

# The role of artefact catalogues in Australian historical archaeology: a framework for discussion

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*Efforts to utilise catalogues prepared in the past two decades of digging in Australia are often hampered by errors and inconsistencies in data, lack of comprehensive reporting, and mismanagement of assemblages, their accompanying documentation and databases. These problems are the result of difficulties affecting other aspects of the archaeological process, such as insufficient funding, training and systematic quantification of assemblages. In order to create more reliable and more efficient catalogues in the future, it is necessary to take a step back and open the debate on the role catalogues should have in Australian historical archaeology. The authors put forward their view that catalogues must be designed to facilitate comprehensive and contextual assemblage analysis, now and in the decades to come. Having established this primary goal, the authors discuss other means to improve the efficiency and consistency of catalogue production, including standards and guidelines, quality assurance testing, reporting and physical access to assemblages and associated records. They conclude with a number of specific measures that might be able to enable these objectives, and importantly, welcome debate on the issue.*

## INTRODUCTION

Producing an artefact catalogue is a routine component of undertaking archaeological excavation. Together with stratigraphic information, plans, drawings, and photographs, the catalogue provides part of the lasting record of the site that has been destroyed. As part of the site record, some form of catalogue must be produced for every site excavated, no matter how large or small. At present there is considerable variation regarding the kind of catalogue that is acceptable. In some instances it may be a minimal list giving only vague information, such as '5 sherds of blue-and-white transfer-print earthenware' or '16 fragments of green bottle glass', while in other instances it will be a large relational database with numerous fields and multiple tables. Reaching consensus on what a minimum standard should be is some way off, but it is our contention that it is a worthwhile goal.

The aim of this paper is to establish the purpose and intent of artefact catalogues and their relationship to analysis and interpretation, and to begin to outline a framework for debate. It is hoped that by encouraging discourse in this area we can begin working towards a set of common principles, and eventually, a more satisfactory solution. While much of the discussion that follows emphasises terrestrial historical archaeology in Australia, it is expected that the issues will also be of relevance to maritime archaeologists, those working on post-contact Aboriginal sites, and archaeologists in New Zealand, and it is hoped that practitioners in those areas will contribute to this debate.

We believe that the lack of consensus about basic standards of artefact cataloguing is a significant impediment to the further development of historical archaeology in Australia. In particular, it restricts the ready exchange of information about sites and assemblages, and makes it virtually impossible to undertake the kind of inter-site comparison that will facilitate wider syntheses of the archaeological record of post-contact Australia—the experiences of the recent re-analysis of the material from Little Lon (Mayne & Murray 2001) and the Exploring the Archaeology of the Modern City project (Crook et al. 2002) being cases in point. This lack of synthesis is despite more than 20 years of publication and the increasingly rapid accumulation of artefact assemblages in museums, universities, heritage agencies, and back sheds around the country.

The absence of standard guidelines also adds to the workload of consulting archaeologists and heritage managers. Each individual consultant is forced to invest time and resources in developing their own recording and database systems, while competitive tendering means that there is seldom appropriate financial recompense for these efforts. Heritage managers, particularly those charged with the eventual curation of assemblages such as Heritage Victoria, are presented with the problem of integrating and reconciling artefact information from a variety of systems which are not always compatible or even comprehensible.

So far, the term 'catalogue' has been used rather than 'database' or even 'analysis'. An artefact catalogue comprises the record of the attributes associated with each artefact and together the attributes establish the location, age, and form of that artefact. Measuring variation in these three dimensions of space, time, and form is the goal of archaeological analysis first articulated in 1960 by Alfred Spaulding. Achieving these fundamental goals is no less relevant today. A good catalogue, combined with the other records from the site as a whole, should enable variation in these three dimensions to be studied both at the time of initial excavation and reporting and at any time in the future.

For the purposes of this paper, a database is the computerised version of the artefact catalogue—be it in a complex relational database, or a simple, spreadsheet-style table. There are many different computer programs available to make artefact databases, from Minark, a stalwart of many early Australian excavations, to Excel, Filemaker-Pro and Access. A catalogue may be created in electronic form from the beginning, or it may be created all or in-part in hard-copy first and the information entered into a database at a later date. In either case, the electronic form is only the embodiment of the catalogue.

Likewise, the catalogue needs to be distinguished from the process of analysis. Cataloguing and analysis are terms that are sometimes used interchangeably, but they are not the same thing. Cataloguing is the identification and recording of the artefact's attributes, the raw data about the assemblage. Analysis constitutes the synthesis and ordering of the raw artefact data so that the structure and dimensions of the assemblage as a whole are defined and clarified, and so that variation across the space of the site and through the time of the site's occupation

can be identified. Analysis is to the catalogue what trench reports are to stratigraphic record sheets and trench notebooks. The latter report the observable characteristics of the site's stratigraphy while the former turns that information into an intelligible sequence of events. Ideally trench reports will be compiled at the time of excavation, but if absolutely necessary the trench notebooks will provide the detail needed to complete them later. Similarly, artefact analysis should be done as the catalogue is completed, but if circumstances do not permit, the information in the catalogue should enable analysis to be undertaken later. In either case, both trench reports and artefact analysis are necessary for the full interpretation of the site.

The integration of catalogue, database, and analysis enables archaeologists to meet the goal of addressing questions established in the research design, but to do so successfully requires careful forethought. The process is one of working backwards from the kind of information required, and its ultimate form, so that it can be first recorded, and then entered in a manner that will facilitate its eventual retrieval. The nature of the research design determines the kind of analysis required and a good database enables data to be easily manipulated in the manner required for that analysis. Good database design simplifies the process of recording data in a way that will allow it to be manipulated, and a good catalogue records the attributes required for the ultimate analysis. With careful planning and a good computer program, many hours of work can be saved at every stage.

In the past two decades, there has been much debate on the processes of archaeological recovery and its impacts on other stakeholders, particularly in urban settings (for published seminar papers see Department of Planning 1989 and Historic Houses Trust 1996; for minutes of discussion groups, see Gojak 1996; see also Connah 1998, Mackay 1996, Mackay & Karskens 1999 and Thorp 1994). Amidst this debate, the nature and challenges of artefact cataloguing, analysis and interpretation have been overshadowed by more immediate concerns of the selection of sites, physical recovery of material culture and public interaction in the process. Nonetheless, the mere mention of inconsistencies or inadequacies in artefact catalogues and databases reveals the dissatisfaction and frustration many historical archaeologists feel about the lack of consensus in recording standards. While most of these opinions have never been documented, similar sentiments were shared by a small group who met for a forum on the cataloguing of artefacts in historical archaeology at the 2001 ASHA conference, and that session was recorded (Crook 2002). We hope this paper brings these issues to the attention of a wider audience and stirs further debate.

## APPROACHES TO ARTEFACT ANALYSIS

There are a number of reasons for the inadequacy of many existing artefact catalogues and databases, including funding, time constraints and lack of expertise. One of the most fundamental problems has been the restriction of post-excavation processing to the production of the artefact catalogue. There is limited expectation that the assemblage as a whole will be quantified or analysed, or even linked back to the original research design. This is directly related to the widespread lack of interest in the information value of artefacts generally, which has been a significant weakness in Australian historical archaeology (Birmingham 1988: 149, Lawrence 1999). It is only relatively recently that Australian archaeologists have published substantive studies of artefacts (Carney 1999, Casey 1999, Gojak 1995, Gojak & Stuart 1999, Lindbergh 1999, Staniforth & Nash 1998, Stuart 1991).

As in much else in Australian historical archaeology, approaches to artefact processing draw on two traditions, those of the United Kingdom and those of the United States.

Unfortunately, while both have much to offer, it is the weaknesses, rather than the strengths, of those traditions which have been most influential here so far. In the United Kingdom post-medieval archaeologists have had a long-standing interest in artefact description (Courtney 1999). Specialists there have developed detailed and precise knowledge of many artefact classes, most notably ceramics (Barker 1991, Gaimster 1997) and clay pipes (Davey 1985, Oswald 1951, Oswald 1961) but also small finds (Cherry 1997, Egan & Michael 1999, Staniland 1997) and the many artefact classes represented in collections such as those edited by Hook and Gaimster (1995) and Redknap (1997). Specialist knowledge has been effectively disseminated among practitioners via publications and seminars so that most artefact catalogues produced are technically accurate and detailed. Standardised guidelines to identification and terminology, such as those produced by MOLAB, the Museum of London Archaeology Laboratory, are also widely available. However, because the interest of most post-medieval archaeologists does not extend beyond the eighteenth century, and because most industrial archaeologists do not consider artefacts, few of these studies are directly applicable to the Australian context.

The weakness of the system in the United Kingdom is that most site reports and artefact studies end with the description of the artefacts, in essence, the production of the catalogue. There is little or no analysis and interpretation of whole assemblages, and little attempt to either provide historical or social contextualisation or to utilise the artefacts to contribute to that contextualisation. While the understanding of specific artefacts is excellent, there is much less understanding of artefacts at the level of the assemblage or the site, and the potential for inter-site comparisons is infrequently explored (but see the studies by Tarlow and West [1999] for recent exceptions).

In the United States the opposite has been the case and there has been considerable emphasis on the analysis of assemblages as a whole and patterning between and within them. A variety of approaches have been developed in order to facilitate quantitative analysis, from early studies such as Harrington and Binford's work on the use of clay tobacco pipes to date sites (Binford 1978, [1961], Harrington 1978 [1954]), to South's (1977) Mean Ceramic Date formula and Brunswick and Carolina pattern techniques that enabled whole assemblages to be characterised and compared, to Miller's (1980, 1991) Ceramic Price Index and to the use of spatial analysis to interpret site function (Gibb & King 1991).

If anything, there has been an even greater interest in the interpretive value of artefacts, and scholars have used artefact studies as a springboard to a variety of new perspectives on American history. These include Deetz's (1977) use of ceramics, gravestones, houses and rubbish disposal patterns to argue for a Georgian World View; Yentch's (1991) use of domestic pottery to explore eighteenth-century gender relations; Ferguson's (1991) use of pottery and food remains to provide insight into the lives of enslaved African Americans; Shackel's (1993) use of toothbrushes to explore the emergence of industrial discipline; Adams's (1976) work on identifying trade patterns based on bottle glass; Fitts's (1999) comparison of middle-class domestic assemblages with nineteenth-century advice literature; and Brown and Cooper's (1990) recognition of African religious survivals in fragments of metal spoons and kettles, chalk, beads, and chicken bones.

While there has been considerable attention given to the interpretation of artefacts and assemblages, there has also been discussion at a more general level of theoretical frameworks. Notable here is work by Beaudry, Cook and Mrozowski (1991), Orser (1989), and Stone (1988). However, technical studies of artefact classes, such as those found with such abundance in the UK, are comparatively scarce, a situation that

Miller and co-authors (1991: 1) attribute to the influence of the New Archaeology and the concomitant devaluing of what was labelled 'particularistic studies'. There are important exceptions to this, beginning with Ivor Noel Hume's *A Guide to Artifacts of Colonial America* (Noel Hume 1970), and including Jones's (1985, 1986, 1991) work on glass, work by Beaudry and co-authors (1983), Majewski and O'Brien (1987), Miller (1993) and Sussman (1979, 1997) on ceramics, Busch (1981) on tin cans, Fontana (1965) and Wells (1998) on nails, and the papers in the general handbooks recently edited by Brauner (2001) and Karklins (2001). These and other similar publications indicate that as in the United Kingdom there are many skilled artefact specialists, but in the United States their knowledge is less likely to have been widely published, and is more frequently found in unpublished site reports.

For the most part, Australia has adopted the American approach of not publishing artefact descriptions. With the exception of the handful of recent papers already referred to, there is little available specialist literature to consult here. In 1987 Judy Birmingham and Damaris Bairstow edited a collection of short papers that had originally been published in the *ASHA Newsletter* and many of these were on aspects of artefact identification. With contributions by a number of specialists such as Robert Varman on nails and Marjorie Graham on ceramics, this collection has become a standard reference on artefacts in Australia. However, it was not intended to be more than a brief introduction, and while the information itself is not out of date, many people have accumulated expertise that surpasses the cursory material published there. Unfortunately, there has been neither the means nor the encouragement for these new experts to share their skills so that the knowledge can be more widely disseminated and built on. Despite the fact that a small number of people are highly skilled in artefact identification, far too many catalogues are still being produced by people with little or no training in historical archaeology and little familiarity with historic artefacts. The inevitable result is catalogues that are inaccurate and inconsistent.

While being satisfied with the American approach to minimal artefact description limited to a basic catalogue, Australia has also borrowed the United Kingdom's practice of accepting minimal analysis or interpretation. One cause of this situation that is frequently revisited in the literature (e.g. Connah 1998, Mackay 1996, Mackay & Karskens 1999, Mayne et al. 2000, Murray & Mayne 2002a) is the fact that so much of the work done here is the result of consultancies. The public nature of archaeological excavation is an inescapable fact, but it is worth noting in this context that a great deal of the work done in the United States, and almost all of that done in the United Kingdom, is also the result of consultancies (Courtney 1999: 2, and see for example Adams & Boling 1989, Brown & Cooper 1990, Majewski & O'Brien 1987, Fitts 1999, Praetzelis & Praetzelis 2001 and Yamin 2001—all excellent analytical studies completed by consultant archaeologists). Indeed, of the few artefact analyses that have been published here, many have been the product of consultancies (Carney 1999, Casey 1999, Gojak 1995, Lindbergh 1999, Lydon 1995, Godden Mackay Logan [ed.] 1999: Vol. 4). Murray and Mayne (2002) make the point that academic-driven excavation is only a minute proportion of the total excavations carried out in most western countries, and that it is not unreasonable to expect that where someone (i.e. a developer) is profiting from the destruction of archaeological sites, the costs of analysing those sites, and their artefacts, should be borne by those making the profits rather than by the public purse.

Rather than assuming that consulting projects cannot include analysis and interpretation, it is worth examining the context in which consultancies are carried out. The problem lies not with the consultancies themselves, but with the fact that rescue excavations here are consistently underfunded.

The traditional rule of thumb for calculating the time needed for post-excavation work has always been that adequate lab work requires another three to four times as long as the period spent in the field. It is rare indeed for anything like that ratio to apply in development-funded projects. Consultants and heritage managers rightly point to the unwillingness of developers to pay for more than they absolutely have to, hence the tendency of projects to include little in the way of post-excavation funding. However, most developers only pay for archaeology at all because it is made a condition of their building permits. The definition of what constitutes archaeology, and the assessment of whether or not permit conditions have been fulfilled, lies with archaeologists. So far there has been a general unwillingness on the part of the profession to concede that analysis and excavation are of equal importance, and that until detailed analysis and thoughtful interpretation are carried out, the excavation as a whole has not been completed. There is an expectation that trench reports will be written, but no similar expectation that artefact catalogues will be accompanied by analysis.

The profession sets the standards, and so far, as a profession we have been happy to accept the bare minimum. As a group we have not valued artefacts and post-excavation work, and so it is unsurprising that we have not been able to persuade others of its value. Historical archaeologists have been satisfied that the information from a site has been 'saved' once the excavation is finished and the stratigraphy written up, and in a competitive market, those who offer more than basic statutory compliance will not win the tender. The analysis of artefacts is a luxury that someone else can pay for, not a necessary part of understanding the site, and anyway, the artefacts can be kept indefinitely in a museum or shed, so there is no immediacy about their interpretation. This attitude, that interpretation can be done at a later date by others, presumably academics or students, has been particularly harmful in the Australian context where until the last decade there simply have not been sufficient academics or students to carry out that kind of research. A further problem is that it cannot be assumed that either the artefacts or their associated documentation will survive to be studied by others.

Whether artefact analysis takes place at the time of excavation or at a later date, the underlying goals informing the catalogue should be broadly similar. The artefacts should be described as comprehensively and as accurately as is reasonably possible, and the results should be logged in a format that is both efficient at the time of cataloguing and sufficiently flexible to be used and manipulated by others. Both the catalogue and the database should be designed with these aims in mind, and should harness time-saving technologies to make the task more efficient and less costly. Most importantly, it must be remembered that a catalogue, no matter how extensive, is not the same as analysis, nor is it a substitute for interpretation. Analysis and interpretation are what completes the site record, and if they cannot be undertaken immediately it is even more vital that the catalogue be adequate to allow it to take place in the future.

## STAKEHOLDERS AND THE CURRENT USE OF ARTEFACT DATABASES

Before discussion of the uses of artefact catalogues, it is worthwhile to identify the parties who have a vested interest in the development of catalogues; that is, who at present uses the catalogues that we have and who else should be. Sadly, artefact catalogues and particularly those in electronic format are typically under-utilised, often due to the technical hindrances of superseded software packages and outmoded hardware.

When datasets are accessible to others, the data—often in printed rather than electronic form—are utilised primarily by

managers of the assemblage, sometimes by other consultants or researchers and sometimes students. The chief utility of the artefact datasets presently is to find particular or unique artefacts for displays in museums or other sites where the artefacts may be of interest to the public. In rare cases, a database will be used to track the storage and movement of artefacts.

Consultants or researchers may utilise a database or printouts to cross reference a specific artefact type, but such use is often limited to catalogues of their own, or close associates' creation. Some undergraduate students also access datasets to undertake specialised analyses on parts contained therein, where available.

There has been some exploration in the presentation of artefact databases to the public, but relevant projects have tended to be small-scale or have necessitated a high degree of re-configuration to create a user-friendly interface. They have been heavily compensated by additional explanation to render archaeological jargon meaningful to an average museum-goer (see for example, the 'Dig It' database at the Museum of Sydney). The extent to which the general public could be genuinely satisfied by an encounter with an archaeological database in its raw form (in contrast to museum-collection databases) is doubtful, although some specialised uses such as school education packages are creditable (e.g. Godden Mackay Logan 2000, Murray & Mayne 2002b).

When it comes to the catalogue itself, the needs of each of these user groups can be quite different. While a collection manager may be primarily concerned with the absolute accuracy of the current storage field, a researcher may rely heavily on descriptor fields and others yet may be unable to retrieve any useable data from the catalogue without accompanying information such as thorough context listings.

These uses may be different, but they are not incompatible and at this point we need to focus on the primary user group: archaeologists intent upon thorough, comparative analysis of large portions of the catalogue dataset. The needs of collection managers are shared to the extent that any archaeologist undertaking such analysis will at some point will need to find artefact *x* in box *y*, and it is the results of the analysis more so than the dataset that may be delivered to the community (see Crook 2002: 'Public interaction and accessibility'). If there were genuine interest, producing a tailored database would be similar to a popularised version of an archaeological investigation report: it is a good idea and is to be encouraged, but it cannot be considered until the technical trench and specialist reports have been prepared.

In sum, an artefact catalogue is largely a tool for the exclusive use of archaeologists, in which case the general public, perhaps even some collection managers, should be considered stakeholders rather than end-users.

## THE PROCESS OF STUDYING ARTEFACTS

Reporting artefacts from an excavation is a multi-stage process, of which cataloguing, or the description of the attributes of the individual artefacts, is only the first step. Subsequent stages of analysis and interpretation are of equal importance in the documentation process. At present in Australia there are numerous examples of site reports that include excellent artefact descriptions, and some examples of final interpretation, but there are very few examples of the middle stage, that of analysis or quantification. For a catalogue to work effectively as a source of information for analysis and interpretation, the nature of those end results must be considered when the catalogue is designed. The interpretation should be shaped by the questions asked in the research design, which in turn determine the kinds of analysis undertaken, and ultimately how the catalogue and the database are structured.

An artefact catalogue should be a record of the attributes of an artefact relevant to the dimensions of space, time, and form. Space, or which site, and where on the site, the artefact came from, is the most crucial variable for archaeologists. It is also the only attribute which is uniquely a product of the excavation, and which cannot be ascertained from the artefact itself. Without that information about stratigraphic context the artefacts are at worst just so much rubbish, and at best no different to the unprovenanced (but usually complete) objects in a museum collection. Despite this significance, information on context is all too often either not included in the final database or lost over time in storage facilities as artefacts become separated from bags and labels, or the labels do not include spatial information.

Time, or the age of an artefact, and form, or the type of artefact, are equally important to the final interpretation, but arguably both can be established by a reasonably skilled artefact specialist observing the artefact at any time after excavation, assuming the artefact has survived. However, information on both space and time is an essential component of the catalogue, particularly if the document is to be of any use to those who do not have the artefact itself before them. Form is perhaps the most straightforward data to be recorded, and the most amenable to standardisation of terms. With adequate training and supervision and the availability of comparative examples, either as actual objects or as good quality photographs, the quantity, shape, size, artefact class, weight, colour, identity, inscription etc. about a given artefact can be noted and recorded by junior staff and volunteers, often during the excavation itself. Standardised terminology and shared visual resources would facilitate this even further, and ensure greater accuracy and efficiency.

Greater expertise is generally required to identify manufacturing details and establish the age of an artefact, and faunal and botanical analysis are specialist skills. Here again standard terms and resources would streamline this element of recording. To identify manufacture (here encompassing both technology and manufacturer) and age often requires some research and the consultation of published (and unpublished) literature. For this reason these details may not be recorded until the excavation has finished and the work has moved to the lab. The additional research required does not mean that the omission of these details is justified however, or that they are not in some way fundamental parts of the catalogue information about an artefact.

Together, the recording of information about time, space, and form constitutes the creation of the artefact catalogue, which may be simultaneously or subsequently transferred to a database. The cataloguing process is essentially a descriptive one, in which a series of observed variables are noted, identified, and recorded. Cataloguing creates the data on which analysis and interpretation are based. The processes of analysing and interpreting these data are separate stages.

Analysis is the process of synthesising the raw data of the catalogue in order to identify patterns and describe the assemblage as a whole, and it requires that data be quantified and summarised in some form. Quantification establishes how much of a given item is present, and this is what varies across time and space. Measures for quantifying artefacts will be addressed below, but here it is worth noting the kinds of questions for which quantification provides answers. These questions include:

- how many artefacts, or of a type of artefact, are present in the site as a whole, in particular stratigraphic or excavation units, and in different temporal phases?
- are some artefact types concentrated in one part of the site than another?
- are some artefact types present in some phases and not others?

- what are the fragmentation rates of artefacts in different contexts?
- what kind of cross-mending is observed between and within different strata and depositional contexts?
- can primary and secondary contexts of discard be identified?

Answers to all of these questions are essential to understanding the site, but none of it is possible unless the raw data from the artefact catalogue are manipulated and summarised in tables and graphs that are designed to provide the kind of information required.

The final stage of reporting artefacts from a site is that of explanation and interpretation. It is here that the data are directly used to address the questions posed in the initial research design. Interpretation cannot be done without both an accurate catalogue and a detailed analysis, and both catalogue and analysis must be shaped with respect to the research design questions. Here the insights into taphonomy, behaviour and culture are used to address fundamental questions about the site itself and how it was used and changed over time, and ideally about broader theoretical and historical issues to do with class, gender, identity, race, the growth of cities, the development of industry, and so on.

## QUANTIFICATION

Analysis, and particularly quantification, is the stage most frequently absent from excavation reports in Australia, yet if the quantified analysis that underpins interpretations is not accessible then the conclusions themselves are less convincing. Archaeologists quantify artefacts in a variety of ways, most commonly fragment counts, fragment weights, and the minimum number of complete items. All have their place and usually some combination of all three will be used to measure variation between temporal and spatial units. The calculation of minimum number of complete objects (MNI[items] or MNV[essels]) is an essential part of analysis, particularly for glass and ceramic assemblages (Miller 1986, Sussman 2000).

Other artefact variables can also be usefully quantified, such as using the manufacturing period of artefacts to calculate mean terminus post quem and terminus ante quem dates for the site or components of the site (South 1977). Once calculated, MNV counts can be used to determine rates of use and discard of pottery (Frankel & Webb in press), and are a useful corrective to generalised assumptions, such as those made about alcohol consumption based solely on fragment counts or weight of bottle glass.

If the relevant information is recorded in the artefact catalogue, and if the electronic database is structured appropriately, it is not a difficult or time-consuming task to produce a wide variety of summary information that quantifies artefact assemblages. Relational databases such as Access, which can store detailed information about site stratigraphy and artefacts in separate but related files, are particularly useful in this regard. Artefact images, or site plans and photographs may also be stored, as can related documentary information about a site's inhabitants. Once properly programmed, Access can generate artefact distribution tables on a range of criteria in a matter of minutes.

Given the ease with which such results can be achieved, there can be little excuse for failing to include at least basic quantification information in the final site record. It is likely that it will continue to be the case that Australian archaeology as a whole will be content to let most site reports conclude with a basic artefact catalogue and description of types rather than insisting on the full interpretation being carried out at the time of excavation. Given this situation, it is even more important that some quantification be carried out and sum-

maries be presented of the artefact types found and their distribution across the site and through time. It is this information that makes the site record accessible to other archaeologists, and if it is not to be provided than at the very least a computer copy of the site database should be made available so that others can carry out the basic data manipulation themselves.

## PURPOSES OF THE CATALOGUE

Detailed, categorical recording of artefact attributes in a catalogue facilitates two kinds of studies: the study or selection of individual items (particularistic) and the study of assemblages of individual items in their context (archaeological). Put another way, these approaches contrast individual artefact identification against assemblage analysis—a distinction confused by the casual reference to artefact cataloguing as 'post-excavation analysis' when it comprises only the first stage of the off-site analytical process: identification.

A particularistic, material-cultural study is one concerned only by the representative or intrinsic values of an artefact. That is, a catalogue may be trawled to find an example a particular type of brick, pin or glass bottle, a rare ceramic transfer print or a maker's mark—perhaps for inclusion in a museum display, or a general study of variations in manufacturing processes. An archaeologist may well undertake such a search of one collection in order to assist with the process of completing the catalogue for another assemblage. In such cases, the precise context of recovery is of little relevance, as is the placement of the descriptive information about the artefact—it may all be within the database field and still provide the same information, once located.

When comparison of the attributes of one or more artefacts (*form*) from one or more occupation places (*space*) or phases (*time*) within a site is required, the careful allocation of data to dedicated fields is vital, and the study becomes archaeological. Such a study goes beyond the question of how many SPODE stamped creamware sherds are in the collection, to how many were recovered from the occupation of household *a*, what range of vessels were represented and how this compares with other tea or tablewares in the same stratigraphic deposits. Beyond that is the question of how each of these patterns compares with household *b* and *c*, neighbourhood *x* and city *y*—among other lateral avenues of research.

But the catalogue data plays a dual role in the analysis and interpretation of people, place and assemblage. Before questions about the archaeological signatures of a household can be accurately addressed, individual artefacts and assemblages make a significant contribution to the refining of the interpretation of stratigraphic units made on site (i.e. *form* informing *time* and *space*). Three key attributes of artefacts—date (absolute, less so than stylistic dates), usage wear and cross-mends with artefacts recovered elsewhere on site—can reinforce, challenge or clarify the understanding of site formation processes. An assemblage thought to be the result of primary deposition, but found in the lab to contain evidence of post-discard wear and is linked to other deposits by way of cross-mended sherds, could be re-interpreted, more reliably, as a secondary deposit. As one informs the other, the interpretation of the site stratigraphy is therefore itself not final until the artefact catalogue and analysis are complete. In both aspects of analytical endeavour, the electronic form of the catalogue is necessary for its comparative power and sadly, many trench reports are completed before or while the catalogue is in preparation and invariably before that data are entered into a database.

It is our contention that the needs of assemblage analysis take priority over particularistic studies when it comes to the design and production of artefact catalogues. That is, catalogues record artefact attributes to facilitate the holistic analysis

and interpretation of the site assemblage, or selected parts of it. *This must be the primary purpose of an artefact catalogue.* The secondary benefits such as the means to track the storage of items, or identify specific artefacts of interest are certainly important and useful to archaeologists and other practitioners, but the primary goal is to undertake assemblage analysis.

Having articulated the primary goal of a catalogue, four fundamental elements of a catalogue become clear. Firstly, an artefact catalogue is only one tool in the overall process and must be visualised, designed and integrated as part of whole process. Secondly, it must have features that facilitate reasonable quantification of quantity of fragments, weight and number of vessels. Thirdly, it should have features that facilitate categorical groupings by function, decoration, manufacture, modification, date and of course stratigraphic context, to the highest degree possible. Finally, the allocation of artefacts to these categories must be reliable and consistent.

## A LONG-TERM VIEW

However created, an artefact catalogue is both an analytical tool and part of the excavation record. In this sense, it is similar to stratigraphic context sheets completed in the field, with which the supervising archaeologist will piece together the overall chronology and use of the site. However, an artefact catalogue is generally conceived to lack the permanency of the record of the recovery of a stratigraphic unit—and with good reason. The nomenclature used to describe various artefacts is frequently debated, although that used to describe a foundation cut or silty loam is widely agreed upon and understood. There are other aids to the recovery of stratigraphic data such as Munsell charts, standard drawing symbols, not to mention several manuals and other publications on the methods of field archaeology. The imperative for this work is that an archaeological site recovered is a site destroyed, and key information overlooked in the field is gone forever.

When it comes to artefact identification and analysis—a laboratory-based endeavour—the imperative of accuracy-or-ruin is diminished. The assemblage (and site records) will be around to double-check uncertain ('unidentified') information, complete unexamined components of the collection ('bulk bags') or bring research initiatives to the dataset. Compounded by the lack of funding usually available at this stage of work, much work that might readily be undertaken on an assemblage and its catalogue is left for 'future researchers' (see Thorp 1994: 7.6). Careful, physical conservation of collections is undertaken for this purpose.

The perceived permanency of assemblages is a dangerous presumption, given the very real examples of site records lost and individual artefacts misplaced or stolen from collections, or damaged or compromised while stored (usually temporarily) in inadequate facilities (e.g. First Government House first season, Sydney; Hyde Park Barracks and the Mint, Sydney; Little Lonsdale Street, Melbourne). In other cases, entire collections have disappeared (e.g. Citylink/Saltwater Crossing, Melbourne; Destitute Asylum, Adelaide). In addition to accidental loss, some collections are culled to reduce the cost of storing artefacts deemed 'undiagnostic' or of no utility in *current* research pursuits.

But, for all those assemblages and site archives that have remained largely intact, how many 'future researchers' have returned to the collections and site archives to pick up where the identification or analysis left off? Some have tried, but soon gave up after difficulties of access to the records, and sadly the ready comprehension of them (see discussion below of the problems of access to data and the importance of thorough reporting; see also Watts 1996: 5–6.). The truth is that for some sites, an individual researcher would need to invest considerable time (ie several months) learning to navigate

their way through site records, and assess or surmise the accuracy of artefact identifications. Projects with funding for such a generous time frame are hard to come by.

To overcome these difficulties, we need not only envisage and design catalogues as part of a broader process, but we must take a long-term view and prepare for the possibility that that process may be staggered over a number of years, even decades. If the pattern of current practice is to continue, this must be acknowledged and accepted and measures undertaken to allow for it. Even in situations where thorough analysis is appropriately undertaken by the excavators, the records must still be ready for manipulation by new analytical techniques and comparison with new local, regional, inter-colonial or even international sites and datasets recovered decades later.

It is arguable that a collection of data in any field of archaeology can only meet the needs of the research program as it was envisaged at the time of the catalogue design. While in principle this is true, the profession collectively does not have the resources to allow what might be otherwise considered 'disposable databases', tossed away after meeting the needs of the research team. Each project should build upon the foundation of knowledge established previously, not re-establish those foundations with each encounter. Further, it is hard to imagine a historical-archaeological research program so narrow that its catalogue were useful to only one project. There is a core set of artefact attributes (function, decoration, quantity) necessary whether you are studying an urban cesspit or the surface scatter of a remote workers' camp. Specialised studies, such as usewear patterns on glass bottles, will invariably require re-examination but this will generally be of a small, manageable component of the whole assemblage and the standard catalogue would play an important role in the selection of that component. The task now is for the profession as a whole to agree upon this core dataset that will be the foundation of important research now and, for as far as we can foresee, in the future.

While the detail of that core is yet to be debated and resolved, some broader principles of cataloguing are determined by this long-term view. A catalogue must be accompanied by detailed reports defining the categories and data within these categories and assessment of the accuracy of allocation to those categories. It should seek to be compatible with other cataloguing systems or clearly define how it differs. Finally, given that together each dataset will comprise the platform for local, or potentially international comparisons—creating a huge dataset for assemblage analysis—catalogue records should provide sufficient detail to minimise physical inspection wherever possible.

## STANDARDS, GUIDELINES AND A CODE OF PRACTICE

Many professions and fields of research benefit from documentation, often prepared by a government body or authority, that outlines the standard of work expected from a range of practitioners. Other support documents may not be compulsory, but are distributed to assist the efficiency with which work is completed. Such documentation is a familiar reference point for many heritage-management reports and has successfully assisted the process of assessing the cultural significance of archaeological and other heritage sites, by application of well-developed criteria (e.g. *Archaeological Assessments* and *Assessing Heritage Significance* by the NSW Heritage Office). But can such documentation assist the task of cataloguing and can criteria be developed without imposing unrealistic demands, or can it be developed at all?

Firstly, widely distributed guidelines, glossaries or other support documents can certainly assist the process. Manuals such as these are typically produced for internal use by indi-

vidual teams or institutions, for example the Sydney Harbour Foreshore Authority (Snelgrove 1990); and the University of Sydney Centre for Historical Archaeology. Those produced in the teaching environment are designed to train less experienced individuals to catalogue comprehensively and provide diagrams of vessel form and templates of vessel size and often specify characteristics and 'tests' of artefact attributes (for example, the infamous 'tongue test' for porous earthenwares).

Some government agencies have ventured into the territory of manuals and guidelines for cataloguing, but the only example available, prepared by Heritage Victoria in 2001, does not provide the level of detail required to facilitate true consistency and comparability. The primary concern of the 'Archaeological Artefacts Management Guidelines' is physical packaging and storage of the delivered assemblage—which is an understandable priority for an authority that has rightly taken responsibility for storage and curation of the state's archaeological assemblage.

The document also lists a limited but functional suite of attributes as 'mandatory' fields and provides a very useful glossary of key words (providing detailed definitions for several materials and broader definitions for functional categories). However, many key words are not defined, most diverge from what has become standard in many other databases (e.g. the use of the term 'costume' instead of 'clothing', or the grouping of medical vessels and all food serving vessels under the category 'Domestic' rather than 'Medical', 'Food Service' and 'Food Preparation' that are typical elsewhere). Further, the document stops short of defining the data *within* categories in the catalogue. That is, we are informed that 'Containers [are] open, often shallow, containers, sometimes having a cover; made of pottery, glass, metal, wood or the like and used for various purposes, especially for holding or serving food' and in this system include 'plates, bowls, cups, eggcups, bottles, iron pots'. There is no further information, however, on how to distinguish plates from bowls when dealing with small rim fragments nor what distinguishes a bowl or bottle in this category from 'containers for serving and consuming food' and 'containers for storing or transporting food', under which 'bowl' and 'bottle' are listed respectively.

While this at least demonstrates the interest of some agencies in systemising the cataloguing process and demonstrates the potential for agency-issued guidelines, minimum recording standards and enforced criteria are another matter. The prospect of defining and agreeing upon criteria for all aspects of artefact cataloguing, now and in the future, is daunting at best, near unimaginable at worst. The consequence of mass production and continual redevelopment of sites leave us with a much fragmented and contested dataset of a range of goods of extraordinary variety. While working catalogue manuals may go much of the way, they rarely define all classes and types of artefacts to the required degree. Even detailed and rigorously researched publications such as the *Parks Canada Glass Glossary* and Coysh and Henrywood's *Dictionary of Blue and White Printed Pottery* regularly fail to account for thousands of fragments recovered from the archaeological record. Amidst this variety and possibility, how do we find common ground, particularly when each site encountered is likely to throw up types never encountered before?

The key is to develop and agree upon standards for the researching and reporting of artefact types, however they vary. That is, the mandatory categories required when cataloguing an assemblage and the mandatory elements that must be defined, justified and referenced in the assemblage report—with a view to establishing the level of internal consistency within each catalogue, even if the specific nomenclature differs from site to site. That is while one cataloguer may record only those sherds that have remains of a handle as teacups, and

another does not, later users can be certain that each approach will be articulated in the final report.

Minimum recording standards should not be a straight jacket. The agreed categories should be justified, widely agreed upon and well defined and researchers should be able to add other fields where required. Neither should minimum recording standards necessitate a mandatory database format or structure—although it would be advantageous.

The next level of defining the data within the categories—what characteristics of a sherd make it a saucer, rather than 'unidentified'—would require much more work and is probably better developed cumulatively, over time, with broad-based and structured discussion and input.

Several other successful sets of criteria, such as those for significance assessment, derive from well developed and widely available documents outlining the principles of task at hand. In the case of significance assessment, it is *The Burra Charter*. Other archaeological handbooks have been derived from a similar document of principles. In NSW, in 1993, a *Draft Code of Practice for Archaeological Investigations* was published by the then-Department of Planning and the Heritage Council of NSW. While the code itself was never implemented, it did give rise to a set of guidelines for the investigation and conservation of historical archaeological sites, to assist archaeologists and developers to investigate sites as efficiently and effectively as possible (NSW Dept. of Planning 1993b). Both the draft code and the guidelines were the outcome of a federally funded grant and structured consultation with the profession (Hutton 1989). A similar process of developing a code of practice or set of principles guiding artefact cataloguing could provide the foundation for successful measures to improve the accuracy and comparability of artefact catalogues.

While guidelines and criteria are important, they cannot work alone. Not only are other improvements—such as better training, serious intent to undertake comprehensive assemblage analysis and more publication of results—necessary, measures must be taken to test the level to which a catalogue complies with criteria. Also, and perhaps more importantly, the criteria and guidelines themselves need review in the longer term.

## QUALITY ASSURANCE AND TESTING

Notwithstanding the development of standards and guidelines, improved training and the wider availability of other reference material, accuracy, consistency and compliance to standards will not automatically follow. This is not because individuals are incompetent or disregard agreed procedures, but because there will always be variation in the interpretation of guidelines—no matter how well conceived or detailed they are. Further, when individuals are faced with the task of processing tens of thousands of broken sherds, mistakes will inevitably occur.

Three types of errors have been identified in the literature of quality assurance testing: *random errors* caused by errors in judgement or fluctuations in observation conditions; *systematic errors* occur when an incorrect attribute is consistently applied to a class of artefacts; and *illegitimate errors* which are genuine, accidental mistakes such as transcription errors (Gnaden & Holdaway 2000: 740). It is vital to the reliability of a catalogue that such errors be identified, distinguished and remedied wherever possible, or at the least, reported.

With regard to systematic errors, while they seem most troubling because an individual may take some responsibility for failing to thoroughly prepare for the task at hand, they are in fact the least troublesome because they can be amended fairly quickly and easily. If, for example, it is noted that all

kaolin marbles in a collection had been mistaken for stone, all marbles catalogued as stone may be re-examined and corrected where necessary, without casting doubt on whether all glass marbles were in fact glass. Random errors, caused by, for example, poor or variable lighting which might lead to misidentification of glass colour, are also serious, but might be avoided by a conscientious improvement of facilities or the introduction of physical reference sets subjected to the same conditions. Illegitimate errors, while seeming trivial (being mere typos or honest mistakes) are in fact the most troubling because they can affect any attribute of any class of artefact and can turn a wine glass into a gin bottle, if for example, code '12' is mistyped '122'. Further, the error will only be discovered by physical examination of the object if the catalogue is not comprehensive enough to throw up other anomalous information (i.e. a gin bottle or a tumbler accidentally allocated to the type 'Stemmed ware' described as a fluted bowl with a ball knob would readily stand-out in the database, but may not be detected from the database alone without such detailed descriptive fields).

Most cataloguing errors can be detected through fairly simple quality-assurance measures. For example, an experienced individual other than the primary cataloguer need only inspect and compare 2% or 3% of all artefacts with the prepared catalogue record to identify most systemic errors and approximate the rate of illegitimate or random errors. To date, such measures have been utilised in only a handful of historical-archaeological projects (e.g. the Exploring the Archaeology of the Modern City project, see Crook et al. 2002) and typically there has been limited scope to develop procedures beyond the immediate needs of the project. Several teams have developed methods to ensure that vital data (such as stratigraphic information) have been correctly entered into the database (e.g. Bickford 1993). It is presumed that most teams do develop means to verify the accuracy of their records, but these are unlikely to be systematic and either way are not generally considered worthy of discussion in the final report.

Further afield, Denis Gnaden and Simon Holdaway (2000) have published results of a study designed to measure the effect of inter-observer variation between an experienced and qualified 'Reference Observer' and a group of less-experienced students studying stone artefacts in western NSW. By comparing the differences in measurement results in a 2% sample of all artefacts recorded in the field, the authors revealed, for example, that some students were measuring platform thickness incorrectly, and did not always recognise incomplete blades but accurately identified most complete ones.

Gnaden and Holdaway stressed the importance of assessing observer variation:

...there is a fundamental necessity to determine the level of variation attributable to the people who manufactured artifacts in the past as distinct from the variation introduced by modern-day archaeologists. (Gnaden & Holdaway 2000: 745)

Further, they demonstrated that the process of identification led to improved procedures to overcome that variation in the current and future seasons of recording.

Quality-assurance testing and reporting must be integrated into the cataloguing process. If conducted at various stages during the process, identified errors may be corrected and further misapplication of criteria prevented. Other additional measures such as photographs of unusual or all artefacts can assist (but never replace) the re-examination of systematic errors of the other 98% of the collection (or parts of it) should it be necessary at a later date.

While some projects have utilised systematic testing of catalogues, there is much work to be done. Given the volume

of artefacts to be processed in historical archaeology, particularly on urban sites, the burden of producing mechanistically consistent records in the face of what can be a monotonous and exhaustive exercise must be shifted from the individual to the profession as a whole. We need to strive to develop systems, gather reference data and provide training to increase the frequency with which chosen systems of classification are applied to artefacts and perhaps more significantly, assess and report the level of conformance to that system.

This is a particular aspect of catalogue creation that requires widespread discussion, and perhaps exchanges with other professions and disciplines concerned with the maintenance of consistent and well recorded data recovery—the quality-assurance professionals being an obvious place to start, at the first principles level, with other reference to medical data collection (see Gnaden & Holdaway 2000).

## REPORTING

It is quite rare for a catalogue to be completed without an accompanying report that defines each field used in the database and outlines the overall methodology used in compiling the catalogue (usually for each artefact class). Typically, however, many of these reports are little more than a print-out of database field definitions and pick-lists, or provide only discursive information on a selected component of the assemblage (see Godden Mackay Logan (ed.) 1999: Vol 4 for exceptions).

What is often lacking, however, is more precise definition of data *within* the fields. While we all know what tea cups and saucers are, it is rarely clear whether, for the purposes of the catalogue, any sherd with a steep, curved rim and decoration on one side was identified as a 'saucer' or only those with the inner well for holding the cup were listed as saucers. Many catalogues are inconsistent on such points—sherds showing the same diagnostic characteristics could be recorded as 'Saucer' or 'Unidentified'.

While the latter may be the result of a less explicit, unsystematic action, remarkably, other systematic and self-referential systems such as type series, colour or shape codes are not described in reports and are discovered when data are accessed and utilised. Of course, standardised systems for such coding on all sites would alleviate the mystery, but there is a wider problem of individuals undervaluing the significance of such systems for subsequent analyses. In some cases, such information can be gathered from an individual who worked on the project but in many more cases the individual has left the field, is uncontactable owing to current work demands or cannot recall the details of the project. It is for this reason that documentation made at the time of work is crucial for future utility, or else like an excavation site, the information may be lost forever.

## TYPE SERIES

While some archaeologists choose not to develop a type series, most are familiar with the concept: a physical, hands-on resource—a representative sample of the collection to facilitate easy access to the whole. One example of an artefact, such as a sherd of willowware or a kaolin marble is selected and identified as 'Blue Transfer-printed Earthenware 1', or 'Marble 7', and any other sherds or items that are identical are recorded as 'repeats' of that representative type. Some unique artefacts will form a type that has only one or two, or no repeats, whereas something as common as willowware can have thousands of sherds allocated to the type.

The reasons usually cited for this (e.g. Thorp & Campbell Conservation 1994: 45) is to facilitate easy access to the whole assemblage. 'Types' are stored in one set of boxes; 'repeats' in

another. Incoming researchers new to the assemblage can peruse a few boxes to get an idea of the range of styles present—which is a particularly useful arrangement.

What has not been widely realised is the value that the database record of that type series can provide to researchers. A type series offers a pre-considered and systematic refinement of other categorical groupings into which each artefact fits. When comprehensively developed and recorded, the potential of a type series to streamline complex assemblage analysis is far-ranging, because it summarises categorical artefact attributes to their most significant degree. Because it identifies identical and potential matching sets the series can also assist the preparation of MNV counts after the initial round of cataloguing.

There is presently an opportunity to exploit already recorded type series—but it must be said, this can only work if the series was adequately described in an independent list (e.g. the Cumberland and Gloucester Streets site) or if recording sheets survive (e.g. Young Street and Raphael Place excavation, see Bickford 1993 and records held by the Museum of Sydney). Because type series are internally referential and often individualistic (Blue Earthenware 7 in one type series may refer to the Temple pattern produced only by Spode, and for other sites, any blue-transfer-printed scenic decoration), the need for careful curation and archiving of independent lists cannot be overstated. Even so, care must be taken when utilising a system developed for a specific purpose (a physical reference set) for a new use not intended by the cataloguers. Of course, the opportunities to devise type series in a fashion that allows complex analytical inquiry in the future are far greater.

## PHYSICAL AND VIRTUAL ACCESS TO COLLECTIONS, DATA AND REPORTS

While development of a standardised or at least compatible approach to catalogues and databases addresses one aspect of advancing Australian historical archaeology, an allied concern is to develop means by which datasets and other resources can be made readily available to researchers and managers. Currently, the final dispositions of collections, reports and datasets varies widely between Australian states and even regions, dependent upon legislative requirements, final ownership of materials and outputs, and the availability of storage facilities. In the absence of a centralised holding system it is difficult to determine what datasets are available, especially within the 'grey literature' of consultancy and unpublished reports, while access to these is often restricted anyway. The extreme size of this country compounds the problem by limiting opportunities to easily travel to specific repositories. Consequently, there is reduced scope for comparative analyses and at worst a loss of primary information as older reports and databases are misplaced or destroyed.

It is clear that some form of centralised system is essential, at the least to index archaeological reports, data and collection information so that relevant materials may be readily identified and retrieved. Preferably this would be developed into a full on-line data storage facility that would also provide direct access to these resources in digital form.

Although at first glance development of a national data access system is a daunting prospect, they are already in place in Europe and America (Roskams 2001: 271, 281). One example is the Archaeology Data Service (ADS), based in the UK, which aims to 'collect, describe, catalogue, preserve, and provide user support for digital resources that are created as a product of archaeological research' (Kilbride 2001). This free service operates at several levels, allowing the user to query the system for different types of site, regions, etc, and produce a listing of site reports and collection details. An assortment of reports, maps, plans, images, spatial information and data-

bases are available on-line within the ADS structure, or links to external sites are provided. An increasing number of older published and grey reports are also being made available. The National Archaeological DataBase (NADB) in the United States provides a similar but less extensive service.

Systems such as the ADS and NADB could readily provide a model for a comparable Australian effort, although it may be that direct collaboration and appropriation of an existing structure would be most efficient and expeditious. Although neither system appears to take a position on standardisation of data collection and treatment such as discussed here, having a common collection point obviously facilitates such a process. Attached to the ADS and NADB systems are a number of discussion papers and guidelines, such as thesauri for standard artefact, structure and boat descriptions, as well as papers and guidelines for standards and best practice. An Australian version could include the format for a standardised database and associated aids for identification described above, as well as direct access to example datasets. The questions of development funding, hosting and continuing management would naturally require some consideration, but are hardly insurmountable if this was approached as a national cross agency/institutional initiative. A broad-based collaboration in the establishment phase might also encourage widespread continuing usage.

While a discussion of physical storage and access to assemblages is outside of the scope of this paper, it is worth noting that in many areas museums and other traditional repositories are less willing to accept artefacts, unless they are accompanied by an appropriate endowment for storage and curation. In some instances the client, whether private or government, will meet these costs, although in the absence of a statutory requirement these sorts of acts of philanthropy are somewhat rare. This likelihood of diminishing assemblage storage capacity emphasises the need to ensure that whatever component of an assemblage is retained is not only adequate for future potential analytical needs, but is also 'storage effective'. In turn, this underscores the need for properly constructed and accessible databases, preferably with supporting materials such as images of diagnostic artefacts.

## THE WAY FORWARD

The way forward for Australasian historical-archaeological databases begins with a step backward: opening up the debate about what drives us to catalogue artefacts in the first place. Any proposed means to improve the reliability, comparability and effectiveness of catalogues, will only succeed if they are derived from a well developed foundation of agreed first principles. This paper has been written to work towards this first step.

Catalogues must be considered and designed within their methodological context and understood to be a tool in the greater process of contextualised assemblage analysis and interpretation. While catalogues must also serve as a tool for the management of a collection, their primary purpose must be to enable complex and comprehensive assemblage analysis. Inevitably, the debate about catalogues will be enhanced and complemented by a broader discussion of comparable frameworks for assemblage analysis and interpretation.

With our perspective positioned in the wider archaeological context, it is clear that a database must be designed to provide sufficient data to meet the needs of research, five, ten or 20 years down the track. To ensure that it does so, we need to share the knowledge accumulated in historical archaeology in the past two decades, improve consistency of data, increase clarity of terms and ensure transparency of process. These goals may be achieved by embracing new technologies, borrowing systems of management from unrelated disciplines (e.g. quality assurance), and utilising traditional methods of

knowledge exchange for training and professional development. Some avenues for bringing about these goals include:

- a Code of Practice or set of Principles adopted by associations such as ASHA, AACA, AIPA, AIMA and government agencies;
- development of specialised and detailed guidelines, with agreed nomenclature for cataloguing all artefact classes, prepared by, or in close consultation with, practising historical archaeologists;
- specialised and detailed publications concerning specific artefacts;
- the development of Quality Assurance systems to minimise errors and oversights;
- collaboration between universities to agree on the key protocols of artefact cataloguing and develop training manuals together to improve the artefact identification skills of historical-archaeological graduates;
- hold workshops and meetings to train newcomers, and keep practising archaeologists up to date with latest developments in artefact identification and assemblage analysis;
- a centralised electronic library for databases and accompanying reports (so others can learn from advances and pitfalls);
- a centralised and updateable bibliography of artefact identification and dating sources relevant to Australian sites;
- an image library of key artefact types as an aid to correct identification and description;
- improved guidelines, or minimum standards, for the delivery of artefact reports accompanying databases;
- a freely available basic database template based on one more of the most widely used forms of software package (such as Microsoft Access) together with guidelines for use—while it should be open for modification by the individual user, it would ensure at least some standardisation in the core database fields;
- thorough examination and comparison of current databases used by consultants and universities in Australian, with some investigation overseas; and, last but not least,
- use the databases we have and experiment with new means of analysing complex assemblages—for example the use of existing systems such as Type Series—to enhance the analytical power of catalogues and set the standard for future research.

At the time of writing, the above reads like little more than a wish list. However, some resources, such as a Code of Practice or a bibliography of artefact identification documents, may be prepared with minimal resources. An increasing number of excavations and analyses have associated web pages that provide a selection of images of objects and these may be pooled together, or used as a model for presenting data from other sites. While full-colour, hard-copy publications may never be substituted, developing resources around a maintained, fully searchable dataset in an open-access, on-line environment (e.g. an image library, or the ADS) will ensure an efficient, widely accessible source of important information that can grow over time.

While the consolidation of reference data may be established in the short term, other developments such as agreed and standardised nomenclature for artefact identification (i.e. what is meant by 'dorset button' or 'tack-shaped stopper'), and systems for quality assurance testing are not simple endeavours. They will require the investment of time and resources from a cross section of the profession: consultants, academics, professional societies, collection owners and managers, and

representatives from state, federal and local government agencies, committed to embarking on a long-term, in fact continuous, process of improvement. Some of these improvements will have no effect unless other hindrances in the archaeological process such as inadequate funding and insufficient training for post-excavation identification, analysis and interpretation are addressed. While it is crucial to explore all means to fund post-excavation identification, analysis and interpretation, we must also look to develop better systems to make the task of cataloguing and analysing more efficient and thus make the most of the funding to which we currently have access.

Some may not agree that these are the most effective methods of improvement, and provide far better suggestions of their own. With the amount of expertise accumulated throughout the field, there will inevitably be some disagreement, and this is not problematic. In fact, it is all the more reason for the profession as a whole to turn its attention to constructive debate and effectual, long-term problem-solving. What we are really aiming for is accuracy and consistency in recording, transparency in process, acknowledgement of limitations on the uses of different databases, and serious consideration of the long-term fate of the catalogues and associated documentation that we spend so long preparing. If we can begin by agreeing upon, and committing to, broader goals of cataloguing, disagreement over minor details would be considered a healthy expression of a diverse field of research, rather than a gulf in opinion that hinders us all. So let the debate begin!

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