Paper 13

Enhancing Access to Australia's Rare Maps: the National Library Online Historical Map Digitisation Project

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BIOGRAPHICAL NOTE

Martin Woods is currently the Curator of Maps at the National Library of Australia. He was awarded a PhD in History in 2000 on the study of voluntary community service and civil society. He has worked extensively with the National Library's oral history, manuscripts and other special materials collections. In 1997 he edited Australia's oral history collections to produce a national directory which was subsequently launched as a website. Later, he was appointed Manager of collection services at the Australian War Memorial where he developed the Memorial's collection search system and military encyclopaedia. After a seven year absence he returned to the National Library as manager responsible for the reading rooms and offsite access. Having recently launched the Library's on-line E-resources website, he is now researching development of a geospatial search interface for the Library's Australian map collections.

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I'm here because I curate the Maps collection at the National Library. This is a time honoured role and one we're lucky the Library has continued to fill over several generations now, and its humbling to realise that people such as Dorothy Prescott have filled this role in the past. So I'd just like to say thanks to all previous curators for leaving the place so well organised and with everything in working order!

The Library Maps curator job is not specialist, in other words its not a cartographic or spatial sciences specialisation, though that might help, but involves the acquisition, management, storage, preservation, conservation and provision of access to maps held by the Library, and that means staffing, training, lobbying for resources etc, and all those other things that unfortunately require performance indicators.

My background is in information science and generalist Australian history. Speaking of which, one of our guilty pleasures is that when we have time we can research Australian history on one of the best imaginable collections, but more often we assist others in this, and provide education and visitor experiences. Above all, the aim is to make the maps we have, known and available as far as we possibly can, and to entice others to the study of maps.

THE COLLECTION

The National Library collection is quite possibly the largest historical map collection in Australia – 600,000 maps and 800,000 aerial maps and photographs. The rare map collection, defined as anything pre-1900 we can possibly fit into our secure store, is quite a bit smaller, about ten or more thousand sheets and 400 atlases, and we are still acquiring. A very brief history for those who haven't heard this from previous curators.

From its foundation in 1901, the Commonwealth Parliamentary Library, in which the National Library had its origins, held a small collection of maps, and atlases.

The collection grew from the efforts of a very few generous bibliophiles and map enthusiasts, including three gentlemen pictured. All very different backgrounds but one thing in common, a disorder called collecting. If collecting is a common enough disease these people had the advanced version. John Ferguson (1881-1969) – Judge of the New South Wales Industrial Commission who had a sideline in collecting and describing library materials, and the Library benefited to the tune of 900 cadastral maps and many others including several thousand sales plans of areas in and around Sydney. The Petherick Collection, acquired in 1911, was notable for its atlases, including the only known surviving copy of the 1659 edition of the Doncker maritime atlas. It has an immensely varied selection of historical maps with an Australia-Pacific emphasis. We are still 'discovering' Petherick, and this year has been another in which we were surprised by our own deficient cataloguing, when two manuscript copies of Vlamingh's outline chart of WA were revealed to us thanks to the keen eye of one of our conference speakers.

Actually, they should have been revealed for what they are earlier because Gunter Schilder, the well known Austrian historian of Dutch Australian exploration and cartography, and editor of the marvellous replica study series Monumenta Cartographica, 'rediscovered' the Van Keulen - Vlamingh charts on a flying visit in 1981. But that's another story and too long to go into details here. The significance of the charts Dorothy has alluded to, but I must add that we have no idea how Petherick 'liberated them from the Netherlands'. More interesting for historians of coastal charting, we've seen this week the Thevenot chart with its clunky west coast – it was to become the most famous depiction of New Holland until Flinders and Freycinet completed the outline. The earlier Thevenot coast did not have the remarkably detailed and far more recognisable shape of WA from the Swan to Exmouth that Vlamingh gave us, but it persisted with the release of the English chart by Bowen in 1744. This was primarily because Vlamingh's findings were not published widely until the 1750s, by which time the British and French were around the corner. Still, a wonderful find, with invaluable detail and now digitised, so not only Gunter Schilder can study them.

The other collector you saw was Rex Nan Kivell (1899-1977). He was born in New Zealand, and had a childhood obsession with the study of Australia and the Pacific, which became a reality when he started collecting in London during his convalescence from war service. He was partner and later owner of the Redfern Gallery in London, and extended his collecting interest across England, Europe and North Africa while pursuing his hobby of archaeology. In 1959 the Australian Government bought his collection of pictures, manuscripts, rare books and maps now held in the National Library. Among the 1,000 or so early maps are Dutch and French items of the sixteenth and seventeenth centuries tracing the development of exploration of the Indian ocean and Pacific. About a third of the collection traces Australia's development during the nineteenth century with a particular emphasis on cadastral and electoral maps of Victoria. He did not forget his New Zealand origins, however, for amongst the material is a superb atlas The Maori Wars, New Zealand 1863-4. Again, now digitised.

R V Tooley's collection of Australian maps is well documented. Unlike the other three collectors Tooley's interest was solely in maps and many of his Australian maps were acquired by the National Library in 1973. It is our priority this year to have completed the digitisation of our total Nan Kivell collection, and all our holdings of Tooley, between his catalogued numbers 1 and 1560.

For the present, these are the greatest single benefactors of the Library's national collection of maps, but we go on collecting.

BEGINNINGS OF DIGITISATION

Firstly. Why should we digitise maps? Do we even need to ask this after what we have seen this week?

A discussion a few weeks ago on the Map history list raised some questions. This particular discussion moved back and forth between advocates as they often do, sometimes driven by a pea under the mattress, but also often revealing some

important issues at play. In this case it was the future of historic map collections, their relevance and access.

I don't think anyone involved in that discussion would have argued against the idea that some collections, such as the National Library's or the well known David Rumsey website and many others have served to enhance the bibliographic record, and that is one key use. Or that security and preservation needs are well served by image capture programs.

Or that equally on the other hand, that in regard to things like watermark analysis only the original will do - for example to verify or otherwise, stated dates of publication which may be shown to be other than that appearing on the map in question. No matter how close we get to this digital image of a manuscript survey of properties adjacent to the Hunter River, we won't see the watermark plainly before us, referring to the stock of Whatman, Turkey Mill 1833. Perhaps we might solve this problem some time in the future?

As these discussions often do, all agreed, or agreed to disagree, and people moved on with their daily chores. I think the last email, wrapping it all up, said something like we all know we have to digitise our collections, and that the discussion of the basic premise of having digitisation programs was a non-issue, or ' beating a dead horse'. Obviously this came from someone with either plenty of money or knowhow or both.

Is it a non-issue? Reading between the lines there were some important questions raised in the discussion that suggest that the horse isn't dead, or to put it another way, any early explorer would have known, you're not flogging it, you're tenderising it!

I've tried to distill the issues raised into two groups, which might be described as hard, and harder. First the hard but essentially solvable problems. As one of the list discussors suggested, there are questions of access, security, curatorial and research needs that all hang off cost and quality. Are images of sufficient resolution and accuracy that they will allow the researcher to do his or her job, or allow checking for stocktaking or security?

Anyone doing a search for a map title on Google will see the proportion of low and medium resolution images returned, often there for sale and not particularly helpful for anything else. The issue for historical cartography and creating heritage digital collections becomes that of 'high quality', and achieving what is adequate.

These days fortunately, most institutions with the will to do so can't really claim that digital image capture is too expensive, and thankfully the technology for still image capture has improved markedly, so hopefully low resolution images will soon become a thing of the past.

I don't want to go through this problem by problem, and in some ways its better to look at the advantages of digitisation to give a better perspective on the problems, so lets look afresh at what are the advantages of high quality image capture.

Creating a digital copy of an item provides a surrogate which can be accessed and used instead of the original, thereby assisting in the preservation of the original. And

materials that are difficult to access because of their physical nature, such as large plans or fragile atlases, can then become accessible.

Apart from potential damage to older and more fragile materials, physical access has another potential down-side, and if you've heard the name Forbes Smiley you'll know that while security concerns can vary sizably from one institution to the next, basic security concerns will affect most.

The process of selecting items for digitisation and having images available on a personal computer gives curators and archivists a better overview of their collections and can assist with the cataloguing process, or with exhibitions and promotion. These advantages were brought together for us this year when doing research for the state and national libraries new website *Southland to New Holland*, which itself would not be possible without digitisation.

But equally, for the curator and for others doing the work, it is a relatively simple matter to send someone a URL without having to attach a whole digital file, and we can now shorthand reference enquiries as for this person doing Walter Burley Griffin research recently. This sort of question used to provoke a two-page essay. And for researchers it is possible, if the images are associated with catalogued information via a retrieval system, to search collections in all sorts of ways and expect some results.

Digitisation also allows the enhancement of an image or portion of the item. High on the list of a curator's priorities is to maintain the integrity of each item in his or her collection. Part of this involves preserving it in its original form, not altering or enhancing it in any way. Even when items are conserved the work must be obvious and reversible. However, the digitisation of an item allows sections to be enlarged or dare I say enhanced temporarily. We've seen plenty of examples this week where users have zoomed in and highlighted areas of plans and maps or analysed difficult sections of text.

This has helped in many cases already where users are more than willing, to identify obvious errors through exposure of the map together with the catalogue record.

Of course, I'm not denying that scanning a map doesn't cost. I was recently required to provide a costing of the image capture program for Maps at the Library, and the figure came in at about $35 per item. Not cheap, but not too bad either – we do about 1500 maps a year – although this cost doesn't count the existing equipment and some technical infrastructure. I'll go into it in a bit more detail in a minute but apart from the camera/scanner basically you need file management, storage and an internet delivery system. For most institutions, it is the infrastructure that's the substantial cost.

Even so, its do-able, and you don't have to agree to digitise everything. Somewhere you find there is a cutoff in your funds or the market or a historical value below which an institution won't scan. So first things first, we need to have some idea what people want and decide when we do and don't need to scan the item. But once undertaken scanning is a rare opportunity to look more closely at your collection, and in relative terms, scanning simply turns library running costs (high) into digital information running costs (eventually lower).

But regardless of digitisation costs, I have to admit to you to feeling guilty going into the rare maps store and thumbing through tens of atlases in the hope of finding some sheet when digital copies might have prevented handling by the librarians and myself. And of course, how much more difficult for a researcher, who does not have the luxury of ready access to a large collection.

With atlases and larger maps, digitisation becomes more problematic. And there again you have to work on the problem of how to get good pictures without undue stress to the material. But we also must weigh that against the stress of taking one picture if it saves 100s of handlings of the material.

CHALLENGES OF FORMATS

I'd like to talk to you now about some efforts we've made recently to improve the quality, reduce handling issues, and possibly even reduce costs. First a little history. Some years ago, Maura O'Connor was able to report on the inauguration of a project at the National Library to digitise some of the rare maps collection. That was 8 years ago, in 1998 – *400 weeks ago* - before Google, and before most of us had much content on our websites, if in fact we had one.
The National Library has been involved in digitising significant Australian material from its Pictures collection since the mid 90's, and in 2001 it embarked on a major digitisation project to provide improved access to some other formats. In 2004, digitisation of still image collection material became a mainstream activity, and over 150,000 still image collection items are now in a digital form.

Significant quantities of original Australian material has now been digitised including photographs, drawings and paintings, sheet music, manuscripts, and maps – now about 5 and a half thousand sheets.
Many of you will be familiar with and have found images using the National Library's Catalogue.

It seems hard to believe, but it was just three years ago for us that it could be truly argued that access to this important collection of early cartographic material was limited for researchers to personal visits or occasional viewings of their material of interest in exhibitions and publications.

Maps digitisation was till then seemingly still the province of the Library of Congress, University of Georgia and British Columbia Archives, to name the leaders, who could afford to provide static images of their rare and fragile map collections in lists over the Internet.

It can also be said that since then, there has been an explosion of digitisation, text, images, audio and video streaming and downloading, backed by systems that can handle files and metadata, and deliver images to an expanding variety of personal and often portable hardware devices. To what extent this may be said of maps, and especially heritage maps, is a big question, but for now will turn the focus to the National Library program.

The National Library has been digitising parts of its collections since the late 1990's in an effort to provide effective and open online access. We are currently routinely digitising significant amounts of Australian heritage materials across a range of formats. The principles are the same for each. Our approach has been to digitise selected materials to assist users in accessing and exploring our collections.
The Library's Digitisation Policy says it like this:

- Enabling users, regardless of location, to directly access and use a range of digitised materials relating to Australia and Australians

But to put in non-program speak, to make history fun. If I can digress for a minute, Robert White, from the University of Sydney recently addressed the question of teaching history in schools raised by the Prime Minister, and suggested the idea of mixing pleasure with "instruction". *Radical! Anyway,* He was concerned with the problem of making Australian History interesting to first year students. He made the point that like travel, history has the attraction of making connections between what's familiar and what's strange and exotic. With travel we visit unfamiliar places, and with history we also visit unfamiliar times, and we are making connections from the here and now to the there and then. He didn't mention them but I'm sure he had in mind maps, because where else is there this tension between instruction and entertainment, and between the familiar and the strange, so strong? Its in the nature of maps, and in the very history of cartography as we have seen this week. So in short, maps are mysterious and fun as well as educational and we need to let more people know this to keep our heritage collections relevant to everyone.
But returning to our stated aims -

- In line with our digitisation objectives the Library's overall philosophy is digitisation for long term access, preservation and re-use.
- We digitise each item once to a high standard so that it can be reused for many purposes. For example we use our digital images to illustrate our publications, and we make them available for purchase by the public online and we use them for Preservation condition reports when lending collection material for an exhibition.

We ensure that the items are described in some way before they are digitised. This includes arrangement, classification, naming, cataloguing and the provision of metadata. And we now have volunteers who are describing the content of atlas sheets and deciphering some of the difficult language we lack the skills or the time to do ourselves.

I realise I'm running short of time so I want to do a couple of things now.

First a very brief overview of how we capture maps and make them available, second an approach we've taken with some more difficult items.

In delivering our digitised content to users we have a delivery system that supports maps, and provides a contextual display that allows users to navigate pages, and zoom in to view fine details. If we return to our users, a map is just a picture if we can't see the details. We currently use the proprietary software MrSID (Multi-resolution Seamless Image Database), produced by LizardTech, which allows excellent zooming capability but poor customisation. We expect to move to an open source software

within the year, JPEG 2000, which will simply mean for our researchers they will be able to zoom much more easily.

Just as important, we ensure that each digital image delivered on the web has a Persistent Identifier. That is a unique name in the image url that remains the same regardless of where the resource is located. In English, this means that when you search through Dorothy's reading list and find a url, you can expect it to always be there. For this we purchased a resolver service and these are now readily available under license. Equally important it means we get onto Google every time someone searches the right set of words.

The Library's digital services architecture comprises:

- Lots of storage and backup
- A Digital Collections Manager which supports the digitisation process, the creation of derivative objects (such as thumbnail images and high resolution images), and technical metadata.
- A Persistent Identifier Resolver Service so that all digital collection objects can be allocated a link which can be accessed via the web and can be referenced in scholarly papers, bookmarks, and hyperlinks from other web pages, with the confidence that this citation will never "break".
- And for the user, probably most important of all, a Delivery System that works best for the materials for digitised collection items to support access via the web.

It goes without saying that maps are less easy than some formats. The problem with maps is that like Port Darwin they can be too large to get a good photo of ! Even with the best possible camera available to us, we cannot get close enough to the map to retain perfect visual acuity, and take in the whole length and breadth of what we can see. The reason for the very high quality of images you've seen this week is that our cameras are married to a scanning back system, which allows us to archive the image at the highest possible resolution, but basically if the camera doesn't see it, the scan won't show it. Or put it another way, if we capture the whole map sheet, we cannot display the details that are on it. The only solution to date is to reduce quality, which is not what we want to do, or, to tile the images, in other words to create images of sections of each map.

This next map is about as far as we can go in one shot and not lose detail and if I was to zoom you'd see a pretty good product.

This is the overview shot of Plate 49 from Tallis's huge illustrated atlas and modern history of the world – a map of Australia showing 64 counties in N.S.W., 24 counties in Victoria and 26 counties in Western Australia. You can see the collection identifier is nla.map indicating the item is from the Map collection, and nk4617 is the unique number we've assigned to this collection item.

This next example is the persistent identifier for A general chart of the Indian and part of the Pacific Oceans, shewing the various passages with 1860 additions, carefully constructed & compiled from the most approved observations and modern surveys, by J.S. Hobbs, F.R.G.S. Hydrographer. And if Hobbs carefully constructed it, we should at least do it justice!

As you can see, its a map on two sheets, each 54 x 193 cm. We want to show both sheets, zoomable in fine detail, and we want persistence. This means we have to make use of gridding. Large collection items cannot always be captured photographically in a single image on a 1:1 ratio. In this circumstance, two shots were needed to get the whole thing in - these images (or photographic "tiles"), together make the whole. In general, the files from such a process are given grid-based Persistent Identifiers so the delivery system knows how to the render the items online. Behind this is a fairly simple java language script which converts the information on the spreadsheet into something the Digital Collection Management system can read, and then convert into the sequence we want to see.

This Plate of the Indian Sea published by Tower in 1750, is a map on 4 sheets, each about a half metre squared. It includes all sorts of insets and details we would struggle to show with any conviction if we limited ourselves to one overview shot and tried to zoom on that. Even at 400dpi, the distance we would have to take the camera back with existing cameras would not allow us any detail visible to the naked eye.

For this map in nine large sheets - Arrowsmith's *Chart of the Pacific Ocean* – each sheet a metre or so square how – could the user be expected to see the chart as a whole, and yet also view the details in one place, edition date, see all the discoveries from Byron to Walpole, or decipher the flurry of activity around the Solomons, or see the volcanic New Hanover as an extension of New Ireland, rather than an island in its own right.

The same sort of problem occurs with atlases, in that case to sequence all the sheets correctly, and we're now into our fifth Dutch atlas digitisation sequence.

But perhaps the format that has challenged us the most are the Echuca river-pilot charts. These require a more complex spreadsheet, to indicate how many grids are needed, and to show the user how the chart was most likely played out, as well as the details.
Really there's not really a limit to this as you can see from the spreadsheet.

The beginning was incredibly small - twenty-five maps from the Rex Nan Kivell rare map collection using a basic SLR camera that could at least deliver a high resolution image over which we placed MRSID, attached it to a catalogue record, gave it an identifier, and put it up on the web, and there you have it!

To sum up - the primary purpose of the digitisation project is to vastly improve access for all Australians to one of the most valuable research resources for Australian history and culture, and if I was thinking about issues surrounding the future of digitisation of cartographic heritage materials, and I was, I'd start with access. That's my library background showing through.

WHAT'S NEXT

I mentioned that the National Library has digitised approximately 5,600 of its rarest maps from its special map collections. SLNSW, which has a similarly large and impressive collection of rare world and Australian maps, has digitised about 1200

items. SLVIC, which has over 100,000 maps of various formats and ages, now has over 600 of its Metropolitan Board of Works plans digitised and available online through a custom-built interactive application via the Main Catalogue. There are a number of significant University collections, some containing unique historical components, such as the University of Melbourne Rare and Historical collection, with approximately 15,000 rare historic maps of countries and regions from around the world, the majority representing Australia, with some 200 or more digitised.
In Australia, leading the way as far as heritage maps are concerned is the NSW Lands department. Remarkably, Lands has digitised over 35,000 of its parish maps and is a real treasure trove for Australian family historians and others.

But really there is a lot that is not available, so I'd say number one is how to get more images up there and available. All our efforts pale by comparison with what the British are now achieving through their heritage lottery money to scan at high resolution the entire ordnance survey, available through English, Scottish and Irish websites, on a fee-based arrangement.

So problem one, more maps. Among the Australian public collections, progress towards digitisation has been quite slow. Why is this so? Are maps not fun? I'd like a dollar for every time I've heard someone say, "I love maps". These are often people with a passing interest, those of you who have an abiding interest would probably say, I need maps. But why do they say it. The manager in me says do they have any money or wherewithal?

Australian history is starting to make good TV, and this year has been a bumper one at that. I see maps and maps collections suffering the same advantages and disadvantages as the teaching of history itself. In fact they might be considered both a primary source and allegory. They are to most people arcane, mysterious, revelatory, banal, immensely detailed but sometimes instantly revelatory. We need to encourage our lords and masters whoever they are to keep maps in the front ranks – since we know that digitisation programs are not only helping to preserve irreplaceable items but are also making them available to the world. I'm always amazed by the incredible objects that come into the digitisation studio at the library. It's a privilege and a pleasure to be able to photograph them and know that we are helping the rest of the world to see them too.

What else? OCR – ing text in atlases or on maps sheets? Who's doing that?
Overlaying current raster images over old maps? Can we do that?
Providing a search interface that is actually designed for finding places – that would be good!

Our program is wedded to a standard catalogue interface. Are there smart people out there who can develop interfaces for heritage materials that work off place, rather than via the usual clunk library catalogue. The State Library of Victoria has shown that there are.

And here's another issue. Carpal Tunnel effect, or searching on four hundred databases. As we move into digitisation of these important collections, how do we find the individual maps and plans? Persistent identifiers will help, and OCR would

help at some point, but can we reduce the options, and are there venues already that we can share data with.

I'd like to put in a plug here for libraries, and particularly Libraries Australia. LA is a federated search which allows access to catalogue records and digital items in all Australian libraries, as long as they meet basic cataloguing and digitisation standards. Its not Maps Australia, but it's a good start.

Digitisation is one of the key projects in most of Australia's cultural institutions. Whatever we may think of the value of the original over the surrogate, the quality, the feel, the sense of the object, it is its representation that is attracting attention, and funding.

Why? We live in a digital age, students deal in the image or sound recording much more than they view the object. It has always been the case that far fewer objects could be seen "in the flesh" than existed. This is still the case. It is a frustration of curators, historians, collectors, museum custodians and general public that it is . How far is that frustration met by digitisation, and particularly of Maps digitisation?

Thank you.

REFERENCES

Selected Images:

T Zuijd landt ontdeckt door Willem de Vlaming
http://nla.gov.au/nla.map-rm751
http://nla.gov.au/nla.map-rm752

Maori Wars (atlas),
http://nla.gov.au/nla.map-ra148

Map of properties adjacent to Hunter River
http://nla.gov.au/nla.map-f382

A plat of the Indian Sea from Cabo Bonea Esperanca to Iapan
http://nla.gov.au/nla.map-t917

This chart of the Pacific Ocean
http://nla.gov.au/nla.map-t61

City of Morgan, Morgan to Wentworth (Echuca River chart)
http://nla.gov.au/nla.map-erpc1-5

Websites:

South Land to New Holland: Dutch Charting of Australia 1606–1756
http://www.nla.gov.au/exhibitions/southland/

Images of early maps on the web
http://www.maphistory.info/webimages.html

State Library of Victoria, MMBW Melbourne Sewerage Plans
http://www.slv.vic.gov.au/cgi-bin/map_item.pl?init=MAIN_GRID_SYSTEM

Libraries Australia
http://librariesaustralia.nla.gov.au/apps/kss