

# Digitisation: A Preservation Approach to the Architecture Heritage Collection

Selina Owen

Architecture Heritage Center, Papua New Guinea University of Technology

**Abstract.** The Architecture Heritage Centre of Papua New Guinea is a Research Centre containing drawings, books, slides, thesis, maps and photographs of traditional buildings of Papua New Guinea. It is a unique and specialize collection on the subject of traditional architecture and buildings of Papua New Guinea. This paper attempts to discuss the process of digitization: a method chosen to preserve the information knowledge contain in this rare and unique collection.

## Introduction

To put the digital technology into some logical perspective, this paper describes raw data collection of traditional buildings, the inauguration of the collection to its current state, the realisation of the fast disappearance of such a tradition and the need for the data to be preserved. This fact is spelt out in two specific categories first: to fast track the collection of data on traditional buildings, and second: to digitise the collection with a view to preserving the data for use by future generation. From the author's perspective, the former outweighs the later as the planet experiences unprecedented climate change.

## General Background

### Papua New Guinea Traditional Culture

The impact of change on traditional buildings of Papua New Guinea is alarming those concerned with preserving and conserving traditions. Historically, observation has it that outside influence had contributed a lot to disappearing cultures. They brought with them their economic, social, spiritual and political concept and infiltrated the minds and ways of life of the local inhabitants. In addition, the intensity of climate change as we are witnessing today is causing great concern and brings many challenges in addressing the preservation and conservation agenda. In short, these challenges are calling for a shift from the traditional ways of preservation and conservation and today the development of digital technology seemed a fitting comfort for many libraries, archives and museums' collections.

### The Ruff's Collection

Being in the US Army during the WWII, Mac Ruff was deployed in the Pacific Island nations. Among these islands was Papua New Guinea, rich with traditional culture, arts and design. Mac Ruff was exposed to the richness of the art and culture at the time after which he returned with his family making several trips first and later became a visiting lecturer in the 1970s and 1980s to the now Papua New Guinea University of Technology. His collection expanded to include visits to various villagers conducting surveys, taking photographs and generally documenting these village trips.

In an attempt to fast track collection and documentation of data, Mac Ruff design a village study project course which he successfully introduced as a subject taken by students of the Architecture and Building Department of the Papua New Guinea University of Technology. Other staff also participated in the village study project conducting surveys, drawing traditional building designs, village lay out, taking photos and writing reports. The Village study project was the best approach Mac Ruff took in the gathering of data of traditional buildings of Papua New Guinea.

## **The Architecture Heritage Centre of Papua New Guinea**

When the Council of the Papua New Guinea University of Technology approved the establishment of the Heritage Centre in 1994, it superseded the Ruff Personal Collection. At the time of its inauguration, the Centre was seen as having a number of purposes as follow:

“ To establish a comprehensive collection of traditional buildings and settlement patterns of all cultural regions within Papua New Guinea and conserve this knowledge for future generations” (Ruff, 1994)  
To make information on traditional building culture of Papua New Guinea accessible locally and internationally through a number of methods seemingly outdated now in this digital age. (Ruff, 1994).

### **On Going Collection of Data and Village Study Surveys**

Since Professor Ruff's untimely death, the incumbent Heads of the Department since continued these village study surveys with fourth and fifth year students, drawing traditional buildings and writing reports thus depositing such data into the Architecture Heritage Centre. The village studies projects carried out by students and staff of the department was seen as the best approach to fast track the collection of data on traditional buildings. The collection of data on the subject somewhat slowed down in recent years, due to frequent departure of certain interested academics from Papua New Guinea when their tenure end after every three years.

### **Total Coverage of Data**

Papua New Guinea is broadly perceived as having four regional culturally identified areas: the New Guinea Islands; the Momase Region, the Southern Region and the Highlands Region. It is further divided into twenty provinces: the North Solomon's, New Ireland, Manus, East New Britain, West New Britain, Western, Gulf, Central, Milnebay, Northern, Morobe, Madang, East Sepik, West Sepik, Wabag, Southern Highlands, Western Highlands, Chimbu, Eastern Highlands and Jiwaga, having more than 800 languages and a cultural diversity of varying nature, what is being surveyed and documented is all that is left of its traditional past. During WWII and immediately after even his time at the University of Technology, Mac Ruff concentrated collection was on the East and West Sepik areas of the country where little intrusion was yet made by the outside world, slowly working his way into the highlands, the Southern and Momase Regions and, very little or none at all of the New Guinea Islands region. More recently, coverage of the New Guinea Islands region was attempted of Manus, the North Solomon and, East and West New Britain Provinces. Retrospective coverage of data on traditional architecture and buildings of Papua New Guinea is still far from comprehensive, but almost all regions have been surveyed. For scientific observation and analysis of traditional building culture, it can be argued that what has been collected is representative of the traditional building culture of Papua New Guinea, however, for retrospective collection and coverage of data, it would be sound advice to collect any and every identifiable traditional buildings that still have strong connection to their past.

About 99.99% of the material collected is original raw data. This remains the only record of a dying culture and will be lost forever if nothing gets done to preserve it. In addition, the material composes primarily of organic material and is subject to damage and natural decay. Hence preserving the information knowledge by way of digitisation is considered appropriate at this point in time.

### **General Awakening of Humanity's Risk of Extinction: the Broader Perspective**

Many theories have been postulated by different cultures around the world that unprecedented calamities had caused geographies of this planet to shift dramatically in the remote past that evident humanity faced the level of extinction.

These calamities follow a regular cycle universal in nature and in response to a wider cycle of planetary alignment. Such information knowledge has been largely and almost lost however thanks to scientific researchers and archaeologist who are able to establish radio carbon study of sediments, astronomers who have observed and study the stars and other planets. The results evidence the existence of more advance civilizations which are confirmed lost caused by climate change due to planetary alignment.

## **Statement**

The general awakening of the lost knowledge of the origin of humanity and the cradle of ancient civilizations are beginning to take hold of the mind set of today's generation that even organisations like UNESCO make it their business to formalise policies to preserve humanity's cultural past.

The realisation of this fact becomes the driving force behind the formulation of today's conservation and preservation of cultural policies.

It is crucially important to understand that, our traditional cultures define who we are, they provide the foundation upon which we stand, and the guiding apparatus to map our future. These traditional cultures have been set out by generations who have preceded us.

## **The Architecture Heritage Centre Digital Project**

Being equally aware of the fast disappearance of traditional building culture and under the Board of Management, the Architecture Heritage Centre embarked upon the digital project in 2006.

### **Purpose**

To facilitate the alignment of the Architecture Heritage Collection with time as humanity moves into the digital age.

To preserve the information knowledge contain in the collection on traditional built forms and especially, architecture, buildings, arts, culture and other related areas for use by future generations.

To provide fast and easy access to information from the collection to interested users both locally, and internationally.

To facilitate research by a wider audience through the Internet Search Engine.

To organize the information knowledge into a databank that can be continuously and easily Accessed by interested academic institutions and individual users.

## **How the Architecture Heritage Centre's Collection is Digitised**

There are two types of digital approach taken: digitising material already in another format and those that are born electronically. Most of what is to be discussed below are images and data that are in the paper format.

### **USING THE SCANNER**

#### **Photographs - A4 Size and Below**

Once scanning starts, the scanner prompts you to choose the location where you want to store the images. When the photo is being scanned, a running number is allocated to the scan image by the system. Changes are made at this point, erasing the number that the system has allocated to the image and replacing it by giving the image a tag preferably the name of the village in Papua New Guinea differentiating it with a running number to indicate that it is part of a group of photos on traditional building of that particular village. E.g. Tararang – 1, Tararang – 2 etc. Each photo scanned photo forming a file.

A directory is created and tagged with the name of the village without qualifying it with a running number.

All the individual photos that have been scanned above Tararang – 1 to Tararang – 100 are altogether moved into the Tararang Directory created above.

A second directory is created tagged with Morobe Province, the name of the Province in which the village Tararang is located. The Tararang Directory is again transferred into the Morobe Province directory.

Any other photographs taken of villages from Morobe Province are scanned and organised in the same like manner, in different directories village by village and moved into the main (Morobe Province) directory.

Photographs on traditional architecture and building of all the other 19 provinces are processed in the same like manner.

The allocation of tags for files and directories are influenced by the nature of reference queries received from local users i.e. users would request information on traditional buildings from a particular village or province of the country.

#### Books/Reports/Journals – A4 Size and Below

Most 99% of books, reports and journals are A4 size, with a 100 or less pages are scanned using flatbed scanners. They are scanned from cover to cover following the same steps taken in scanning photographs as described above. The only difference is the choice of tags use for files and directories. The author's name and title of the item is used e.g. Settlement patterns in Kupaigo – 1 to Settlement patterns in Kupaigo – 100. This kind of tagging is allocated to each page of file. When the second directory is created, it is tagged with the title of the book only in this case "Settlement pattern in Kupaigo". All the pages or files of reports "Settlement pattern of Kupaigo – 1 to 100 are moved into this directory. A second directory is again created tagged with the Authors name. The "Settlement pattern of Kupaigo" directory is then moved into the authors directory. In many cases, one author writes many reports all of which are placed in the same directory. Reputable authors have individual directories of all their work. This decision is made based upon the user needs on the ground. Works of authors that are not so popular are moved into one directory tagged "Staff Research Reports". Similarly, one directory is created as a surrogate for all students work each student having his own directory tagged "Student Research Report"

#### Drawings A4 Size and Below

Drawings that are A4 size and below are scanned using the flatbed scanner. Not many drawings are in this category. Again if they are drawings of village site plans, or actual drawings of traditional houses or of relics used for the interior decoration or spiritual use, they are scanned each drawing image making files. All files of drawings of a particular village is placed in a directory in the same like manner as described with the organisation of photos above. Directories for such drawings as these are tagged e.g., Drawings – Murik Lake".

### USING THE DIGITAL CAMERAS

#### Thick and Oversized Books

The choice of using the digital cameras becomes apparent when the problem of thickness of an item (book) is faced. They are too thick to be securely placed on a flatbed scanner without being broken on the spine. In the case of oversized pages, digital cameras are elevated higher enough until the content of the page is in full view, before an image or page content is captured digitally. The tagging or indexing of images and page contents are done after the shooting is completed one book at a time. Images and page contents are downloaded using the scanning and camera wizard software already available in the computer. Editing each image at a time the title of the book is typed in at the bottom of each image or page content qualified by a running number. If there is enough space for the author's name, then it is included. Example 1, Example 2. The organisation of files and directories are again employed as is being described above with the scanning of books/reports/magazines in the same like manner.

### Photos A3 Size and Larger

Photos that are A3 or larger in size are digitised using digital cameras again organising images into files and directories as already been described above.

### Maps and Drawings A3 Size and Larger

The Original item is digitised using either a scanner or digital camera. After an image is captured, the original is placed back in the stack/shelve/drawer/archival box in the standard arrangement the AHC employs which is common to most libraries, archives and museums.

During digitisation, the following considerations are taken into account.

Digital images are created to a resolution appropriate to the nature of the item. Quality is ensured using the many capabilities and facilities that are already made available by installed softwares in computers, digital cameras and scanners following Digital Capture Standards.

No alterations are made to the images ensuring originality of items as close as possible.

An image is digitised once only, and can be used several times over for different purposes.

The Digitisation of the AHC Collection does not end our commitment for proper storage, care and preservation of original material. After digitisation, all material are placed back in the order they have been in the past, i.e. in a library, archive or museum type of set up, ensuring order, cleanliness and an air-conditioned environment.

### STORAGE

In the past since the project started in 2006, groups of indexed photos were stored on CDs. Recently, the Centre purchased an external drive that have 1 terabyte memory capacity. The digitisation of books/reports/documents will require more of this external drives. Perhaps as IBM has indicated in the literature, there are such things as exabytes which have more memory capacity than terabytes.

### CHART

Chart showing the type of material digitised, Bit Depth, Resolution and File Format used during the digitisation process. [to be completed for power point presentation]

Material	Bit Depth	Resolution	File Format
Black/White printed text			
Black/White Handwritten			
Black/White Photograph			
Black/White Oversized			
B/W Drawings Oversized			
B/W Maps/Oversized			

### Literature Review

The United Nations Educational Scientific and Cultural Organisation (UNESCO) is a global institution that concerns and tasks itself with the attempt to preserve dying and almost lost cultures which evidence the past of humanity and its civilisation, ensuring that future generations will be knowledgeable about their past.

Amongst its many and related missions, the preservation and conservation of cultural heritage component of UNESCO is at the very heart of the Architecture Heritage Centre of PNG, and is mandated to accomplish such a mission in the specific area of traditional architecture and buildings of the country.

The Convention Concerning the Protection of the World Cultural and Natural Heritage is a group made up of concern individuals/countries/organisations about the rapid lost of cultures and heritage of the world. As such, during their many conventions they have compiled 38 articles as guidelines to set into motion the conservation and preservation exercise by their member countries and participants. These articles form the basis and which UNESCO has adopted in 1972 to enhance its global mission on conservation and preservation of cultural heritage of great value, and that are at risk of being lost.

Of interest to the Architecture Heritage Centre's vision and mission are: "monuments: architectural works, works of monumental sculpture and painting, elements of structures of an archaeological nature, inscriptions, cave dwellings and combinations of features which are outstanding universal value from the point of view of history, arts or science", and " groups of buildings: ..... separate or connected buildings which because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science" (Article 1: UNESCO 1972 )

Also Article 3, of UNESCO, 1972 is concern of the high risk of digital heritage of the world to advertisements highlighting the fast rate of changes being made to hardware and softwares rendering them obsolete. In turn, the situation lead to, "uncertancies about resources, responsibility and methods for maintenance and preservation and the lack of supportive legislation." (Article 3: UNESCO 1972)

Smith (1999) made clear cut distinctions between preservation and access. Smith argues that although the digital technology makes easy access to library and archival collections, the technology is not adequate in its current state for archival preservation.

Specifically, she points out two very important facts which all libraries, archives and museums should take note of. Firstly she argues that original items which are frail and fragile when placed on flatbed scanners will destroy their original form. Secondly, she dreadfully points out that libraries, archives and museums should not make hast in discarding material after digitisation as this could result in un-revokable lost of information. The technology has its weaknesses and considered by some as unsuitable for preservation.

Further, Lee 1995 established some interesting points about the life span of the digital technology, that CD-R disks are being developed to increase their life span. TDK claim 70 years life span, Kodak 217 years and Mitsui 300 years. However, these are claims only and remain to be proven.

The Lemurians was a people whose technology was far advance and sophisticated than any known to man. They knew 2,000 – 3,000 years before the event took place that their continent will be destroyed by a great catastrophe. Being concern about the possibility of their civilization being lost, they did two things to preserve their traditional cultures.

They undertook to teach many people about the earth and the history of mankind believing that the information would be stored inside the cells of the human body. This point is especially interesting as Papua New Guinea's historical past is oral where information knowledge was verbally passed down from generation to generation.

They stored information in crystals, dug deep into the earth and kept these crystals there while destruction was taking place on the surface. The crystal method of preservation is above this generation's intellectual capacity.

Similarly in another observation such as crystal skulls many of which are found all around the globe some of you in this forum may be well aware of them are being kept in museums today. Quartz crystals were used to craft these skulls providing a balance temperature that is neither hot nor cold. The craftsmanship of the crystal skulls and into which information was stored was second to none.

IBM had made some observation of these crystal skulls and indicated that they can store “millions of gigabites, terabytes, possibly even exabytes, and hold more information than any current computer” (Guide to Digital Imaging on-line)

### **Strengths and Weaknesses Observed during the AHC’s Digital Project**

Having gone through the digitisation process, the following weaknesses and strength of the digital technology are established, and ones that are common among libraries, archives and museums.

#### Weaknesses

Images that are electronically created cannot be accessed by the human eye without being aided by computers.

The hard-wares and softwares that enhance digitisation have very short life spans e.g. they are being outdated within every 18 months to five years rendering them obsolete. Softwares for instance change every two to three years.

The short life span of these hard-wares and softwares prove very costly because funds must be sorted regularly to keep up with recommended updates of both.

The availability of large size scanners to scan large size items often proof difficult.

Softwares for digital imaging limits appropriate indexing terms needed to efficiently access images on special collections.

Quality control of digital images and metadata are often time consuming and complex.

Papua New Guinea experience a high frequency of power outages that sometimes go for days and weeks, affecting the workflow and sometimes wipe out complete scanning softwares.

Sometimes images take up a lot of space and sometimes lost due to the high frequency of power outages.

Quality of some images and metadata also are lost during the process of digitisation.

Different scanners are used with slightly different formatting rendering them difficult to merge images of the same building, village or province. AHC employs Epson Perfection 4180 Photo, CanoScan 0646U ex and SnapScan 1212 Agfa.

#### Strengths

Scanners are able to copy on to computers allowing flexibility to make alteration.

Images and metadata captured by flatbed scanners prove to be of high quality.

Images can be used in reports and produce other documents electronically.

Scan images and metadata can be creatively transformed using graphic applications.

Proves efficient retrieval turnaround time when the digital images are properly indexed.

Makes multiple users and access possible.

Saves on shipping cost.

Easy for digital images and metadata to be disseminated.

Reproduction of images is easy during and after disaster recovery experience.

Easy to make copies of the record.

May help ready and easy access to digital records during court or legal proceedings.

Digital image quality can be maintained from generation to generation and copies can be as good as the original.

## **The Copyright Law**

Application of the copy right law is being considered however, this is being put on hold for further deliberation by the Management of the Centre.

## **Summary and Conclusion**

The traditional building culture of Papua New Guinea is fast disappearing due to natural cause of decay and social and economic influence which hasten their lost and destruction.

The fast disappearance of such a culture as discussed in the literature review contributes to the weakening of any nation's cultural identity including that of Papua New Guinea.

The realisation of this dilemma is often aggravated by the lack of support at the village, provincial and national level due to financial, staffing and technical constrains.

The protection and conservation of traditional buildings is yet to be constitutionalised in order to enforce and hasten steps to conserve them.

Realising that the traditional building culture is of great value and interest, they must be preserve as part of Papua New Guinea's traditional culture and identity.

The two primary purpose of the Architecture Heritage Centre are being undertaken although slow due to staffing, financial and technical constrains.

Digital technology is suitable for accessing information but not so suitable at this point in time for preservation and needs more time for it to develop.

Given the increasing intensity of climate change, resulting in extreme weather pattern, the Architecture Heritage Centre sees itself as taking an important step in preserving such a unique tradition although the state of the art digital technology is in its embryonic state.

## **Recommendations**

The Lemurian's crystal technology is seen as the best preservation approach for libraries, archives and museums and should be developed if humanity is concern about preserving the culture of this generation. The life span of crystal technology is millions of years and as IBM has indicated, the technology can store vast volumes of information.

In the absent of a copy right law to control the collection, it is imperative that a framework to affect the application of it must be underway before any of its rare work, images that are authentic or original gets out to public domains.



## References

Architecture Heritage Centre of Papua New Guinea by Mac Ruff, University of Technology, Lae, 1994; 9p.

A survey of preservation and conservation practices and techniques in Nigerian University Libraries by Olatokun Wale Michael In LIBRES, Vol. 18, Issue No. 2, p1-18.

Digital Archives: Preservation or Access by Abby Smith In The Council on Library and Information Resources, 1999.

Digital Archiving and preservation: technologies and processes for a trusted repository by Jantz Ronald and Giarlo Michael In Archives and the Digital Library, 199. The Haworth Information Press, 2006.

Digital libraries: definitions, issues and challenges by Garry Cleveland; 1998 at <http://ifla.queenslibrary.org>

Guide to digital Imaging, Utah State Archive, Division of Archives & Record Services, Utah, June 2005, 11p. at <http://archives.utah.gov/records-management/ERM/guide-t-digital-imaging.html>

Lemuria Reflection at <http://www.lemuria.net/article-lemuria-a-reflection.html>

Managing Preservation for Libraries and archives: current practices and future developments edited by John Feather, Ashgate, Burlington, 2004.

Responding to one of the recommendations “The Preservation of Traditional Living Art in Oceania” by South Pacific Commission – UNESCO Symposium of 1979,

Unesco Cultural Diversity and Heritage. Charter on the Preservation of Digital Preservation???

World Heritage at <http://whc.unesco.org>