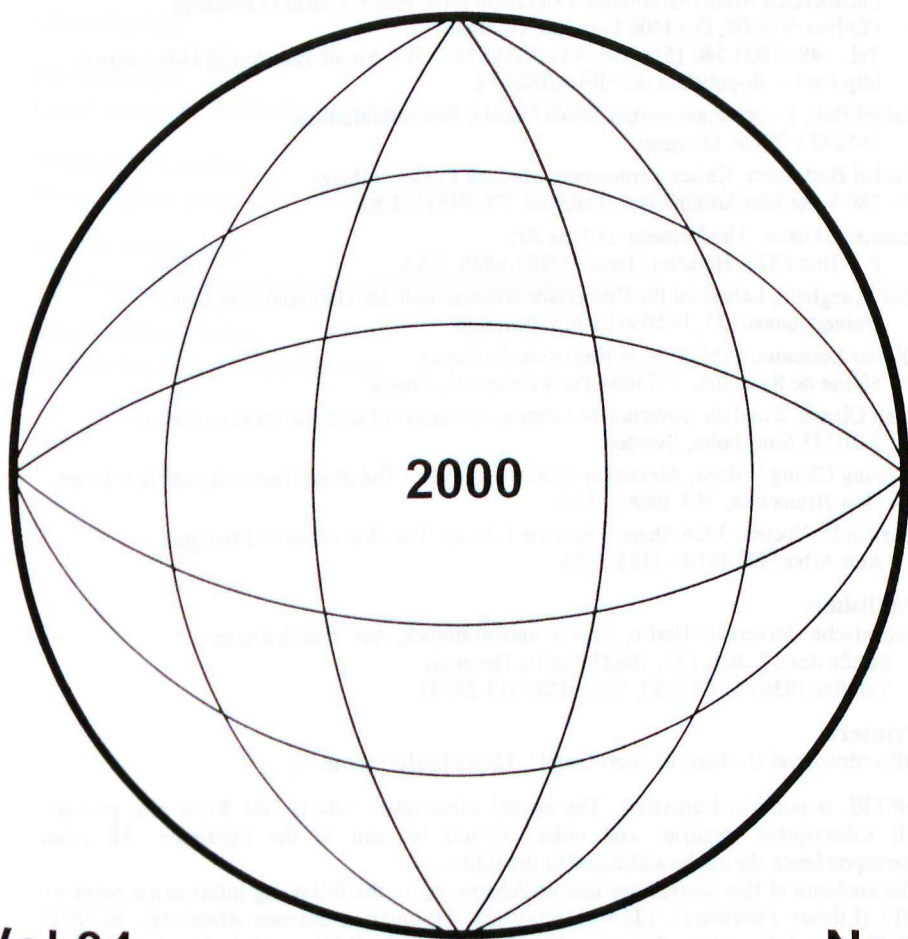


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THE ROLES OF KNOWLEDGE PROFESSIONALS FOR KNOWLEDGE MANAGEMENT*

By Seonghee Kim

Abstract: Knowledge and Knowledge Management have emerged as a current 'hot issue' for many organizations. This paper starts by exploring the definition of knowledge and knowledge management. It then considers the partnership for knowledge management, and especially how librarians as knowledge professionals, users, and technology experts can contribute to effective knowledge management. It is concluded that knowledge professionals will have to move from the background to the center of the organizational stage, to jointly hold the reins of knowledge management.

Introduction

In this information and knowledge age, knowledge is the most important factor in the long term success of both an individual and organization. In fact, knowledge may soon be the only source of competitive advantage for an organization. These knowledge assets reside in many different places such as: database, knowledge bases, filing cabinets and peoples' heads and are distributed right across the organization. All too often one part of an organization repeats work of another part simply because it is impossible to keep track of, and make use of knowledge in other parts. Libraries as major functions of an organization need to know what the organization's corporate knowledge assets are and how to manage and make use of these assets to get maximum return. This paper explores the phenomenon of Knowledge Management(KM) from the viewpoint of a management academic with a professional background as a librarian. Then, the paper proposes new roles of librarians for maximizing the value of knowledge in an intelligent organization.

Knowledge and Knowledge Management

The organization's success depends critically on a successful knowledge management. Knowledge assets are the knowledge that an organization owns or

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needs to own to achieve its goals. Knowledge equals information, extracted, filtered or formatted in some way.

Knowledge can be divided into two types. They are tacit knowledge and explicit knowledge. Tacit knowledge consists of the hands-on skills, best practices, special know-how, heuristic, intuitions, and so on. Tacit knowledge is personal knowledge that is hard to formalize or articulate (Polanyi 1973). The transfer of tacit knowledge is by tradition and shared experience, through for example, apprenticeship or job training. Tacit knowledge in an organization ensures task effectiveness -- that the right things are being done so that the work unit could attain its objectives. It also provides for a kind of creative robustness -- intuition and heuristic can often tackle tough problems that would otherwise be difficult to solve. Whereas tacit knowledge is implicit, explicit knowledge is rule-based knowledge that is used to match actions to situations by invoking appropriate rules. Explicit knowledge guides action by answering three questions: what kind of situation is this? What kind of person am I or: What kind of organization is this? and finally, What does a person or an organization do in a situation such as this? (March 1994). Explicit knowledge is used in the design of routines, standard operation procedures, and the structure of data records. Explicit knowledge enables the organization to enjoy a certain level of operational efficiency and control. It also promotes equitable, consistent organizational responses. Those forms of knowledge can be found in any organization. The organization however, is skilled at continuously expanding, renewing, and refreshing its knowledge in all categories. The organization promotes the learning of tacit knowledge to increase the skill and creative capacity of its employees and takes advantage of explicit knowledge to maximize efficiency. In effect, the organization has acquired a third class of knowledge - meta-knowledge- that it uses to create and integrate all its intellectual resources in order to achieve high levels of performance.

The organization adopts a holistic approach to knowledge management that successfully combines tacit and explicit knowledge at all levels of the organization. Tacit knowledge is cultivated in an organizational culture that motivates through shared vision and common purpose. Personal knowledge is leveraged with explicit knowledge for the design and development of innovative products, services and processes. Strategic vision and operational expertise are fused in creative action.

Where an organization's performance is heavily reliant on knowledge work then knowledge management is pivotal. Knowledge work emphasizes the use of professional intellect in activities which use individual and external knowledge.

Knowledge Management is a discipline that promotes an integrated approach to identifying, managing and sharing all of an organization's knowledge assets including unarticulated expertise and experience resident in individual workers. In other words, knowledge management is taking advantage of what you know. Knowledge Management involves the identification and analysis of available and required knowledge, and the subsequent planning and control of actions to develop knowledge assets so as to fulfill organizational objectives. Knowledge Management is not about managing or organizing books or journals, searching the inherent for clients or arranging for the circulation of materials. However, each of these activities can in some way be part of the knowledge management spectrum and processes. Knowledge Management is about enhancing the use of organizational knowledge through sound practices of knowledge management and organizational learning. Thus, Knowledge Management is a combination of information Management, Communications, and Human Resources.

The purpose of Knowledge Management is to deliver value to organization. The basic goal of knowledge management is to harness the knowledge resources and knowledge capabilities of the organization in order to enable the organization to learn and adapt to its changing environment (Auster and Choo, 1995). Therefore, Knowledge Management practices aim to draw out the tacit knowledge people have, what they carry around with them, what they observe and learn from experience, rather than what is usually explicitly stated. Managing knowledge goes much further than capturing data and manipulating it to obtain information. Davenport (1993) explains that knowledge management process is about acquisition, creation, packaging, and application or reuse of knowledge. Some examples of each of these types of knowledge management process are:

- Knowledge Acquisition: finding existing knowledge, understanding requirements, searching among multiple sources.
- Knowledge Creation: research activities, creative processes in advertising, writing books or articles, making movies, and so on.
- Packaging: publishing, editing, design work
- Applying or using existing knowledge : auditing, medical diagnosis;
- Reuse of knowledge for new purpose: leveraging knowledge in product development processes, software development.

The partnerships for knowledge management

I have described the concept of knowledge and knowledge management. Knowledge -based systems forge new partnerships that bring together the

organization's capabilities to create and use knowledge, organize knowledge, and build infrastructures that enable the effective management of knowledge.

Three groups of experts who need to work together as teams of knowledge partners are at the heart of the knowledge center. They are users, knowledge professionals including librarians, and technology experts.

Users are the individuals in the organization who are personally involved in the act of creating and using knowledge. Users, including the professionals, technologists, managers, and many others possess and apply the tacit knowledge and explicit knowledge. The knowledge and expertise they have is specialized and focused on the organization's domain of activity. Through their coordinated effort the organization as a whole performs its role and attains its goals. Through their knowledge creation and use, the organization learns, makes discoveries, creates innovations, and undergoes adaptation.

Knowledge professionals are the individuals in the knowledge center who have the skills, training and know-how to organize knowledge into systems and structures that facilitate the productive use of knowledge resources. They include librarians, records managers, archivists, and other information specialists. Their tasks include the representation of the various kinds of organizational knowledge; developing methods and systems of structuring and accessing knowledge; knowledge distribution and delivery; amplifying the usefulness and value of knowledge; knowledge storage and retrieval; and so on. Their general focus is to enhance the accessibility and quality of knowledge so that the organization will have an enlightened view of itself and its environment. The knowledge professionals design and develop knowledge products and services that promote learning and awareness; they preserve the organization's memory to provide the continuity and context for action and interpretation.

The knowledge technology (KT) experts are the individuals in the organization who have the specialized expertise to fashion the knowledge infrastructure of the organization. The knowledge technology experts include the system analysts, system designers, software engineers, programmers, data administrators, network managers, and other specialists who develop knowledge based systems and networks. Their general focus is to establish and maintain an knowledge infrastructure that models the flow and transaction of knowledge, and accelerates the processing of data and communication of messages. The knowledge technology experts build applications, databases, networks that allow the organization to do its work with accuracy, reliability, and speed.

In the intelligent organization, the knowledge of the three groups of users, knowledge managers, and KT experts congeal into a superstructure for

organizational learning and growth. In order to work together in teams of users, knowledge professionals, and knowledge technology experts, each group will need to re-orientate its traditional mindset. Users will need to separate the management of knowledge from the management of knowledge technology. Knowledge technology in most cases has been heavily managed, whereas the management of knowledge processes -- identifying needs, acquiring knowledge, organizing and storing knowledge, developing knowledge services, distributing knowledge, and using knowledge -- has been largely neglected. Users need to understand that the goals and principles of knowledge management are quite different from the objectives and methods of knowledge technology management. Users could participate fully in these knowledge processes, not just as end-consumers of knowledge services, but as active agents in every activity of the knowledge management cycle, especially in clarifying knowledge needs, collecting knowledge, sharing knowledge, and transforming raw data into useable knowledge. Users should share the responsibility of identifying and communicating their knowledge needs, and not abdicate this work completely to the knowledge professionals (librarians) or knowledge technology experts. The most valuable knowledge sources in the organization are the people themselves, and they should participate actively in an organizationwide knowledge collection and knowledge sharing network. KT experts are the most prominent group in today's technology-dominated environment. The management of knowledge technology has remained in the media's spotlight for many years. KT experts have become proficient at fashioning knowledge-based systems that dramatically increase operational efficiency and task productivity. At the same time, the same systems are equally well known for their inability to provide more holistic information about processes, subject areas, or even documents. Computer-based information systems concentrate on formal, structured, internal data, leaving out the informal, unstructured, external information that most decision makers require. KT experts need to move the user to the center of their focus -- develop a behavior-based, process-oriented understanding of the knowledge user in terms of their needs and knowledge use dispositions. People in organizations are not content with structured transactional data, they also want knowledge technology to simplify the use of the informal, unstructured information that forms the bulk of the organization's knowledge resources. They also want external data: knowledge to help them understand how the external environment is changing, what other organizations are doing, and how the organization is doing. In other words, users want a web of formal and informal data, internal and external data that are meaningful to them for cultivating insight and developing choices.

The intelligent organization understands that the discovery and use of knowledge can best be achieved through strategic knowledge partnerships that combine the skills and expertise of its users, librarians as knowledge professionals, and KT experts. This collective synergy is necessary to weave an knowledge tapestry that draws together structured and unstructured, internal and external, as well as historical, current, and future-oriented knowledge; to create the tools and methods to access knowledge and select the best available knowledge sources; to design knowledge architectures based on a rich understanding of users' knowledge and communication requirements; and to integrate the organization's knowledge processes into a springboard for organizational learning and development. Through strategic knowledge partnerships, the intelligent organization can significantly enhance each of the knowledge processes that make up the knowledge management cycle.

The roles of knowledge professionals for knowledge management

Knowledge Management has emerged as a key concern of organizations. Librarians have long been regarded as part of the support staff of the organization, working quietly in the background, often uninvolved in any of the critical functions of the organization. Information professionals have to recast their roles as an knowledge professional. In other words, librarians need to work as knowledge worker. Knowledge work is characterized by variety and exception rather than routine and is performed by professional or technical workers with a high level of skill and expertise. So those who exercise their intellects in any of these types of activities are knowledge workers. If librarian's work can be or is totally routinized, then they are an administrative worker(for example, gatekeeper), not a knowledge worker. That means that librarian's roles should be not limited to being the custodians or gatekeepers of information. Knowledge professionals will have to move from the background to the center of the organizational stage, to jointly hold the reins of knowledge management with users and the technology experts, to help steer and shape the knowledge policies, structures, processes, and systems that will nurture organizational learning. Knowledge professionals should be able to extract, filter and disseminate vital external knowledge. They also will design and develop workgroup application suites that are effectively platforms for knowledge management. Finally, they will work side by side with users in collecting and analyzing strategic intelligence; and to act as trainers and consultants who transfer knowledge gathering and research skills throughout the organization.

Conclusion

This study described the notion of knowledge and knowledge management and investigated the roles of librarians as knowledge professionals for obtaining

organizational goals. The knowledge professional position will continue to evolve as the knowledge infrastructure develops. The precise role of the knowledge professional will depend on the organization structure and knowledge needs. The emphasis in roles of knowledge professional will likely change according to the needs of the user community and the level of technological sophistication.

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DIGITAL IMAGE LIBRARIES: TECHNOLOGICAL ADVANCEMENT AND SOCIAL IMPACT ON THE TEACHING OF ART AND ARCHITECTURAL HISTORY*

By Angela Giral

Abstract: The paper will describe a series of recent projects in the United States dealing with digital image libraries and their impact on the teaching practices of art and architectural historians. Among the projects discussed will be the creation of an "Image reserve collection" for a freshman course on Masterpieces of Western Art; the Digital Image Access Project, the Museum Educational Site Licensing Project, AMICO, the Museum Digital Licensing Collective, the SHA Image Bank, the Image Directory (a commercial enterprise). The discussion will include issues of licensing and intellectual property, metadata and evolving cataloging practices, image quality, costs of creation and delivery (human, financial, and institutional), as well as the potential of digital imaging in the preservation of fragile 'illustrated texts', the dissemination of archival information, and document delivery (including the WebDOC project, a collaboration between an American consortium -RLG- and a Dutch consortium -Pica).

New technology has brought a coalescence of two institutions, the library and the museum, that have a common origin - the Wunderkammern or Cabinets des curiosités assembled by the princely families of the Renaissance. At the same time the Internet is changing the world of education much as the "discovery" of Columbus changed the way inhabitants of both Europe and the Americas viewed the world; and the World Wide Web represents a 'revolution' in communication that has been equated to that of the invention of movable type by Guttenberg.

Some of the most challenging questions that archivists and librarians are facing today surround the decisions about how to create and maintain digital research resources. With the rapid transformation of the way that research resources are being made available electronically, traditional questions of acquisition, selection, preservation, access, and use of research resources are also transformed. At the same time, museums are feeling similar technological pressures on the one hand for the automation of registrarial and inventory records, and on the other for educational outreach. This paper will outline some recent efforts in the United States to assemble and/or give access to collections of digital images in support of

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the teaching of art and architectural history and some observations on the impact that such efforts and the emerging technological changes are having on teaching styles and approaches to the discipline.

Libraries have a long history of collaboration in the development of standards. It must be said that the early national and international databases of bibliographic information were built upon the notion that sharing such information would cut down cataloging costs. Since a copy of the same book was likely to be in many libraries, access to the cataloging records would obviate redundant efforts in all the libraries that acquired the same book. Neither archives nor museums experienced such an economic incentive, since both institutions, by definition, collected unique objects. It has thus taken longer for both to see the advantages of shared information. The requirement of standards for the sake of the collocation of information so dear to librarians, seemed at first like an imposition, an unnecessary thwarting of curatorial creativity, and early collaborative attempts failed primarily for political reasons: suspiciousness of the intentions of other participants, insistence on the unique needs of each institution's patrons, jealously guarded 'special' information that holders feared could be misused or abused by others, etc.

As a veteran of standardization wars I must say that I had heard many of the same excuses from my library colleagues when the MARC format was first introduced. Now I find myself bewildered once more and confronted with the challenge of 'managing' the vast amounts of information available in cyberspace, as well as having to rethink the value of cherished standards in the light of new and ever more sophisticated 'search engines'.

Images and image librarians are bringing us together in several ways: Is it necessary for every slide collection in every art history department in the U.S. (or indeed the world) to laboriously catalog an image of the Mona Lisa, or of Michelangelo's David? But if we are going to share the cataloging we have to agree on whether we are going to say Mona Lisa or Gioconda, or Joconde; Michelangelo or Buonarrotti, or Miguel Angel, etc. etc. And if images are to be shared by all with access to a campus network should the burden of collecting, cataloging, and maintaining digital images be born by the Department of Art History or should digital images become part of a centrally administered Digital Collection? Can museums profit from sharing their information (visual or textual)? Will access to archival finding aids or bibliographic records help them in the development of context for their educational programs? Is direct access to digital archives in museum collections a more logical or economic way to develop access to images for teaching and research than assembling local collections?

Who does the work? Who benefits? Who pays? Who profits? These are some of the questions that we are asking ourselves. I will describe here a series of experiments and projects designed to test out potential answers to these questions.

RLG

The Research Libraries Group (RLG) is a not-for-profit membership corporation devoted to the mission of "improving access to information that supports research and learning." Founded in 1974 and incorporated in 1975 by Columbia, Harvard, and Yale universities and The New York Public Library, RLG became and is today a pioneer in developing cooperative solutions to the problems that research collections and their users face in the acquisition, delivery, and preservation of information. The technological infrastructure through which RLG delivers services to its members and subscribers is known as the Research Libraries Information Network (RLIN). One of the earliest special subject groups to be formed within RLG was the Art and Architecture Program Committee, now renamed the Art and Architecture Group, it has been a consistent forum for the collaboration among librarians of museum and of academic research institutions. RLG has engaged in a variety of projects that involve the use of images.

DIAP

The Digital Image Access Project (DIAP) was undertaken in 1994-95 to investigate strategies for improving access to and preservation of photographic image archives. DIAP involved nine RLG institutions which, in partnership with Stokes Imaging of Austin, Texas, experimented with an online image management system to find economical ways to catalog and index large photographic collections as well as ways to make them more accessible. Approximately nine thousand images related to the project theme, "The Urban Landscape," were digitized and included in the project database along with related index records.

WEBDOC and ARCHES

In the context of two separate projects, RLG has developed the essential infrastructure to support links on the World Wide Web between descriptive (cataloging) records, mid-level metadata (such as archival finding aids), and whole digitized information objects (such as articles and images). This infrastructure includes navigational tools plus a full suite of access control and management functions, which ensure that rights holders and other value-added providers can restrict and/or charge for the use of their documents, if necessary. WebDOC is a joint undertaking of RLG and Pica, the Dutch Centre for Library

Automation, that is focused particularly on access control mechanisms. Arches (Archival Server) is an RLG project, focused on improved navigation, especially when mid-level metadata or full-text searching are involved, and on the development of a long-term storage environment for electronic documents.

The two projects have converged in an integrated infrastructure that will be the home for documents digitized pursuant to RLG's own digital reformatting projects, Studies in Scarlet and Global Immigration, and that can also be used to support electronic journals, digital publishing projects, museum image projects, and related enterprises.

The REACH and VISION projects of RLG

The REACH Project (Record Export for Art and Cultural Heritage) is an effort to create a testbed database of museum object records. The goal is to export existing machine-readable data from heterogeneous museum collection management systems and analyze the research value of the resulting database when researchers use a single interface to search the database in conjunction with RLG's other resources, including bibliographic and archival records in RLINr, auction catalog records in the SCIPIO database, finding aids, plus abstracting and indexing tools such as the Bibliography of the History of Art, and Anthropological Literature.

The REACH testbed database will be comprised of at least 10,000 records from art and cultural heritage institutions. The focus of the project is on core data that accompanies and identifies museum objects, not their surrogates, including a broad range of both art objects and material culture artefacts.

The VISION (Visual Resources Information Online Network) Project is a joint Effort of VRA (Visual Resources Association) and RLG with Getty Support. This effort is designed to bring more visual resources information online; promulgate and test the use of standards for creating and sharing such information; and evaluate the new data's value in the context of existing RLG research information databases.

In the VISION project, 32 VRA members will use a template on the World Wide Web, based on the VRA Data Standards Committee's "Core Categories for Visual Resources, Version 2.0," to catalog photographs and slides of works of art, architecture, and other cultural heritage artifacts. This template will be the first implementation of the Core Categories standard.

Through the template and RLG software, VISION records will be converted into a data stream that parallels or complements data coming from the RLG REACH (Record Export for Art and Cultural Heritage) project. VISION and REACH records will both go into a new RLG union catalog for museum objects and image

records, accessible through the Web. The value of this new testbed file will be enhanced by the Getty Information Institute's Union List of Artist Names (ULAN).

MUSEUMS

Most of the 8,200 American museums do not have the financial or technical resources to digitize large or important portions of their collections. Most museums also do not have the capability to run a state-of-the-art Information Technology department, develop specialized software, manage and finance the archiving of digital materials as they migrate to new storage media, or administer the distribution of digital materials. There are varying standards for digital documentation and imaging, and no clear consensus exists on best practices across rapidly changing technologies. But a series of recent projects represent valiant efforts to deal with these issues in a collaborative manner.

MESL

The Museum Educational Site Licensing (MESL) project was launched in late 1994 as a joint enterprise of the Getty Information Institute and MUSE Educational Media, to explore whether it was possible for two like-minded communities to reach agreement on ways to enable rather than restrict uses, through the uses of social contracts that enable educators to use materials while protecting the rights of copyright holders. Through this project, seven museums made available over 9,000 images and their descriptive data to seven universities for them to mount them in their respective campus networks.

The purpose of the Museum Educational Site Licensing Project (MESL) was to explore and promote the educational benefits of digital access to museum collections through campus networks maintained by academic institutions in order to help promote the development of computer-based learning tools for the study of art and culture. As indicated by its name, licensing for the use of images was an important element of this project. With the cooperation of members of the U.S. Copyright Office and the Library of Congress National Digital Library Program, MESL participants signed a model agreement that had to be vetted by lawyers of all fourteen institutions. The experience resulted in the drafting of a document on 'Terms and Conditions for Educational Institution Licensing of Museum Images' that will be part of the MESL final report

MESL was designed to be a two year demonstration project, its initial success has spawned a study of the finances of providing images on campus that is being conducted by Dr. Howard Besser at the University of California at Berkeley with

support of the Andrew W. Mellon Foundation, as well as two new consortia that will pick up the MESL experiences and take them into new, expanded directions. These are AMICO and MDLC.

MDLC

A Museum Licensing Collective is now being developed to assist museums of all sizes and types, including historical societies and archives, in financing and digitizing materials from their collections, and licensing these digital images to educational institutions, commercial companies, and the public. The American Association of Museums has endorsed the Collective's development process, and is also participating in its development. This non-profit Collective, owned by its museum members, will help fund the digitization and documentation of museum materials to build an expanding collection of high-quality authoritative digital materials that could greatly benefit education and research.

During the first several years, the Collective will help fund and assemble digitized materials that complement major multi-disciplinary themes. The initial theme will be 19th century American culture. The reason for this broadly mandated thematic collecting approach is that it could quickly assemble a large number of digitized images with the depth and breadth to stimulate a wide array of scholarly activities in diverse disciplines, such as history, literature, art, social studies, etc.

Appropriate 19th cent. American materials will be selected by museum staff at art and history museums, historical societies, and archives. An initial group of 20 museums with strong 19th cent. American holdings will form the core of the Museum Licensing Collective. Additional museums and collecting societies with digitized 19th century American cultural materials will be invited to use the site licensing administrative facilities of the Collective.

It is estimated that at least 20,000 images relating to 19th cent. American culture would be available for site licensing through the Collective in late 1998 - 1999. Computer services will be performed under contract with major academic research libraries, and the University of California at Berkeley and Cornell University will be involved with the MDLC in this respect. It is also anticipated that Sun Microsystems will be the initial technology provider for the MDLC.

AMICO

The Art Museum Image Consortium (AMICO) is a non-profit corporation formed by North American Art Museums to provide educational access to and delivery of cultural heritage information by creating, maintaining and licensing a collective digital library of images and documentation of works in their collections.

AMICO balances the needs of small and large museums, the well prepared and the novice, by providing for different levels of membership participation from observer through full contributor. It will help individual museums to reduce risks through collective decision making and to share expertise, including the adoption of common standards and guidelines. Services which it is envisioned that AMICO will deliver to its members include:

1. Technology Information Services, including "best practice" guidelines, "frequently asked questions", standards for data capture, advice on hardware and software, application guidelines, training and research and liaison with developing standards
2. Data Enhancement Services, including data value standardization, the addition of unique identifiers and watermarking of images, subject indexing, metadata augmentation, use of terms in controlled vocabularies, markup of text to SGML, and mapping institutional data to export standards.
3. Catalog Management Services, including creating an integrated, publicly accessible directory with many access points and different interfaces for different users which enables educators to identify works which they have licensed and may use through AMICO and allows the public to seek further rights including commercial use rights from the individual museum members.
4. Rights Management Services, including defining the minimum rights management data requirements, creating searchable rights metadata systems, negotiating rights with individual rights holders and their collectives, writing model licensing agreements, providing a forum for and developing terms of licenses for schools and school districts, museum education departments, and public libraries, and developing and disseminating end-user responsibility training materials.
5. Customer Services, including monitoring and analyzing uses and users, conducting focus groups to identify users needs, and promoting innovative educational uses of museum digital content.
6. Collaborative Partnering, including with technology firms, funding sources, standards organizations, telecommunication providers, and others.

PRIVATE INSTITUTIONS

In the realm of culture, as in others, the American way is to rely on private enterprise, both profit and non profit. Among the first the Getty Trust, and in particular the Getty Information Institute, on the one hand and the Society of Architectural Historians on the other deserve special mention.

THE GETTY

As currently defined, the mission of the Getty Information Institute centers on enhancing worldwide access to cultural heritage information for research and education by means of computer technology.

The Getty Information Institute has supported RLG in many of its art related endeavors, in particular the REACH and VISION projects described above. It supported an early experiment in the sharing of museum data, the Museum Prototype, and has lent its support to MESL and AMICO. It has published an Introduction to Imaging, by Howard Besser and Jennifer Trant, Object, Image, Inquiry: the Art Historian at Work, by Marilyn Schmitt, 1988; Protecting Cultural Objects Through International Documentation Standards, by Robin Thornes, 1995; Categories for the Description of Works of Art, 1994; as well as supported the creation of structured vocabulary tools such as The Art and Architecture Thesaurus, The Union list of Artists Names, and The Thesaurus of Geographic Names. Finally it continues to sponsor interesting web retrieval and searching experiments such as a.k.a. and Los Angeles Culture Net.

SOCIETY OF ARCHITECTURAL HISTORIANS

At its annual meeting in St. Louis in April 1996, some members of the Society of Architectural Historians created an experimental project they entitled an 'Image Exchange'. The idea is for members to contribute their own slides of buildings and volunteer them for shared educational use. Plans and additional graphics might be sought among older volumes clearly in the public domain. The pilot project deals with landmarks of American architecture, 1850-99, mentioned in more than one of four survey textbooks currently in print. The project is an ambitious one, trying to deal with such varied issues as copyright, standardized scanning of images, the establishment of a canonical set of images (or at least buildings), and the development of a structured interface.

The SAH has also given permission for the digitization of 15 years of its journal pages, and the linking of each article to its bibliographic description in the Avery Index to Architectural Periodicals as part of RLG's Web-DOC project.

COMMERCIAL ENTERPRISES

The best known commercial enterprise directed to the digitization of images is perhaps CORBIS, founded in 1989 as a private company by the Chief Executive Officer of Microsoft, Bill Gates with the goal of creating "a preeminent electronic archive of great images that will capture the entire human experience throughout history. Today it has assembled more than a million images from fifteen

museums, at least one university and the purchase of several photographic archives. Although they claim the investment so far outweighs financial gains, and have no set rates, they will charge as much as \$600.00 for the use of a single image and say they expect to charge universities between \$100 and \$300 per image.

A more recent enterprise is the IMAGE DIRECTORY. Created by Academic Press, it is described as "a database of information from museums and collections around the world" and modestly claiming to be but a 'books in print' equivalent for the world of images in that they provide only information on sources of images, and not the images themselves. It has recently begun to offer access by institutional subscription.

COLUMBIA UNIVERSITY

Universities are hotbeds of experimentation and exploration. I will limit myself here to mentioning a few projects at Columbia University, where I have worked for the last fifteen years, projects and experiments designed to assemble digital collections and provide optimal access to them. Among the programs and activities the following merit mention:

AVIADOR

The Avery Videodisc Index of Architectural Drawings on RLIN is an interactive system that links videodisc images of 41,000 architectural drawings from the Avery Architectural and Fine Arts Library to their online catalog descriptions on RLIN. Completed in 1993, long before the advent of the World Wide Web, AVIADOR allows a user to browse through the architectural images on the videodisc and, upon finding an image of interest, simultaneously display the RLIN catalog record describing the drawing. Conversely, the user can search RLIN for catalog descriptions of drawings in the Avery collection and instantly view the corresponding architectural images on the videodisc.

DIAP

Columbia was one of the nine Universities that participated in the Digital Access Image Project. The principal collection involved was an archive of approximately 750 photographs documenting the construction of the Empire State Building, other small collections were added by way of experimenting with the digitization of images from a variety of sources. At the end of the DIAP project the Columbia team proceeded to experiment with Photo-CD and loading of the images, first in Mosaic, then in Netscape, and making them available through the World Wide Web, with their RLIN records transformed on the fly.

ART-HUM

The course entitled Humanities C1121. Masterpieces of Western Art, more commonly referred to as, "Art Humanities" or Art-Hum for short, has been a degree requirement for all College students and an integral part of the Core Curriculum since 1947. Art-Hum is not a historical survey but an analytical study of a limited number of major monuments and images in Western art, and includes field trips to museums, galleries, and buildings in the New York metropolitan area. Its chief purpose is to acquaint students with the character of the experience of the visual arts and to introduce them to modes of analysis and interpretation. The course seeks to provide students with a foundation in visual literacy. A series of topics in the development of Western art has been selected to afford a sense of the range of expressive possibilities in painting, sculpture, and architecture. These include the Parthenon, the Gothic cathedral of Amiens, and works by Raphael, Michelangelo, Bruegel, Rembrandt, Bernini, Monet, Picasso, and Frank Lloyd Wright.

Beginning in 1995, and coinciding with the expansion of the University's Ethernet infrastructure to every campus building and dormitory room, we created an Image Reserve Collection that allowed students to consult the images presented in class from a variety of terminals: in libraries, in public lounges, and in their own bedrooms. Care has been taken to obtain the highest possible image quality and to obtain licensing rights to every image used for the reserve collection. For this reason most of the images have access restricted to Columbia affiliates or to visitors that consult them on one of the campus terminals.

Columbia was one of the seven universities that participated in the Museum Educational Site Licensing Project (MESL), and it did so with the collaboration -- of the University Libraries with members of the INSTITUTE FOR LEARNING TECHNOLOGIES, founded in 1986 at Teachers College; with ACADEMIC INFORMATION SERVICES (AcIS); with members of the COMPUTER SCIENCE department, who used images in their experimental visual-query systems WebSEEK and SaFe; and with faculty members in the Department of Art History and Archaeology and its MEDIA CENTER FOR ART HISTORY. The first project of the Media Center, an elaborate site using digital technologies for the analysis of the construction of the cathedral of Amiens, under the direction of Prof. Stephen Murray, is used as a link from the Art-Hum image reserve collection.

FACULTY REACTIONS

The notion that we are as much the victims of our own tools as the makers and users of them is not a new one. Some years ago, researching Le Corbusier, I came

across the only project that he built in Latin America, a house and office for Dr. Pedro Currutchet in the Argentinian city of La Plata, and I discovered that Dr. Currutchet had published a book on what he called Aximmanual surgery . In this book he argues for a more rational design of the implements of surgery, one in which the tools would follow the natural axis of the hand as prolongation of the fingers, instead of the unnatural "cruci-form" tools, such as scissors, in current use. Quite coincidentally, I came across a professor at the Harvard medical school who used Dr. Currutchet's book to make his students conscious of the fact that the technologies they were about to learn were not the only way to cut into the human body. But what about the tools of art history?

The reactions to the use of new technologies for the teaching of art history or art appreciation courses range from total rejection by those who fear that electronic reproduction will be so good that students will prefer it instead of going to the original (or who, conversely, scorn digital images because they are not as good as 35mm slides --which they are not). The other extreme is represented by those who swallow the hype of technological promise and expect a dazzling plenitude of information and images assuming that "the computer will do it all," whatever the word "all" means in each case. As the technology changes there are those who extol the virtues of the 'current' technology over the new. Thus an architectural historian refuses to accept 35mm slides and insists on continuing to use (and to have made) glass lantern slides because "the 35mm slide does not contain as much information", oblivious to the advantages of color and remote control of projection for instance; an art historian at another university insists in the advantages of showing black and white slides, for they are better for the analysis of form in paintings, only at the end of each lecture allowing the projection of a few rapidly viewed color representations of the same paintings.

But an increasing number of art historians and teachers of art history are beginning to make serious explorations of the potential of new technology to re-think the goals of their enterprise and the means to their achievement

In 1988, in *Object , Image, Inquiry: the Art Historian at Work* a few of the art historians interviewed timorously admit that they have begun to use the computer for word processing, some even rejoice in the advantages it offers over the typewriter; but in the special section of the June 1997 *Art Bulletin*, on "Digital culture and the practices of art and art history" the contributors paint a very different picture:

James Elkins confesses that, by and large, we do not look closely at pictures unless we are looking at symbols or historically pertinent signs, and refers to the possibility of using computers as an opportunity "to inquire into some of the

fundamental assumptions that structure the discipline of art history" and describes how he had used the computer to "see images differently, revealing analytic possibilities and meanings otherwise missed". Kathleen Cohen concludes that the sharing of images from a variety of sources could offer us access to many images that will help us get beyond the so-called canon and replace solitary research by collaborative teams. She also proposes a realistic list of 'dragons' that have to be 'slayed' before the doors to the promised treasures of a Magic Classroom can be opened. Marilyn Aronberg Lavin, in Princeton, has developed ECIT (Electronic Compendiums of Image and Text) as an interactive tool that provides the infrastructure for her Piero project, studying the frescoes of Piero della Francesca. She talks about experimenting with a student accumulation of materials and ideas in a kind of Seminar ECIT. Gary Schwartz calls for touchstones of authenticity, unmanipulable values and verity as an antidote to virtuality, and warns against the dangers of the "alliance of digital imagery with the sanctification of art."

The MESL project generated a number of interesting discussions and presentations from the faculty group most directly involved with the project. Among them the following stand up in my memory:

At the University of Maryland, Sally Promey designed a course around the images she knew would be available, on "American Art to 1876." Benefiting from the proximity of some of the originals in surrounding museums, she taught the students to analyze the paintings using the digital images in the classroom and then sent them out to see the originals. She was rewarded with the excitement of the students who had been able to see so much more in the original because they were able to compare it with the digital image. She also collaborated with Terry Gips' course on "Digital Imaging" and together they generated an extraordinary dialog between budding artists and art historians by having the former paint pictures that represented the descriptions provided by the latter and comparing the new creations to the originals described by the art history students.

Claudia Lazzaro, of Cornell University, spoke eloquently at one meeting of the different impact of showing 9 images of rape in the Renaissance simultaneously on the screen, from the traditional two by two image presentation in art history classrooms.

Laura Meixner, also at Cornell, described her course on "Impressionism in Society" for which she created a virtual gallery of 'Coastal Views' from the MESL images, and used it as part of a larger virtual gallery of Impressionist images. Students in this interdisciplinary lecture course viewed the virtual gallery in conjunction with "Modern Life in France" and exhibition of works on paper at Cornell's art museum. "By viewing MESL images in thematic groups, including

'Prints and Politics' and 'Bathers and Brothels', she says, students contextualized the original works of art they chose as their term paper topics. The placement of a kiosk in the Johnson Museum exhibition space proved very effective in engaging students in lively exchanges of ideas concerning the major social, cultural, and political preoccupations of the Impressionist era."

PROBLEMS

But all these wonders are not without a host of problems. One of the most vexing ones I regularly encounter, the following message:

File Not found

The requested URL /~leif/udr/index.htm was not found on this server.

has led me to the conclusion that this technological brave new world is no more advanced than the Middle Ages -the copy you see is as good as the ability of the 'monk' that made it, and your access to it depends on the wealth of the 'monastery' in which you reside. But at least in the Middle Ages it was possible to chain the books to the shelves so that they would not walk away and become 'not found on this server'.

There are still many problems, in addition to problems of hardware, software, 'courseware', bandwidth, standards image quality and for metadata, storage and memory size, there is the issue of preservation. Having to deal now with the nightmare that is the preservation of our cultural heritage on crumbling paper whose manufacture was 'revolutionized' by technology in the 19th century should make us very leary of the cost and problems of the preservation of digital information.

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THE VIEW FROM "DOWN UNDER" : ARLIS/ANZ AND THE WORLD OF ART LIBRARIANSHIP*

By J. Margaret Shaw

Art librarians in Australia and New Zealand do not spend their time constantly thinking about how far away they are from the rest of the world. Like their international colleagues they are too busy getting on with their jobs. Nevertheless, because we work in a very international field it is inevitable that we are aware of, and devise strategies to operate within, the constraints of living "down under".

What I should like to do briefly is to put "down under" in context. To do so I shall compare and contrast the environments of the members of ARLIS/ANZ [Arts Libraries Society / Australia and New Zealand], ARLIS /UK and Ireland and ARLIS / North America.

All three ARLIS organisations under consideration cover more than one country, with separate governmental, educational, and socio-economic systems. In the case of ARLIS/UK and Ireland the situation is becoming increasingly complex both externally with the move into Europe and internally with the changes in Scotland.

ARLIS/ANZ covers Australia and New Zealand: two separate countries separated by some 2,000 kilometres of water. One thing we share is the frequent use of two terms: "down under" and "the antipodes". Terms which, in their origins, reflect a view of us as being somehow removed from the civilised world, the under side of the world or, as "antipodes" is defined in the Oxford dictionary, "diametrically opposite" .

Being underneath is easily fixed.

* Originally presented to ARLIS/NA Conference, Vancouver March 1999

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In addition, the antipodean definition is becoming increasingly less relevant.

Post-World War II migration and economic reality have caused the focus of thinking in our part of the world to shift from a very Anglo-Celtic position to one which encompasses mainland Europe and increasingly today the Middle East, Asia and the Pacific. Indeed, ARLIS/ANZ has a proposal on the table to expand our coverage into our part of the Pacific. This focus is mirrored in our growing interest in the arts of the region. In 1999 the ARLIS/ANZ annual conference was held in Brisbane in October to coincide with the third Asia-Pacific Triennial.

Nevertheless, distance from the most concentrated centres of art historical scholarship remains an important geographical factor.

Size is also relevant, [Chart 1] since distances within the region are significant for both ARLIS/NA and ARLIS/ANZ members, particularly when considering attendance at an annual conference. The 1999 executive of the New Zealand regional chapter of ARLIS/ANZ faced a two day journey by road and sea between the Secretary and the Treasurer, with the Chairman somewhere in between.

A third factor is population which is, of course, reflected in the respective sizes of our organisations [Chart 2].

The membership chart [Chart 3] shows only those members of each organisation actually resident or located within the official territory of that organisation and, of course, it reflects only those art librarians who chose to join their professional organisation. Not surprisingly, the shape of the charts is fairly similar.

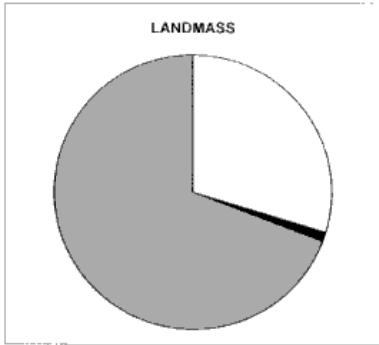


Chart 1

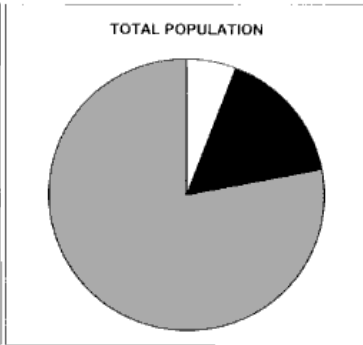


Chart 2

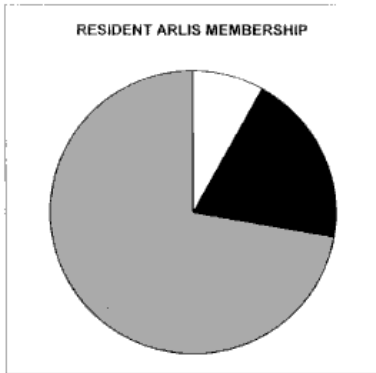


Chart 3

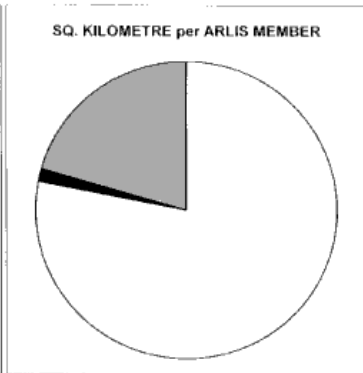


Chart 4



However, if we put charts 1 and 3 together we see a marked difference in which ARLIS/ANZ members and also, I suspect, the more isolated members of ARLIA/NA will recognise an underlying truth.

Of course, we are lucky to live at a time when technology is making communication so much easier. It is absolutely impossible to over-emphasise the impact of e-mail and related technologies on our isolated part of the world. Not only do they facilitate much closer contact with large numbers of colleagues around the globe but they are also having an impact on how we work within our region. For example, ARLIS/ANZ has changed from having the executive as a whole located in one place to having an executive with representatives from a variety of locations.

For ARLIS/ANZ members, environmental factors have both negative and positive aspects. On the negative side there are simply fewer people to do the range of tasks necessary both in relation to the documentation of our national art, the provision of information about art world-wide and administratively, the organisation of a professional body and its activities.

There are also economic drawbacks. A small population in a large area does mean an expensive infrastructure. In addition, it can be harder for a small group of relatively small libraries to attract funding for a project so the saying "small is beautiful" is often the pattern. As yet, neither Australia nor New Zealand has developed the tradition of patronage for the arts which exists in North America, nor do we have as good a track record of public funding for the arts as is found in the UK or Europe.

However, there are many positive sides to small populations. One of the greatest impacts is that, in some ways, a small population does simplify matters, particularly in technologically developed economies.

Firstly, it is relatively easy to know the majority of players in the game and to be aware of what they are doing.

Secondly, if you are trying to have a collection which is comprehensive in the art of your country or region, the number of publications is relatively small and, although ephemeral materials always seem overwhelming in any situation, realistically, the number of pieces of paper we have to handle is smaller.

Thirdly, it is, while not simple, certainly simpler to set up national systems in a country with a small population and a proportionally small number of libraries. For art librarians in Australia and New Zealand there is a large part of our work which is linked to national rather than subject specialist systems.

Australia, increasingly in conjunction with New Zealand, is very much the country of the DNC, the Distributed National Collection. In fact this is a principle which has come to underlie much of Australian librarianship in all fields with national and state libraries playing a pivotal role.

One of the key components in this system is the national bibliographic database, *Kinetica*, which is hosted by the National Library of Australia. This database, which is so far only available on subscription, contains the holdings of a large proportion of libraries throughout Australia.

We also have a national Inter-Lending system, originally based on the exchange of vouchers rather than cash, but increasingly becoming an on-line version of the same thing. In conjunction with this there is a directory of all libraries which offer inter-library loan as a service which is now available on-line. New Zealand libraries are also beginning to appear in this directory.

The National Library also hosts the Australian Libraries Gateway which is a directory of all Australian libraries accessible through the world wide web.

The National Library in New Zealand plays a similarly pivotal role to that of its counterpart in Australia.

Other NLA-based projects include:

- the *Register of Australia Archives and Manuscripts* - a relatively new but rapidly growing data-base which gives access to archival materials all over Australia;
- *Pandora* - a project to archive Australian electronic publications, although not yet virtual exhibition catalogues which is a field which I hope will be taken up by ARLIS/ANZ;

and

- *Imagesearch* - a pilot project searching image data-bases across a number of institutions.

I am not, of course, suggesting that art libraries in other countries lead a purely ARLIS-based existence. We are all part of other institutions, other libraries and other library networks. However, in a sparsely populated area of the world the ability to set up national systems is not only somewhat simpler, it is also a practical and economic necessity.

This is also not say that ARLIS/ANZ does not act to support and develop projects which are of particular interest to its members. The recent creation of a fund to provide travel and research grants for ARLIS/ANZ members is a major step in

this direction. The first grant has resulted in a free, web-based tool called ARIADNE which is a survey of in-house indexing of the arts in Australia.

In the past, ARLIS/ANZ has also been involved in the production of the AVAD [Australian Visual Arts Data-base] CDROM which contains some 19 separate files, 8 of which were supported or encouraged by ARLIS, and some of which are now being converted to on-line subscription services along with new [ARLIS assisted] data-bases.

What then are the issues which are currently exercising the talents and imaginations of art librarians in Australia and New Zealand?

As we work in an increasingly international environment the similarity of issues facing us all becomes more apparent. We all work in a general environment of down-sizing and economic rationalism but for art librarians there are other issues which are much more integral to our profession and which will effect us long after the economic rationalists have, hopefully, rationalised themselves out of existence. As an art museum librarian I share with colleagues around the world an interest in questions of public access, and a more pro-active approach to it, and the establishment of archival collections within museums.

However, for all of us, and particularly those in far-flung locations, the key issue must be the switch to an international information environment in which on-line access to information is becoming increasingly dominant.

Art history and librarianship have always had an international dimension. However, the rules of the game have changed markedly in a very short time. Where the international dimension was, in the past, something which was sought and welcomed, it is now something which engulfs us whether we wish it or not.

The librarian's role as a collector, documentalist and guide to information resources will become even more essential, if somewhat changed, provided we take the initiative. There are many players in the electronic game who fail to recognise the difference between information technology and information management and who are happy to step in and assume both roles. They will of course have to learn what librarians have been trained to do for generations, regardless of format, but no-one will save our place for us if we leave it vacant.

The area in which I believe art librarians face the greatest challenge is in the location, selection, capture and archiving of information in electronic form.

Each aspect has important components.

It is a truism to say that there is a great deal of rubbish available on the World Wide Web. There is also an increasing amount of very useful information beyond the basic contact information which must be seen as one of its greatest riches at present. Predictably, some of the most structured information is increasingly becoming subscription-based which puts it firmly back in the library/ information service sphere.

In spite of the growing technological sophistication of researchers, we find that in many ways the change of medium has not changed their basic behaviour.

- They still want librarians to save them time by helping them find the appropriate material.
- They still want continued access in a medium which is, by its nature, potentially ephemeral even for major papers.

Just as we have selected and organised print materials for generations, so do we need to develop techniques to ensure that we do not leave a gap in the record of art historical activity which can never be retrieved.

Projects are developing in many countries including Australasia, and no doubt, in a few years time it will be a common-place occurrence with automated regular sweeps of the web [or its equivalent] for new materials but there will continue to be a great need for skilled editing and selection. In the meantime, important information is being hidden in the plethora of rubbish and, ultimately, lost. Unlike paper ephemera which people tend to hoard and eventually, to deposit, electronic ephemera takes more effort to collect, is much easier to destroy and exists in very few copies. For art librarians, the capturing of virtual exhibitions must be something we come to terms with very quickly before too much is lost. This has not yet commenced seriously in Australasia. As a first stage, we should at least be keeping a record of our own institution's activities in this sphere.

I mentioned above the Pandora project in Australia. This project is currently limited to electronic journals, perhaps the easiest group to collect. There are many such projects around the world including some which are much more sophisticated, but there is still a need to document and publicise their existence.

Similarly, the digitisation of collections is something which is pre-occupying art librarianship and related professions around the world. It is also an area in which an international approach is increasingly common given the ease of operation across long distances

We are moving rapidly towards the beginning of the 21Century, a century in which the full impact of global automation of information will be felt. While the

electronic environment facilitates the sharing of information globally, as a corollary, so does it pose a threat to cultural diversity, the loss of local culture and the manipulation of the less developed and powerful. The impacts of colonialism have the potential to be just as devastating in our field as in the economic and political sphere.

The 1st January 2001 will also mark the celebration of 100 years of Australian nationhood although some aspects of Australian culture are many, many thousands of years older. For the indigenous people of Australia this is not cause for whole hearted celebration, just as the new millennium may not be for those cultures which, in the coming century, may be increasingly threatened by electronic colonialism.

Acknowledgement

Acknowledgement is given to Universal Press Pty Ltd, Australia, for permission to reproduce the *Down-Under map*.

Appendix

Useful on-line addresses:

ARLIS/ANZ home page

http://www.arts.monash.edu.au/others/arlis_anz

ACN[Australian Cultural Network]

Maps cultural web sites in Australia. Through ACN you can search more than 900 Australian cultural websites, over 410,000 screens of information.

<http://www.acn.net.au/>

AMOL [Australian Museums Online]

http://amol.org.au/guide/guide_one.asp

AVAD [Australian Visual Arts Databases] on disc from Discovery Media see url for AVAD on- line]

AVAD on line [Subscription]

contains:

ARIADNE/Indexing the visual arts in Australia: a survey [free]

ART EX 1990 - [List of Australian art exhibition catalogues][sub]

NATSIVAD [National Aboriginal and Torres Strait Islander Studies

Visual Artists Database] [subscription]

AUSTART [Australian Art Journals Index 1987 -] [subscription]

<http://discoverymedia.purescript.com.au/>

MURA

[Catalogue of the collections of the Australian Institute of Aboriginal and Torres Strait Islander Studies Library]

<http://unicorn.aiatsis.gov.au/start.html>

NATIONAL GALLERY OF AUSTRALIA:

Includes both art collection and Research Library catalogues on-line

<http://www.nga.gov.au>

NATIONAL LIBRARY OF AUSTRALIA

<http://www.nla.gov.au>

includes:

AUSTRALIAN LIBRARIES GATEWAY

<http://www.nla.gov.au/libraries/>

IMAGESEARCH [pilot project to access images across different Institutions]

<http://www.nla.gov.au/imagesearch>

ILRS [Inter-lending Resource Sharing Directory]

<http://www.nla.gov.au/ilrs>

KINETICA [national bibliographic data base] [Subscription]

<http://www.nla.gov.au/kinetica/>

PANDORA [Archive of networked documentary resources]

<http://www.nla.gov.au/pandora/>

RAAM [Register of Australian Archives and Manuscripts]

<http://www.nla.gov.au/raam/>

NATIONAL LIBRARY OF NEW ZEALAND

<http://www.natlib.govt.nz/>

Te Puna [includes New Zealand Bibliographic Network]

<http://tepuna.natlib.govt.nz/>

New Zealand Libraries [on-line directory]

<http://www.lincoln.ac.nz/libr/nz/nzlibs.htm>

New Zealand Libraries e-mail directory:

<http://www.vuw.ac.nz/dlis/ssubdl/director/nzlib/>

MUSEUM OF NEW ZEALAND TE PAPA TONGAREWA:

<http://www.tepapa.govt.nz/default.html>

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Url: www.nga.gov.au [under Research]

LOCAL HISTORY IN AUSTRALIA: SUPPORTING CULTURAL HERITAGE*

By Jan Partridge

Local history resources in Australia are developing slowly but surely as more and more people recognise the value of creating viable and supportive local communities. Despite the economic benefits from globalisation being pushed by business, governments and the media, the impact of the loss of a cultural identity are now being recognised and felt by many people.

Although virtual communities are touted as one solution to this problem, people can still feel dispossessed because these 'communities' must by their very nature remain remote and not fulfil daily needs. The impact also of sterile suburban development over the past few decades, the gutting of rural areas by the withdrawal of banks, businesses and other infrastructure support, and the increasing isolation of individuals has also been recognised by individuals and local governments.

Belatedly, governments at all levels in Australia are now working to recreate the community spirit which has been eroded over past decades, at the same time as using the local community as a basis for job creation through cultural heritage and tourism. In order to achieve this, the economic benefits of developing local history collections in public libraries, historical societies, archives and museums are slowly being recognised as important resources for historical, cultural, economic and community development. Australia celebrates the centenary of the establishment of the Commonwealth of Australia in 2001 and this has also resulted in a heightened interest in local history. People are now preparing to commemorate this even and are reflecting on changes to the country over the past century.

Cultural heritage, the public and community face of history, has become popular. This term covers many areas; the natural and built environment, movable cultural heritage collections in local museums and art galleries, local history collections in libraries, archives and historical societies, public and local history, but also cultural heritage tourism. In particular, the conservation and presentation of the

* Paper presented at International Federation of Library Associations (IFLA), 65th IFLA Council and General Conference Bangkok, Thailand, August 20 - August 28, 1999

country's heritage for tourism is seen as vital for the continued prosperity of much of Australia, particularly those areas suffering a withdrawal of government facilities and businesses.

Australian governments at a national and state level have supported the preservation of our cultural heritage through the collection, management and preservation of artworks, artefacts and documentary heritage by national, state and regional galleries, museums, archives and libraries. Most of the emphasis over the past few decades, however, has been on the identification, listing, management and protection of the built and natural heritage. The federal *Australian Heritage Commission Act of 1975*, and subsequent state acts, which emphasised preservation and conservation of the built and natural environment, created an upsurge of interest in the local environment.

As a result of this legislation Heritage Councils and National Trust offices were formed in all states of Australia, and Australians were encouraged to actively participate in collecting, preserving and managing their local historical sites. Each local authority was required to list all historical buildings and places and in order to do this, research needed to be undertaken to identify them. This activity boosted interest in developing local history services, although many well-established collections had been founded decades before.

Despite this, in the cultural heritage scene, documentary heritage has been the most neglected. Grants exist for the preservation of buildings, sites, objects and visual media such as photographs but less money has been made available to support quality management of, and access to, collections of historical material. This may be attributed to the nature of documentary historical collections and the differences between the disciplines caring for these resources:

- documentary resources are not as visually appealing as buildings, artworks and artefacts;
- the scattered nature of Australia's documentary heritage which is dispersed throughout the country in national, state, regional and private libraries and archives, historical societies, church archives, private businesses, voluntary clubs and sporting organisations, schools, etc. has made it difficult to establish standards;
- there has been an expectation that national and state libraries and archives would be responsible for ensuring the collection and preservation of all Australia's documentary heritage but in times of economic restraint this goal is being weakened;
- the different professional approaches and practices of archivists, librarians and records managers has resulted in a variety of systems and procedures;

- the lack of cohesion and concerted pressure on governments and the Australian public to support their documentary heritage has resulted in limited financial support.

The library profession as a whole has not advanced its cause as publicly as museum curators, archivists, and art gallery experts. In some senses the library profession has stood outside the ‘cultural heritage’ sphere and not argued that historical collections held locally support the collections in major libraries and archives and are of paramount importance for accurate and timely research at a local level.

The situation is also exacerbated because, although the National and State Libraries have excellent collections of Australiana, in the current economic conditions they are finding it difficult to continue to collect all material relating to Australia. As a result, increased pressure is being placed on other libraries, particularly at a local and regional level. Local governments across Australia are to be commended for the support they are giving to the development and maintenance of local history collections in public libraries, and there are some excellent collections across Australia. Unfortunately financial and moral support for local history services and the employment of professional local history librarians is not universal. Councils receive no incentive to develop these resources and therefore local history services must compete for funds with all other council activities.

While the signs are encouraging there is still a lot to be done, and a number of issues to be resolved. There is a need for;

- standard terminology in the local history area,
- a clear definition of what is meant by a ‘local history collection’,
- a better understanding of users and prospective clients,
- guidelines for collection management, staffing levels, use of volunteers, etc.,
- standards for organising and accessing collections: classifications schemes, indexing, thesauri,
- assistance with technological developments: digitisation, Internet access,
- best practice models for the management of local history services,
- identification of the role/s of local history librarians,
- standard expectations for the education for local history library staff,
- promotion of collections and services to the community,
- closer networking in the local community,

AND

- Effective action to ensure local history services are recognised as essential support for the cultural heritage industry

Firstly, in Australia there is difficulty over terminology. The terms ‘local studies’, ‘local history’, and more recently ‘community history’ are used interchangeably. The term ‘local studies’ was adopted from Britain to describe historical collections and has had some benefits because historians jealously guarded the term ‘local history’. On the whole ‘local studies’ has referred to the collection of historical materials and ‘local history’ to historical research, however many libraries do refer to their collections as local history services and the person in charge as the local history librarian. As interest in community identity gains popularity, the term ‘community history’ has been adopted by historians and there has been a move to this term. Perhaps more importantly, ‘cultural heritage’ is replacing the term ‘history’ in the broader community.

Should local history collections now become known as ‘community cultural heritage services’ – rather clumsy but possibly more relevant to the community? If local history services are to become visible in the cultural heritage industry, then a change of name seems inevitable.

Further, there needs to be a broader understanding of what a local history collection is or could be. A number of trends are occurring and these are encouraging.

What constitutes local history has also been widened to encompass corporate and institutional history, histories of individuals, families, houses, built environment, streetscapes, ethnic and indigenous people in the community, and more recently all aspects of the natural environment. Collections now cover the full breadth of the culture, experience and background of all Australians irrespective of background. Today Aboriginal people and people from different ethnic backgrounds have claimed their place in local history, local museums and heritage organisations, and are actively engaged in presenting their stories to the community. These different perceptions on Australia’s history and development has not necessarily meant an easy path for local history enthusiasts or local history collections. Some local history publications may well be contested histories which initially upset members of the community but which will ultimately bring a richness to the local heritage which would otherwise not exist.

Local history librarians acquire material relating to the past, but now increasingly they are gathering material concerning the present. This creates a living collection which can create whole new user groups. It also means that a very active collecting policy needs to be established and that the local history librarians needs to network throughout the community.

Materials collected now can comprise any format from archival manuscripts to electronic records and newer formats requires different expertise, technological support and greater financial assistance. This is impacting on budgeting, space, staff training, and collection development.

Little research has been conducted into who uses local history collections, how they are used, and their value to the local community. Alan Bundy (1999) conducted a survey of collections in Australia. In this survey of 534 public libraries, there was a response from 233 libraries of which 178 stated that they had a local studies collection. While two respondents stated their collection was commenced as early as 1940s, the growth since then indicates the potential for local history collections: 1950s – 3, 1960s – 11, 1970s – 26, 1980s – 66, 1990s – 36. The upsurge in the 1980s may reflect the bicentenary of the first white settlement in Australia in 1788. Hopefully the celebration of the centenary of the establish of the Commonwealth of Australia will have a similar effect.

While further research on use of these collections needs to be undertaken, what is known is that users come from industry, government, schools and universities, as well as the general public. Increasingly stress is being placed on local history collections by family historians and some services such as the Kew Public Library in Melbourne and the City of Playford in South Australia have accepted this, and are committed to providing a wide range of family history resources for their community.

Collection management is another issue. Efforts are being made to establish guidelines for collection management but further work is needed to develop universal standards for the organisation and access of collections, such as classification schemes, levels of indexing, standard thesauri, specific software, etc. Currently in Australia there is a proliferation of systems in place. Most local history collections are catalogued onto the main library catalogue and while this provides easy access to library users, there is still a need for more discussion on appropriate levels of indexing, the classification of archival, audio-visual and electronic material, etc.

The use of the Internet is increasing exponentially. Many local history services are promoting their services through the Internet and a considerable number now have excellent websites with online catalogues and good photographic displays. However there is still a need to design content-rich websites for researchers. The library profession is behind other information professions in developing skills of interpretation. While some fine photographic collections are available through the World Wide Web, some lack quality descriptions, explanations and interpretations of what those photographs represent. Lack of finance is, of course a factor as is lack of experience in analysing and interpreting photographs for researchers.

Websites are brilliant for displaying the treasures of the collection but it would also be very useful if libraries placed copies of their policy documents, disaster plans, etc. on their website to assist others. Future developments should include access to original materials through the web, especially in Australia. Because of distance, access to primary source material remains a headache for researchers. Few libraries make their rare material available through inter-library loan and may not allow photocopying, so digitisation will be the way of the future. Some very interesting projects are currently being undertaken at the national, state and local level and a listing of some of these projects can be seen at the National Library of Australia's website. As researchers become more sophisticated in their searching, the demand for remote access to full-text material on the web will increase and the profession must be ready to assume these new responsibilities.

Another issue is the continued growth of resources only available electronically. As more and more government, commercial, private and academic information becomes available only in electronic format, this information is in danger of being lost unless local history services convince governments that local history collections can only be viable if electronic resources are collected, and that future local histories will not be able to be written if the resources are not available.

As these trends continue, there is some confusion about the role/s of local history librarians, the level of professionalism required for the position, and the status of the manager of the local history services. While the major role is the management of local history collections, a number of local history librarians are also engaged in managing the local history website, digitising collections, co-operating with the local historical societies on community projects, developing regional co-operative cataloguing schemes, interacting with the local heritage enterprises, and supporting cultural heritage tourism.

As these roles become more complex, there is a need for established staffing guidelines. Currently the management of local history services varies from state to state. Some states in Australia have professional librarians managing these units, others have archivists, whilst some states consider this is the role of library technicians. Some managers work in isolation in purpose-built heritage houses, others work in regional library centres or the central library of a multi-library system. Some have additional staff to assist with clerical work but most are dependent on community volunteers. Because of the increasing number of local history services it is imperative that guidelines on staffing levels and qualifications in relation to the size and breadth of collections be established.

Most local history library staff are qualified in librarianship but collections may require other expertise as well. Library classification principles do not suit all formats of material acquired, but a limited number of local history librarians are qualified archivists or have specific knowledge of archives, as well as preservation

and conservation practices. The level of commitment by staff is very encouraging as many have gained qualifications in local history to better serve their clientele.

Unfortunately universities in Australia, in a period of stringent budget cuts, are concentrating on the broader history courses and reducing an emphasis on local history. To overcome this, several universities are rethinking the needs of local history library staff, and family and community historians who are not interested in undertaking a more traditional form of study and devising special courses to suit. The School of Media and Information at Curtin University of Technology has developed a fee-paying *Graduate Certificate in Local Studies*, which is available in distance education mode and in 2000 will be a web-based course available internationally. This certificate is taught jointly by the School and the Research Institute of Cultural Heritage at Curtin University and tries to maintain a balance between the management of local history collections, archives, preservation and conservation, technology and practical history research. There is a need for more short courses to help local history librarians acquire additional skills, and it would be worthwhile if these were made available internationally through web-based delivery.

Local history services occupy a difficult position in the library and information profession in Australia and possibly elsewhere. Local history librarians often work in isolation, but to survive and develop a successful service a local history librarian must sell the service to the parent authority, interact with the local community, network with local, regional, and state cultural heritage organisation and with other local history librarians, as well as contribute to issues relevant to the wider library profession. Local history librarians may have more issues in common with the heritage industry than other members of the library profession and so, of necessity, must balance the needs of both sectors.

Ideally, local history librarians need to actively promote their service to the parent institution to ensure continued adequate funding. Techniques for doing this vary but one opportunity which might assist is to become a regional archival centre. Currently only the most developed local history services are the archival depository for the local authority. Under existing legislation local government archival materials are forwarded to the state Public Records Office, however, as the trickle-down effect continues, it is possible that the local history centre will also become a council/ regional archival resource. It is an area which is worth pursuing.

While most services are well promoted to the local community, local history librarians have been less involved with the cultural heritage industry, and to some extent has stood outside it. This industry comprises practitioners from a wide range of disciplines; anthropology, archaeology, museums, history, conservation, archives, tourism, local government, and interacting with them requires an

understanding of the broader cultural heritage concepts. Cultural heritage tourism, in a period where communities are suffering from a downturn in local industry, is seen as economically important. To encourage visitors, councils are supporting a proliferation of pamphlets, booklets and exhibitions to promote heritage walks, heritage places, local events and people, at times without consulting the local history librarian. The growth of heritage tourism offers opportunities for the local history librarian to promote the collection to the heritage community and to offer support for researchers engaged in developing these publications and activities.

Part of the problem facing local history librarians is that conceptually there has been confusion over the placement of local history in the broader cultural heritage scene. The heritage industry is a powerful one and the place of local history in this industry, and the relationship between all the disciplines involved in presenting and preserving the history of the local community requires further exploration. Gaps exist between local history librarians, cultural heritage professionals, and local history enthusiasts. Local communities see cultural tourism as an economic gain without necessarily understanding the need for advice and assistance from the local history librarian and professional historians. Good promotion of the resources of the local history collection and consultations with historians and heritage groups could overcome these gaps.

While these demands increase the complexity of work for local history librarians they also offer opportunities for increased status and financial benefits. It may be that heritage tourism will be the catalyst which will increase the number of local history collections in public libraries in Australia. There is no doubt that local governments need to be convinced of the worth of local history collections but creating alliances with the cultural heritage industry and providing evidence on economic gains for the local community cannot help but benefit the collection. Further pressure will also be placed on local authorities as the major collecting institutions advise local councils there are no longer able to collect all the material relating to that area. Unless local libraries develop collections this material may well be lost.

There is no doubt that local history is a growth area but how can local history librarians accomplish all that is required of them? They need support from the Local Studies Section of ALIA, as well as more co-operative networks. The Local Studies Section publishes a newsletter *Local-Link*, and supports *ALIAlocal*, an internet discussion group. By organising conferences and workshops at a state and national level, and by attending cultural heritage meetings and conventions members of the Local Studies Section are trying to contribute to discussions on cultural heritage issues, and highlight local history issues in that industry. Much more needs to be done in the area of policy, planning, standards, and guidelines. The establishment of best practice models and standards should assist local history

librarians manage and promote their collections. The Local Studies Section of ALIA sees that this is a role which it should play but at the moment does not have the resources to accomplish this.

There is much to be done to ensure the continued collection and maintenance of Australia's documentary heritage and the establishment of national standards. While not detracting from the excellent work being done in the field, more financial assistance and co-operation between libraries, archives and museums is essential if Australian local history collections are to become major resources to support the state and national library Australiana collections. Local history librarians need to market themselves and their collections to heritage organisations so that they become visible and central to the cultural heritage industry.

While these issues relate to the Australian scene, it is likely the situation is echoed in other countries, and it is worthwhile supporting each other and developing international standards and policies to strengthen the local history librarians in the field.

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GENEALOGICAL GEOGRAPHY: PLACE IDENTIFICATION IN THE MAP LIBRARY*

By William H. Lamble

Abstract: This paper examines the factors, which govern identification of place in its environment, its literature and its description as presented to the reference librarian by the genealogical researcher. The concept of place seems a simple enough idea, but the more it is studied the greater grows the realisation of its complexity. The study of toponymy becomes more necessary in the effective identification of place and the retrieval of required spatial data.

Toponyms and exonyms, their elements of activity, status, extent, focus and boundaries are examined, explicated and defined. The techniques, sources and tools needed by the map and geography librarian to provide adequate services to genealogical researchers are considered, together with the researchers' varying levels of carto-literacy and the accuracy of their source documents in identifying place.

Introduction

One major and very popular approach to enlightenment is family history research. Map libraries form essential gateways to achieving such enlightenment. This paper is based on years of experience as a map librarian answering enquiries from genealogical researchers. The wording of such enquiries would be very precise but for a number of reasons, as I shall explain, ineffective in information retrieval from the normal descriptive sources of a library's collection. Enquiries were complicated by the fact that there appeared to be a multiplicity of vocabularies used - by geographers, cataloguers, other librarians and the readers themselves. Place name requests were generated from documents which may have corrupted the specific place name recorded and have not related the place to the jurisdiction involved and rarely linked other relevant jurisdictions. Hierarchies in geographical identification are difficult to establish both in "jurisdictional" and "status" orders. The terminology prescribed in LCSH (Library of Congress List of Subject Headings) is at odds with the international jargon of geographical terms and in many cases is imprecise. Precision is made more difficult by temporal changes in nomenclature and geographical location or extent. This paper draws from a number of presentations made to family history groups and is part of a

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more intensive investigation into geographic classification and carto-bibliographical information retrieval.

In much of the paper I am referring to traditional hard copy maps. As historical information is the objective of genealogical research, most of the maps required will be older and not likely to be available in digitised form. Modern technology allows the creation of maps in layers, and the user can choose the layers of information required. The number of layers available on one screen is however limited by readability. Hard copy maps and also those earlier maps which have been scanned and digitised do not at the moment allow separation of layers.

The Question of Place

One of the most frequently asked questions is phrased as "Where are you from?" or "Where do you live?" This is one of the most difficult questions to answer simply and in a meaningful way. This emphasises the point that we are not place specific in our everyday living and that our reference terminology for places is never consistent, neither exclusive nor inclusive. The range of overlapping areas in which we live comprise:

- State
- Metropolitan Area
- Local Government Area or Ward
- Suburb
- Locality
- Postal District
- School catchment district
- Electoral District or Division or Province
- Natural region
- Telephone exchange district
- Religious district - Parish, Deanery or Diocese
- Census District
- Etc.

Determinants of Location Description and Identification

There are a number of factors involved in identifying place. Location is governed by the activity or event considered in that location and the location also has a status. The location is circumscribed by a boundary and has a focal point and may also have temporal limitations. These factors are not spatially or temporarily exclusive and the specific locations will often overlap or coincide, as I

demonstrate below. However, before studying the factors in detail it is necessary to consider three aspects used in the transfer of locational information.

Official usage may be prescribed - as is often the case currently due to the existence of official geographical nomenclature authorities, or may be accepted through patterns of long usage. On the other hand names are often applied for commercial reasons without meeting the strictures of or acceptance by the authorities. There is also the weight of popular tradition, which has restricted accurate cartography down the ages - but this is another study entirely. The matter is further complicated by the vagaries of mental maps and their inaccuracies, about which much has been written. These last two factors can be described as the common "*Worldview*" or "*Weltbild*". Government topographic maps usually only contain official names and these names are used in the compilation of national gazetteers. Other thematic maps, including government maps are not so restrictive, e.g. geological maps and tend to record the popular or vernacular place names with restriction. There is an atlas of Western Australia that contains 34 maps of the State. (Drawing the line/ compiled by J.F. Berry). Each map is a map of the administrative boundaries of divisions of the State adopted by different agencies, Commonwealth, State and Local. Names and boundaries sometimes vary, sometimes not. It seems unbelievable but it is quite logical - there is nothing to stop the absurd being logical.

Activity, Event or Object in Space

References to location are also effectually references to a particular event or activity as much as an area or an object. I use the terms activity or event with broad meanings. What is shown on the map is either "cultural" or "natural" - these are cartographic jargon terms and on the one hand "artificial, built or human" and on the other "something occurring independently of human intervention". The activity is defined and limited by two things - it has a focal point and a boundary that localises it and attracts a name. We are most concerned in using this aspect when we create or use geographical subdivisions for topical subject headings - but this approach is often misused. A specific geographical location should be described directly by its appropriate name, but allowance for linkage to other forms of the name is required in automated retrieval systems. In indirect subject access, one has to consider if this is for a comprehensive work on the locality (direct access required) or topic specific. If the latter, is it unique for the geopolity (indirect use of locality name) or topic specific for one of a type of localities in a wider geopolity? In the second instance, retrieval requirements indicate that the geographical subdivision should be for the wider geopolity. In a card catalogue it is reasonable to use:

Stroud (England)—Maps.

Streets—England—Stroud—Maps.

But in an automated catalogue, and these usually search indirect headings, the second heading should be:

Streets—England—Gloucestershire—Maps.

The Status of Place

Status appears to have a cultural connotation only, but the choice of terms to describe geographical locations must also be applied to natural aspects, as they cannot be divorced from the cultural in any form of spatial data transfer. Terms for natural divisions are more subject to jargon and national language practices. We are all familiar with the concept of mountain ranges, but perhaps are less familiar with the broader term cordillera or orogen. We can readily grasp the term botanical province and most know the word tundra if not taiga or other regional descriptors.

It is when we consider the human aspect that the system becomes complicated, both hierarchically and jurisdictionally. Terms used are:

- Populated places
- Townlands
- Towns
- Cities
- Urban areas
- Villages
- Parishes
- Hamlets
- Etc.

The areas encompassed by these settlements have evolved in the case of "old world" countries and to a certain extent devolved before resuming evolution in the ex-colonial countries. Town plans were created on square mile blocks in North America and "county" or "shire" boundaries drawn by straight lines on a blank map before settlement. The matter of territoriality derived from aristocratic titles and the associated landholdings will be dealt with later. In retrieving information about a specific location it is important to recognise status as this can determine the wider geographical area to be used as an access term for searching.

Jurisdiction

For the genealogist a major purpose is to locate the jurisdictional repository for documentary records as well as locating events on the map. Subject classifiers and

cataloguers blithely use the term jurisdiction to create and apply hierarchical subject headings and classification notation as if this is a unique and exhaustive method of handling the problem. Reference practice requires the supplementation by gazetteers and historical topographic dictionaries and histories to determine bibliographical search terms. Jurisdictions are not a simple and single identification process. Constitutionally these are defined in acts which separate, allocate and delegate powers politically, administratively and ecclesiastically, creating "tiers of government. Jurisdiction is a subdivision of activity and to meet the needs of the researcher both the location of an event and the appropriate jurisdictions in which it is sited are to be identified. When considering the ecclesiastical nature of jurisdiction, attention must be paid to the differing practices of the Roman Catholic and Anglican Churches. The former names dioceses by their extent while the latter by their cathedral city - although the territory administered may be the same, e.g. Sees of Iceland (Catholic) and Reykjavik (Anglican).

Boundaries and focal points

Every activity has a focal point and its area is circumscribed by boundaries. With the passage of time areas expand and the boundaries change. When I first moved to Perth, Western Australia in 1961 the Perth Metropolitan Area was considered to be that area within a 20-mile (32-km) radius of the Perth General Post Office. This latter is considered the *geographical* focus for the area, consisting of the City of Perth and a number of cities, towns and road districts (now called shires). Today the Metropolitan Area now extends 105 km from north to south and 60 km from West to East. By 2005 the north to south extent will be 175 km, several rural shires and even all or major portions of some previously non-metropolitan regions being absorbed by the growing conurbation. This is not an isolated example of global urbanisation. Natural features generally have stable and recognised boundaries, human boundaries have either evolved or devolved to correspond to natural obstacles which form good defences although this stricture is not always so compelling nowadays.

Laws governing the distribution of electoral divisions are a rare but useful example of the definition of a community and its boundaries is to be found in the Commonwealth Electoral Act of Australia:

- "(a) community of interests within the Division, including economic, social and regional interests;***
- (b) means of communication and travel within the Division;***
- (c) the trend of population changes within the State;***
- (d) the physical features of the Division; and***
- (e) existing boundaries of Divisions and Subdivisions."***

Statutory terms of reference demonstrate the nature of specified place, but are complicated by the need to equalise as far as possible the population numbers within each division. This, of course, does cause some distortion in regard to meeting the other requirements.

The focal point of any area is dependent on the activity. Cathedrals, town halls, schools, shopping centres, to give a few examples, can all be focal points for activities that have the name in common, a portion of the same territory but different boundaries. Shopping centres in particular may have quite a catchment area in relation to the community in which it is situated. The example of map sheet titles is interesting. The Landranger maps at a scale of 1:50 000 of the British Ordnance Survey each cover an area 40 x 40 km. and are centred on the major feature or group of features covered by the map and uses these for its title. The International map of the world at a scale of 1:1 000 000 and the Australian topographic series at a scale of 1:100 000 are based on a grid formed by the use of geographical co-ordinates, 6 x 4 degrees for the IMW and 30 minutes for the Australian series. The Perth Metropolitan area appears in both series split into northern and southern parts, respectively in the bottom left and the top left hand corners of two sheets. The IMW sheets are titled Perth and Albany; the Australian maps are titled Perth and Fremantle. In neither case do the sheet titles demonstrate the area covered by the map sheets nor do they automatically present identification of the boundaries.

History of Human Settlement Development and Identification

As I have already mentioned human habitations have either evolved or devolved. Nomad civilisations are not considered to have had fixed settlements but they did have favoured grazing and hunting areas camping and wintering areas and there was competition for these. Not only would there have been some form of identification but also a necessity for defence. In identifying places we find the first emergence of place name elements - words which describe the nature or quality of the place. Current modern examples are -field, -up or -ville, but they are not just limited to suffixes. The change to agriculture saw the use of more long lasting settlements and these expanded with the growth of trade and industrialisation. Thus places and their name evolved. Conquest in its turn brought enforced changes - there are plenty of examples in ancient and modern history. Throughout this process there was also the sense of a focal point for the "activity" with its boundaries.

The 16th century brought a change - colonisation of new worlds. First the Americas, latterly Australasia and to a certain extent Africa. Terra Nullius was a concept embraced in practice if not stated policy. The difference of course was in

the state of geographical knowledge - maps showed wide-open spaces and there was little indigenous information available as there was in Eurasia. Surveyors drew potential settlements and administrative areas on blank sheets and sent pioneers out to settle and multiply. One only has to look at the county boundary maps of the USA and Australia and the 1 square mile town block plans of US cities to see what I mean. These plans took no heed of natural boundaries and obstacles. The result - a redrawing of boundaries and unplanned population transit contrary to the plans of the colonial powers. It is interesting to see how few of the original counties of Western Australia retain their names, let alone their original boundaries. So we have two patterns of development in settlements - evolution and devolution with both processes reversible after a certain stage of development.

Status evolved as well. To look at English development from the Middle Ages on we must look at the administrative structure. Under the feudal system, land devolved from the crown through an infrastructure of counties, baronies and manors; each level responsible for providing just so much service through to the level above up to the crown. The territoriality of aristocratic titles which originally presupposed jurisdiction are now irrelevant - the Duchy of Cornwall with major landholdings in London is a separate entity from the County of Cornwall (political entity), the Duchies of Devon, Norfolk, Northumberland and Westminster are grounded in Derbyshire, Sussex, London and Cumbria respectively. With the reformation we find a partial democratisation of the upper levels (due to the growth of the merchant class) and the transformation of the manor to the parish - the ecclesiastical parish. It was not until 1824 as part of wholesale legislative measures to cope with the industrial revolution that the civil parish separate from the church parish was created. The two types of parish then developed in their own ways, one depending on population changes, the other on changes to church membership. Names may have been retained or new ones coined - here one is very interested in the status applicable to each place and its name. The exercise in 1972, which caused the County boundary revision in the UK in 1974, has been repeated and boundaries are being changed again. For instance, the former County of Rutland has been restored!

Toponyms and Exonyms

A toponym is a place name. More specifically it is the officially recognised name of a place within its own jurisdiction. Most countries and states have geographical names authorities who approve the nomenclature for that jurisdiction. They have generally only existed since World War II and have only received formal international recognition since the 1970s. This has not stopped the adoption and usage of unofficial names and there has also been a proliferation of place name changes - for various reasons. The existence of differing official and unofficial

names has already been mentioned. This however only referred to names within one language community. Considerable international effort through United Nations conferences, global and regional has been made to provide an agreed geographical nomenclature throughout the world. As the toponym is the recognised form of a place name within a polity, so an exonym is the officially recognised usage for place names in another country - London, Londres; Bruxelles, Brussels and Praha, Prague. The OPALINE database of the Bibliotheque nationale de France does provide a solution to this problem in accessing the map collections from a subject approach.

Most official records created more than a 100 years ago were copied from oral reports and this caused errors due to phonetic rendering and speech corruption. "The back of Hill End farm" was corrupted by elision and dialect and ended up on a document as Backhill End in one example I have dealt with. Variant spellings abound for the same pronunciation - Street and Strete. Bristol was originally called Brigg Stowe (place of the bridge), became Bristowe and then because of the local dialect with its terminal L became Bristol. The same happens on the continent, the island of Funnen in Denmark is shown on Danish maps as Fyn.

Toponymy and the History of Place Names

The history of particular place names is sometimes obvious, sometimes not. There are at least two Colognes. This name developed from the Roman habit of naming settlements (founded in the provinces to settle retired soldiers) Colonia Agrippina or Augustalis, etc, (depending on the then emperor, his heir or favourite). The first became known to the English and French as Cologne, to the Germans as Koln. Political correctness abounds in toponymy. Not only conquest but international rivalry and sensitivity as well as ideology, religions and politics also make their mark. There is a plethora of competing French and German names on the French, German and Swiss border areas e.g. Lorraine or Lotharingia. The Baltic States provide a variety of names in Polish, German, Russian and Slavic. I particularly enjoyed Michener's Poland, which gave an enthralling and readily understandable account of boundary and name changes in Eastern Europe. We must also remember such name changes as St Petersburg, or Petrograd or Leningrad and pay attention to name changes in places like Vietnam.

I have mentioned the move towards authorising names. People have always been contrary and done their own thing. This is very noticeable in the mining areas. Prospectors have consistently named their diggings independently. Some of the names have survived to be recognised and shown on topographic maps. As I have stated above place name indexes are not comprehensive gazetteers and only list officially recognised names. However, they are also subject to human and

typographical error. Thomsons Brook in W.A. (the official name) appears in the Australian Master place name index as both Thompson Brook and Thomson Brook. However the geological maps are less severe and record most of the unofficial names. Developers are also name providers. Nowadays they are generally well controlled and work within limits set by the Geographic Name Authorities. This was not so in the past. Names for new land releases would be selected for their selling power and gradually be lost, other than on personal records created during their brief life - names almost guaranteed to appear on some of the documentary records cited by family historians and thus used as their search terms. One last difficulty is a process I call creep. A place name moves. When I was in the Air Force in the 1950's I used to go home via Bath (Aqua Sulis = Hot springs to the Romans) and passed successively through Batheaston, Bathampton and Bathwick - each with their own railway stations (closed in 1956). In the 1970's I was asked to find Bathwick on a map and horrors - a Bathwick House and a Bathwick Road but no Bathwick. Then in the 1980's a new map of Bath shows the locality of Bathwick. Localities may decline, cease to be fashionable and a new area spring up alongside. This goes through the same process and the next new development is named "historically" so a lost name re-emerges but not necessarily in the same spot. I have found aspects of this phenomenon in many areas while researching geographical locations for clients.

The Objectives of the Genealogical Researcher

Some genealogical researchers are aware of all the objectives in using maps in their research. Having made several presentations to family historians of varying expertise and experience, I have consistently amended or refined my coverage of the subject. Beginners and the less cartographically sophisticated tend only to request a map to show the location of a place mainly as a simple illustration without realising the benefits. However, the main function of map use in genealogical research is its use as a tool in effective pursuit of family history; the production of effective maps to illustrate the compiled family history is often a separate exercise.

The researcher depends upon documentary evidence to support his genealogy. The prime purpose of his map use is to locate activities and events, which led to the creation of records, and to identify the repositories where those records may be found. The repositories will be determined by the activity or event and will not share the same name necessarily. The example of a street address in Walton-on-the-Hill in 1830 shows how many jurisdictional locations it has had over the next 150 years. A database is being created in Western Australia linking place names and jurisdictions for all communities of 200 or more population; it will also need to incorporate isolated place names.

The enquirer in framing a request usually does not distinguish between the different sets of information required and the limits inherent in maps due to scale and size. Essentially three maps are required:

1. Small scale showing the major area in which the enquirer's family lived and its geographical relationships to major known locations.
2. Medium scale (1:50 000 to 1:250 000) showing the environment in which the family lived – physiography and topography, lines of communication and commercial centres.
3. Large scale (1:10 000 or larger) showing building details or on which such details can be plotted.

Also required will be boundary, cadastral and other thematic information. Given the temporal changes that have occurred, the need for a wider range of maps is implicit. It is also not always feasible to provide the maps for the reader to do the rest. Some personal readers need map reading and drafting assistance. When providing a remote service, as happens in the Western Australian library service, it is often necessary to provide annotated copies from maps to meet the needs shown above. It is a problem facing all reference librarians as to how far they should go in providing service.

Tools and Strategies for Genealogical Map Reference Work

Maps are the obvious tools to be found in map libraries. They are often more than they claim to be. Cartographers produce a map for a particular purpose with prime thematic information. This is reflected in the title and the catalogue record. The main information is usually supported by other information to provide a base and context. It is often this secondary information which is the specific detail needed by the map user. The terminology used by the researcher does not correspond to that prescribed by the arbiters of cataloguing practice for place names. The authoritative sources cited in cataloguing manuals are fixed in time and limited to officially approved names. Names given may be corrupted – "Backhill End" turned out to be "at the back of Hillend Farm" and "Churhaasmartin" as "Church House, Marton (Middlesbrough)". Eastern Europe in particular was subject to major boundary and imposed language shifts as Empires flowed and ebbed. Documents I have handled from one region in southeast Poland and the Ukraine have been multilingual.

To cope with these the map library should hold or have access to, as well as current and historical gazetteers and map indexes, topographical dictionaries and histories, travel guides (the 19th century Baedekars I have found extremely useful). There should also be access to a wide range of directories (local and professional)

and official and university lists and registers. The British War Office issued some useful multilingual gazetteers of Eastern European countries after the Second World War. Toponymical works such as those of the English Place Name Society are also desirable. As more countries are making their official gazetteers and place name indexes available on-line, it is becoming easier, but "How can you look up a word in the dictionary if you don't know how to spell it?" The map librarian must gain some knowledge of the principles of toponymy – especially of place name elements and be able to think laterally to decipher handwritten phonetically spelt names and locate or plot them on maps.

Conclusion – Skills and Outcomes

Nearly twenty years ago I participated in a workshop on the qualifications required for a map curator. Both library and cartographic/geographic skills were considered essential components, together with physical bibliographic knowledge. To these I now add some specialisation in toponymy. Maps are an information media and may require interpretation to make their contents available to the user – the map librarian must be able to do this. As mentioned, such is the physical make-up of maps that most provide other information in support of their primary theme. It is often this supporting information and interpretation that is required by the researcher. If we are to succeed as gatekeepers on the path to enlightenment, we need to empower ourselves to release the wealth of information for which we care.

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THE IMPERMANENCE OF MAPS IN THE INFORMATION AGE^{*}

By Patrick McGlamery

It seems to me that maps are, by their nature, reports. Rarely lyrical or narrative, maps report either the state of the earth's surface, a plan for the earth's surface or a report of people and resources on the earth. The earliest existing map, a property survey pressed into a wet clay tablet and found in the Nineveh library is indicative of the reporting nature of maps. It's cousin document, a blueprint survey in the Mansfield Town Hall in Mansfield, Connecticut, USA, of the McGlamery's property is not that distant a relative. Both are "records of understanding" or contracts of ownership. Of course there are fictional maps: allegorical maps of fairylands, maps of heaven and hell, maps of worlds created in novels and conceptual maps of land developments. However, most maps are representative of the earth's surface and are cartographic reports of scientific information.

I maintain that maps are not **meant** to be long-lived. They are created to satisfy a particular scientific hypothesis that relates to time and space. For example, a topographic survey of the Spring Hill Quadrangle, where I live. This map was published by the US Geological Society in 1897, 1947, 1957, 1967, and 1987. Each edition or revision was created to portray this particular place in time. There is no cartographic intent to transition, or synthesize changes in the landscape, physical or administrative. While the user can infer changes, by comparing one edition to the other, it is not the intent of the map to show changes. Each map is simply a report of the topographic state of Spring Hill at a point in time. One can only get the most recent edition from the US Geological Survey. The back issues are available from libraries and archives... map libraries. These libraries have collected, preserved and cataloged the maps knowing that if they didn't, **the maps would disappear**. The scientific process would use them up, consume them. Maps are, by their very nature, impermanent.

This is different than books. Written scientific reports certainly exist. But there are other genres such as fiction, history, biography, and poetry, which are as vital now as when they were first written down. The Ramakien, the Bible,

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Shakespeare's plays have not changed significantly over the centuries. They were meant to last, to be a permanent part of the cultural environment. Issues of the permanence of the content of these works and artifacts are significantly different than for maps.

The impermanent nature of maps, therefore, is grounded in its **content**. This is an important distinct to make. This paper is concerned more with the collection development of spatial information in cartographic format than it is with the preservation of material. . Map content has been extremely fragile, residing as it has on single sheets of paper. While preservation of physical materials is critical, unless the information content is recognized as important enough to collection and manage, preservation will never be undertaken. For while maps are impermanent on either paper or digital media, they are totally lost if the information professional, that is the librarian or archivist, fails to recognize their true cultural worth in the first-place and does not add them to a managed collection.

Maps have always had a habit of falling through the cracks in the publishing distribution system. They have always suffered a backwater existence in mainstream publishing... and in libraries. While maps probably are represented in all libraries and archives, typically they are under-cataloged, under-preserved and poorly stored and retrieved. Sheet maps are large, fragile and pretty. Often they hang on walls... until they either fade or fall off... Be that as it may, the mission of the library is to collect, describe and provide access to information; and in the case of maps spatial information.

Maps are often considered working papers by an agency. They end up off, at the end of the stack, rolled up and stuffed in a box. In agencies they are most often collected until there is a need for space, and then they are dumped. Or saved. If they are fortunate enough to be saved they are often separated from textual material, or indices, the parts of the larger project. While state and federal agencies are often required to archive their published materials with a library or archives, there often are no requirements to archive 'working papers.'

An aggressive collecting strategy for the research library is to make its archival mission known to the agency or author. When the agency realizes that a library will take the material that they have collected, they will more often than not, deposit it with the library. After all, they thought enough of it to keep it neatly rolled for all those years. Periodic letters of interest to agencies only need to work once in order to save one-of-a-kind material.

Preservation of paper maps is well documented and the IFLA Geography and Map Section has a program for teaching map preservation strategies and tactics around the world. Today I want to focus on the unique issues of the impermanence of digital spatial information.

Few information formats have been as profoundly effected by digital computing as maps. In 1999, the issue before us with spatial information is not simply one of maps. Maps have always been compilations of datum writ graphically... cartographically. The art and craft of cartography draws the coordinate numbers as points and lines, classes and colors a country's population. The user, the map-reader, never sees the numeric data, though they can extrapolate the value if a grid or legend is given.

Twenty years ago, debate raged over the definition of cartography and maps. The International Cartographic Association (ICA) invited re-definitions of cartography in light of innovations in computer technology. Two camps emerged, stressing the importance of the map on one hand, and the spatial database on the other. M. Visvalingum articulated a middle ground, focusing not on product, but on content. She said, "If cartography is concerned with the making and use of maps, then it is not just concerned with visual products: it is equally concerned with the processes of mapping, from data collection, transformation and simplification through to symbolism and with map reading, analysis and interpretation. These intellectual processes are expressed in terms of prevailing technologies and computer-based Information Technology is fast becoming the dominant technology of the day." (Visvalingum, 1989)

The past ten years have seen profound changes in spatial information creation, storage, processing and management. In the past decade, the dropping costs of computer and network charges and the ready availability of computer mapping and 'GIS' or Geographic Information Systems software should alert the information professional to emerging issues of permanence of spatial information.

In the United States economic considerations have required the Geological Survey to re-evaluate its printed map production.

The USGS's Open-file Reports, begun thirty years ago, have include unpublished manuscript reports, maps, and other material that are made available for public consultation at depositories. These reports are a nonpermanent form of publication that may be cited in other publications as sources of information. Typically this series has been distributed on microfiche to depository libraries. Though they are not cited in the private *Guide to USGS Publications*, they are listed in the public document *Publications of the U.S. Geological Survey*.

In recent years the USGS scientist has been able to overcome the economics of print technology by publishing digitally. USGS Open-file Report 99-149 "Geology and Mineral Deposits of the Keweenaw Peninsula, Michigan" is an excellent example of such a report. The geologic map included in this report was compiled in Arc/Info, a Geographic Information System, or GIS . The complete report contains: 1.) color maps as image files 2.) text describing the geology 3.) spatial database files. Instead of the viewing the map, the user must now 'process' it. The many steps in OF99-149 <<http://pubs.usgs.gov/openfile/of99-149/index.html>> require that the user:

- Consult the readme.txt file for a complete description of the report, including instructions for downloading and importing the files.
- View the database explanation as an unformatted, ASCII text file: readme.txt (14 Kb)
- View the text pamphlet of the report in Adobe Acrobat Portable Document Format: of998pam.pdf (397 Kb). Go to Adobe Acrobat to download the free Acrobat Reader software if you you don't already have it. The PDF file is 18 pages on 8.5" x 11" paper and prints best on a 600 dpi laser printer.
- Download the compressed data files in unprojected geographic coordinates with units in decimal degrees of998.tar.gz (1.3 Mb)
- Download the compressed data files in Michigan Stateplane coordinates with units in feet: of998198.tar.gz (1.5 Mb)
- Download the compressed file for printing the paper map (34" tall x 66" wide) in PostScript format. The map was designed and tested on Hewlett Packard DesignJet 650, 750, and 2500 series printers. Select this option if you have access to a large format printer capable of plotting PostScript files: of998.ps.gz (4.2 Mb compressed and 20.8 Mb uncompressed). This file has been successfully printed from Arc/Info, Adobe Illustrator, and from the MS-DOS prompt using the "print" command.
- Download the compressed Arc/Info graphics file: of998.gra.gz (1.8 Mb compressed and 6.0 Mb uncompressed). This file will only plot in Arc/Info.
- Order a paper copy of the map from the USGS Maps on Demand facility.
- View the metadata files for the Arc/Info coverages.
- View parts of the map in Adobe Acrobat Portable Document Format. These parts are sub-sets of the full paper map, and can be used for on-screen viewing.

Previously this report would have been relegated to a black and white microfiche publication. It would have lived an obscure and grainy existence. The user's ability

to 'process' the information would have been to print a copy of a part of the map at high or low resolution. While the microform series continues, less material is going in.

Despite its complexity, the digital version is an resounding improvement, limited only by the users' hardware capabilities, as we shall see.

The USGS defines a digital map product as data intended both for display as a map and for processing by scientific or technical application software. The data may be geologic, geo-chemical, or geophysical databases, sample locations, or associated text. This subsumes the range of products that the Division has included in *the Miscellaneous Geological Investigations*-and *Miscellaneous Field Studies* series, and their predecessor series. This definition does not include geo-referenced data that are not intended for viewing as a map; the best examples of these are time series at specific point locations. Stand-alone raster images (e.g. satellite data) are not here considered as digital map products; however, such raster imagery may form one layer of a digital map product when it is accompanied by other interpretative geologic map information.

Currently, the USGS uses conventional lithographic printing techniques to produce paper copies of the majority of its mapping products. This practice is not economical for those products where the demand is low. With the advent of newer technologies, high speed, large format printers have been coupled with innovative computer technologies to turn digital map data into a printed map. It is now possible to store and retrieve data from vast geospatial data bases, and print a map on an as-needed basis, that is print on demand--thereby eliminating the need to warehouse a paper inventory of maps for which there is low demand. (USGS, 1999)

Using print-on-demand technology, USGS is implementing map-on-demand (MOD) printing, for selected infrequently requested map products. By providing MOD products, USGS can provide an alternative to traditional large volume printing and can improve the responsiveness to customers by providing access to USGS scientific data in a format that other wise might not be available.

However, we should not assume that what the USGS is doing with published digital maps is necessarily what others are doing. The USGS is an example of excellent distribution of this emerging cartographic format. The Survey and the US Depository Library program bring these digital maps to the libraries door. The more critical problem is acquiring map material that is not in a standard distribution network.

Indeed the maps published by ESRI in their *Map Book* series are representative of maps produced by the ARC/INFO program by private and public agencies internationally. ARC/INFO is a world leader in GIS software. Each year since 1985 users have gathered to share examples of digital cartography in the ESRI User's Conference. Each year maps are exhibited and the 'best of show' are published in a glossy presentation volume. The series is a good representation of the evolution of computer based mapping. The contemporary cartographer can now plot a limited number of high quality color maps for decision-makers in the office, rather than incurring the costs of time and money of traditional map publishing. In the past decade report map publishing has declined while individual map creation has increase. We can speculate that less than 20 copies of a map are plotted, 19 for reports and one for the cartographer to put up in his or her cubicle.

These maps are typically not collected in libraries because they exist outside the publishing system. They are not created for sale. They are created as reports and as one-time use for decision making. What this means is that the paper trail created in the past is broken in the digital age. The impermanence of maps will make the reconstruction of our thoughts and worldviews all that much more difficult for historians in the future. The Map Book maps have only one thing in common; the cartographers used ARC/INFO to create them. We only know of them because the cartographers wanted to share them with the cartographic community, not with an extended community of users. Librarians need to collect more aggressively in order to insure that these sorts of maps will be shared with a broader community.

A brief bibliographic search of maps published in the *Map Book* series reveals that only since 1993, when ESRI began donating the selected maps to the Library of Congress, have these digital maps been cataloged. Libraries will have to market their skills as catalogers, indexers and conservators to the burgeoning community of digital map publishers if we hope to preserve of cartographic history.

Maps generated on the Internet represent an even more fragile picture of digital cartography.

MapQuest, the Internet mapping business, is the largest map publisher in the history of the cartography. More maps have been produced in the past seven years than ever before. MapQuest uses maps as navigational tools, but mapping is also a powerful visualization tool. Now, as data visualization emerges as the new 'killer app' maps are quickly being integrated into information standards.

Mapnet is a tool for visualizing the Internet. Visualization beyond the purview of a single provider has become a challenging task that has received little attention from the research community. Commercial Internet service providers grow increasingly hesitant to voluntarily publish topology or peering information about their networks, and those that do so use no standard format, leading to the problem that any existing maps are fairly incomparable with each other. At the same time, the evolution of cooperative research networks, currently framed by the U. S. National Science Foundation, new connections to the very Broadband Network System (vBNS) and cooperating U.S. federal agencies, has given rise to the desire to be able to share performance information across infrastructures, perhaps even commercial ones.

Mapnet has developed a tool for visualizing the dynamic infrastructure of multiple backbone providers simultaneously, and for updating and correcting information that may be invalid or out of date (Mapnet Update). The tool's accuracy relies on the cooperation of providers in keeping the information accurate. Mapnet is also developing a module that will allow one to request performance or routing information across arbitrary points of the infrastructure amenable to measurement.

Mapnet begs the question of map publishing in a different way than MapQuest, it explores the notion of data visualization. Is this publishing? The Mapnet map is a map of relationships, not of wires in the ground or under the water. If it is part of a dynamic decision making process that is a cartographic snap-shot of the state of the InterNet.

In conclusion, maps have always been an impermanent part of our information environment. Maps are inherently "reports." As spatial information transitions from paper to digital, the library community will need to monitor both media. There are a number of map collecting issues which are worth noting:

- Maps, either paper or digital, are elusive
 1. Maps are often part of a textual report, seen as addenda, and overlooked.
 2. Paper maps are easily separated from other parts of the report.
- Maps are transformative

Paper maps are a presentation of compiled data, which computer-based Information Technology can include as a spatial database.
- Libraries have well defined roles
 1. Strong collection development policies that respond to the users needs, and not just to the publisher's catalogs are important.

2. Cataloging maps and cataloging spatial data are changing and evolving with developing spatial metadata standards.
 3. Preservation and archiving of digital spatial data is poorly defined, but practitioners understand the issue.
- Networked maps are innovative and unpredictable
 1. The networked environment is introducing new types of maps and data visualization.
 2. New networked communities are new information consumers.

During this time of continuing transition, librarians should be extra diligent. The vagaries of information at the end of the Twentieth Century are severe. Maps and spatial data are particularly susceptible. The library community should take a leadership role, defining the problems and developing solutions. However, it is incumbent on librarian's to take the responsibility for collecting these impermanent information artifacts.

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HOW TO PUT YOUR MAPS ON THE INTERNET*

By David Yehling Allen

Abstract: Many libraries are creating raster images of paper maps and making them available over the Internet. This presentation is intended to provide an overview of imaging technology for map librarians and administrators considering such projects. References in footnotes and a bibliography will enable those interested to explore technical questions in depth.

There are several approaches to digitizing and distributing raster images of maps on the Internet. Acceptable work for some purposes can be accomplished with very little expense or staff time. Producing high-quality images of large maps, however, involves considerable commitments of time and money. Available technologies for digitizing maps include scanning from film (such as Kodak Photo CD process), use of flatbed scanners, and high-end digital cameras. The advantages and disadvantages of these methods are discussed. Suggested guidelines for producing image files suitable for research are presented. High resolution images of large maps require very large data files, and methods of compressing and distributing these files are described. The importance of creating metadata that can be searched on the World Wide Web will also be stressed.

This article is intended as a non-technical overview.¹ My purpose is to encourage those of you who have not done so to make parts of your map collections available on the World Wide Web. This is an updated version of a paper delivered at the 65th IFLA Council and General Conference in Bangkok, Thailand, August 20-28, 1999.

I will focus primarily on creating images of historical maps, although the techniques I will be describing can also be used to digitize topographic maps, aerial photographs, and satellite images. So far almost all of the projects involving the digitization of antique maps have been done in North America and Western Europe. There is no reason why similar projects cannot be carried out elsewhere. It would truly be a wonderful contribution to both scholarly research and cultural

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¹ For a more technically oriented overview of the subject of this paper see David Yehling Allen, (August 15, 1998), 1-6 <<http://www.rlg.org/preserv/diginews/diginews2-4.html>>. This article contains links to many of the most important sites concerned with imaging cartographic materials. Additional information can be found in Issue No. 12 (1997) of *Meridian* (the Journal of the Map and Geography Round Table, American Library Association). This entire issue is devoted to digital imaging of maps; footnotes to the articles in that issue provide access to most of the relevant literature.

understanding if high-resolution images of the world's cartographic treasures could be viewed by anyone with a connection to the Internet.

Historical maps must be digitized as raster images.² Raster images have become increasingly important in the world of digital mapping in the last few years. Ordinarily when you think of digital mapping, what comes to mind is geographic information systems (GIS), which are best known for their ability to manipulate vector images. Raster images, however, are appearing more and more frequently on the Internet, and most leading GIS software programs have also become quite good at working with raster as well as vector images.

There are several reasons why we are seeing more raster images. A major drawback of Raster images has been their enormous file size, which made it almost impossible to work with them using ordinary computers, or to transmit them over the Internet. An uncompressed raster image of a medium-sized colored map can easily occupy several hundred megabytes. A number of developments in the last few years have made working with files this size practicable. These include the increasing power of reasonably priced personal computers, the availability of inexpensive mass storage, the development of new file compression techniques, and the invention of new ways to transmit large files over the Internet.

It is possible to get started putting maps on the Internet with a very small investment in training or money. All you really need is access to a server, and an ordinary PC equipped with a small amount of additional software and hardware. If you don't have much experience with computers, it is probably best to start out small. The drawback of this low-cost approach is that you will have to settle for digitizing very small maps, or else for producing low-resolution images. A small map of--say, 20 x 30 cm.--can be scanned using an ordinary commercial scanner, compressed using JPEG (a public domain program), and served up on the Web for all to see.³ Larger maps can be photographed on 35 mm. slides, and digitized at a

² Raster images are formed from a grid of rectangular "pixels." Vector images are created from mathematically defined lines and curves. Vector maps created by GIS programs can also be put on the Internet using programs such as ESRI's *ArcView Internet Map Server*.

³ One of the most prominent sites that has put up large numbers of scanned images of small maps is the Perry-Castañeda Library Map Collection at the University of Texas at Austin <http://www.lib.utexas.edu/Libs/PCL/Map_collection/Map_collection.html>. An ingenious example of what can be done using very low tech equipment is the Historic USGS Maps of New England collection at the Diamond Library of the University of New Hampshire <<http://docs.unh.edu/nhtopos/nhtopos.htm>>. These map images were scanned in sections by a researcher using a laptop computer and a handheld scanner. Although there are many interesting technical problems with the images (such as moiré effect), they are nonetheless usable for many research purposes.

reasonable cost using a process such as Kodak Photo CD.⁴ Images of ordinary sized maps produced from slides will not, however, have adequate resolution to capture all of the details on the map.

Producing research quality images of medium-sized or large maps is much more difficult and expensive. It is nonetheless within reach of most large libraries, such as national libraries and many museum and university libraries. So far most of the work of this type has been done in the United States, with the Library of Congress Geography and Map Division leading the way. Most recently a San Francisco map collector, David Rumsey, has raised the art of digitizing maps to new levels through the employment of cutting edge technology. These have been the pioneers, and in the remainder of this paper I will outline what needs to be done to produce comparable images.⁵

There is an emerging consensus that maps need to be digitized at a minimum of about 300 dpi in 24 bit color if all the important details are to be captured. (The requirements for black and white maps are somewhat different.) An uncompressed image file of even a relatively small map (say 60 by 90 cm.) Will occupy several hundred megabytes. In order to make such a map available on the Internet, a sequence of steps has to be followed: the map has to be digitized, the uncompressed files need to be stored, the files need to be edited and compressed, the compressed files need to be placed on a server, and metadata needs to be created to make the maps known to the world.

The most difficult part of this process is digitizing the map. Here you have essentially three options: digitizing from film, using a scanner, or using a digital camera. Digitizing from film produces the least satisfactory results, but it is also the easiest and least expensive method for those that have small numbers of maps to digitize. The procedure involves taking 4 x 5" or even 8 x 10" photographs and either scanning the negatives or transparencies yourself, or sending them to a service bureau for scanning. Working with a film intermediary creates unavoidable losses in resolution and color fidelity in comparison with other methods. Nonetheless, it is possible in this way to get very good results with a relatively small investment. Patrick McGlamery of the University of Connecticut

⁴ On Photo CD see David Yehling Allen, "Digital Imaging for the Rest of Us: Kodak Photo CD and Kodak Pro Photo CD," *Meridian* No. 12 (1997), 15-18.

⁵ The URL for the Library of Congress Geography and Map Division is: <<http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html>>. The David Rumsey collection can be viewed at: <<http://www.DavidRumsey.com>>.

Map and Geographic Information Center has provided us with examples of excellent work done in this way.⁶

It is easier to produce more consistent results by scanning maps directly, but scanners are limited by the size of the maps they can handle. There are a few scanners that can work with large maps. The Library of Congress is using an expensive flatbed scanner produced by the Tangent Imaging Systems for its Panoramic Map digitization project.⁷ The Library of Congress obtained its scanner as a donation. Cost and some technical considerations make it doubtful whether many libraries will want to imitate the Library of Congress in this respect, although they have obtained excellent results using this scanner. For those who prefer to work with scanners, sheet-feed scanners are a less expensive option, although they are not suitable for rare or fragile materials.⁸

In my opinion, high-end digital cameras, which are being used for the David Rumsey collection, are presently the best option for those contemplating creating large numbers of research quality map images. A device like the Phase I Power Phase FX digital camera back for 4 x 5" view cameras can create images up to 10,500 x 12,600 pixels in 24 bit color. At this resolution one can digitize maps up to 35 x 42 inches at 300 dpi.⁹ The total cost of a digital camera back and associated equipment is somewhat lower than that of a Tangent scanner. Digital cameras also reportedly have better color fidelity than scanners, and can work with three dimensional objects, such as bound atlases. They can be used with a variety of types of art as well as maps.

Once you have created digital images of your maps, the other problems are relatively easy to solve. The uncompressed images can be stored on CDs. Before compressing the images, you will probably want to crop and edit them using a program like Adobe Photoshop. The resulting images can be distributed on CDs or DVDs. If you want to put your maps up on the Internet, you can create low resolution copies and compress them using JPEG. If you want to put up high quality images on the Internet, you will have to use a specialized program like

⁶ Patrick McGlamery's work can be found at: <<http://magic.lib.uconn.edu/exhibits>>.

⁷ The flatbed scanner made by Tangent Imaging Systems (a division of Scangraphics Corporation) can scan maps up to 24 x 36" in size. Information is available at <<http://www.colorscom.com>>.

⁸ The Office of the Coast Survey of the National Oceanic and Atmospheric Administration of the United States used a color roller scanner made by Anatech Corporation for digitizing its Historical Map and Chart Collection. See: <<http://chartmaker.nco.noaa.gov/ocs/text/MAP-COLL.HTM>>

⁹ Information on the Phase I PowerPhase FX can be obtained at: <<http://www.phaseone.com>>. See also, Peter B. Hirtle and Carol De Natale, "Selecting a Digital Camera: the Cornell Museum Online Project," *RLG DigiNews*, Vol. 2, No. 6 (Dec. 15, 1998) <<http://www.rlg.org/prserv/diginews2-6.html#technical1>>

MrSID, which is used by both the Library of Congress and David Rumsey.¹⁰ This program uses special compression techniques to obtain a higher level of compression with good image quality than can be obtained by using JPEG. It also allows users to zoom in on images. Because MrSID never transmits more of an image than can be actually viewed on a computer screen, it makes it possible to view large digital files without transmitting more than a small portion of them at one time over the Internet.

I would like to conclude with a word about metadata. It is not enough just to put up images of your maps on the Internet. You also need to provide some bibliographic information, and you need to enable people to find them on the Internet. Most of us have been rather casual about furnishing this information, and have made do with providing a minimal amount of bibliographic information (author, title, date of publication of the original map) along with the images. If collections of digital images reflect a specific geographic area, this approach works tolerably well, and the maps can be located by using tools such as Odden's bookmarks.¹¹ But this is not a satisfactory solution in the long run. We need a single database of all the digital maps in the world, which could be searched by author, title, keyword, and other parameters. Map librarians are only now starting to grapple with this problem, and information about these ongoing efforts can be found on the Web.¹² At least for historical maps, I expect that we will want to adopt an approach similar to the OCLC CORC project, which involves the creation of a Web searchable database combining standard MARC cataloging records with "Dublin Core" brief cataloging.¹³

¹⁰ MrSID is created by a company called LizardTech <<http://www.lizardtech.com>>. See also Steven Puglia, "Fractal and Wavelet Compression," *RLG DigiNews*, Vol 2, No. 3 (June 15, 1998)<<http://www.rlg.org/preserv/diginews/diginews23.html#technical2>>

¹¹ The URL for Odden's Bookmarks is: <<http://kartoserver.frw.ruu.nl/HTML/staff/oddens/oddens.html>>.

¹² For information on metadata, see the American Library Association, Map and Geography Round Table, "Metadata Primer for Map Librarians" <<http://www.sunysb.edu/libmap/metadata.htm>>. For a more technical introduction to metadata from an international perspective see Jan Smits, "The Creation and Integration of Metadata in Spatial Data Collections," prepared for the 63rd IFLA Conference, Copenhagen, Denmark (18 August, 1997)<<http://magic.lib.uconn.edu/ifla/meta-smits.htm>>.

¹³ For the Dublin Core see: <<http://www.oclc.org/oclc/research/projects/corc/index.htm>>

How to Put Your Maps on the Internet: Sources of Information

General Information on Digital Imaging

1. Besser and Trent, "Introduction to Imaging"
<http://www.ahip.getty.edu/intro_imaging>. (Good on basics).
2. David Yehling Allen, "Creating and Distributing High Resolution Cartographic Images" <<http://www.rlg.org/preserv/diginews2-4.html>>
(Comprehensive introduction with links to many sites)

Sites with Digital Images of Maps

1. Perry-Casteñada Map Library at the University of Texas at Austin
<http://www.lib.utexas.edu/Libs/PCL/Map_collection/Map_collection.html>
(Many small maps scanned with desktop scanner)
2. Historic USGS maps of New England <<http://docs.unh.edu/nhtopos/nhtopos.htm>>
(Maps scanned in sections with hand-held scanner.)
3. Library of Congress, Geography and Map Division
<<http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html>>
4. David Rumsey Collection <<http://www.DavidRumsey.com>>
5. Scanned maps from the University of Connecticut
<<http://magic.lib.uconn.edu/exhibits>>

Photo-CD, Scanners, and Digital Cameras

1. Anne R. Kenney and Oya Y. Rieger, "Using Kodak Photo CD Technology for Preservation and Access: A Guide for Librarians, Archivists and Curators"
<<http://www.library.cornell.edu/preservation/kodak/cover.htm>>
2. Tangent scanners: <<http://www.colors.com>>
3. Phase I digital cameras: <<http://www.phaseone.com>>
4. Peter B. Hirtle and Carol de Natale, "Selecting a Digital Camera: the Cornell Museum Online Project," *RLG DigiNews*, Vol. 2, No. 6 (Dec. 15, 1998)
<<http://www.rlg.org/preserv/diginews/diginews2-6.html#technical1>>

Software for Compressing and Distributing Images

1. MrSID: <<http://www.lizardtech.com>>
2. Steven Puglia, "Fractal and Wavelet Compression," *RLG DigiNews*, Vol. 2, No. 3 (June 15, 1998) <<http://www.rlg.org/preserv/diginews/diginews23.html#technical2>>

Metadata

1. Odden's Bookmarks:
<<http://kartoserver.frw.ruu.nl/HTML/staff/oddens/oddens.html>>
2. American Library Association, Map and Geography Round Table, "Metadata Primer for Map Librarians": <<http://www.sunysb.edu/libmap/metadata.htm>>
3. Dublin Core homepage: <<http://Purl.oclc.org/dc/>>
4. CORC Project: <<http://www.oclc.org/oclc/research/projects/corc/>>.

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