums who having accepted the product of an excavation have then proceeded to renumber every sherd to conform to their own accessioning system; when several thousand sherds were involved in this then there was a considerable (and wasteful) use of manpower.

Gone are those days of receiving an archive (including the finds) from the boot of a car (Fig. 5) - a dozen boxes of finds, a couple of rolls of plans, and a few site notebooks together with a file of photographs. We now deal with maybe two or three hundred boxes at a time (all to standard units) all collected by stratigraphic unit/context/modular context. In addition there are thousands of archive sheets, matrix diagrams, and also computer print-outs and even microfiche to take on board. The excavator may well turn up with the information that a couple of computer tapes are needed to interpret the archives and should be run on the local main frame computer (Fig. 6). It bodes ill when many museums do not have standard boxes, cannot afford microfiche readers and often have access to completely the wrong computer. Even the provision of a correct storage environment for the paper archive is beyond most museums (Fig. 7). It is remarkable that Mortimer's paper archive dating from the 1880's, at Hull for example, survived not only appalling storage conditions for over 70 years, but also a bombing assault in 1941!

The sort of product that museums now receive can best be illustrated by giving an actual example -in 1981 at one county museum operation over a four month period 750 boxes of material were received from four different sites. The archives was extremely varied. One site produced $1\frac{1}{2}$ plan chests (with vertically hung plans and inked in drawings) 17 files of record sheets (A4) and a number of A4 photographic books, together with the information that the County Council's computer held much of the data and should be maintained. All the boxes were labelled by site and classified by material. The second site had three paper folders of notes, a roll of $\frac{1}{2}$ inch drawings, a box of assorted slides and black and white photographs. Boxes were labelled with the sites name. The third run by the museum had everything on A4 sheets in A4 files, rolls of plans in different sizes and film and pictures neatly labelled in boxes. All the material in this case was boxed by accession number which was in turn related to context.

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This variation underlines the failure of communication between the field archaeologist and the museum, and the sheer problems of storing different sizes of paper archives is something which is really quite intolerable if we are to hope to provide a coherent paper archive to members of the public and to future researchers.

The lack of uniformity (Fig. 8) then does mean not only problems for the excavator but also for the museum. No matter what sort of Brave New World we look to in the future, the proliferation of site sheets of different types after the death of the site notebook, and the rise of the computer - and the fact is that there are at least seven different computer based approaches to excavations on different types and makes of computers - make it important that we try and arrive at minimum standards which produce a clear archive which is readily interpretable, hopefully in a common form to all museums.

The concept of the archive as a data base capable of interrogation by future researchers uninvolved in its compilation must be supported but with three reservations. The first arises from the fact that few sites are totally excavated and hence the researcher into an archive is looking at someone else's sample. The second concerns the excavation data which, no less when it is contained within a machine-based storage system is at least in part a subjective record. The third reservation concerns the retrieval and treatment of material from the site which is an area where a series of options exist and a series of decisions need to be made. With regard to these options there seem to be five distinct processes to which excavated material may be subjected. These are RECORD, RETRIEVAL, ANALYSIS, RETENTION and CURATION.

1. RECORD

Very little of a site is retained, or at least very little of that part of it which is sampled by excavation, and in a rescue situation there may be no further possibility of re-examination. Hence the layers and structures 'survive' only in the form of written, graphic and photographic record. This we are constrained to accept for the bulk of the excavated material and therefore there should be good reasons why any class of material of which the site is composed should be subjected to the four succeeding processes, the second of which is:

2. RETRIEVAL

The only justification for the retrieval of material from a site is that it has the potential to provide us with further information either through research directly related to the specific site and to the specific questions to which the fieldwork was addressed or through future programmes of research of a more global nature. If this potential does not exist it is hard to justify the costs involved in the collection, cleaning, marking, storage and preliminary conservation of the material.

3. ANALYSIS

As just indicated, material may be the subject of analysis within the terms of a post-excavation research design for the particular field project which generated it or it may take place within the framework of a broader research programme. It should be added that, particularly in the field of archaeological science certain forms of analysis are in practice destructive of the material being analysed. There is perhaps a strong case for the retention of parallel unanalysed samples.

4. RETENTION

The purpose of retention in the long term is to allow the re-examination of material. Prime examples would appear to be pottery and metal objects where a future researcher may need to go beyond either the drawn record or written descriptions and tabulated characteristics. It would no doubt be heretical to suggest

that a high proportion of bodysherds and animal bones, which are likely to form a substantial part of the volume of the material archaeology do not fall into this category!

5. CURATION

With the final process we are very much into the province of the museum. As the storage grant system to an extent recognises, considerations of cost also apply, not merely in the areas of heating, lighting and storage space, but long-term conservation and of staff time dealing with enquiries.

As we said at the outset the point to be stressed about these processes is that each stage should be the subject of conscious decisions. It is surely not sufficient to take the view 'we dug it up so we may as well keep it' particularly against a background of problem-orientated research designs and excavation sampling strategies.

The procedures involved in the production of archives from Central Excavation Unit excavations are outlined elsewhere (HBMC(E), 1985). In summary the proformas on which the basic data is entered double as input documents to the computer though it should be stressed that they are also retained in an unaltered state as part of the archive. Once all the data from the site has been transferred on to the data base it may then be subjected to interrogation and analysis within the terms of the Post-Excavation Research Design. Information provided by specialist analyses of artefacts and samples is added to the data base to produce an amplified integrated record.

At appropriate points within this process, which in 'Cunliffe Report' (Cunliffe, 1983) terms represents the compilation of the Research Archive, computer print-outs of data may be generated. At the completion of this process the data resulting from original records and specialist analysis is capable of dissemination in three forms - **computer print-out, microfiche** and on **floppy disc/magnetic tape.** The first of these would conventionally form part of the archive as a series of catalogues. The drawbacks are, firstly, the bulky nature of this material and, secondly, the manner in which the data is presented is 'fixed' and hence fails to exploit the full potential of the machine base. The second form of presentation, microfiche, obviously avoids the problem of bulk but the data contained in the fiche is subject to the same constraints as the paper record. A further drawback may be that a person wishing to interrogate the record does not have immediate access to a reader though these are items which museums housing archives must surely seek to acquire. The third form of presentation is on the disc/tape itself. This has the major advantage in that it allows the user to direct themselves directly to the data. There are of course technical problems in this area arising from the non-compatability of different systems and different software but it is our view that by the end of the century the conventional means of access to information throughout our society will be via a VDU.

It is axiomatic that the production of the archive begins on site and the form of that archive is dictated by the recording system adopted, retrieval policy, sampling strategy and overall research design. The development of the archive in the post-excavation process requires the formulation of carefully considered problem-orientated research designs. The increasing use of machine-based systems for the storage and sorting of data creates new opportunities in terms of the accessibility of archives and the adoption of such systems by museums will present to future researchers the ability to address a 'live' archive.

The relationship between field archaeologists and museums is in many cases not as good as it should be. There are museum archaeologists who have failed to keep up with changes in the nature of the field record just as there are field archaeologists who do not fully consider the requirements of the museum in its role

as custodian of the archive. Early and close liaison is clearly of paramount importance but problems in this area will be greatly reduced if a broadly similar concept of the archive and its components is accepted by both producers and consumers. The definition of minimum requirements will surely lead to a more systematically compiled and more uniform product which would be to everyone's benefit. If we all merely continue to operate on the basis of our own good ideas and individual approaches we shall begin to look like the United Nations without the simultaneous translation facilities.

Both field archaeologists and museums are expending considerable funds on the relatively expensive acquisition of information about the past and the subsequent storage of this information. The majority of the funds for this work are derived from public money and the aim must surely be to improve the public's understanding of the past. It is therefore crucial to consider the accessibility of this expensively obtained information. It is of course important to ask 'who is using the archives?' It is equally important to consider the extent to which the greater 'usability' of these archives must surely improve and extend their use (Fig. 9).

Acknowledgement

The writers wish to thank Belinda Whitwell for providing the drawings.

References

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HBMC(E), 1985; **Central Excavation Unit Manual (3 parts).**

Fig. 1. "The relationship between the field archaeologist and museum may be seen as that of producer and consumer"

Fig. 2. "Field archaeology .... is placing a considerable burden on museums as consumers"
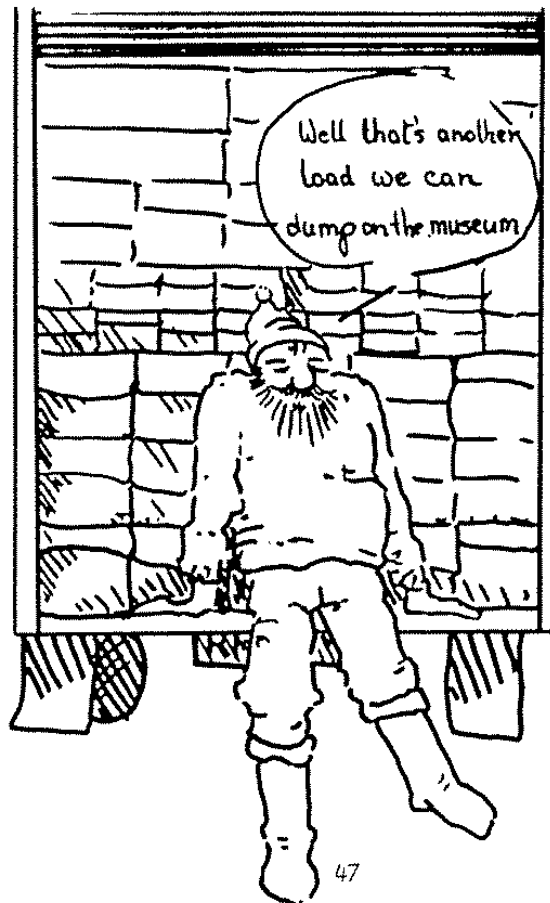
Fig. 3. "Where an excavator .... decides .... to renumber contexts ...."

These notes explain how to understand the published report in relationship to the original excavation archive

Fig. 4. "Few people were collecting tons of soil samples...."

We thought you should have the unprocessed soil samples too. They may be useful!

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Fig. 5. "Gone are the days of receiving an archive ... from the boot of a car"

Fig. 6. "The excavator may well turn up with the information that a couple of computer tapes are needed to interpret the archive"

Fig. 7. "Even the provision of a correct storage environment for the paper archive is beyond most museums"

Fig. 8. "The lack of uniformity....."

Fig. 9. "It is equally important to consider the extent to which the greater 'usability' of these archives must surely improve and extend their use"

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The Policy of English Heritage in respect of Grants for the Storage of Archaeological Archives

G.J. Wainwright

1.   The decision to make payments to approved museums for the storage of archaeological archives from DoE (now HBMC) grant aided excavations arose from recommendations in the Dimbleby Report: **The Scientific Treatment of Material from Rescue Excavations** which was commissioned by the Ancient Monuments Board for England and published by the Secretary of State in 1978.

2.   That document recognised as a general principle that the creation, housing and use of an archive is a single continuous process and that all archives should be housed in a museum or a museum controlled building.
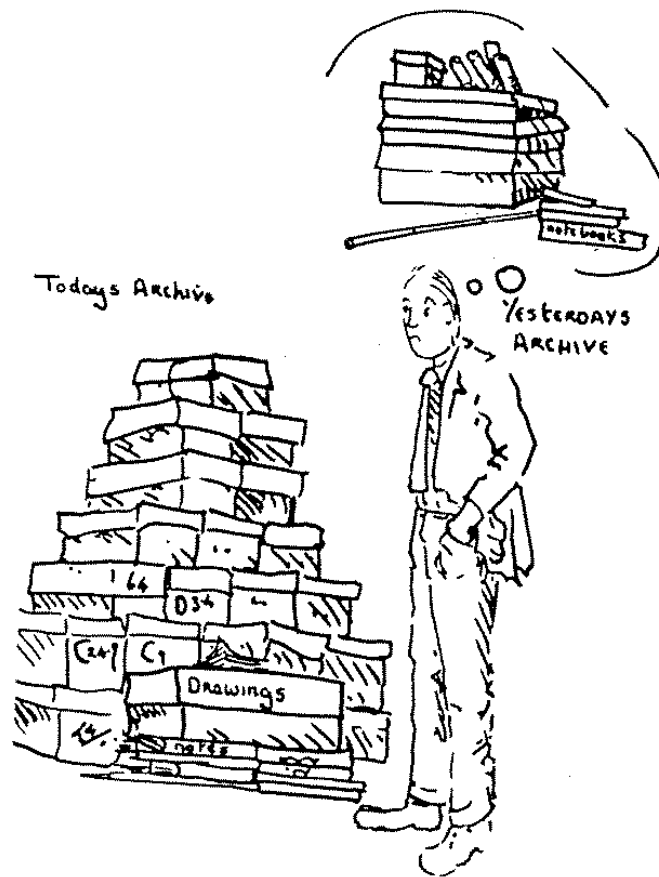
3.   The archive consists of three elements:-

   (i)   the site records, including descriptive notes, drawings, photographs, computer listings, diaries, correspondence etc.

   (ii)   documents deriving from the preliminary sorting, such as card indices, context sheets which list and quantify cultural or environmental data, context matrix sheets, computer listings of primary data etc.

   (iii) environmental and artifactual material from the excavation and records relating to them.

4.   The report also recommended that 'ideally' no excavation should take place until arrangements for the future storage, conservation and maintenance of the archive have been made. This presupposes:-

   (i)   that ownership of the finds is settled at planning stage

   (ii)   museum involvement at the planning stage and throughout the ensuring assembly of the archive

   (iii) that the archive is organised in advance of deposition to agreed standards

   (iv)   that the archive is deposited only with a museum capable of meeting agreed standards of security, storage, conservation and curatorial care.

These recommendations constitute the ideal framework within which the HBMC conducts its rescue policy.

5.   The HBMC therefore continues the policy established by the DoE of ensuring the suitable storage of excavation archives resulting from rescue excavations grant-aided by them. The method of payment is by means of a once for all grant payable at the time that an archive is deposited in an approved museum and calculated on the volume of material to be stored. The rate current for 1984/85 is £7.35 per 0.017 cu metre.

6.   Eligibility criteria for inclusion on the list of approved museums is not a policy matter for the HBMC. This policy is decided by the Museums and Galleries Commission in consultation with the Area Museums Councils and that body is responsible for nominating museums as approved recipients of archives.

7.   Payment of storage grants is made on the basis of the date at which rescue-funded archives **of whatever age** crossed the threshold of the approved museum. Material which was already in the museum or in a museum store on 1 November 1981 does not qualify.

8.   Where an Excavation Director having consulted the landowner fails to obtain the agreement of the appropriate museum to accept the prospective archive, he should refer to the Area Museum Council which will then offer it to other approved museums. In the event of there being no approved museum willing to accept the archive the Area Museum Council will approach the Trustees of the British Museum. Alternatively, the Director, having consulted the landowner, may arrange at the outset for the archive to be accepted by the British Museum.

9.   The grant is made only following formal acceptance by the managing body of the recipient museum of grant conditions which have been drawn up in consultation with the Museums and Galleries Commission. In essence this states that the total archive must remain in the care of the museum in adequate and proper curatorial care and may not be permanently removed, divided or disposed of without consultation with the HBMC and without the Commission's consent. In case of serious infringement of this agreement, the Commission claims the power to reclaim all grants made.

10.   In the past the Commission has taken the view that the storage grant should be paid only when the complete archive (objects, samples, site records etc.) was deposited. However, many units have storage problems and seek to off-load the excavation archive onto the approved museum as post-excavation work is completed. At the same time the museum was precluded from claiming storage grant until they had the complete archive in their possession. Payment of storage grants will in future be approved as and when completed sections of the archive are delivered to the approved museum subject to an undertaking from that museum that they will eventually accept the complete archive for storage.

11.   On the question of selection and retention of environmental and artefactual material from excavations the HBMC operates within the guidelines set out by the Working Party of the British Museum chaired by Dr. Longworth.

12.   Total grants made for storage purposes have been as follows:

     1981/82:-   £84,268

     1982/83:-   £73,547

     1983/84:-   £108,994

     1984/85:-   £34,638

No storage grant has so far been refused on the grounds of shortage of funds.

Order or chaos?

Malcolm Watkins

The subject of this paper is the organisation of archaeological archives within museums for their best potential use. It is therefore necessarily a philosophical paper designed to give practical advice on the best way to reach order rather than to dictate how that order should be arranged. Museums in this country are not a state service, nor are they ever likely to be entirely in public hands. The nature and scope of their archaeological collections and the requirements placed upon them are therefore extremely variable.

To understand the problems, we need to understand the nature of our collections. The curator has a quite unique archaeological problem which is unmatched by his colleagues in field archaeology; simply the breadth of the methods by which his collections are constructed. There are four main sources, and these must all be integrated in a successful museum system.

    (a) single items and small groups as chance finds which may or may not have significant documentation,
    (b) large groups such as private collections which probably carry significant documentary and photographic support,
    (c) material from museum-based excavations,
    (d) material from excavations organised by other bodies which may be subdivided into that from excavations conducted in the past (often decades previously) and that from new excavations, in which the museum officers may opine on the methods of ordering.

It is category (d) which is most likely to cause us headaches, indeed migraines. Despite the admirable intentions of HBMC the number of excavations in which the curator has either the encouragement of the excavator or the time to be involved is lamentably small. There are, despite the differing requirements of the two disciplines, areas of common ground which can be developed to assist the curator - a surprisingly simple one being the use of the museum accession number as the site code rather than some arbitrary collection of initials at the whim of the excavator. There are of course problems involved in accessioning privately (landowner) owned material but on the whole these are less difficult to deal with than several thousand finds requiring renumbering. This is where the professionalism of our below-ground colleagues is of prime significance; it is, alas, all too often lacking, as excavators continue to see the completion of the publication (in whatever form is currently accepted) as the end of their responsibility. Indeed, some seem to see their responsibility as lying more with landowners who might disperse their finds than with museums which are at least pursuing the same supposed ends as field archaeologists. In the late '60s and early '70s the tail began to wag the dog. In some instances (fortunately few) this is still the case.

I suggest that there are fundamentally ten categories of material that may be anticipated for archaeological collections (Fig. 1). Any or all of these might arrive as part of a single accession, and they may be arranged in several different ways by the excavator and those processing the finds for publication. Again, clearly the duty of the curator is to seek to advise at the earliest possible (i.e. before application for grants) opportunity those systems which the museum has adopted for long-term storage, including details of boxes, racks and packing techniques. Early decisions to use non-volatile plasticised labels rather than luggage tags, and permanent ink rather than ballpoint or pencil can save much hassle later. For properly funded excavations this should prove to be no problem. I doubt the wisdom of any other type of excavation nowadays, particularly amateur efforts in which corners are cut on the justification that the archaeology is important enough to warrant it. If, however, one is relevant to you then the possibility of providing

good systems to the excavator should be considered, rather than waiting for the assortment of overfilled butter cartons, tobacco tins and chocolate boxes that may occur. All too often though the expenditure of museum funds at this point will be wasted as the excavator is often likely to store finds in his or her garage or outhouse for years, frequently with disastrous effect. Recent accessions of very important sites at Gloucester have included finds stored in old paint tins, boxes containing tumbles of sherds and neat mouse nests made from the bags in which those sherds had been packed, and in one particularly gruesome instance a mummified rat that had died in one of the boxes (an interesting health and safety problem).

Assuming that we are all receiving miscellaneous assemblages of material as described above, how could we arrange them to create a usable whole?

(i) **By Site?**
This is, essentially the way that excavated finds and documentation usually arrive ("here's my Blodgett's Tump long barrow material"). It has the merit of being the nearest to an ideal grouping for the "re-excavation" of a site, but this is not a common occurrence probably because of the frustration caused by trying to interpret usually inadequate records. It is, however, poor for artefact - or period-based studies, and not good for the creation of ideal storage systems based on environmental conditions and the needs of the material.

(ii) **By Chronology?**
This may seem to be ideal for period-based studies, but it presupposes that, for example, the excavator's team or the curator have either identified the periods correctly or that further studies will not alter our dating. For that reason and others, it is poor for many artefact studies. In most instances it is inadequate for site studies where even a simple site will have intrusive material from several periods. It may be reasonable for some typological studies (e.g. collared urns or samian ware) but this presupposes that we always correctly identify our material. Neither is this very good for idealised storage systems, using racks and units designed and in suitable environments for the material. The chronological approach is nonetheless worthy of consideration.

(iii) **By Donor?**
There is a case to be argued for ordering collections according to donors, particularly where there are a number of significant excavators involved, but on the whole this is not suitable for any other angle of enquiry. A card-index or computer based information retrieval system is far more sensible for personality cults.

(iv) **By Material?**
Storage by material type is undoubtedly the best format for the specimens themselves. Lead can be kept in steel drawers, iron in silica gel beds, wood in the correct environment, etc. Storage systems appropriate to the material and its usual scale may be developed in the best locations. Ordering by material alone however will not assist with queries on period, site or typological themes, except in rare circumstances.

(v) **By Artefact Type?**
Assuming that all artefacts are in a recognisable state this would seem to be quite good, although it clearly will not normally assist us to find items from a particular period or site or material.

We can see from this that there is no ideal system based on a single factor. We must therefore look for a balance of material needs against user needs.

We should therefore seek to establish why we are arranging the stores. There are basically three types of user for whom we must cater:

(a) Staff, and in particular those members of staff who are regularly working with the archive.

(b) Specialists who may be making enquiries based on typology (brooches), chronology (neolithic finds), typology and chronology (Roman brooches), geography (such and such a parish) or material (worked bone). Indeed, more complex enquiries may occur (worked neolithic bone from Burton-in-the-Bog).

(c) Educational/interpretation enquirers, who may bear similarities to group (b) users or may be group (a) users.
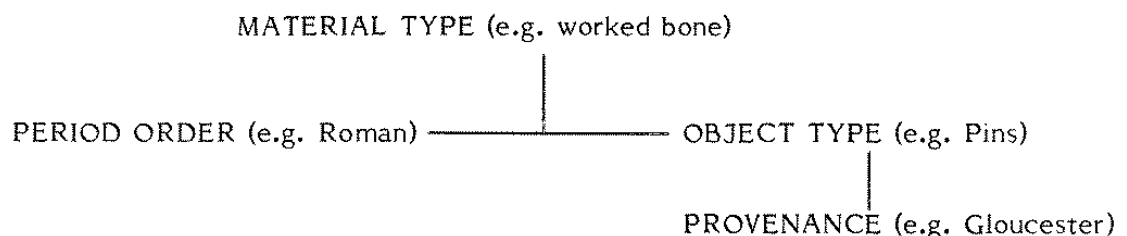
Of these groups the staff are the most important.

Whatever systems are adopted the staff must understand them and be able to use them simply. We are the interface between all other users and the collections. Sadly, most systems have developed without any design concept. They are thus often illogical, and to use a jargon term they are not user-friendly. Very often our own knowledge of the collections becomes the key to their use - and this is a dangerous situation. In order to progress we must design for the future.One significant factor to bear in mind is that our collections, unlike those of any other discipline, have the facility to be graded, and therefore we can think in terms of graded stores. On the one hand we have material that is special by virtue of either value, fragility, stealability, or its regular use; in this category also rests the documentation of the collection. On the other hand are the bulky, quantity items or those seldom used such as skeletal collections or specialist collections of pottery or worked stone. There may be common ground in the middle (as for example finely sculptured Anglo-Saxon stone) but on the whole a division of stores is possible between those requiring considerable environmental and security controls and those which require less. Prime areas may be kept for the first grade, while the second grade can survive quite happily in stores away from your main building.

The key to good use of stores is to some extent the ability to move items without difficulty. To that end we should seek to standardise our systems as far as possible, at least within an institution. There is a case to be argued for us to attempt to do it over a wider area however. If all museums used the same box sizes, cabinets, racks, pallets and plan chests, we could organise a consortium for purchasing at special rates and apply pressure on excavators to use similar modular systems. To paraphrase Donne "No museum is an island".

Fig. 2 suggests an approach to System Design. Central is the artefact or record with the ways in which it may be categorised around it. These categories may also be linked by strong or weak connections, while materials may require simple or complex storage.

From the figure we see clearly that no system is totally foolproof, but a workable one would be as follows:

MATERIAL TYPE (e.g. worked bone)

PERIOD ORDER (e.g. Roman) ———————— OBJECT TYPE (e.g. Pins)

PROVENANCE (e.g. Gloucester)

Individual categories could be further subdivided if required (e.g. specific sites in Gloucester). The system then acts as a material index, and to a lesser extent an index for the other categories - an enquirer asking for bone Roman pins from Kingsholm, Gloucester, can be rapidly serviced. Back-up indexes on cards or Back-up indexes on cards or computer can be used as well, if desired. The major advantage with this system is that it provides for storage to suit the material; racks

or cupboards as appropriate and in the best environments. It has the drawbacks of being inefficient where only one of a particular category exists in the collection, but even that may be dealt with under "miscellaneous" or using back-up indexes. An alternative system might be to arrange in Period, then Material and Type, and finally Provenance order, but this is less reliable as so much is of doubtful date. Significantly, it means separating objects from a single site, but except in rare circumstances this is likely to prove less inconvenient than attempting to order a collection by provenance. Most enquiries are based on categories of material rather than on particular sites.

We are left with an eight-point plan to help us design for the future:

1. **WHAT AM I LIKELY TO COLLECT?** (e.g. do not plan huge stores if you are not a major archaeological centre).

2. **WHAT SPECIAL CONDITIONS MIGHT I REQUIRE?** (e.g. are you likely to be dealing with waterlogged material regularly?)

3. **WHAT USE IS THE MATERIAL?** (e.g. can you afford to store it in less accessible stores if it is to be consulted only once a decade?)

4. **WHAT SYSTEMS BEST SUIT MY MATERIAL?** (e.g. palletised storage is unlikely to be much use where the collection is small scale)

5. **HOW USER-FRIENDLY IS MY SYSTEM?** (e.g. can you answer enquiries quickly and easily?) Linked with ..

6. **WHAT CROSS-REFERENCES INDEXES ARE REQUIRED?**

7. **CAN I AND MY SUCCESSORS AFFORD THE SYSTEM?**   (e.g. if you do not have resources to adequately control environments if necessary, is your museum the right place for the material?)

8. **WILL MY SYSTEM STILL WORK IN 10, 20, 30 YEARS?**   (e.g. will you still be able to get non-standard boxes etc.? If not, think again).

FINALLY
‾‾‾‾‾‾‾

<div align="center">

THINK AHEAD

THINK WHY

THINK WHAT IS BEST

DO
‾‾

</div>

CATEGORIES

(a) Metalwork - Precious

- Non-Ferrous - copper alloys - lead alloys

- Ferrous

(b) Ceramic - Fragmentary

- Complete or semi-complete

(c) Stone - Small artifacts - axes, arrowheads etc.

- Sculptures + architectural fragments

- Larger artifacts - querns, etc.

- Samples?

(d) Bone - Artifacts

- Human skeletal

- Animal skeletal

(e) Wood - Artifacts

- Structural

(f) Other organic - Leather

- Cloth

- Rope, etc.

(g) Contextual - Kilns, wharves, wells, etc.

(h) Environmental - Soil samples

- Other samples - snails, grasses, seeds, etc.

(i) Numismatic - Coins, tokens, etc.

(j) Documentary - Note-books

- Plans, drawings, etc.

- Photographic

(k) Other - (there must be)!

Any or all of these might arrive as part of a single accession, and may be grouped in several different ways before they come in.
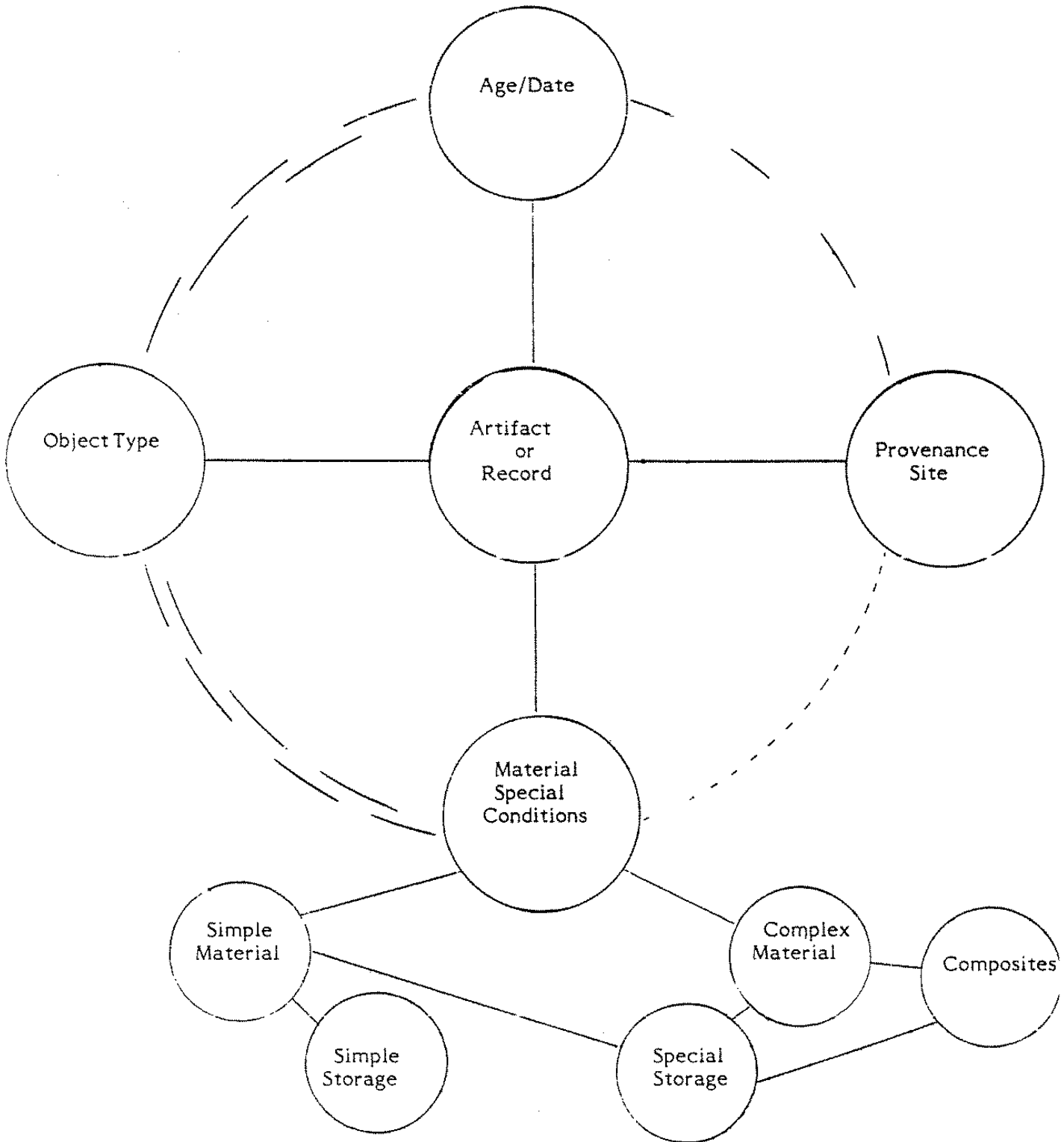
Fig. 1

Fig. 2

Housing the Photographic Archive - Dust to Dust - not necessarily!

Brian Tremain

As a photographer I am concerned with what happens to my negatives once they are printed, for having spent much time and expertise in producing them to have them deteriorate through poor storage is unthinkable. This of course goes for all negatives in my care.

By 1981 it was becoming clear that something should be done regarding the care and storage of photographic negatives and prints. To identify the problem a little more clearly, Gordon Audio Visual and the National Maritime Museum held a seminar at Greenwich entitled "The Photographic Image at Risk" and as a result of that Seminar a committee was formed.

The P.I.A.R. committee decided the best and probably the only way it was able to do anything would be to prepare a pamphlet which would outline some of the 'pros' and 'cons' of photographic image retention. This it did mainly by the efforts of the only chemist on the committee, Tom Collings, and following a little publicity has sent out over a hundred copies to enquirers who are concerned how they should look after the collections of photographs and negatives entrusted to them.

To proceed, I could do no better than to read from our pamphlet.

Introduction

The preservation of most historical objects always presents the conservator with a range of problems which must, at the least, be partially solved in order to achieve that end. Photographic materials, whilst conforming to this general statement, present many problems which do not occur with other historical objects.

Whilst appearing initially to be simple objects, photographs are all extremely complex. The range of materials on which a photographic image can be supported will include paper, glass, ceramic, wood, plastics, metal and even leather: the emulsions can include gelatine, albumen and cellulose nitrate. The image itself can be extremely varied. Whilst most images are based on silver, the forms in which that silver image can be produced vary considerably. These varying forms almost all present the image silver in a filamentary state, a state which has an enormous surface area per unit volume, a state which presents most of the silver for chemical attack at any one instance. As silver is so very sensitive to a whole range of pollutants, it is particularly vulnerable to chemical degradation. In fact, the silver photographic image must be one of the most chemically sensitive image forms that exists. Furthermore, none of the dyestuffs used for the production of modern colour images is archivally stable, most being very easily bleached by light, some fading even in dark. As if the situation were not complex already, there is, superimposed on all the above, the variables associated with the types of processing which have been carried out, the efficiency of those processes and any chemical after treatments e.g. toning. It follows, therefore, that any would-be conservator of photographic materials must have an overall experience in many areas of conservation and of the chemical factors involved.

Classification

Photographs in any collection can usually be allocated into one or two categories. The first contains those photographs which are important by virtue only of the record of the event they display, the other contains those which are of real intrinsic value themselves. It is essential that, when examining a collection, a decision be made with each photograph or group of photographs into which category

it fits because this will define the type of treatment required. If the photographic record is of the prime importance then a good archivally stable copy of that record will prolong usefully the relevant information; if the photograph itself is of value then its preservation is a much more complex problem.

Factors Affecting Permanence

When considering the factors which relate to the permanence of photographic materials, two main categories emerge:

1. internal factors, i.e. inherent properties of the individual materials themselves, their interaction and those relating to the chemical factors from their manufacture and processing.

2. external factors, i.e. temperature, relative humidity, pollutants, light, mould, insect attack and handling.

Most of the internal factors relating to the individual materials and their conservation together with photographic processing techniques, are covered in current literature, but the external factors are less well established.

Temperature and Relative Humidity

Temperature and relative humidity are so closely related that it would be unwise to separate them. When the wide range of materials which are encountered is considered and the combinations in which they occur, it is little wonder that recommendations for archivally safe storage temperatures and relative humidities vary so much in the literature. However, if it is realised that in almost every case some form of compromise has to be established, perhaps this apparent variation is not so confusing. In general, the lower the temperature the slower the rate of the chemical reactions which produce degradation. However, in practice, the choice of temperature must relate to the practical problems associated with preconditioning for and retrieval from low temperature storage.

For most prints on paper, albums and cased photographs a stable relative humidity of between 40 and 50% is thought to be most suitable, whilst for acetate base film between 15 and 30% and polyester base film between 25 and 30%. Temperatures for non-colour material should be stable and lie between 10 and 15°C but lower temperatures are recommended for colour 0-5°C. However such temperatures for colour material may not be possible to achieve in practice. Non-archival conditions which will extend the useful life of colour photographs at a constant storage temperature of between 8 and 12°C and a constant relative humidity between 30 and 45%.

Pollutants

Pollutants can originate from many sources, some atmospheric, others by contamination from adjacent materials. Known pollutants will include sulphur dioxide and hydrogen sulphide from the burning of fossil fuel, the latter also as a by-product under acidic conditions in paper and board of chemical processing, ammonia from dye-line copiers, ozone from electrostatic copiers, oxides of nitrogen from car exhausts, formaldehyde from some plastics and peroxides from some resins, paints and bleached wood. Whilst the safe level of these pollutants has yet to be established for photographic material, it must be accepted that such levels would be so low that in all practical cases they should be undetectable.

Pollutants from adjacent materials, which are in intimate contact for long periods create further problems. Mounting boards containing mechanical wood (ground wood) have been used since the 1870s. These boards become acidic and brittle and must present one of the major conservation problems when the large

numbers of such badly mounted paper prints are considered. Whilst the removal of non-albumen prints from old mounts is fairly straightforward, though very time-consuming, albumen prints present additional problems because of the special sensitivity of the emulsion to water. Furthermore, residual chemicals in storage materials can cause problems. One major source is associated with residual reducible sulphur as a contaminant from the chemical processing of papermaking pulp. This contaminant becomes chemically active only at a pH below 5.5. However, the 'acid free' paper and board does not guarantee its absence. An 'acid free' material may well have a pH between 6 and 8 but that value maybe the natural one of the material or may have been achieved by the addition of compensating chemicals to an already existing "soup" of residual processing chemicals. Because of the acidic environment in which we exist, maintenance of a pH above 5.5 may not be possible archivally so that as the pH drops the residual reducible sulphur becomes activated. Further it has been found that dyestuffs in certain coloured museum mounting board contain reducible sulphur and hence will create deterioration of silver images. It follows, therefore, that deacidification leaving behind an alkaline buffer and the use of buffered papers and boards above this level will cause problems.

Light

Light of any intensity has the ability to stimulate many forms of degradation and whilst it is generally accepted that for most works of art on paper a value below 50 lux is 'safe' for display, this does not necessarily apply to all photographs. The quality of the light is also important. Ultra violet radiation has the most energy and hence will be the most damaging; the high sensitivity of photographic images demands its absence. Choice of suitable light sources for display can ensure its absence and there are available a number of ultra-violet filtering plastics which will reduce the ultra violet level to an undetectable one when measured by the usual metering equipment if the initial level is not too high. The heating effects of light also must not be overlooked. Tungsten filament spot lamps will require heat filters. A rise to temperature of more than 1°C per 10 hours is regarded as unacceptable. It is worth realising also that such heat absorption will not be uniform, the darker areas absorbing more light energy and hence becoming hotter. This causes a temperature variation within the object and the associated internal physical strains. Colour materials present additional problems. Apart from the light absorption of the darker parts of a transparency on projection and corresponding rise in temperature, producing stress affects on the film, some have been found to face perceptably after an exposure of only 20 minutes to the projector lamp. It follows, therefore, that to prolong the useful life of colour transparencies, projection of the original must be avoided.

Mould Attack

Almost any organic material if stored above a relative humidity of 65% will be in a condition which will sustain mould growth, similarly below 65% no growth can occur. There has not been adequate research carried out yet to be able to recommend an archivally safe fungicide but it must be questioned whether it is necessary. If damp, mouldy materials are first dried gently, the surface dry mould lightly brushed off, (care being taken not to inhale the mould debris) and then stored at a relative humidity safely below 65% the remaining mould spores will lie dormant and in time die and no reinfestation from the atmosphere will occur. There can be few circumstances where fungicides are satisfactory substitutes for correct storage conditions.

Handling

When any material is handled there is a degree of physical damage, additionally there is a transfer of chemicals from the skin to the object. With photographs the need for very careful handling and protection from mis-handling is essential. Transfer of sulphides from the skin to the image can cause deterioration. The procedure introduced by the Royal Photographic Society of those handling photographs wearing white cotton gloves has much to recommend it.

Specifications for Storage and Display Materials

There are a number of specifications and evaluation tests, recommended for materials to be used in the storage, display and repair of photographs, but as more becomes known, these specifications need updating. The following represents the current views on the necessary basic requirements.

1. The pH of materials should be between 6.0 and 8.0

2. All paper on board should be free from mechanical wood (ground wood).

3. All materials should have an undetectable reducible sulphur content and hence pass a silver-tarnish test.

4. Materials should be free from both oxidising and reducing agents, e.g. peroxides and formaldehyde.

5. Plastics should be free from halogenated compounds, e.g. P.V.C., and from plasticisers or surface coatings which may migrate into photograph.

6. Any technique using adhesives should be reversible simply without damage to any part of the photograph.

The detection of peroxides and formaldehyde in some plastics, resins, paints and bleached wood at the required level of sensitivity is not possible at present. The only practical solution, therefore is to use only materials in which their absence is ensured by the very nature and mode of manufacture. Any storage system must take into consideration the nature of the object being stored and the retrieval procedure. With photographic material the nature of the objects will be wide and hence no one storage system will suit all. There are many materials available for photographic use, some designed with preservation in mind, many without.

Now in conclusion I could do no better than reiterate the main areas of concern.

1. Identify the problem - safe, easy storage with good access

2. Protect against damp, heat and abrasion

3. Assess usage; - archive only - occasional use - regular use

4. Enclosures for each type of usage; - Water soluble PVA Glue-neutral Ph. non-tarnishing, not too hygroscopic, non abrasive

5. Storage systems - cardboard box, wooden box, plastic box, metal box, archive box.

   Open shelf, wooden cupboard, metal cupboard, filing drawers.

6. Recording - number negative itself - card or Book index-computer

7. Information recorded. Negative no., Acquisition/find no., subject description/ title, type of object, date of find etc., Photographer, date of entry, date printed, cross references, additional remarks

8. Assure archival processing.

(Many points were illustrated with slides. In particular illustration was given of faults in storage which was too dense, and the effects of dampness on gelatine emulsions.)

The Storage of Paper Archives

Heather Broughton

The archivist concerns himself with the preservation of all forms of the written word; 'documents' which record the events, transactions and administrations of individuals, corporations, businesses, organisations and other bodies. These 'documents' may be parchment membranes, punched tape, magnetic tape, photographic negatives and prints, cinefilm, microfilm or microfiche; or they may be paper in the form of single leaves, maps, plans, working drawings, volumes, files, rolls, or punched cards. It is this latter category, the paper archive, in which the archivist's knowledge is the most beneficial to the archaeologist.

Like the archive of a particular family, business, estate or other administration, the archive of an individual archaeological excavation is unique and cannot be repeated. Whilst accepting, as an archivist, that what is of primary importance to me - the archive - is of secondary importance, after the artifact, to the archaeologist, it is essential to recognise that the site archive is a primary record. Is it not unreasonable, therefore, to suggest that the descriptive notes, drawings, diaries, correspondence, card indexes and matrix sheets from a site be treated in the same way as their parallels and contemporaries in an archive or record office?

Both the archaeologist and the archivist have had to cope recently with a tremendous increase of interest by the public, and the generation of far greater data in volume and range of document, in these aspects of local history. This makes it essential to have our archives accessioned, sub-numbered, located and readily accessible for reference and study by staff and public alike. Anyone responsible for the management of an archive realises, however, that it is futile to operate these functions without provision for proper physical preservation and storage of the archive in the first place.

The first stage in identifying the problems of paper archive storage is to investigate the nature of the materials used and the agents of their destruction. It is important to realise that one of the main threats to paper comes from within the paper itself. Hand made 'linen and rag' papers of the eighteenth and early nineteenth centuries present a negligible conservation problem because of the purity of the manufacturing process and the lack of chemical ingredients. Both the archaeologist and archivist face a very great problem, however, with the twentieth century machine made papers, in which the chemical composition (and therefore the acidic and corrosive element) outweighs the woodpulp content. Particularly vulnerable is the machine made paper of the early twentieth century, which, subjected to the sulphur dioxide fumes from the oil and grease of the gas lamp, gradually became a breeding ground for the corrosive effects of sulphuric acid. Generally the cheaper, poor quality papers have the higher chemical composition and a higher acid content (paper should have a ph value of 6.5 to 8.5 - cheaper paper usually has an acid content below the recommended ph 5.5) and this is where the main problem lies, because this is exactly the sort of paper used for site notes, drawings, diaries and note books. An eminent archivist made a valid point when he said

> 'an essential measure in the protection of future archives should be to ensure
> that the documents of the greatest potential historical value are drawn up on
> good quality paper.' (Duchein, 1977)

Having recognised that the paper archive and the ink writing on it has self-destructing elements within it, one must then identify the agents of destruction, the outside influences which will ultimately destroy the historical records, and how each can be controlled.

Humidity

An environment which has a damp or a dry atmosphere, or which suffers fluctuations in humidity levels, will induce mould growth or a 'drying out' and brittleness in the documents. A relative humidity of 55%-65% is recommended as a suitable level to maintain; humidification and dehumidification equipment being used to control, increase or decrease the level of relative humidity.

Temperature

A high temperature, coupled with a high humidity, can activate mould spores in a very short space of time; a high temperature, coupled with low humidity, makes paper brittle. A constant temperature between 13°C and 18°C is recommended.

Atmospheric Pollution

The air contains injurious chemicals which have an acidic effect on the paper. Naturally pollution is greater in industrial regions and populated areas (where many of our archive repositories and museums are situated). Air filters, fitted to the storage areas, eliminate 95% of dust particles in the atmosphere - failing a filtration system closed boxes with well fitting lids do suffice.

Atmospheric Stagnation

Good ventilation is essential to provide the circulation of air around documents and to prevent mould growth. Air-conditioning is the most efficient solution - 'finger' holes in the storage boxes will also help whilst minimising the contact of paper with harmful pollutants.

Animal and Insect Pests

Seen and unseen, certain creatures are happy to nibble away at the bindings and papers of documents whatever the climatic conditions. The only way to be sure that a document is pest-free is to fumigate it, and any accompanying papers, in a special fumigation chamber with thymol crystals before placing the infested document with its pest-free counterparts in the storage area.

Sunlight

Exposure of documents to the ultra-violet in the sun's rays, even on a dull day, is harmful both to the paper and the ink. To minimise this exposure documents must be stored in special archive boxes with well-fitting lids and produced for consultation in an area away from direct sunlight. Special provisions for the exhibition of archival documents are to be found in British Standard 5454.

Human Contact

Misplacement, theft, wilful damage and most of all, general handling are serious enemies to the documents' preservation. All that can be done to control this is to ensure that all documents are stored in the best possible way, providing the best protection for the document, the simplest means of production for use and supervision of the document if being consulted by the public.

Packing and storing the archives must be done with utensils of archive quality. Loose documents should be inspected for metal staples and paper clips, which must be removed in favour of brass paper clips. Once numbered the loose sheets are stored flat in folders of acid-free manilla before placing in storage boxes. These boxes must be designed to fit the documents, strong enough to withstand handling and the weight of the documents they contain, easy to handle and be constructed

of materials which have no chemical effect on the documents. For outsize documents, maps, plans and working drawings, the melinex folder, made-to-measure of a thin perspex material, has the advantage of providing protection and avoids handling the original. Portfolios are useful for the large, heavy bundles or collections of drawings which need to be kept together but are too heavy for the melinex folder. Finally the cylindrical roll or map box, again constructed of acid-free materials, is a useful protector of rolled documents.

Whereas shelving for boxes presents no problems, outsize documents, even in folders, portfolios and map boxes can cause a major headache to their custodian. Horizontal storage of maps, plans and the like is the best prevention against strain and distortion, but presents practical problems in removal and replacement of those plans at the bottom of the drawer. Vertical storage makes the documents more accessible, but can put a severe strain on them, if provision is not made to support the weight. Any volumes whose size or binding strength prohibits their sitting open on the shelves must be boxed until provision can be made for their repair.

In a large archive operation such as a local authority record office, the building housing the archives must conform to British Standards. It is worthwhile, however, for even those who are custodians of small archives to read this paper (British Standards Institution, 1977) and to appreciate the provisions for load distribution, drainage, fire resistance, air conditioning, lighting, security, fire precautions, floors, doors and the regular maintenance of plant and control and observation of temperature, humidity and ventilation.

Finally, an important point must be made about document repair. More damage is done to documents by unskilled repair work (sellotape, 'elastoplast' bindings, unsuitable adhesives) and by the use of inferior quality material (backings of poor quality board) than by any other outside force. The techniques of paper document repair, deacidification, lamination and binding should be applied to those primary site records in danger of becoming unusable because of their condition and before the information contained in this archive is lost forever. The archive conservator employed by the local record office is always pleased to offer advice on correct repair and may be the only professional equipped to undertake the work in the county. Likewise, I know that my fellow archivists throughout the country are pleased to be consulted on storage problems and to provide information on suppliers, materials and equipment.

References

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                                     Society of Archivists Conservation Group

The Scholarly Use Of Excavation Archives

Alan McWhirr

The choice of the above title by the organisers of the conference, seems to imply that they believe scholars, however they may be defined, have different needs from other users of an excavation archive. Does it therefore follow that there will be people using these archives for non-scholarly uses? It seems most unlikely to me that many people, whether they be scholars or not, will in fact make extensive use of the archive. Some specialists will require print-outs of a particular report but will rarely have to visit the archive in person. The most frequent user is likely to be a future archaeologist working in a previously excavated area or site. The extent to which an archive will be consulted will depend upon the nature of the pubished report; if the excavations have not been published then the archive assumes greater importance. If fiche is used to any great extent in a published report to provide detailed specialist reports or plans of some of the finer points of an excavation, then very few people will need to consult the archive, for they will have the bulk of the evidence on film or as a print-out. This introduction of fiche has enabled a number of excavators to include more level III material in the published report than would have been possible with conventional publishing methods.

The future use of excavation archives will, therefore, depend to a great extent on how excavations are to be published. The DoE made their position clear in Advisory Note 25 issued in 1980 where they "strongly recommended that detailed evidence should be presented on microfiche...." The DoE's position was further consolidated in Advisory Note 40 by the acceptance of the report of the joint working party of the CBA and DoE (Cunliffe, 1983). The CBA's decision to reopen discussion on the matter is, however, unlikely to influence thinking in Fortress House. The Historic Buildings and Monuments Commission (HBMC) has accepted the guidelines laid down by DoE and continues to cite Advisory Note 25 (Department of the Environment, 1980) as policy.

The dilemma which confronts scholars faced with the increasing number of excavation reports now appearing has been eloquently stated by Professor L. Alcock in a paper which is not, perhaps, as well known as it should be (Alcock, 1977-8). Alcock states that the problem is not so much the expense of pubication, but the time it takes for readers to wade through these new publications. He writes:

> "What is at issue here is readers' time; the time of the interested; but more especially of those professionals who have to use the results of excavation to produce syntheses, whether for museum exhibition, teaching in higher and secondary education, or exposition to that wider public who provide the social justification and motive for the spending of public money on archaeology. As the number of excavations increases, and as the expected length, detail and complexity of excavation reports grow exponentially, so does it become inevitable that archaeologists must read a decreasing fraction of the field; and that increasingly uncritically. The day has long gone when the leisurely and cricital reading of half-a-dozen major excavation reports, and perhaps fifty minor ones, could provide the basis for a wholly satisfctory account of the English Iron Age. Yet, if excavation is to have any intellectual meaning, if it is to be anything more than a fun-pursuit, then the creation of syntheses must keep pace with field work and excavation."

If one accepts the premise that it is the reader who should be given prime consideration when deciding how to publish an excavation then Alcock suggests that for most purposes all that is needed "... is a summary account of major structures,

most characteristic finds, and outline site history; with just enough presentation of the basic evidence to demonstrate how the main stratigraphical sequence is established, and with the excavator's preferred solutions..." (Alcock 1977-8, 4).

Alcock's summary report is a 'distillation of a primary report', the primary report being the "fullest possible description, analysis, discussion and illustration of the excavation evidence, structures, stratification, finds, environmental data, etc." (Alcock 1977-8, 4). The primary report would form the backbone of the archive and should be capable of being readily copied or made available as fiche, floppy disk, printout etc. It is interesting to note that in the first Advisory Note to emanate from HBMC entitled **Reports on Excavation Completed before 31st December 1972** we find in section 5 the phrase 'complete archive' explained as 'finds, site records, photographs, drawings and draft report'. Alcock's primary report would seem to be what HBMC are here calling a draft report; both, however, stress its importance.

Scholars, it is being suggested, will only have time to read the broadest outlines of an excavation, that is Alcock's summary report. If further details are required it should be possible to find them in the archive. Whether scholars will have the time to go further and consult the archive in person when so many will be scattered around the country is doubtful, but if they are made available through the post this might answer some of the criticisms. The size of an archive could be considerable, with hundreds of site drawings, photographs and slides and not every scholarly enquiry will want, for example, a complete set of photographs. An efficient archive must therefore contain a full and detailed index so that accurate choices can be made. To help the user several well-placed depositories of excavation archives would be an advantage, for one single collection in London would not serve the best interests of scholars scattered around the British Isles.

At present the use to which excavation archives will be put is difficult to gauge. Clearly the primary or draft report is likely to be the most frequently requested part of the archive, but it may turn out that in order to assess the quality of an excavation future archaeologists may find the photographic collection vital. There may be conflicts between long-term storage requirements of the archive and accessibility to the user. Interactive video systems for storing photographs and slides have a great deal of potential, especially when linked to a microcomputer which can select images quickly, but these systems are expensive and may not last long enough to be a worthwhile proposition.

To encourage the use of the excavation archive it must be 'user friendly' and archaeological units and museums will have a duty to ensure that details are readily available to any enquirer, scholar or not. It should also be remembered that quite a number of users are likely to be based overseas, but will still need the same sort of facilities required by those of us based in this country.

References

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Department of the Environment, 1980; **Advisory Note to Grant-Aided Units, Publication Grants,** Advisory Note 25

Archiving The Heritage

Jennifer Stewart

The two main aspects to be considered under this heading are:

- the long-term environmental storage requirements of computerised records created by the excavation team including for example, computer stationery (print-out), 'floppy disks', magnetic tape, cassettes, including microcassettes, and COMfiche (fiche from computerised records);

- consideration of whether museums should in fact be storing computerised media at all.

This article is based on research work carried out for the Archaeology Group of the UK Institute of Conservation. In November 1981, it drew up interim guidelines on the environmental standards for the permanent storage of excavated material from archaeological sites in the UK. The document dealt with traditional finds, not with records, photographs etc. or computerised records and optical data disks. Paper and photographic records and their storage have already been admirably described by Brian Tremain and Heather Broughton, so here consideration will be given to computerised media and optical data disks.

The first and obvious point to make is that, being products of new technologies, computerised media have just not been around long enough for us to build up the mass of information, the inherited knowledge, and experience on which to base guidelines. Brian Tremain noted that photographic conservation was still in its infancy, by that token, computerised record conservation has not yet been born. Another problem is that to give guidelines on how to store this media in the long term, one either requires to carry out clinical tests, observing and monitoring items over a long term and noting their chemical and physical changes, or else to speed up the process by 'ageing tests' as happens with paper products. Even if there were organisations to carry out these expensive and time-consuming tests, there is, as far as I know, no agreement on how to operate them.

The main horrifying conclusion one comes to after reading the available literature is that no computerised media except COMfiche can be considered to be of archival quality and capable of longterm storage. Magnetic discs, for example, hard discs, disc packs and 'floppy' disks are not an archivally stable medium because these are easy to erase, or degrade the information; or have mechanical problems with the reading equipment. The life of a 'floppy' disk can be seen to be from one to five years depending on the use to which it is subjected during its recording life; each time it is used its potential life-span is reduced (manufacturers make varying claims on longevity). Magnetic tape, including cassette based records: here manufacturers recommend that users make security copies of information, for example on 'floppy' disks, onto magnetic tape. It is now possible to purchase magnetic tape units for microcomputer systems, so as a matter of course all 'floppy' disk information can be transferred at set intervals onto magnetic tape with the added advantage of being relatively cheap and forming high-density storage. However in the long-term, magnetic tape is not an archivally stable medium. There are no standards to cover archival testing of the material and there is also a wide range of factors which affect its longevity such as pre-use history, packing density, use and storage conditions, and very real problems can be generated by physical damage from bad handling, and adverse environmental conditions, all of which degrade the information stored on the magnetic medium. In addition, complex maintenance is required, including rewinding for re-tensioning and periodic recopying which needs specific machinery (Hendley, 1983). So it must be emphasized that magnetic media of whatever type are of ephemeral quality and cannot be considered 'archival'. If one receives in magnetic media from a unit, then one should consider depositing them with a local university or local authority computing centre which has the facilities to store, clean, and

recopy as necessary and may be able to provide the optimum air-conditioned environment. If there is no other local agency to undertake this storage, the recommended storage of the above media is at a maximum temperature of 21°C, maximum relative humidity of 40% and in dust-free storage, on painted wooden or plastic shelving (not steel shelving), away from electrical fields, such as electric motors and storage heaters.

In comparison, COMfiche can be viewed as ideal archival storage media due to its high density storing of both images and text, its compactness, cheapness in generating both masters and copy versions, with the added advantage of accepted standards for formats, reduction, and processing unlike any of the other media mentioned so far. If one can specify, obtain masters of silver halide and generate 'use' copies of diazo or vesicular film which can be stored separately from the masters. Masters should be processed according to the standards in BS 1153 (British Standards Institution, 1975). Masters should not be used for viewing, only to generate use copies. Both use and master copies should be kept in the dark, at 10-16°C, at 30-40% relative humidity. 'Use' copies can be kept in individual acid-free enclosures, and stored vertically in filing cabinets. Ensure that no rubber bands, metal clips or staples are used with either 'use' copies or masters. Check 'use' copies every two years for scratches and regenerate as necessary.

Optical data disks such as videodisks are likely to be the high density record storage of the future although at the moment most units and museums will not be able to afford the high origination costs involved.

The receipt of computerised records and especially their absorption into the museum's existing documentation system, can be problematical. How should a museum deal with computerised records of a site for example, on 'floppy' disks which are of little immediate benefit for collections management, as may happen with statistical records? The choices here may be either to transfer the records to a suitable centre with proper facilities and to note the new location of these records in the museum documentation for the site (perhaps also receiving a copy of these records as printout or fiche for museum researchers) or alternatively if no centre is conveniently to hand, to keep the records in the museum, with printout or fiche copies for researchers. If however, the museum receives in records on a computerised medium which would be of assistance for collections management, such as finds catalogues, should the museum be able to utilise these records, even to the extent of editing in new information, for example re-identifications or new storage locations? (This assumes the museum has facilities to read/edit the computerised records either via compatible systems or reformatting facilities.) In any event, the museum should try to avoid duplicating the Unit's work when receiving in an archive, for example by re-numbering finds. Several museums now approach this problem by treating the whole archive (finds and records) as a single accession, recorded as such in the museum's accession register, which then leads into the excavator's records. As a minimum, the excavation records should consist of finds registers and basic listings of numbered bags, samples etc. These basic records can then be slotted into the museum's own inventory and location control systems. Once the archive is accepted, the museum is then accountable for it, as with all other donations. The location control systems include here noting the movement of items within the museum, and also loans out for external display. If the museum accepts finds with the proviso that they are boxed in suitable containers, it could equally suggest that the remainder of the archive, the records, be in a form which can be easily absorbed into the museum's own inventory and location control records (for example, basic listings of small finds, bags, samples, etc.) If however, the museum has no location control systems, then it should perhaps not be eligible for 'box grants' and the Area Museum Councils when assessing museums, should view a working inventory and location system as an equal priority to the other conservation and security standards which are already being applied.

References

British Standards Institution, 1975; **Recommendations on the processing and storage of silver-gelatine type microfilm. BS 1153**

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(BNB Research Fund Report no. 10)

To preserve the past is to safeguard the future

Ian Longworth

One of the most surprising features of the explosion in archaeological activity over the past twenty or so years has been the apparent failure of archaeologists to produce, or indeed even discuss, a code of practice for the selection or retention of those elements of the past which they were able to retrieve in the course of their excavations. The Director of an excavation, perhaps still cocooned within the omniscient mantle bestowed upon the breed by Wheeler, was seen as akin to the Master of a ship - all powerful. Received wisdom declared that the Director was the only person capable of making decisions. The words "in the field" were sometimes added, but not often. While the ship's captain wisely interposed a vessel between himself and the water to regulate his movements, the Excavation Director felt no such constraint - an ability to walk on water being taken for granted. Yet if the subsequent product of the excavation was not to reflect simply the idiosyncratic choice of each Director some accepted code or set of guidelines was clearly needed. Equally necessary was and still is an acceptance by museum personnel that the excavation product thus assembled is worthy of preservation in its entirety. Two years ago the British Museum invited a Working Party to look into the question of selection and retention of both environmental and artefactual material from excavations and its report was widely circulated. It is worth looking at one or two points in that report (British Museum, 1982) a little more closely.

Four principal reasons were put forward to justify permanent retention.

1) To enable present and future generations to see and examine in tangible form aspects of their common heritage.

2) To provide the opportunity to check and re-examine conclusions and judgements reached in the past.

3) To ensure as far as practicable that the needs of future research can be met.

4) To facilitate the teaching and understanding of archaeology and inter-related disciplines.

Of these the preservation of the heritage and the underpinning of the teaching and understanding of archaeology would in themselves require the retention of only a modest fraction of the material recovered from the field. The current fad persists in most museums of showing one where ten would be much more interesting, but more lavish displays could still be furnished by modest calls upon the total archive. The two remaining reasons advanced are, however, altogether different. To check and re-examine conclusions and judgements already made, in the present state of artefact studies, demands the retention of those artefacts, while the needs of future research take us into the realms of the barely perceptible. We can only ponder that if the range of research continues to expand at the rate we have seen over the past two decades then very little indeed can be excluded without prejudicing future lines of enquiry.

The proposals for selection and retention set out in the report were generally well received though the rather timorous views put forward for the limited retention of post-Medieval pottery stirred more than the imagination. The ensuing strident abuse indicated an urgent need for revision in that area. That apart the report appeared to most to offer a reasonable set of guidelines and as such was approved by the then Ancient Monuments Board for England. The report set out to offer guidance as much in the environmental field as in the strictly artefactual and though the need for selection in this area is self evident the arguments for preserving certain categories are equally telling; again not simply to offer   an

opportunity to re-check scientific results against the original evidence, but to provide raw material for use by scientists in the future who may well be then using approaches and techniques not yet envisaged. For some materials this will call for special storage conditions without which retention would be both pointless and impossible. Museums, which can claim with some justification a degree of permanence over other forms of institution, can offer a unique service in this sphere.

It is of course true that what we are trying to preserve has already undergone to varying degrees a process of selective winnowing. Even if the excavator follows a suggested code, the selection of areas to be examined already sets the process in motion. Recovery is also biased, as many case studies now document, by the individual digger's ability to see and recover certain forms of artefact and by the presence or absence and the degree and type of sieving operated. Decay is often the main selective process before excavation, but may also play a further role if stringent precautions are not taken during the often lengthy initial period of post-excavation processing. What remains, hopefully, is however what the excavation director considers to be the fraction recoverable and capable of preservation on a permanent basis.

The role of the excavator is thus fairly clearly defined but do museums see the end product in a different light? Should we be making our own value judgements? Should museums ape the private collector aiming to possess one of each, discarding the poorer example in favour of the better preserved or the pleasanter to look at? If the role of a particular museum is concerned solely with display then the answer might be yes, and this is a point I shall return to.

I belong to the school of thought which believes that the first and foremost role of the museum profession taken as a whole is to preserve the portable fraction of the past that is capable of recovery, and that such material is placed with museums in trust for the future. All other functions I see as secondary. What society perceives as the role of the museums at any one time has and will change, as fashions and social attitudes wax and wane. It is essential, however, to separate out the **response** to changing fashion from the **ability to respond.** Without the preservation of the primary data the ability to react to change can only be at best curtailed, at worst foregone. Not all museums can or should attempt, however, to be the repository for such material.

It might seem reasonable to suggest that the actual destination of any particular archaeological archive should be governed by two considerations and two considerations only - one legal, one professional. While the paper archive probably belongs to the body that paid for its production and the photographic archive might similarly belong, the artefactual component of the archive undoubtedly belongs to the owner of the land from whence it came. The ability of many archaeologists and indeed many museum colleagues to consider this of little consequence is a constant source of fascination. Legally, the owner of the land has the absolute right to retain or dispose of the finds as he wishes. The professional aspect should be governed by the ability of a museum to guarantee the preservation of the archive, its maintenance and the ability to make it freely available to those qualified to study it. Clearly in selecting the destination of an archive, we cannot go against the law and the rightful wishes of the owner. I suggest there is equally little justification for a museum to receive an archive if it is incapable of meeting the professional standards required for its upkeep. It is however a fact that archaeological material including major excavation archives is still being placed with such museums and it should be a matter of great concern to the Society of Museum Archaeologists that this is so.

The justification appears to be the concept that archaeological finds like serfs are inalienable from the lands from which they spring. The extreme form of the argument is, and I have heard it more than once, that it would be preferable to see

the finds disintegrate than that they should leave, depending upon the degree of parochialism being expounded, the village, the town, the city, the county or the country. Such sentiments simply bring the profession into disrepute and would quickly promote a much greater expansion of private ownership than we have at present with all the perils and uncertainties that that would produce. It would be well to remember that in many areas both rural and urban, land ownership is now increasingly in the hands of individuals and institutions remote from the locality and its emotional ties. Parochial attitudes of this type are more likely to provoke ridicule than sympathy.

If museum archaeologists are to establish an acceptable standing within their profession and if the preservation of the remains recoverable from the past is a primary aim then the excavation archive, assembled often at great expense must go to museums capable of ensuring its future. It is of course equally true that the proper upkeep and use of such an archive is itself a costly affair. For that very reason the limited resources which we have available should not be spread too thinly but consolidated into a relatively small number of regional and national museums whose function would be to offer the expensive but unglamorous service of providing facilities for future research. This in turn would mean an abandonment of the present dogma that all museums should attempt to be all things to all men. The very necessary role of the smaller museums in generating a local interest in and respect for the past would in no way be diminished, rather the reverse, since resources might then be better employed once the burden of the research collection was removed.

The argument will be put forward that to turn away an archive or to divert it to another institution would be an admission of failure and in any case unacceptable to the local ratepayers and their elected representatives. Museum archaeologists are not, however, the only professionals to be employed by local and national government and other professions are capable of maintaining the standards of their profession while in such employment. In this Society at least we can speak openly of such matters, and it is long overdue that we should do so.

I am of course well aware that in advocating a near total retention of the excavation product I am moving against the tide of feeling now apparent which argues that the rescue and preservation of everything in sight has gone way beyond credible limits. Ancient Monuments or listed buildings thus taken, are preserved at an arbitrary moment in their natural cycle of development or decay. Selective preservation, we are told, would here serve us well enough. I am certainly in some sympathy with such a view so why do I not advocate its application in the sphere of the product of archaeological excavation? Well, unless you are fortunate enough to be employing your own personal finances you should be wary of wasting assets. To have recovered information with great care and expense only to discard it must surely be something justified only by reasoned argument. To keep is cheaper than to replace and keep. But archaeological contexts are, as we are well aware, unique and in many areas of the subject we are still at the stage of discovering how very infrequent are the times when the so-called example can really be taken to typify the whole. Frequency and phasing studies and recent taphonomic research which though at present only in its infancy already shows signs of producing far-reaching effects upon the way we interpret sites, demand that we keep the whole not the part; the finds from all contexts not simply those that offer information most useful for the initial site report. If the site has been well recorded and processed, and who would dare to suggest otherwise, the prime future use of the archive will not be towards re-interpretation of that particular site but almost entirely towards the interpretation of other contexts and the aiding of other independent lines of study.

The argument that resources are not available to cope with such a policy of retention will only convince if the statement can be shown to be true on a nationwide not local level.If a particular museum cannot cope then it would be only reasonable to ascertain that others cannot provide the necessary facilities. The fact is that the amount of material recovered though large should be entirely manageable as long as resources are well applied. Surely the time has come for the portable fraction of our past to be treated with the same degree of respect and professional concern as the field monument and standing structures from which the majority derive.

Reference

British Museum, 1982; **Selection and Retention of Environmental and Artefactual Material from Excavations:** A Report by a Working Party of the British Museum

The Archaeological Records Of The National Monuments Record, England

F.A. Aberg

The National Monuments Record is part of the Royal Commission on Historical Monuments for England, and is paralleled by similar offices within the Royal Commissions for Wales and Scotland. It is a national archive for historic buildings and archaeology in each country, and in England is divided, like Caesar's Gaul, into three parts; the Architectural Record Section, the Aerial Photographic Section and the Archaeological Record Section. The last of these is my responsibility, but like the others it is charged with the duty of protection for the records appropriate to the subject; and its collections have been made as the result of field survey by the Royal Commissions' staff, by its function as a repository for the records of archaeological units, and its archive service to the amateur archaeological world, which has been such an important feature of British archaeology.

In practice the Archaeological Record Section has no statutory power to fall back on for its ability to collect archaeological records, although it performs its duties in much the same manner as the Public Record Office for state archives. The NMR maintains a record that is open to the public at set times of day, and has a staff to assist the enquirer in his search for knowledge. It is guided by a warrant and Commissioners appointed by the Crown in determining policy and priorities, and its records constitute the only central archive in English archaeology that embraces state, local authority and private research. Archives of national importance, particularly those that may be unpublished, are its particular concern, although in many cases they are copied to ensure their permanent preservation and accessibility and are not held as originals. Within these parameters there is no finite limit to the date range or form of the records collected, which generally can be categorised as photographs, original archives or copies.

The NMR photographic collection comprises over one million prints of buildings and sites, and those in the Archaeology Record Section represent some ten per cent of this total. The archaeological prints incorporate all photographs taken for Royal Commission purposes, and also those taken for the National Archaeological Record, formerly the Ordnance Survey Archaeology Index. The spread is therefore truly national, although there is inevitably better representation in some areas than others, and certain monuments, such as Stonehenge and Avebury, exhibit their special importance by the extensive range of photographs available. For both these important religious sites there are photographs showing the stone settings in the 1860's, and some of particular historic interest such as 'Druid's Day' at Stonehenge on August 24th, 1905, or the early efforts to re-erect the fallen stones at Stonehenge under the direction of Colonel Hawley in 1919-20. Excavations at Avebury by H.St George Grey and Alexander Keiller are also part of the photographic record, as well as investigations at other sites such as Windmill Hill, Wiltshire, also by Alexander Keiller. Early colour slides exist for some pre-World War II excavations such as Maiden Castle, Dorset and Little Woodbury, Wiltshire, and the original $2\frac{1}{4}$ inch slides, have been recopied as 35mm slides to ensure that the originals are used as little as possible. The question of conservation for its own and outside collections is obviously one of the NMR's duties, and is met by reprinting or copying to create new negatives when deterioration of the original is evident, due to excessive handling or deficient storage conditions.

The photographs and slides of the Society of Antiquaries of London are an example of these problems. The glass negatives include those for the research excavations funded by the Society, but there is no matching set of prints for the public to consult, and it will be some years before all become available. In 1984-85 some 1400 prints for Maiden Castle, Dorset, and 450 prints for Stanwick, North

Yorkshire, were added to the public archive. The other sites represented in this archive, such as Lydney, Gloucestershire, or Richborough, Kent, remain in the negative store waiting for their turn, which means that it will be late 1986 before every site is available unless one uses the unprinted negatives.

Where original archives and excavation records are involved the policy of the NMR is quite clear. It has always been held by the Commissioners that original records should be deposited with the excavation finds, although the Royal Commission will copy those records without charge, when copyright will remain with the owners, but it is expected that the copy made for the NMR should be available in the public archive for anyone to inspect.

Original excavation records have been accepted in some instances, if the record might be regarded as representative of the best research of its period, or when the site is of national importance. The archives of Dr. G. Bersu for Little Woodbury, and Mr. T.C.M. Brewster for Wetwang and Garton Slack are two such records in the Archaeology Record Section, and others are accepted from time to time. If records are being disposed of by public sale, the National Monuments Record can also purchase collections as deemed appropriate to prevent dispersal. The same policy applies to archives that are multi-county and national in the sense of indexes as research of more than one locality. Miss L. Chitty's records are the largest of this kind in the NMR, and incorporate some 60,000 index cards for stone and bronze implements, and 102 box files of correspondence, annotated offprints, and maps relating to the whole of England and parts of Europe.

The common method used at present in the NMR for copying text and drawings is microfilm, although the photocopier was previously used, and some records still remain in the latter format. The change was the result of a combination of factors, but not least were the problems of space and quantity from using photocopies, which required larger storage facilities, and produced even greater quantities of records to be retrieved than the originals, because of its single-sided method of duplication. When excavation records, or other archives are copied microfilm has equal flexiblity in accepting text or graphics, and the negative has an archival life of some 400 years when properly stored. Even copies of the negatives can be expected to last at least 50 years in the correct storage conditions.

Real microfilm has been used in the NMR to copy the records for Dr. C.A.R. Radford's excavations at Cricklade, and the archives of other sites, but it is being gradually superceded by microfiche for all types of archaeological records. The change began with the report of the Frere Committee, **Principles of Publication in Rescue Archaeology,** which drew the attention of many archaeologists to microfiche for the first time. The transparent sheet of film is a standard internationally recognised size A6 (105mm x 148mm), and was first extensively used in the 1960's, though it is only since 1974 and the Frere Report that it has become familiar, and only in the last five years that it has become a common adjunct of archaeological publication, as an enclosure inside the cover of a journal or report. Most frequently it contains 98 images of A4 pages arranged in 7 rows and 14 columns, but the 60 frame microfiche is not uncommon and other variations can be made to order. With the correct design of the heading that titles each fiche and planning of each microfiche operation, it is an inexpensive method of copying archives and it is simple and cheap to reproduce copies for the user. It is also easy to rearrange or copy sections of a record by units, without the expense of making a complete new reel, or the need to refilm the entire archive in the event of its reorganisation, and at present no other medium provides such a simple, cheap and flexible system to copy and make archaeological records available to a user of the NMR.

The Frere Committee recommended that the NMR should act as a national archive for excavation archives (Appendix II, vi.), and at present over 500 excavations have been microfiched as the basis of that collection. The Royal Commission has microfiched records free of charge to the owner, whether it be an

archaeological unit or a private researcher, and has returned a free copy of the microfiche with the original records. It has also expanded the resources of the NMR to provide microfilm readers and reader-printers for the public user, as envisaged by Professor Frere, so that the record can be inspected and copies provided as microfilm or in paper form on request. In practice it has proved possible to microcopy both large and small archives of any period, and to adopt a common ordering for retrieval to take account of the increasing variety of data recorded during excavation. The NMR provides guidance to any unit or organisation on this, and will also undertake a trial if there seems to be any special problem. The microfiche follows the order of context records, drawings, photographs, finds data, environmental records, etc., going on to include drafts of the report and correspondence if made available. An index to the archive is requested when possible, and agreement is necessary on the titling that is necessary, but given those preliminaries the administration is kept to the minimum. In normal circumstances the excavation archive for a site is filmed in one operation, but it is possible with microfiche to take selected groups that are ready, e.g. drawings, and to copy them separately, slotting the rest of the records in around the first group as they become available. The microfilming is usually done by the HMSO Reprographic Unit at Basildon, Essex, the records being transported by RCHM staff, or by the archaeological unit concerned. In the latter case the turn-around time for copying at Basildon is often 48 hours or less, but in the former the other commitments of RCHM staff have to be fitted in, and it may be four to six weeks between the collection of the records and their return. The excavation archives copied in this way include those for the York Archaeological Trust, the Oxford Archaeological Unit, Northampton City Council and many others, and the full list for these will appear in the RCHM Annual Review for 1985.

In outlining these methods it is idle to pretend that microfilm does everything. There are problems about copying photographs, since half-tone prints do not appear clearly on negative microfilm. Positive microfilm is an improvement, but it still poses difficulties over obtaining good quality prints from the microfilm image. If unit archives rely on 35mm contact prints, microcopying for the NMR will not provide a retrievable archive, and a catalogue has been provided in such cases as a substitute.

There are difficulties too about the many colour slides that form part of the excavation archives. These can be microfiched, but only at a cost of £60.00 per fiche, which is as expensive as copying the slide in 35mm format. The NMR has copied slides on colour fiche and made duplicate slides as part of the archives it holds, but has had to limit the operation because of cost. In the copying of the 1400 slides for the excavations at North Elmham, Norfolk, considerable assistance was given by the Norfolk Archaeological Unit, which undertook the labour-intensive task of labelling all the slides, but this is one part of the record where the NMR is still experimenting to find the best solution.

The print-out produced by microfilm reader-printers also continues to disappoint users. In fact it has considerably improved in quality during the period since the Frere report in 1974, and the comparison with photocopies is unfair, if these are also looked at in the light of technical changes for the corresponding period. The judgement would be fairer if the needs of the NMR are the criteria, which is to make the record accessible, and to provide an archive from which the record can be reconstituted if the original is destroyed. On that basis microfilm can be regarded as fulfilling its requirement, which is different from the user need based on publication and the incorporation of microfiche in archaeological reports.

The excavation archive in the Archaeology Record Section now includes some 40,000 fiche, and there is an equal number devoted to other archaeological manuscripts. The Lukis collections of drawings in Guernsey museum can be consulted in the NMR, and although no adequate substitute for the original water-colours, it is nonetheless available to the researcher, as are the Bateman

archives from Sheffield Museums and many others. Apart from providing a security archive the NMR also therefore offers a central research library for many records that would otherwise suffer from increased handling. It is also in one respect a means of publication, in the sense that the archives can be read; and this must become more and more important when increased attention to recording during archaeological excavation and research produces quantities of data that cannot circulate through publication in the accepted sense of the term. As the quantities of records rise to their thousands and tens of thousands per site, a smaller proportion can be published, and to consult the evidence the researcher is forced back to the original archive or copy whenever that might be available. In that respect it is perhaps thought-provoking that users of excavation archives in the NMR inevitably begin their research with the drawings, and only if this evidence is promising do they proceed to consult the other types of record available.

To assist in decisions about the priorities for records in need of microfilming the Archaeological Record Section began in 1978 the compilation of an index of all archaeological excavations carried out in England. For two years this was funded jointly by the RCHM and the Inspectorate of Ancient Monuments, but the latter withdrew from the project in 1979. The objectives are to compile a list of all excavations irrespective of the date at which they were carried out, and to locate the original documentary and graphic records that might survive from such investigations. The latter will provide archaeologists for the first time with some idea of the total archive resource from excavation, and the index provides details of the types of records that exist for each site, the location of those records or copies, and the location of the finds. Details are also collected of the sponsoring body e.g. Historic Buildings and Monuments Commission, and the publication of any report. The project has been organised by dividing England into areas and hiring a researcher on a one year contract to complete each area, or by giving grant aid to a unit such as the Wessex Archaeological Trust, or a local authority such as Wiltshire County Council, to compile the index in defined areas. In some areas such as Hampshire some funding has been provided by the County Council, and a copy of the record has been built into the local sites and monuments record. The Archaeological Record Section owes a debt of gratitude to excavators throughout England for their help with this project in their patient replies to questions about the locations of records. It is hoped to complete the national survey in 1987, and to then embark on the revision and enhancement of the record to investigate large archives not already explored in detail because of lack of time. (See Fig. 1)

Some 20,000 excavations are now indexed, and the only areas remaining for completion are East Anglia and Greater London, and parts of south-east Wiltshire, Kent, Hertfordshire and Essex are currently in progress. One problem has been to define an archaeological excavation for the purposes of the survey so that stray finds and objects retrieved from building sites are excluded, and the emphasis is on investigations that result in the recording not merely of artefacts but structures by means of notes, plans, photographs or geophysical methods. A sample of the results demonstrate the data that is now available, and Figs. 1-3 show comparitive tables possible following computerisation. Fig. 1 shows two examples of the full provision for any site, which allows for recording possibilities such as the division of the records and finds between different institutions, and the presence or absence of archive copies in the NMR. Fig. 2 lists sites by thesaurus terms and Fig. 3 by period; but it is equally possible to study the archive by the records held at any institution, or by the excavator's names arranged in alphabetical order. The emphasis now is on the completion of this archive for England and its computerisation, since this will enable the RCHM to publish national catalogues in any of the formats described, or variations on them. In the meantime the parts of the record already in the computer are available for consultation by arrangement, and it is planned to add them to the public record that can be consulted in the NMR library during 1985. (See Figs. 2 and 3)

The equipment used for computerisation of the microfiche catalogue and excavations index in London, consists of two Plessey 68000 processors, which serve the Archaeological and Architectural Records Sections together. They are linked to eight terminals and are intended for the preparation of the catalogues of the collection in Fortress House, the present headquarters of the RCHM (England). The introduction of computers in the NMR was begun by the Aerial Photographic Unit in 1982, and the other sections installed the Plessey and Logtica system in March 1984 after a long period of assessment of our needs and examination of equipment specification in which Simon Grant has played a leading role. In the use of computers the NMR might be regarded therefore as a late starter, though in fact this is not correct and different systems have been under review since 1976.

If the history of computer application to archaeological data is considered, computers only became commonplace in Europe during the 1960's when they were used for scientific analysis and sites and monuments catalogues. The systems available at that time were mainframes with powerful processing facilities and large storage capacity, but they were both expensive to purchase and run, and were large also in physical size. In government therefore only the larger departments had their own computer dedicated to their own needs and fringe offices and smaller departments had to share these facilities using spare capacity and time. When the RCHM looked at the options available for computerisation in 1976-78, any operation it decided to adopt would have been in such an installation based in Norwich, Southampton or elsewhere, and would have had to rely on using printed-out catalogues compiled from data transcribed onto forms in Fortress House, but imput and held at outside locations. Even terminals linked to such locations did not guarantee immediate access to the data because of differential priorities in queuing, and RCHM would have been faced with recurrent costs for the land lines and processing time on such external facilities. The alternative available at that time was the 8-byte microprocessor, a new phase in the construction of data-bases, but very limited in processing power and storage capacity despite its flexibility and cheapness. In terms of the storage capacity required for the Archaeological Record Section, some 60 MB, this was not a realistic alternative. The decisions taken therefore was to wait for the new generation of mini-computors which promised processor power and storage of the required size for an in-house system capable of meeting the needs of a national record.

The Plessey system has at present 1.5 MB of processing memory and 336 MB of storage, and both can be expanded if necessary. A Xenix operating system has been adopted which uses the Informix Database Management package, a relational database, which offers a flexible response to enquiries by allowing the data to be restructured to answer questions of any type. It uses C programming language, and the RCHM can call on, or interface, with other Unix-based softwares whenever necessary. Successful trials have been held, for example, of the transfer of selected data from the Field Wardens reports on scheduled monuments, from magnetic tapes kindly provided by the Historic Buildings and Monuments Commission (HBMC), and sample print-outs were obtained to demonstrate avenues of possible co-operation.

The next stage in the computerisation of the records of the Archaeology Record Section is application at the Southampton Branch, which was formed in April 1983, from what was formerly the Ordnance Survey Archaeology Section. This branch curates the National Archaeological Record (NAR) of 150,000 site records, which is held as approximately 200,000 index cards that are linked to a key set of maps at 1:10,000 scale, on which a numerical sequence, the antiquity number, is based. The Southampton archive also includes a very large bibliographical index for British archaeology of approximately 350,000 entries and has a detailed record of some 240 linear earthworks or monuments, such as Roman Roads, Offa's Dyke and the earlier canals and railways. Other indexes are also maintained for the library catalogue and map collection, and there are also the records created for the period maps published by the Ordnance Survey such as **Roman Britain.** This complex and highly important archive has to be maintained, and has to meet the varied demands made on it as part of the system by which the national maps are kept up-to-date. As a part of the flow-line for map production during which the antiquities are checked, the computer

system must be capable of meeting the needs of revision by providing data on the antiquities present or absent on any map for scales that vary from 1:1250 to 1:625,000. Similarly the computer at Southampton has to respond to the needs of RCHM field-teams based at six different locations in England, and be able to supply the information about antiquities in any area of the country where the Ordnance Survey decides that re-survey is necessary for its maps.

The analysis for the user requirement and tender specification was therefore longer and more complicated than for the London office, being completed in this instance by Dr. Roger Leech, and resulting in the purchase of a VAX.750 and Oracle software, which should be installed in April 1985. Account has been taken of the need for standard file instructions and formats between the London and Southampton facilities, and as a national archive the Royal Commission is very aware of its central role in setting data standards that allows it to exchange data with other institutions. The HBMC has already been mentioned, and equally the needs of local authorities have been considered. The association of County Archaeologists has collaborated with the RCHM in discussing the practicalities of the national record accepting data from local SMR's, in exchange for the records made from field survey and the bibliographical searches made at Southampton. As a test of the methods of data exchange, and an examination of what data is of mutual concern, the RCHM is co-operating with Somerset County Council in a pilot experiment relating to the County SMR, which will it is hoped provide the national guidelines for the acceptance of records into the NAR from the counties.

The relationship of the NMR to other record holders such as museums is also regarded as a crucial factor, and influence on the methods by which the archive is enlarged and arranged. It is the reason why the RCHM began in 1983 the sponsorship of a joint research scholarship with the SERC on the problems of this interface, in which David Evans has already provided a valuable input on current developments in the fast changing technology. With the Council for British Archaeology the RCHM is consulting on collaboration in the revival of an annual bibliography for archaeology, which can capitalise on the computerised bibliography at Southampton. With the Institute of Field Archaeologists a study has also begun on present computer usage in archaeology, which might provide professionals with guidelines to ensure that data can be interchanged between the many institutions in our profession.

Practical problems will no doubt prevent perfect solutions of all these efforts, but in the administration of its archives the NMR is looking ahead as well as wrestling with the management of its heterogenous collections. Experiments are proceeding, for example, in the application of microfiche to the archive of $3\frac{1}{4}$ by $3\frac{1}{4}$ inch slides, which in many cases illustrate monuments and sites in the period between the wars before the 35mm slide became common, and at present are inaccessible because of the pressure on accommodation in central London. In the field of video technology the Archaeology Record Section is hoping to run an experiment with British Telecom to project digital antiquity data over a video image of the map area, which will simplify correction of the graphic data with consequent savings of manpower and improve methods of depiction using colour. There is also hope in the near future that optical disk systems will become an economic reality which will enable the NMR to provide rapid retrieval of its photographic collections, and perhaps even make them available through a network system. In all these possibilities the most important word is 'cost', since the economics offered by microfiche versus computer versus optical disk will ultimately determine what the National Monuments Record can provide. Those who study the information technology market remain optimistic about the realities of such developments, and only trust that the institutions involved will collaborate in taking advantage of the opportunities.

Fig. 1. Full record entries for the RCHM Index for Archaeological Excavations
showing two examples relating to the Isle of Wight

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ACE REPORT PRINTOUT          THE FULL RECORD
ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)   NATIONAL MONUMENTS RECORD   ARCHAEOLOGICAL RECORDS SECTION   EXCAVATION INDEX

GENERAL INFORMATION   quarter sheet: SZ 38                        O.S. no.:                           county:   THE ISLE OF WIGHT
                      grid ref: SZ 39480 85480    AHR no. :  0    0.00                                district: KZ
                      site name: SHALCOMBE DOWN                                           SHR no.:    parish:   SHALFLEET

SITE CLASSIFICATION   types:   BARROW/SECONDARY BURIALS
                      periods: BA/AS

EXCAVATION DETAILS    excavated by: HOLMES,SIR.L.               started: 1817   finished: 1817
                      auspices: PRI
                      funding:                                  absolute date:

ARCHIVE DETAIL        museum: BH        Notes [ ]  Plans [ ]  Photos [ ]  Negs [ ]  Slides [ ]  Corr [ ]  Manus [Y]
                      museum:                 [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]
                      location:               [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]
                      location:               [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]
                                        other location:
                                        other location:

BIBLIOGRAPHY         title:  1.  ARNOLD,C.J./1978/PHD THESIS 166-169          type: REF
                             2.
                             3.
                             4.

FINDS LOCATION       museum: IWCAC
                     museum:

REMARKS


GENERAL INFORMATION   quarter sheet: SZ 38 NE                      O.S. no.:                           county:   THE ISLE OF WIGHT
                      grid ref: SZ                 AHR no. :  0    0.00                                district: KZ
                      site name: PAY DOWN                                                 SHR no.:    parish:   BRIGHTSTONE

SITE CLASSIFICATION   types:   BARROW
                      periods: BA

EXCAVATION DETAILS    excavated by: SKINNER,REV.J.               started: 1818   finished: 1818
                      auspices:
                      funding:                                   absolute date:

ARCHIVE DETAIL        museum:   IWCAC       Notes [ ]  Plans [ ]  Photos [ ]  Negs [ ]  Slides [ ]  Corr [ ]  Manus [Y]
                      museum:   BH                [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]
                      location: SOC.ANTIQ         [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]
                      location:                   [ ]        [ ]          [ ]        [ ]          [ ]        [ ]          [Y]

BIBLIOGRAPHY         title:  1.  JBAA WINCHESTER VOL 1845/150               type: REF
                             2.  HILLIER,G./HIST & ANTIQ 1860/4                   REF
                             3.  SHERWIN,G.A./1936-1942/BA NOTE 76                MSS
                             4.                                                   MSS

FINDS LOCATION       museum:                                        other location:
                     museum:                                        other location:

REMARKS
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RCHM(E) NATIONAL MONUMENTS RECORD EXCAVATION INDEX   INDEX OF EXCAVATIONS IN HAMPSHIRE: BY TYPE

Type	Period	Site name	Excavators	Start	End	Grid Ref	O.S. no.
HEARTH							
	UNKNOWN	ODIHAM		1980	1980	SU 75 SE	0.00
	MEDIEVAL	CHURCH FARM	ROSKILL,MRS.A.	194-	195-	SU 45 NW	4.00
HEARTHS							
	BRONZE AGE	ROCKFORD COMMON	BOWEN,H.C./RIDLEY,M.	1968	1969	SU 10 NE	0.00
		ROCKFORD COMMON	BOWEN,H.C./RIDLEY,M.	1968	1968	SU 10 NE	0.00
	IRON AGE	GEORGE INN, PORTSDOWN 3	BRADLEY,R./LEWIS,E.	1966	1967	SU 60 NE	0.00
	ROMAN	EAST ANTON	DAVIS,R./STARTIN,M.	1970	1972	SU 34 NE	0.00
	POST MEDIEVAL	WELLOW CHURCH	GREEN,F.	1981	1981	SU 21 NE	0.00
HILLFORT							
	IRON AGE	BAULKSBURY	HAWKES,J.	1939	1939	SU 34 SE	1.00
		BAULKSBURY CAMP	WAINWRIGHT,G.J.	1967	1967	SU 34 SE	1.00
		BAULKSBURY CAMP	WAINWRIGHT,G.J.	1973	1973	SU 34 SE	1.00
		BAULKSBURY CAMP	SMITH,K.	1981	1981	SU 34 SE	1.00
		BUCKLAND RINGS	HAWKES,C.F.C.	1934	1935	SZ 39 NW	7.00
		BURY HILL	HAWKES,C.F.C.	1939	1939	SU 34 SW	6.00
		CASTLE HILL	BROOKS,R.T.	1967	1967	SU 41 NW	0.00
		CHILWORTH RING		1927	1928	SU 41 NW	17.00
		CHILWORTH RING	LIDDEL,D.	1928	1928	SU 33 NW	17.00
		DANEBURY	CUNLIFFE,B.W.	1969	1980	SU 33 NW	22.00
		QUARLEY HILL	HAWKES,C.F.C.	1938	1938	SU 24 SE	3.00
		ST CATHERINES HILL	HAWKES,C./HYRES,J.N.L.*	1925	1928	SU 42 NE	0.00
		WHITSBURY CASTLE	RAHTZ,P.A.	1960	1961	SU 11 NW	2.00
		WINKLEBURY CAMP	ROBERTSON-MACKAY,R.**	1959	1960	SU 65 SW	10.00
		WOOLBURY RING	YOUNG,W.E.V.	1932	1932	SU 33 SE	0.00
HOLLOW WAY							
	IRON AGE	POPHAM TO COMPTON (M3:R361)	FASHAM,P.J.	1977	1977	SU 53 NW	0.00
	ROMAN	ITCHEN VALLEY	FASHAM,P.J.	1974	1974	SU 53 SW	0.00
		POPHAM TO COMPTON (M3:R371)	FASHAM,P.J.	1976	1977	SU 53 NW	0.00
HOMESTEAD							
	MEDIEVAL	HILTON COPSE,SHEDFIELD	SOFFE,G.	1975	1976	SU 51 SE	0.00

Fig. 3. A selection of the data from the Index of Archaeological Excavations ordered in this example by period, and again taken from the record for Hampshire

ACHM(E)   NATIONAL MONUMENTS RECORD   EXCAVATION INDEX   INDEX OF EXCAVATIONS IN HAMPSHIRE: BY PERIOD

Period	Type	Site name	Excavators	Start	End	Grid Ref	O.S. no.
PREHISTORIC	FLINT SCATTER*	POPHAM TO COMPTON (H3:R390)	FASHAM,P.J.	1976	1977	SU 53 NW	0.00
PALAEOLITHIC	CHIPPING FLOOR	PORTSWOOD	NICHOLAS,R.	1914	1915	SU 41 SW	20.00
		RED BARNS	DRAPER,J.C.	1973	1973	SU 60 NW	0.00
		RED BARNS	APSIMON,A./GAMBLE,C.	1974	1975	SU 60 NW	0.00
	FLINT IMPLEMENTS	NR FARLEY HOUSE				SU 32 NE	0.00
	RAISED BEACH	FORT WALLINGTON	SHACKLEY,M.	1972	1972	SU 50 NE	0.00
MESOLITHIC	CHIPPING FLOOR	HEATH BROW	O'FARNELL,CANON.F.	1920	1920	SU 84 NW	52.00
		OAKHANGER SITES 3,5,7.	RANKINE,M.F.	195-	195-	SU 73 NE	0.00
		SHEDFIELD	DRAPER,J.C.	1950	1950	SU 51 SE	0.00
		SHEDFIELD	CORNEY,A.	1951	1951	SU 51 SE	0.00
		THE WARREN,OAKHANGER SITE N.V.	RANKINE,M.F.	195-	195-	SU 73 NE	0.00
		THE WARREN,THE SLAB,OAKHANGER	RANKINE,M.F.	195-	195-	SU 73 NE	0.00
		TROTTSFORD,SLEAFORD	RANKINE,M.F.	1939	1939	SU 83 NW	0.00
		WALLINGTON MILITARY ROAD PORTS DOWN	HUGHES,M.F.	1972	1972	SU 50 NE	0.00
	FINDS	MICHELDEVER WOOD:M3.R4	FASHAM,P.J.	1974	1974	SU 53 NW	0.00
	FLINT IMPLEMENTS	HOLBURY MANOR FARM	MILLSHER,MR./ABERG,F.A.	1958	1958	SU 40 SW	35.00
		SCHOOL FARM		1980	1980	SU 32 SE	0.00
	FLINT KNAPPING SITE	FIR HILL					
		TROTTSFORD,SLEAFORD	RANKINE,M.F.	1926	1926	SU 83 NW	5.00
	OCCUPATION	BARGATE STREET	RANKINE,W.F.	1956	1956	SU 73 NE	7.00
		BROOM HILL	WACHER,J.S.	1971	1979	SU 41 SW	0.00
		BROOM HILL	O'MALLEY,M.	1971	1979	SU 32 NE	0.00
		HEATH BROW	O'FARNELL,CANON.F.	1920	1920	SU 86 NW	52.00
		LONGMOOR INCLOSURE,WHITEHILL SITE 1	JACOBI,R.M.	197-	198-	SU 72 NE	0.00
		SHORTHEATH COMMON/WOOLMER/LONGMOOR	RANKINE,W.F.			SU 73 NE	7.00

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Putting The Key In Keyword: Some Thoughts On Data Retrieval
with special reference to the SHIC and DUA systems

Cherry Lavell

> It is easy enough to make an index, as it is to make a broom
> of odds and ends, as rough as oat straw; but to make an
> index tied up tight and that will sweep into corners, isn't so
> easy.   (John Ruskin)

During the 18 years I have spent compiling the (manual) database known as
British Archaeological Abstracts I have lived daily with the problems of   retrieving
information from publications.   Unfortunately very few people have a good
understanding of this process, whether in conventional indexes or in computer
systems; and some of them have latched on to the notion of 'keywords' as if they
had found some kind of Open Sesame! with which to unlock our information stores
(cf. Martlew 1984). However, none of the keyword lists I have seen so far has shown
much potential for efficient retrieval, and some of them (including the drafts so far
made available by the National Monuments Record of RCHM(E)) are inadequate on
account of their weak structure. Without close attention to the interrelation of
synonyms, parts-for-wholes and the like, no keyword list can function efficiently in
retrieval. This is serious enough in a manual system, but of course in a computer
one can lose data much more thoroughly and disastrously. As I have written of this
general problem elsewhere (Lavell, 1981 and forthcoming; Adams & Lavell, 1984) I
shall restrict my criticism to one particular system which has been recommended for
museum archaeology. This is the Social History and Industrial Classification or SHIC
(SHIC Working Party, 1984; Light, 1983).

SHIC was devised essentially for use in arranging museum collections of what
used to be called 'bygones' but is nowadays known as 'folk life' or 'rural life'.
However, Harrison (1984, 40) has suggested that it could be adapted for use in
archaeology.   While I would not dispute too energetically Harrison's view of
archaeology as 'after all, only an earlier "folklife"', I do wish to demonstrate to
curators and others why I think SHIC is unsuitable even as a foundation for
archaeological applications.

In the first place, classification schemes, especially strongly hierarchical ones,
are a statement of today's knowledge, and in five or ten years are almost certain to
need drastic overhaul. Secondly, the decimal form of classification (on which SHIC
is laid out) dates back to the 19th century when the scope of human knowledge was
a great deal smaller than it is now. Quite simply, the base 10 framework of the
decimal system cannot cope with the extreme complexity of modern specialisms;
note how SHIC has had to spread over two adjacent blocks of ten for several
sections (e.g. 4.51-52 for food, drink and tobacco manufacturing industries). We
cannot impose these tight constraints on our knowledge; we need something that can
grow continually without strain and without resorting to long, error-prone strings of
decimal numbers. The power of the modern computer, particularly the minicomputer
and increasingly the micro, has released us from all this, as organisations like the
Institution of Mining and Metallurgy have already recognised. With archaeological
data banks and archives, which consist partly of well-structured information and
partly of free text, we need multiple access points and well controlled vocabularies -
not classifications (cf. Benson 1984, 60-1).

Even so, let us look specifically at SHIC in terms of archaeological materials.
Take pottery, our commonest artefact: Section 2.66, Serving and eating of food,
seems the obvious place, especially as this 'includes oven-to-table ware', which must
cover most prehistoric pottery! But some of our pots might be storage vessels
(Section 2.62, Storage). Or are they 2.661, Food serving containers? Which vessels

did Iron Age people eat from (2.664, Food eating containers)? And when a Bronze Age person has used an old 2.62 to put his grandfather's ashes in, does it then go under 3.23, Memorial, or 1.1186, Death and burial? SHIC has a functional orientation, as these examples show: it 'groups items according to the sphere of activity in which they were primarily associated in context'. But we so rarely know the archaeological context even vaguely, let alone as precisely as SHIC expects. Think of the average town site with its intercut and mixed stratigraphies, and the pieces of artefacts which may or may not belong together. The classic study of Millie's Camp (Bonnichsen, 1973) has warned us - for ever, I would have thought - of the risks attendant on attributing function in archaeological contexts. Too often we have to guess, or despairingly assign things to the 'ritual' holdall (and SHIC does not cater for 'ritual objects' as such).

Moreover, because so much archaeology is inevitably period-based still, we would need to subdivide the SHIC sections into Neolithic, Bronze Age and all the rest. For the Roman and medieval periods we have literally dozens of locally-produced pottery fabrics each requiring its own decimal number, since SHIC's broad categories will not retrieve the relatively precise categories needed by archaeologists.

The trouble with classifications (of whatever sort) is that they are normally designed from the top down: one starts with vague general categories like Domestic Life or Working Life, and then gradually breaks them down into finer classes until the name of an actual object is reached. Or, in the case of SHIC you rarely get to the name of an actual artefact because, as Richard Light has pointed out (Light, 1983), after five levels of hierarchy you still have not reached 'coal scuttle' but merely 2.3116, Accessories for Solid Fuel Heating. Granted that SHIC's main purpose is for arranging things in museums, it may suffice. It may also help to identify gaps in collections: the presence of only three examples of "2.62" as against 359 of "2.63" may require action (though surely the imbalance ought to have shown up long before the collection was given SHIC numbers). But as a tool for retrieval, which is suggested as one of its uses in relation to MDA cards and the like, I cannot see SHIC working well, and anyone who thinks it can be adapted for archaeological purposes probably does not know enough about archaeology!

My own preference, arrived at only after some years, is for getting the bottom level of any hierarchy set out first. All the most specific terms possible - Grooved Ware pottery, kerbed cairn, basilican building, moated site, charcoal burial - should be laid out in a straight alphabetical sequence. (Adjectives may be inverted - 'cairn, kerbed' - to bring all variants of a noun together.) A basic word list constructed like this would be acceptable the whole UK over, because it could accommodate all the regional terms like brochs and raths and rounds and deneholes; and yet no organisation has to use the whole of the list but can just extract the words it requires. However, the basic list must be able to bear all the strains imposed on it by increasing masses of data, and must therefore have all its synonyms tied together into a structure which remains clear even when parts of the list are discarded. This ensures that information is not lost because the enquirer has forgotten, or never even known, all the possible synonyms. (Some enquirers using a base called Coffeeline asked for references to 'instant coffee' and were puzzled that so few appeared; a copy of the Coffeeline thesaurus would have shown them that the 'right' term was 'soluble coffee' (Dubois, 1984, 65). Of course, a really user-friendly system would have warned them on-screen what term to use for efficient retrieval.)

The basic word list will probably need to have generic tags or hierarchical relationships added to it. For instance, an organisation acquiring it might want to tag 'hearth' as a DOMESTIC function and probably also as an INDUSTRIAL one. (SHIC only grudgingly allows such dual functions.) If several layers of hierarchy are desired then (say) an Iron Age poker can go under SOLID FUEL ACCESSORY which itself goes under HEATING which again is a subdivision of HEATING, LIGHTING, WATER & SANITATION (using here the SHIC terms for illustration).

The 'bottom line terms' - the most specific ones - will guarantee that individual databases are compatible with each other, even if there are the inevitable disagreements about whether the generic term is CIVIL SITE (say) or COMMUNITY SITE. When interchanging information, an institution wanting 'MILITARY STRUCTURES' would specify the bottom line terms that it expected, thus obviating misunderstanding by the supplying institution.

The only word list I have seen so far that matches this specification is that currently in use at the Museum of London's Department of Urban Archaeology. Audrey Adams, who compiled the list, is that rare being, a trained librarian with a practical knowledge of archaeology and the way in which archaeologists - museum curators and excavators both - actually work. The list is immensely detailed as it has to cope with the particular problems of metropolitan data, but its structure ensures that all related words are tied together and no odd items are lost. (It is a broom that sweeps into corners....) Any organisation ought to be able to take the core of the DUA list, add to it any local terms needed (tying them into the structure, obviously) and apply whatever generic tags it finds suitable.

Retrieval from archives and records is by no means a straightforward matter; good analysts/retrievers have a particular mental set even before they have a skill. Indexing, or analysis for information retrieval, is emphatically **not** a job that anyone can do; let us not undervalue it, or we shall find the millions of pounds spent in excavation, post-excavation and publishing have been virtually thrown away because we have no reliable means of getting the data out again (Farley, 1984, 20). 'Dust to dust' indeed...

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Archaeological Records and Archives in a Regional Context

Peter Fasham

The Trust for Wessex Archaeology, a non-governmental (neither central nor local) charitable body, deals with Rescue Archaeology and survey in the counties of Berkshire, Dorset, Hampshire, Isle of Wight and Wiltshire. The 4460 square miles extends from the end of Heathrow's runways to Lyme Regis and from Ventnor to Cricklade. A total of 34 district councils are involved. The Trust currently employs over 100 people and annually is involved with more than thirty archaeological projects.

It has been estimated that there are two dozen museums or museum services with which we have to deal and, of course, two Museum Federations. There is one DoE museum, seven private museums (one acting as a County Museum), eleven district museums, three museum services and two town museums. Individualy all of these museums are as helpful as they can be - but collectively for the Trust life is not so easy.

The essence of the Trust's excavation brief as per the conditions of HBMC funding is to produce paper records of threatened sites for both publication and future use. Any work outside these strict parameters must be funded by sources other than HBMC. Although the range of sites is quite varied - waterlogged medieval towns to Neolithic features around Stonehenge - an attempt is made to produce an archive on a standardised format which is internally consistent and cohesive but which, in the long run, is also capable of providing a regional database of different classes of material.

When we turn to our two dozen museums we are faced with an array, not quite bewildering but nevertheless real, of storage and archive modules and media. Each museum seems to have a different preferred box size, and indeed some give us boxes, some sell us boxes, some expect us to arrange our own boxes. The paper records are stored and maintained differently, and therefore different things are expected of the Trust. The problems of computerised records is one that must be talked about in almost hushed tones as only one or two of the museums can cope with a computer product. Fiche readers are a little more common or at least more easily accessible to most of the museums. All the Trust's field records and archives are intended for microfiche.

It is probably accepted that the aims of the excavating Unit to produce an archive and publication are perhaps different to the curatorial and display aims of the recipient museum. This problem can be resolved by adequate discussion and goodwill but does involve a certain amount of reordering and reboxing of material. More crucially from a regional Unit's viewpoint is this total lack of standards for boxes and other storage modules. The Trust has to use precious cash and manpower resources to adjust its temporary stores to accommodate the variety of box sizes. It would be a lot easier, and the economies of scale make it attractive, if there were a set of standards for boxes, paper storage, museum/Unit retrieval systems and computer compatability. Is this need for broad standards to remain a dream or can it become reality?

Despite this plea for standards and standardised systems we should never lose sight of the basic fact of excavation that each site is different and must be treated accordingly and that our standardised systems must be flexible enough to cope with all eventualities.

The record after all must reflect what was in the ground.

Chairman's Review

Nicholas Thomas

In recent years the SMA has conferred in detail on the problems of museum storage: it has also considered how objects should be interpreted and displayed in museums. Those conferences, one at York, the other at Winchester, have both been published **Archaeological Storage,** 1981; and **Archaeological Display,** 1983. When we considered what next should be discussed at a week-end conference, an occasion on which we always enjoy the benefit of an audience which is not only a cross-section of museum curators but includes also a priceless leavening of experts from outside our profession, we did not take long to select as our subject the whole process of archaeological excavation, from the dig's inception to the use of its archive once absorbed within the museum. We have endless problems, not the least being our generally inadequate funding and a legacy of buildings often unsuitable for the task or in poor repair and difficult to control climatically. Few, however, of the various pressures exerted upon museum staff and buildings are heavier than the desirability of housing permanently the finds and supporting documentation from archaeological excavations. That such collections of new, scientifically collected data should come to museums is what every museum archaeologist wants. They believe that the proper and planned route to be taken by the dig's product should be straight to the nearest relevant museum. But they realise also that their museums must be equipped to house and to care for and to make available these assorted data as required. And that makes a heavy demand upon their curatorial expertise and upon the physical resources they have available. Clearly, the time had arrived for the SMA to discuss the matter together, asking guidance from a variety of producers and users and experts in related fields. Our long week-end at Leicester resulted in a wealth of valuable papers and comments and it is a pleasure once again to write an introduction to what was said.

We covered the subject in the way that we would like to see an excavation organised - preliminary work (including matters such as establishment of ownership, identification of the receiving museum); the excavation; what is involved after the dig has closed; and the needs of researchers and others who use the product subsequently.

General

It became clear, - I suppose we knew it already - that the threat to our ancient (and less ancient) heritage continues and is unlikely to abate before the end of the century. Destruction of parts of the astonishingly profuse remains of man's presence in these islands continues; in certain areas at a quite unacceptable rate. Legislation to protect it remains inadequate - or at least the political will to enforce that legislation lacks strength - and the necessary funds, also, are lacking. Indeed contrast between the wealth of certain urban units and its lack among the majority of such organisations became a feature of our discussions as conference proceeded. What was not in doubt was the sheer volume of objects and data which have come from the ground since the early seventies, and will do so in the years ahead. But, as Jennifer Stewart said, of computer technology; "we must not moan about it, we must simply prepare ourselves."

Several speakers pointed up the unhappy results now caused by the unofficial decision taken a decade or so ago to house units outside museums. It was a mistake, from which museums and archaeology are now suffering. Nor has the breech between 'archaeologists' and 'museum archaeologists' entirely been healed. Conference reminded us that the SMA still has a major role to play there, has still to make the effort to bridge the gulf that endures between us. In this connection it

became clear that the uneven geographical distribution of units and approved museums was a major cause for concern and that no effort should be spared to resolve it. Peter Fasham's plea for standardisation in all sorts of storage methods on-site came from bitter practical experience. In the fifties, even the earlier sixties, the general public had a consciousness about archaeology that owed much to the use of television by Sir Mortimer Wheeler. That seems now to have been lost. Preservation of the natural heritage attracts a political lobby, and with it strong legislation, which archaeology and museums lack. We welcomed, therefore, the comments of Peter Addyman, whose entrepreneurial flair in marketing his astonishing discoveries through **experiences** like the Jorvik Centre clearly marked the way ahead for discerning members of our profession. That so many young people have now had direct experience of archaeology through the various schemes of the Manpower Services Commission must also be welcomed.

Before the Dig

The ideal way to plan an excavation is so simple : yet most dig directors continue to get it wrong. What is required is that the museum curator, the excavation director, the planners and developers and the site owner work together from the start. That way the final home for the dig's product is known and its staff are involved from Page One : the excavators arrange their systems for digging and documenting and on-site storing so that the transition to the museum is smooth, the health of the finds cared for, their numbering compatible with the museum's inventory process; and the landowner knows what he is giving away (assuming that he has agreed), and where it is located. Experience continues to show that this simple ideal - basically a matter of common sense, good management and agreed regional collecting policy among museums - still proves hard to realise. But for the sake of the excavation product - for the long-term usefulness of the expensively produced data - it MUST BE resolved. It is a matter of professionalism.

During the Dig

The finest management tool for excavators is the computer. It has come to stay and we ignore its use during and after the excavation at our own peril. It offers the perfect system for ordering all features of the site excavation and for extracting maximum information from the finds. Archaeologists, including those in the museum, must be computer-literate.

Cherry Lavell and many others warned, however, of the dangers and frustrations that are accumulating as different excavations continue to fail to standardise their record systems, to fail to seek compatibility in computer software. Conference urged the vital importance of establishing a forum for computer users in thefield and in the museums.

After the Dig

The SMA, it was felt, could come into its own when insuring that, in the ordering of the archive once it had crossed the museum threshold, standardisation of archive management was established. As museum professionals, we should define minimum requirements and standards, we should agree a basic approach to the data within our care.

Jennifer Stewart and others undermined the confidence of those curators who thought they knew it all, by establishing how little was yet known of the shelf-life of computer software, even of paper and photographic negatives and prints. If the curator may understand much about the storage of objects, he has only just started down the road of archive-keeping. Perhaps here more than anywhere else, the advantages of computer technology threaten to be outweighed by inherent physical

weaknesses which are not at present fully appreciated, let alone understood. The presence among us of Heather Broughton, the County Archivist, gave authority to our discussion of ways to look after paper. In this section we heard again some of the 'dos' and 'don'ts' of conservation applied to objects recovered from archaeological contexts; learned once more of the need (and the considerable expense) for permanent vigilance over the well-being of the full archive once it has been installed within the museum and the arrangements for storage which allow that to be followed.

Users of the Archive

Alan McWhirr led a succession of shorter papers about the needs of those whose research takes them to data from excavations. Methods of good indexing and suitable location control systems were talked through : and from Alan Aberg came the welcome news that the National Monuments Record was willing to help with the copying of records, to full archival standard. Alan McWhirr gave us a refreshing reminder that there was still no substitute for visual material in research and in display : that the real thing remained without price, - like the use of the old-fashioned written word in its description.

More collaboration between all concerned with excavation and with the housing of its total product; standardisation; those were the keywords to come out of our conference. And with them came the call for great determination and courage with which to face what lies immediately ahead of us!