# Database Applications in an Imperfect World: The Necessity and Charm of Compromise

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*In recent times each of the authors have implemented and utilised the same database tool in notably diverse situations. This paper seeks to highlight some of the pragmatic considerations which inevitably impinge upon any software implementation. Archival*

*tools and methodologies must be sufficiently robust to engage with this imperfect world. Compromise and flexibility are essential. These different experiences are brought together to illustrate the parity of our concerns and what we actually practise as archivists.*

The creation of documentation or metadata which enables records to be controlled and retrieved is the essential professional act of largesse which an archivist can bestow on the records for which he or she has responsibility. The selection, implementation and application of the appropriate medium to contain this metadata is usually fraught with crises of confidence, laughable resources, tortured legacy systems, imaginative timelines and a myriad of other equally ludicrous obstacles.

The engagement with these obstacles can take place on widely differing terrain: there is the treacherous, high, rocky ground of government archives, the marginal country of educational institutions which can be drought-prone, the arable land of collecting archives which is liable to weed infestations, and many others. However the fundamental issues of documentation system requirements and processes remain much the same in each case. That which unites us as archivists ultimately subsumes the differences of big and small, public and private, in-house and collecting. This article illustrates the experiences of different terrains and combatants with the same documentation tool. Each battleground has its own unique character and testing moments: the stories which follow are true (albeit with some judicious editing).

## Database daring in university archives (Kylie Percival)

There is more than a passing resemblance to a proud new parent when an archivist or records manager extols the virtues of their latest software baby, snugly installed in its new home while creating havoc around it. However, amidst the immediate post-implementation adulation, it can be beneficial to articulate the context and events which brought forth this new creation so that others might be wiser and other greyer heads might nod wisely. The practicalities of specific case histories can forewarn or inspire the uninitiated, and provide a touchstone of reassurance for those who know only too well the pitfalls. This section presents the context surrounding the implementation of the Heritage Documentation Management System (HDMS) developed by the Australian Science and Technology Heritage Centre (Austehc) at the Adelaide University Archives.

The Adelaide University Archives has always been a small operation. In 1999, the part-time University Archivist position evolved into a full-time role as Manager, Records and Archives Services. The University Archives comprises approximately 800 metres of records and our resources are still relatively

modest. However, the circumstances of the Archives have vastly improved in the past 12-month period. The key to this change is the revitalised support of senior management and the administrative relocation of the Archives from the Information Technology Services Division to the Office of the Vice-Chancellor. The resulting formation of the Records and Archives Services unit has provided a sound basis on which to establish an archives program which aims to engage seamlessly with current records management. The evolving proactive agenda of Records and Archives Services is a far cry from the previously disparate and marginalised University Archives and Records Management Office entities.

Aside from the restructure itself and the recruitment of key professional personnel, the pressing priority was to identify and implement new database management software for both current records management and the Archives. Both these areas had separate Filemaker Pro (version 2.1) legacy systems which had evolved in-house as 'short-term' expediencies several years previously. The steadfast unwillingness of previous University administrators to spend money on specialised software for records management forced staff to utilise the University's Filemaker Pro site licence. Filemaker Pro is a generic database software product produced by Claris (initially only available as a Macintosh product but later PC versions were released). Note however, that current relational Filemaker Pro version 5 software can be used very successfully in a small archives situation such as a school or sporting club. Indeed there are numerous examples of such applications in Adelaide.[1]

Initially as University Archivist, I simply sought a convenient means of searching the existing manual Series Register in an electronic format. There was a desperate requirement to address the unfamiliar array of University reference inquiries. While this was undoubtedly useful, the complexity of managing provenances, multiple accessions and items associated with any one series demanded a more sophisticated program. The constraints of this old software forced a host of sometimes ingenious contrivances with a proliferation of linked databases. The University Archives' database requirements had rapidly outgrown the flat file structure of Filemaker Pro version 2.1.[2]

Filemaker Pro had always been an unsuitable substitute for records management software. The Records Management Office had simply used their application of Filemaker Pro to manage the creation and location of files (a separate Lotus Notes database was used for the registration of correspondence). Meanwhile, the University's Information Technology Services area had not adopted the successive Filemaker Pro software upgrades and were generally withdrawing support for Filemaker applications. The

passage of time and the increasingly unrealistic demands on the software saw Filemaker Pro version 2.1 acquire a reputation for instability and 'flakey' behaviour. The inability of this outdated version of Filemaker to correctly store and retrieve post-2000 dates caused lesser disquiet. Ultimately this non-Y2K compliance was quite advantageous in recouping some of the system conversion costs from the generous bucket of Y2K funding.

Despite the common legacy systems, the new amalgamated structure, and notwithstanding the perceived theoretical advantages of integration, the software needs of the Archives and current records were deliberately considered as separate issues. This decision may well be revisited in the future. However in 1999, the expediencies associated with gaining support for a new records management system with an implementation deadline of December in the same year, demanded that the issues be kept as uncomplicated as possible. Consideration of archives documentation with reference to the records management software selection process would have muddied the waters and consumed time which was not available. The decision was made to proceed with TRIM version 4.3 to replace the file management for current records (and subsequently to manage document registration). The December 1999 deadline was met despite numerous hazards which were successfully countered by the exceptional efforts of those who supported the project.

Parallel to the TRIM project, I had been evaluating options for replacing the archives documentation. This decision was undoubtedly less critical; it was a less public issue with far fewer ongoing ramifications for the University. However the decision would have daily consequences for our work in the Archives so it was not undertaken lightly. The following factors influenced my decision. A Microsoft Access based system was an obvious choice because it would be supported by the University's Information Technology people. HDMS was an attractive solution, given its robust archival integrity and its ability to generate HTML files for a web-based finding aid. This software application had been used over several years in many different situations both large and small, including James Cook University. HDMS users had positively endorsed its functionality. The clinching factor was the attractive price. Also, Joanne Evans from Austehc was able to take the tab-delimited data exported from the Filemaker Pro legacy system and import it into the HDMS series table ready for our immediate use.

There were numerous adjustments to be made once the HDMS software was installed and these adjustments were required on the part of the people using the system – not the system itself. The Archives staff were well accustomed to the idiosyncrasies of the ancient Filemaker Pro databases. We knew how to manipulate them with endless tinkering to enable the databases to fulfil a

passing current requirement. In contrast, as Access novices we felt clumsy, inept and frustrated. The focus on the TRIM implementation meant there was little available time to invest in fully understanding this new archives software. Initially it took great resolve not to sneak peeks at the old databases to answer an inquiry – especially if time was pressing. Interestingly, there were no such temptations with TRIM but considerable time had been allocated to gaining familiarity with the system and to formal staff training prior to its implementation. Gradually we began to interact with the new HDMS database, to enter provenances and new accessions, and update series documentation, thus we came to appreciate its functionality and to utilise it more fully.

We are still coming to terms with one major adjustment – the inventory level control. Our past expediency was simply to create word-processed lists for those series which demanded inventory level control for the purposes of retrieval. However many large series such as minutes had no inventory control. While we were delighted to utilise the HDMS inventory capability for those series with word-processed lists, we were less enthusiastic about creating separate item records for series which we could simply manage on a series level. However the only means of managing locations in HDMS is via inventory control, so we were obliged to create at least one 'dummy' inventory record per series to manage locations. This has caused some frustration. Indeed we did explore the alternative of entering locations as free text in one of the series descriptive fields. But that raised an immediate difficulty with the HTML files generated from the database which subsequently displayed series locations within these free text descriptive fields for all to see – a most undesirable outcome. Thus we have become resigned to the use of 'dummy' inventory records for location management. However one of our own adaptations of HDMS has been the use of the series number as the prefix for the inventory number instead of the alpha prefix used more commonly. Thus an inventory number might be 0315/00001 with 315 as the series number. This has proved to be beneficial in browsing the inventory entries especially given the nature of these dummy inventory entries.

Since implementing HDMS our confidence and ability to use the system has increased significantly. We have been successfully weaned from our Filemaker databases. The current focus is on preparing, entering and reviewing our documentation to ensure the highest quality data when the HTML guide is made available to the public later in the year. The ability to see our data in the current HTML output has encouraged us to be more critical of our documentation. We can make changes to the data, regenerate the HTML guide with a couple of clicks and review the modified data immediately, which is most satisfying. We (and even our University IT colleagues) have been impressed with the level of sophisticated programming behind HDMS.

The Melbourne Austehc staff have been very helpful when we have occasionally required additional assistance. We have found it necessary to supplement the HDMS manual with our own basic procedures on how to register a provenance, accession, series and inventory item in HDMS. Future editions of the manual would benefit from the inclusion of pro formas for such procedures which users could tailor to their own organisations.

## Documenting the museum milieu (Francesca Zilio)

When I first entered the realm of museum collecting archives my initial thought amidst the panic was that archival practice was not universal; rather, two realms existed. One realm comprised the 'big' all-encompassing government archives and the other the rest of us. In my previous 'big' archive life where archives were the core business, I had boarded the evangelical bandwagon equipped with mandates and mantras ready to preach the paths of righteousness in order to make agencies compliant. At first glance my new life seemed to exist at the opposite end of the spectrum. Archival mandates and mantras didn't apply, compliance and accountability was unthinkable, and there were no other archivists with whom to deliberate the complexities of life. Chaos reigned supreme. In reality, the disjunction between these two realms is not so great, and what we have in common far exceeds anything that might separate us. This has been amply demonstrated by my recent experience at the South Australian Museum's Department of Anthropology Archives.

In the 1940s the Anthropology Archives evolved from the need to document objects held by the Museum's Department of Anthropology, to provide information for exhibitions and displays, and to document their contextual history. The records contained within the Archives include both original and copied documentation from all over Australia. In addition there are reprints of publications authored by South Australian Museum employees and other reprints that relate to South Australian Museum collections.

A working subset of the Archives are the Specimen Documentation files comprising information relating specifically to museum objects. Curators file original documentation such as correspondence or short articles alphabetically by donor and object registration number. Original documentation of more than a few folios are accessioned into the Archives. On occasion, archival records are copied and filed in the Specimen Documentation files thereby creating duplication and confusion. It is not clear under whose jurisdiction (archives or curatorial staff) the Specimen Documentation files truly fall.

With the collection growing exponentially Norman B Tindale, the curator of Anthropology, recognised the need to manage the records and aid their

retrieval.[3] Tindale implemented a registration system in 1949 whereby newly acquired paper documents such as correspondence, diaries, vocabularies and manuscripts were identified as AD (Anthropology Document) followed by the next sequential number. Photographs were allocated an AP (Anthropological Photographs) identifier followed by the next sequential number. Author or photographer, country, donor, condition, location, title, date, cross reference to object, photograph and/or document if required, and subject information was documented. In 1966, Tindale's successor Graeme Pretty secured a grant from the Australian Institute of Aboriginal Studies[4] to describe and accession records according to the Institute's procedures. This system incorporated the concept of provenance and location in which copies or originals existed. Using his experience as a librarian, Pretty further developed this registration system to include classifications linking the archives to the objects and to record formats. Classifications included Australian and Foreign Ethnology, Industrial History, Folk Culture, Archaeology, Human Biology and Museum History.

The first major review of the collection documentation came in 1978 when Pretty arranged for an assessment by an archivist. From 1980 to 1982, an archivist and two assistants were contracted to implement the record group system. Records were first accessioned and then arranged by collector, donor or creator. An AA (Anthropology Archives) prefix was allocated followed by the next sequential number thereby defining its group. Collections were then arranged into series and described accordingly. This implementation superseded Tindale's registration system but the previous 'AD' and 'AP' identifiers were retained. On completion, approximately 600 record groups were recorded into a paper-based manual system and returned to the curator's custody.

In the absence of an archivist, the record group system was not maintained nor was it fully understood. In the intervening years records were not arranged or described, creating an extensive backlog with some records remaining unprovenanced and unidentified. To compound the problem, the record group system in place assumed a comprehensive knowledge of the archives and its highly complex interrelationships in order to access and retrieve records. For example, Tindale donated his own manuscripts as well as records acquired from and/or created by fellow scientists. A collection may not have records created by the donor but comprise records created and/or collected by multiple people. Acquisitions were usually accessioned under the creator. This intellectual control was too rigid, as it focused on a single provenance for any series. Relationships between series and series, series and provenance, and provenance and provenance were not documented.

Confusion over provenance extended to physical control. Items carefully wrapped in layers of paper and plastic were stored loosely according to format; thousands of original photographs were placed on mobile shelving, whereas copies for publication and exhibitions were filed in albums in filing cabinets with no identifier linking the two. The result was an example of how to disperse a collection to as many locations as possible, and as a result originals were continually copied because the prospect of trying to locate a copy was too daunting.

A curious aspect of museum archives is the blurring between public records and 'collecting archives'. Public records can be broadly defined as those records created by a publicly funded agency in the conduct of business, while collecting archives are collected, acquired or received into an institution's custody through donation or bequest. At the South Australian Museum, as in other scientific institutions, many records fall into the blurred boundary between public and private records. These are predominantly research records of South Australian Museum scientists whose official work spills into private time and where projects are funded jointly by the employing institution and private organisations. This lack of clarity has contributed to the perception that records created during the course of business are in fact the personal property of the employee rather than the property of the organisations which paid for the work to be conducted. Through lack of policy and understanding, many past employees have not transferred records into the archives.

As I grappled with the complexities of the Anthropology Archives, I increasingly appreciated that archival practice did transcend the perceived boundaries between large government and small collecting archives. The tools and methodology within an archival theoretical construct were equally applicable within the two realms despite the size and resource disparity. These include standards, metadata, controlled vocabulary and functional appraisal, just to name a few.

As fate would have it, I discussed the difficulties of the Anthropology Archives with Gavan McCarthy from the Australian Science and Technology Heritage Centre at approximately 1 a.m. after the 1997 Adelaide ASA Conference dinner. As conversations ensued, my despair turned into confidence. I was hopeful that the implementation of an electronic archive management database such as Austehc's HDMS[5] would untangle the poorly maintained record group system to map the intricate web of relationships presented through series and provenance whilst capturing legacy systems.

Before implementing such a system, provenance and jurisdiction had to be clarified. Essentially, government records had to be captured intellectually

into a government recordkeeping system. To assist in making appraisal decisions on those records that fell into the 'blurred' and collecting category identified earlier, I read Terry Cook's 'Mind Over Matter: Towards a New Theory of Archival Appraisal'.[6] This is an uplifting article that looks at appraisal not only in the broad government context but also within non-government institutions and organisations. Cook maintains that once the institution has been appraised 'then the [resulting] image should certainly be further supplemented by personal, private records in all media by use of the documentation strategy to identify who or what has fallen through the cracks'.[7] By placing records in a broader socio-historical context or 'ambience' as argued by Chris Hurley, then a clearer image of what should be kept can be made.[8] Once the collections' provenance and jurisdiction had been ascertained the next step was to think about the archival control system.

In an ideal world I would have abandoned the record group system and begun afresh with an implementation of the Australian series system.[9] The series system focuses on the series as its unit of management, linking each and every one to its provenance or multi-provenances and related series. In addition, the creator's recordkeeping system would be maintained, the archival principles of provenance and original order respected, and controlled vocabulary used. However, labour intensive conversion to a new system is not always an option when resources are extremely limited.

I drew up a specification to clarify what I wanted the system to do, taking into account the practicalities of our situation. The South Australian Museum did not have an Information Technology section to develop an in-house system and there were minimal resources to purchase off-the-shelf software. Our specific needs were to:

- unite the multiple databases that had been created (previous attempts had been made to record information on Q&A and Microsoft Access databases for various components of the collection);
- capture legacy systems;
- manage at item level rather than just series (most South Australian Museum requests are focused on individual items such as photographs for genealogical research and publication, rather than series);
- map the relationship between series and series, series and provenance, provenance and provenance;
- retrieve information for native title and Aboriginal genealogical research (researchers request information about an individual or family, community or geographic location);

- incorporate the Tindale 'Catalog of Australian Aboriginal Tribes'[10] which is the vital point of access for native title and genealogy, and incorporate the Australian Institute for Aboriginal and Torres Strait Islander Studies' listing for language groups;
- comply with current descriptive standards such as ISAAR(CPF), the International Standard Archival Authority Record for Corporate Bodies, Persons and Families;[11]
- restrict access to culturally sensitive records;
- incorporate metadata such as Dublin Core;[12]
- produce an electronic and paper finding aid; and
- attach scanned images at a later date.

As the bureaucratic wheels turn slowly I did not acquire Austehc's HDMS until 1999. The HDMS has met all our specified requirements and is currently a work in progress. I worked with Austehc to tailor HDMS to meet the particular needs of South Australian Museum's Anthropology Archives. To date this partnership has been most productive and positive. There is so much to be done in practically applying our current archival management tools to collecting archives, and the South Australian Museum case is simply one example of how an individual archivist has attempted to engage with and apply these tools.

## Working across the spectrum (Helen Morgan)

As an archivist with the Australian Science and Technology Heritage Centre I have been fortunate to work across the spectrum of both the large and small, in-house and non-custodial archive, addressing government and collecting archive needs. The large Generation Victoria records project for the defunct State Electricity Commission of Victoria, undertaken over three years and dealing with kilometres of records, represents one such extreme. Elsewhere in the spectrum, I have worked from the collecting perspective on the records of Antarctic explorer and educationalist Dr Phillip Law, a project completed over an enjoyable three-month period in his sunroom using a laptop computer to document the accumulations of a lifetime.

A commonality of both the Generation Victoria and Phillip Law experiences was the reality of being a short-term or contract archivist – a project archivist working with a defined amount of resources (time and money, and never enough of either) both to get the project finished and to do justice to the records, ensuring that they have lives beyond their keepers. Regardless of the

permanence of archival positions or the scope of collections, the project approach should underline everything archivists do. We have found database technology invaluable in making that easier, from printing out box labels to item-level processing and searching, from being able to output data in multiple formats to satisfy reporting and auditing requirements, to keeping a tangible, measuring eye on progress. The database technology which was crucial to all aspects of running and completing the Generation Victoria records project[13] continues, in a more refined and sophisticated form, to meet the needs of the 'small' project work we now undertake, like Law. The archival processing tool which we developed, Heritage Documentation Management System (HDMS), is a database flexible enough to document the 'records continuum', series system, or record group (insert preferred construct here), and any archival decisions we made. This tool processes records, helps create finding aids, facilitates access, and manages physical locations and loans.

It is interesting to look back over the archival literature and note that in the 1980s archivists could condemn the emphasis on the management side of archiving, such as processing, storing and preserving, saying 'There is no point in "control without understanding"'.[14] This is true, however, with the relational database technology available to us now, these practical management issues don't need to be divorced from, or take away from time spent upon, the intellectual needs of the archive. There should be no 'scholar or administrator' dichotomy.

An archival documentation management system must:

- capture and document the intrinsic nature of records, archivally describing records and capturing context;
- support archivists and give them the tools to manage the whole process more efficiently, from accessioning records, managing inventory processing to producing printed guides and outputting into HTML, XML and EAD; and
- satisfy the range of users – the archivist on many levels and external users' informational needs, be that through hands-on highly structured (read-only) searching of the database system or through a guide on the Internet.

My greatest pleasure on finishing the Law records project was not bundling them up and seeing them safely off to the National Library of Australia, nor was it considering the project finished (there are always more records and I know that the Christmas card I sent Dr Law last year will end up among them!). It wasn't in successfully dealing with a researcher while the records were temporarily in Austehc's custody last year, or in combining word

processing, editing and database skills to produce a guide to the records, printable on demand. I was pleased with all these things and the ease with which, almost at the push of a single button, we generated an HTML guide from the Law database and published it on the Austehc website.[15] What gave me the greatest satisfaction was learning that someone in Hobart accessed the guide on the Internet and with no assistance from me whatsoever discovered that Law, being a thorough recordkeeper, had copies of blueprints of Wilkes station in his diaries. The original plans (and other copies) cannot be found in formal government recordkeeping systems within Australia and the United States Navy. Bringing the Law project to a point of completion and producing an outcome in the form of a guide sent out into the ether, out of my hands (out of anybody's hands) and knowing that somebody found something useful without the archivist's intervention is immensely satisfying.[16]

Processing work was first done on Phillip Law's records back in 1988 by Australian Science Archives Project staff members Gavan McCarthy and Oscar Manhal. Some of those records, ultimately destined for the National Library in Canberra, remained in Law's possession and others were temporarily in the custody of Museum Victoria while Law's biography was being researched and written. A guide to these records was produced from a number of word-processed documents.[17] In 1997 we approached the National Library and secured funding to document the remaining and still growing Law collection. We planned to use our HDMS database on the project. In order to incorporate the first accession from 1988 our first task was to take those four or five electronic files – the text of the printed guide – tab delimit the data and with a bit of tweaking import it into the inventory table of the database. I cut and pasted the series and provenance information into the series and provenance tables and retrospectively created an accession entry in the accession table, using information from the printed guide and from old ASAP working project files.

With the data in a manageable form I identified (and corrected if necessary) consistency issues, capturing the related nature of the records by the use of unique identifiers with the related functionality of the system. Because the work was begun in our pre-database days the common procedure of incorporating the series and sequence within series numbers into the inventory identifying (ID) number was used, ie 1/1. With potentially hundreds of items in a series and the exigencies of the way computers read data I had to change that numbering to read 01/001 to get it to order properly, but inscribed the files in pencil in the format 3/99 (as the original accession's were) for in the real world all those zeros looked silly. I was concerned about the items and their database equivalents being inscribed differently but the leading zeros in the series and provenance codes can be stripped out in the various output

formats. I have seen other users of database technology use the series/sequence combination and succumb to temptation, changing the unique identifier to reflect reordering of items in series as new items are discovered. A unique identifier is a unique identifier, simply that and should remain fixed. This is why we prefer to use barcodes and avoid the series/sequence combination, capturing this information separately in two fields. To satisfy the preference of researchers we order our inventory output based on these fields rather than the unique identifier. Had I been starting from scratch with the Law records I would have used barcodes, but finances (and my conscience) didn't allow for revisiting work from 1988.

The second phase of the Law project was straightforward and done at Law's home, made easy by processing the records straight into the database and enjoyable by discussions over tea breaks and lunch. I rehoused the records into acid-free boxes in their series groupings as required. The records ended up temporarily in our custody before transfer to the National Library. Using the loan/use functionality of the database I recorded all movements (locations and transfer dates) of the records which left Law's custody, from Law to Austehc to the National Library, against the relevant inventory items (in some cases Law has retained partial series). Those that remain in Law's custody are designated as such.

During this time a researcher (with Law's permission) used the records and I allowed her to search the database using the read-only user interface (as opposed to the edit interface containing full documentation including transferor details). From the database, using one of the customised reports it contains and a bit of my own fiddling, I produced an inventory report of all the items containing information on her subject.

The database made the task of transferring the records simple too, through its ability to generate box labels containing the collection name, repository name, series number and inventory range. Although processing had finished by this stage and the funding had been used up, the records were still in Austehc's custody and Law gave me occasional groups of records to add to the collection. It was a simple task to add them in. Because the printed and HTML guides were produced directly from the database it was easy to incorporate the additional records at the push of a button and not worry about version control between the tool (the database) and the output (the guides).

The archival relationships between the records and their creator have been explicitly captured using relational database technology and should be clear to successive archivists who engage with these records. These relationships

should also be clear to future researchers. Back in 1997 a former power station client commented to me that they preferred the archival software to the records management software because ours had 'layered thinking'.[18] The intellectual and physical management needs of the records have been met, and the HTML guide to Law's records is up there on the web and working.[19]

## Conclusion

This paper was not an attempt to provide an *Archives and Manuscripts* emulation of the current voyeuristic fad for 'real life' television. We have simply sought to offer a selection of modest yet real life case studies which demonstrate something of the vexations and imperfections of implementing database technology regardless of the technology's archival purity and robustness. Compromise is inevitable, and indeed desirable. Without compromise we would never begin to achieve our desired outcomes.

Theoretical rigour, the development of standards and the exploitation of software are all indispensable to our profession. Yet it is the application of these tools which heralds their greatest test. Given organisations with their fascinating idiosyncratic cultures, managers whose interest in records can often optimistically be described as marginal, the endless and inexplicable shifting alliances, together with all the other intriguing aspects of the contemporary workplace, what we achieve as archivists is eminently noteworthy, if not outright miraculous. Ultimately, the better we understand our particular terrain with its particular set of obstacles, the better we will be able to negotiate those obstacles and the more we achieve.

The process of contributing to this paper reinforced to each contributor the commonality of our experience as archivists. Superficially our circumstances might differ widely, yet we seek the same outcome for the records for which we are responsible. We wish to document material so that it can be identified and accessed by others largely independent of our continued intervention – we seek a partial and metaphoric redundancy for ourselves as relevant material is identified via available technology unaided by the archivist.

## Endnotes

1 Examples include Flinders University, Walford Anglican School for Girls, and the Royal Adelaide Golf Club.

2 Relational database functionality (as opposed to flat file systems) enables data entered once to be linked to data sets contained elsewhere in the database. For example, series data entered can be linked to each relevant inventory item without retyping the data on each occasion. Quite sophisticated data management becomes possible with minimum effort.

3 For more on Norman B Tindale as a recordkeeper, see F Jury, 'Invisible Boundaries: A Paradigm Shift', *Archives and Manuscripts*, vol. 27, no. 1, May 1999, pp. 62–73.

4 Now the Australian Institute for Aboriginal and Torres Strait Islander Studies.

5 It started life as the ADS (Archival Documentation Management System). For more on the early development of this tool see J Evans, 'Structure of the ADS', presentation at Archives and Reform – Preparing for Tomorrow, Australian Society of Archivists 1997 National Conference, Adelaide, 24–26 July 1997, at *www.asap.unimelb.edu.au/pubs/articles/asa97/ADSStructure.htm.*

6 T Cook, 'Mind over Matter: Towards a New Theory of Archival Appraisal', in B Craig (ed.), *The Archival Imagination – Essays in Honour of Hugh A Taylor*, Association of Canadian Archivists, 1992, pp. 39–70.

7 ibid., p. 51.

8 C Hurley, 'Ambient Functions – Abandoned Children to Zoos', *Archivaria*, no. 40, 1995, pp. 21–39.

9 For more information on the Australian series system as evident in the Commonwealth Record Series system (CRS) see the National Archives of Australia website at *naa12.naa.gov.au/manual/index.htm.*

10 From 1921 until the 1980s, Tindale mapped 'tribal' boundaries. This work culminated in his 1974 publication *Aboriginal Tribes of Australia: Their Terrain, Environmental Controls, Distribution, Limits and Proper Names*, Australian National University Press, Canberra. The catalog forms one part of the book that lists each tribe according to state.

11 *www.ica.org/cds/isaar_e.html.*

12 *purl.oclc.org/dc/.*

13 J Evans and M Novacco, 'The Generation Victoria Story', *Archives at the Centre: Proceedings of the Australian Society of Archivists Conference, Alice Springs, 24-25 May 1996*, Australian Society of Archivists, Canberra, 1997, pp. 45–51.

14 J Brazier, 'The Archivist: Scholar or Administrator?', *Archives and Manuscripts*, vol. 16, no. 1, May 1988, p. 12.

15 H Morgan, O Manhal and G McCarthy, *Phillip Garth Law: Guide to Records*, Australian Science and Technology Heritage Centre, Melbourne, 1999, at *www.austehc.unimelb.edu.au/guides/lawp/.*

16 See Michael McKernan on this issue, from the perspective of both researcher and repository manager in 'Reflections on Research', *Archivists – The Image and Future of the Profession: 1995 Conference Proceedings, Canberra, 27–29 July 1995*, Australian Society of Archivists, Canberra, 1996, pp. 64–70.

17 O Manhal and G McCarthy, *The Records of Phillip Garth Law (1912- )*, Australian Science Archives Project, Melbourne, 1989.

18 Personal communication with the author, 28 May 1997.

19 For more on web publishing and working with information infrastructure, see G McCarthy, 'Australian Science and Technology Heritage Centre: Networking Australia's Cultural Heritage', *Lasie*, vol. 31, no. 2, June 2000, pp. 33–8.