International Association of Sound and Audiovisual Archives

Internationale Vereinigung der Schall- und audiovisuellen Archive

Association Internationale d'Archives Sonores et Audiovisuelles

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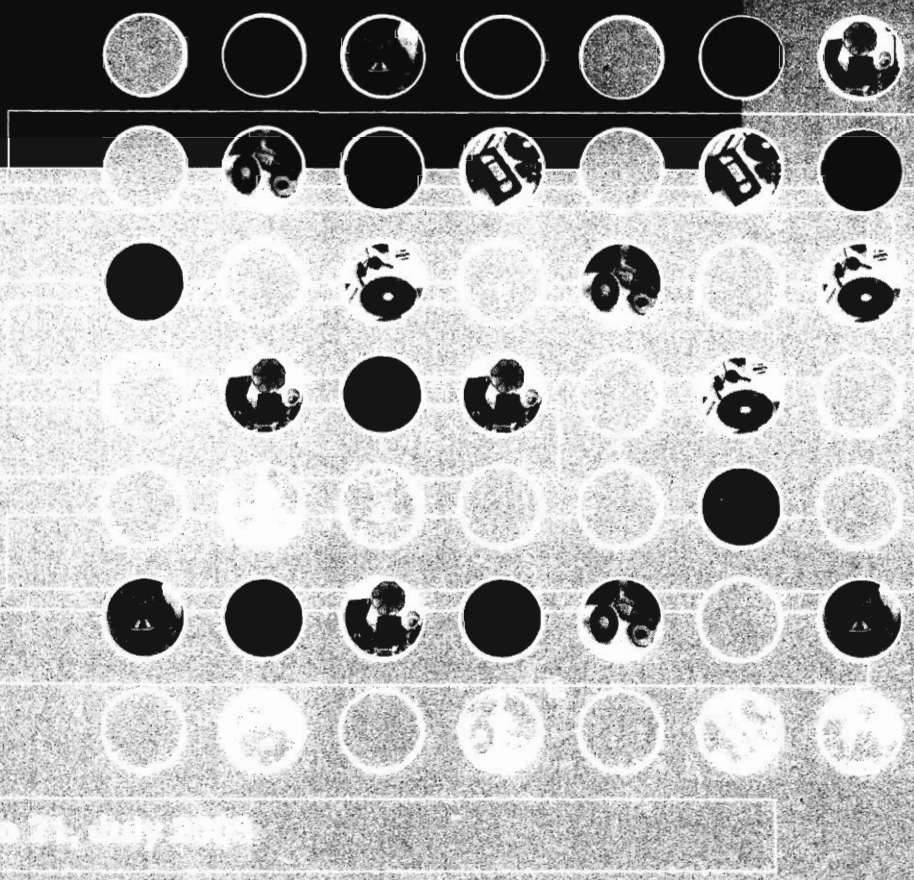

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Editorial

The 1994 Rwanda genocide occurred without many people noticing it. So it seems. Almost a million people were killed in a mere 100 days. Some say it was the most efficient mass killing since the atomic bombings of Hiroshima and Nagasaki[1] – and yet, the world at large did not really take notice and, even more sinister, those who knew chose to ignore it. Even today, there is still a great unawareness of what really happened during those 100 gruelling days in 1994 when ethnic hatred exploded and resulted in the massacre of Tutsis and moderate Hutus. Almost ten years later, the only 'archive' that exists in Rwanda to tell the story is the bodies, left intact and reduced to bones at the sites of those massacres.

I was privilege to be part of a small group of archivists and historians to have been invited by the *Aegis Trust* to Rwanda to evaluate an audiovisual archive pilot programme, which has as its main objective to record and preserve the *gacaca (gha-tja-tja)* courts the Rwanda government has set up to deal with the genocide. Through these traditionally-based hearings, the communities are trying to understand what happened in 1994. It is hoped that this process will bring justice, forgiveness and reconciliation. The audiovisual project will ensure that the memory of genocide is preserved and protected in the national consciousness of the Rwandan people. In doing so, the audio-visual archive will also present the Rwanda people with an invaluable gift, as the rapporteur of the Evaluation Programme, Colin Hunter, has so aptly put it.

The upcoming conference in September in Pretoria emphasises this sense of archiving in its theme *'Memory and Society'* and the role audiovisual archives can play with regard to the preservation of memories.

In this edition of the IASA Journal you can read about the role *Information Professionals*, as Elizabeth Watson calls us, should play in archiving cultural heritage. Elizabeth is a librarian in the Learning Resource Centre at the University of the West Indies. In this article she reflects on issues pertaining to archiving the African heritage, in particular archiving of the musical heritage of our societies, in her case the Caribbean musical heritage - the calypso. We also bring you two presentations from the Aarhus conference: Shubha Chaudhuri's insightful paper on the challenges research collections and archives are faced with regarding digitisation of what she calls supplementary materials, and the interesting paper on uncompressed video archiving by Franz Pavuza and Nadja Wallaszkovits. Violet Matangira from the National Archives of Zimbabwe comments on the position of audiovisual archiving in the ESARBICA Region. And finally, Ottar Johnsen et al, give us an insight into the optical techniques for saving the sound of phonographic records with the interesting twist in the title of their article 'VisualAudio'.

By now you should have received your invitation to attend the 2003 Annual Conference (*Audiovisual Archives: Memory and Society*) in Pretoria, and the preliminary programme. The aim of the programme, with its variety of topics and interesting speakers, is to seduce you into attending the conference. We hope to see you there.

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[1] Gourevitch, P. 1998. *We Wish To Inform You That Tomorrow We Will Be Killed With Our Families. Stories from Rwanda.* Picador : USA

It happens frequently that I am asked to lecture on audiovisual archiving to archivists and librarians. What puzzles me is that I am not asked to speak about audiovisual documents, but rather about "non paper material", "electronic media" or – the worst – "non-books". In the introduction to my lectures I therefore always explain that I am speaking exclusively about audiovisual material for the simple reason that this is a category per se, as important as e.g. books or paper documents in archives, which merits full recognition. The importance of the audiovisual record is mainly owing to the fact that it has become the main information format for most people, and audiovisual information therefore not only tells our history but shapes it too.

One of the main tasks of our association is to promote this idea together with the other NGOs of our branch beyond the relatively narrow limits of our professional background. Ray Edmondson has, in his "Philosophy of Audiovisual Archiving", given a large number of reasons and arguments for full recognition of the activities and profession of audiovisual archiving. We are happy to know that the text is currently under revision and hope to improve its distribution, perhaps with a more attractive title.

My plea for full recognition of audiovisual archiving could lead to a misunderstanding: I don't want to create a sort of ghetto for this activity. We have to be aware that, thanks to digitisation, the trend is towards integration of the different types of documents. But this integration can be successful only if the specific characteristics of audiovisual documents are adequately recognised. It is a matter of fact that the main workshops, seminars and congresses on digitisation of cultural heritage today are confined to paper materials and photographs (the latter, in my country, is considered part of the audiovisual heritage). The problem of sound and moving images is left entirely to special events dominated by broadcasting institutions. Here, IASA has a challenge to bring these problems to the large community of heritage institutions (libraries, archives and museums) and to seek solutions that are adapted to the needs and possibilities of this community.

Recently I was in Mexico and assisted in the first phase of the second seminar on audiovisual archiving organised by Radio Educatión. I was asked to speak on the "Code of Ethics of IASA". When I first saw this topic, I was rather apprehensive. As there is no official IASA document on ethics, I could not imagine inventing something that had not been adopted by the members of our association. Finally I decided to take as a point of departure the IASA-TC 03 document "Standards, Recommended Practices and Strategies: The Safeguarding of the Audio Heritage: Ethics Principles and Preservation Strategy". I found in this document all the items that seemed to me worth mentioning in the context of ethics. The great advantage was that it was all closely linked to the reality of audiovisual archiving, which saved me from the ineffectual task of producing a purely theoretical paper. If you have not yet read IASA-TC-03, I would strongly recommend that you do so.

The next official document IASA will issue is on the crucial item of selection for digitisation. It is mainly my fault that the text has not yet been published. I requested certain modifications, which seemed necessary to me. One concern is the term "de-selection", which could be misunderstood as an invitation to destroy all the material that has not been selected for digitisation. The other point is that long-term storage of digitised materials is not an easy task and is linked to some hitherto unresolved problems. I hope we will be able to finalise this text soon and print it for the Pretoria Conference.

I wish you all a pleasant summer (and winter for the members in the other hemisphere). I am looking forward to meeting you in Pretoria.

Kurt Deggeller
28 May 2003

Challenges in the Digitization of Supplementary Materials in Research Collections and Archives.

Shubha Chaudhuri.
Paper given at the IASA Conference, Aarhus, 2002

As we talk of the many changes and challenges in the archival world brought about by the era of digitization, we also find that we have to reflect, often as an afterthought, on where what we have traditionally called "supplementary materials" fit. To me the term itself is a reflection of what the challenge is. We have not given them the same place we have given recordings, even while recognizing their importance. However, collections, which have these supplementary elements, are considered richer and more useful. Today, as we deal with the wide-spread changes brought about by digital technology in the management of our archives, we are also faced with the problem of handling these materials. [1]

The issues facing us in dealing with supplementary materials are related to the fact that as curators and archivists in research archives, we have to keep the collection as a whole, preserve the identity of the collector and the focus of research, while ensuring that all the elements that make up the collection are also available independently.

The special challenges arise from the fact that an audiovisual archive creates its storage and working spaces as well as all its systems around audiovisual recordings, which have very specific needs. "Accompanying" or "supplementary" materials are then in many ways treated as subsidiary – valuable certainly, but still subsidiary. Incorporating these with recordings has always been a goal of research archives, but one that has been difficult to attain in practical terms for reasons discussed later. The developments in digitization where images, still and moving, and recordings can be reduced to computer files offer opportunities with an ease and at a cost that could not have been thought of earlier.

What Characterizes Research Archives or Collections?

What makes research collections or archives special is that they consist of field recordings that were made as part of research projects. These may be for one or many projects. They are either institutional projects, or individual projects and collections that are deposited in an archive. The challenge for research archives has always been that research collections made by different researchers, with varying focus and aims, have to be made uniformly accessible. In the case of those projects that are not made by the institution itself, it is impossible to enforce consistency and common standards of recording, methodology, data collection, and all the other elements that are part of the documentation or research.

[1] I am basing my remarks largely on my experience of my dealing with these at the Archives and Research Centre for Ethnomusicology, American Institute of Indian Studies (ARCE). This is an archive that primarily serves as a repository for collections of research materials. At this time we have 159 collections made by researchers and institutions and individual collectors that total to approximately 17000 hours. These are accompanied by field journals, rough logs, cue sheets, transcriptions and translations, publications, photographs, and so on, not in any consistent pattern or quantity.

Supplementary Materials/Accompanying Documentation

What are the most common forms of supplementary material that accompany research collections?
For the most part, they are:

- Field notes/journals
- Recording logs
- Transcriptions and translations
- Photographs
- Maps
- Artefacts – eg musical instruments, art objects, or articles of everyday use.
- Published materials collected by the researcher during research. These are often newspaper cuttings, articles, and ephemera such as pamphlets in local languages, brochures of events, posters, etc. In the case of published recordings, there would also be record sleeves, liner notes and so on.
- Published recordings may also be part of the supplementary material.

Supplementary material is not only what is part of the field work, but often consists of materials produced after completion, such as articles, books, dissertations, recordings, CD ROMS. These are also often deposited in the archive, or acquired by the archive to add value to the collection.

Problems of Supplementary Materials: Preservation and Access

Storage – The most common problem facing archives in the storage of supplementary or accompanying materials is that they are all different in terms of material and *storage* requirements, which leads to their being stored in different ways and in different places. This makes it difficult to provide access and a cohesive identity. There is also the fact that an archive may not have the facilities for storage of materials that are not normally part of its collection. These are issues, which would not be a challenge to an anthropological or ethnological museum, that are geared to artifacts and multiple materials but become problematic for an archive with space for recordings and none, perhaps, for storing and showcasing instruments.

Preservation/Conversation strategy - Staff and expertise in an audiovisual archive tend to be concentrated in the domain of recordings, and it is difficult to set up and sustain methods of preserving paper, artefacts and other materials – each of which has specialized needs. These have been long-standing issues. As audiovisual archives are engaged in development and application of standards in the audiovisual domain, they have had to borrow the methodology of dealing with the supplementary materials from libraries, paper archives and museums, and not always with much success. It is impossible, too, for an audiovisual archive to create facilities in-house for preservation of these materials – such as deacidification of paper - for which more expertise is found in many libraries, and photo archives.

Digitization provides the tempting options of scanning and digital microfilming, which reduces the focus on the issue of storage. However, most audiovisual archives have not developed standards for digitization of paper records. It is necessary for us, as audiovisual archivists, to pay attention to the digitization standards of other media, if we are to rely on this technology. Similarly, it is hard for audiovisual archives to have appropriate storage facilities and systems for dealing with the preservation and conservation of objects. In all these areas, there is also the issue of permanent preservation of the originals. No archive would be comfortable with getting rid of original paper records, maps or objects, though specialized storage units may not be available.

Digitization then offers some benefits in the area of preservation of paper records by capturing the current quality and aiding preservation by reducing the handling of original materials.

In managing our archives, equipment for these also becomes an issue and forces most of us to make compromises. Should documents be scanned or microfilmed? What is the cost of microfilming? Do we have the equipment and manpower for this? Do we have the equipment to read it? The attraction of scanning is that it can be provided to the end user on a computer monitor. Although the cost of hardware is lower than ever before, it is not negligible, and many of us may not have the manpower and capacity to scan and store many hundreds and thousands of documents, transcriptions, field notes, logs and so on. Photographs have similar problems. We have attempted to follow systems developed by photo archives, but are not always able to follow them. Scanning for preservation is different from scanning for access, especially for the Internet. Audiovisual archives may not be able to afford the same level of equipment for processing these materials, as priority has to be given to equipment for the digitization of recordings.

As far as objects and artefacts are concerned, the implication of digitization at this time means they are photographed or filmed on video and the photographs and video recordings are then digitized. Again, as far as preservation goes, it is in reducing the handling that digitization is useful. However, there is the added possibility that these materials could be stored at remote locations that have more appropriate storage facilities, and access limited to digital images.

Cataloguing and Access

1. The challenges of cataloguing research collections is that they consist of multiple materials, and that the identity of the collection has to be maintained. This requires all the materials related by collection, or project, or field trip to be accessible as a unified whole.
2. Making sure that supplementary materials are made accessible by subject, or topic of interest, and not necessarily only as a collection. It is only through the numbering system that we have typically brought all the materials together on the basis of collection and of tape number. This becomes necessary as cataloguing formats for books, objects, photographs and notes are not the same.

However, materials such as notes and journals are not generally catalogued as independent items, but are numbered using a collection or tape number. This naturally varies from archive to archive.

3. The challenge here is going to be providing access to field notes and journals, logs and so on. Scanning these for access is going to be a demanding task, and collating them with recordings a more complicated one. Handing over a set of files, or a stack of photographs, may seem to be a simpler alternative to archivists! However, it is precisely in this area that the benefits and challenges of digitization are going to be felt. Once materials have been reduced to computer files and objects, they can be integrated into a database record, thus tying the "supplementary" record to that of the recording. Too often, supplementary materials are correlated only with the collection as a whole, so that a user who accesses a particular recording or tape does not find the particular photograph or notes that go with it. Of course, there are times when materials may be relevant only to the collection as a whole and not related to a particular recording.

Access is also simplified, as a range of reference facilities does not have to be provided for, and a user can access all the materials at a computer terminal. We are perhaps at a stage when listening areas and carrels are going to be a thing of the past.

Digitization of recordings has brought the discussions of cataloguing to the much-debated issue of metadata. However, we need at this time to incorporate the needs of the so-called supplementary materials into our requirements for metadata so that they are finally incorporated into the system as integral parts of a research collection and not as "additional" "supplementary"

The development of digitization technologies as an inexpensive means of providing recordings over the Internet has greatly changed user expectations. Catalogues are no longer restricted to being used in-house. For archives, making recordings available has also meant having to create databases and documentation on the Internet. Apart from the issue of rights, this has also led to redesigning and reworking of catalogues, which have to be adapted to online searches in an anonymous catalogue in cyberspace and not in the archives, where the materials are tangibly available for browsing with the assistance of helpful archive personnel!

Rights and Ownership

In an overall sense, the rights pertaining to the collection of recordings extend to the supplementary material. Few, if any, archives make provision for these in their contracts, or deal with them through separate contracts. The contract we use at ARCE does not mention notes and other materials, but does not specify them, nor does it lay down different criteria for each of these. The copyright situation for each of these is also obviously different. For example, the author of a photograph, according to Indian law, is the photographer, but the rights to the recording of a performance are vested in the performer. The researcher or recorder has no legal right, unless it has been specially acquired, though the archives naturally attribute a moral right to the collector or researcher.

There is no difference or provision made by us for the publication or dissemination of materials such as notes, transcriptions and translations, many of which may be material for publication even without the recordings that they accompany. However these were not thought of really as feasible and hence were not covered by the agreement in any specific fashion. The authorship of all the accompanying documents was not always made very clear, either – they may belong to an informant, a research assistant, a performer and so on. The ownership in a general sense was with the researcher or collector. However, we see that these are in a different category from the recordings, which we attribute to the researcher, as the researcher not only has a moral right but may actually have copyright on photographs and accompanying documentation.

The Internet today offers ways of dissemination and publication that we had not previously had to account for. Accompanying and supplementary materials can be digitized and made publicly available. We no longer have to think of publication as a finished product, a book or published recording. Work in progress, extracts and fragments all make their way onto the Internet as pages on a web site. The demands, too, have changed and perhaps the greatest indication of that is the requests for samples and short-duration clips for CD ROMS and web sites that face us as an archive. Requesters are surprised that the law for 3 minutes or 30 is no different, and we find ourselves unprepared for these requests as well. It is these, as well as our desire to put our collection on a web site, that today are making it necessary for us to review and change our contracts and seek permission to provide samples of recordings.

With digitization we find that not only are we looking at changing technology, but at major changes in our systems and working processes.

The ARCE Situation

At ARCE our policy is to welcome as much documentation as a researcher is willing to part with. Typically, this consists of recording logs, field notes, textual transcriptions and translations, occasionally musical transcription, and various kinds of ephemera. Older collections also most often included photographs and slides. There are more infrequent instances of manuscripts. We do not accept artefacts, as we do not have the facilities to care for and display them[2]. However, many institutions with a more regional focus have collections of musical instruments, masks, painted scrolls, and other such materials.

I would like to discuss the implication of this in the light of a project on which we have recently embarked. This is to design an integrated interface for the existing databases, and bring in samples of audio and video recordings, as well as still images.

[2] The two that we have are stored in the vault along with recordings which provides a stable temperature and humidity storage as well as protection from dust.

This is intended to work as archive management software, since it will also integrate workflow and processes that were hitherto not automated. This would mean that a user sitting at a terminal could search the databases through a GIS interface, by keyword or through a set of queries dealing with genre, context, melodic and rhythmic categories, and so forth.

We are forced to realize that it was a much simpler affair to walk over to a filing cabinet, or guide the user to a shelf!

We now find that we are faced with preparation of fresh content for our system, and that we have to index our materials differently and reorganize our materials in order to do so. However, we also find that digitization offers us new and exciting opportunities to integrate supplementary ways that we had not been able to do before, providing context in various ways and enriching the level of user access.

Uncompressed Video Archiving – A Strategy for Safeguarding the Austrian Video Research Footage

Franz Pavuza and Nadja Wallaszkovits
Paper given at the IASA Conference, Aarhus, 2002

Abstract

Based on the recommendation of an evaluation process, the Phonogrammarchiv (Vienna) expanded its activities to include archiving of video research material. Following the outcome of a careful investigation of video research footage available at Austrian Universities and research institutions, a feasibility study made in 1999 suggested the use of Digi-Beta as archival master format, and of S-VHS as the format for access copies.

Recent developments in both technology and cost of modern tape formats for general high-level backup purposes mainly for the IT market (LTO and SDLT) suggested a substantial change in our storage philosophy: An uncompressed signal representation and – in the long run – a non-proprietary file format, preferably standardised and accepted by the archival community, should be employed for archival purposes. High- and low-level access formats (on tape and/or optical disk) are derived during the acquisition in parallel with the archival format. With the rapid development of high density LTO-tapes and the MXF File format in the final stage of evaluation, the nonetheless substantial investments will - in our opinion - be more than justified by providing video material in its uncompressed original quality for future research and post-processing.

Over the past decades, multimedia based documentation has become increasingly relevant to research and development. Therefore, besides sound recordings, more and more accompanying documents in the form of video documentation were incorporated into the holdings of the Phonogrammarchiv of the Austrian Academy of Sciences.

In Austria, scientific film recordings – historically seen, the first medium to study and analyse motion sequences - always had adequate archival storage in the Austrian Institute for Scientific Film, while the upcoming new technology of videography caused a basic change of scene: The availability of portable consumer equipment resulted in decentralisation of scientific video production. Consistent acquisition was no longer possible, especially after closure of the Austrian Institute for Scientific Film. Until now, there has been no adequate central institution in Austria to archive these unique recordings of scientific interest.

In the late 1990's, an evaluation team analysed the work of the Phonogrammarchiv, and recommended expansion of the archive's activities into video archiving. A general survey was initiated, followed by a feasibility study. The positive results of these studies forced the Videographic Committee of the Austrian Academy of Sciences, which was founded to monitor and support these video activities, to agree with the practical implementation of the project.

General Survey of Video Research Footage in Austria

The goal of the general survey was to contact research institutions in Austria, and to compile a survey of quantity, quality, format and the contents of existing video productions. The aim was also to define existing problems and reach an estimate of the annual growth of videographic research material in Austria.

Within a span of five months, about 900 Austrian research institutions were contacted. Generally, the institutions showed great interest in central archival storage of their video research material. The general survey spotted over 2000 hours of video research footage. The plan is to archive these stocks based on a selection rate of about 50 per cent (estimate).

The general survey showed that the greater part of material is recorded on endangered formats: The most common formats are Umatic highband, Umatic lowband, Video8/Hi8 and Betacam. Several hours are recorded on Betacam SP, Digital Betacam, DVCam, DVCPro and Digital S. And there is also some material recorded on 2" open reel format, and some on Video 2000.

Feasibility Study – Defining the Basic Prerequisites for an Archival System

Part two of the project was the feasibility study, the goals of which were to find an adequate archival format, to develop a technical concept, to calculate the personnel planning and the required space and, as a result of all these factors, to calculate the cost.

As the first step, the basic prerequisites for an archival system were specified:

To prevent significant loss of data, especially for the very first dubbing process for analogue archival tapes, a format that is better than the original one is required. For digital archiving (i.e. transfer of the originally analogue tapes to the digital domain) transfer loss must be minimised by choosing the best available converters with respect to resolution and linearity. 12, 14 and even 16 bit converters are available, or have at least been announced, but a good 10-bit converter is an acceptable choice when cost is to be considered.

Many manufacturers and major institutions that define and standardise procedures for archival purposes must equally support the chosen archive format. For video, these would be mainly EBU, SMPTE and IASA.

It is of prime importance to make use of storage media that offer well-defined stability over their storage life span. Therefore – and sometimes contrary to technology trends focused on devices for consumer applications – older but well tested media with decades of experience are preferred.

Archival works ask for inclusion of extensive metadata that give sufficient information, not only about the contents of the archived footage, but also about the circumstances of the recording and the technical equipment. These data are to be expandable and preferably also in a standardised form for easy exchange.

Finally, low cost is always of concern. This applies not only to initial hardware cost, but also – and for video in the wider sense– to operating costs, depending largely on the amount of incoming data.

Possible Solutions for a Video Archive

Classical approach (as initially intended for the Phonogrammarchiv)

As the archival format, digital storage on tape was chosen mainly for the possibility of keeping the data at a constant quality level by regularly copying without degrading. The other main reason for choosing tape was the well-defined behaviour of tape under controlled conditions of temperature and humidity.

Initially (i.e. in the late nineties) the widely accepted Digi-Beta format seemed to be the best compromise between picture quality, data integrity and originality, and transfer capability for the main archival format. Digi-Beta uses 10-bit data converters (then an excellent choice with respect to competing formats) and keeps artefacts at a low level owing to a moderate compression rate.

For quick access, research and distribution the S-VHS format had acceptable picture quality and low cost. It was in accordance with the recommendations of the Austrian Ministry of Science regarding AV-equipment for universities, therefore players and recorders were available in sufficient numbers.

New approach

However, with the rapid change in technology a new concept was required. Recent developments in both the technology and cost of modern tape formats for general high-level backup purposes mainly for the IT market (LTO and SDLT) suggested a substantial change in our storage philosophy:

The digital data should be stored without undergoing any compression, and it should be stored on high performance computer tapes for reliability and durability.

The data format should – at least in the long run – follow the new MXF definition. Since the format is still undergoing evaluation among the major broadcasting and AV-related societies (such as SMPTE), temporary storage of the footage on proprietary formats was reasonable. Nevertheless, the choice of the major supplier of recording hardware depended largely on its explicit declaration that it would support the new format as soon as these institutions accepted it.

S-VHS will be accompanied by optical disks (SVCD and DVD) for research and distribution, depending on the demand of the customer and the level of quality.

As a new point of interest, the stored material should be accessible through the Web, if not to the full extent and of the best quality (for copyright reasons).

Guidelines for our Decision

New hardware developments result in reasonably priced capture-stations (personal computer based data acquisition devices) that also enable sufficient storage of the video data because hard disk capacity is not a problem any longer. Dedicated disks (or disk arrays) can stand data rates of up to 35 MB/s (Mega-Bytes per second), enough to acquire uncompressed video data streams with 12-bit resolution per colour. The capture-station offers various file formats for different purposes (even single frames for documentation), thus covering all the needs from browsing to scientific investigations. With MXF as the future format, extensive metadata can be added.

New computer tapes of very high reliability minimise data transfer by offering data rates of up to 15 MB/s that make overnight backups of long videotapes possible. The cassettes are equipped with sophisticated tape transport mechanism and can theoretically record wear-related characteristics of the tape (access frequency, operational parameters etc). Basic access parameters can be monitored over the SCSI-interface.

These tapes have a very significant additional advantage: they were created by a consortium of major companies of the IT-community and are well defined for at least three generations in advance, with the additional benefit of guaranteed backwards-compatibility over one (read/write) and two (read) generations. They will be available in capacities up to 800 GB, currently supporting 100 GB and 200 GB (starting next spring), well in accordance with the need of our archive (125GB/h with uncompressed material; new consumer digital formats frequently used in field research will be stored in their native digital format and thus need substantially less).

Uncompressed Storage for Archival Material – Why?

Sophisticated processing – even when possible only in the far future – does not allow any artefacts induced by compression algorithms. Even today, restoration software performs best when dealing with uncompressed material.

Various tests show that under critical conditions these artefacts are not only visible but prevent further processing, or result in misleading frames. Medical imaging recommends no more than 4:1 compression for critical content, so it is very likely that even less would be too much for probably more demanding applications of the future. Digital audio has already revealed some weak spots of extensive data compression, with digital video to follow. The nature of the compression algorithms – which were compiled in accordance with the specific properties of the human visual system – is to try to suppress small and rapid changes within the frame. This can be contrary to the needs of some image processing programs for special purposes. For example, a demonstration by a skilled player on an exotic musical instrument would be distorted by extensive video compression, and possible points of interest – e.g. the artistic finger movements of the player – would be unreadable owing to the simplifying drawing of the compression algorithm on this particular spot within the frame.

It is easily understandable that an uncompressed archival format is the best basis for further data reduction for other purposes on all the quality levels (browsing, research, web).

Disadvantages associated with uncompressed video are obvious: very high data rates that require fast hardware devices (acquisition and storage) and cause distribution problems for online research within a local network. Furthermore, storage requirements for both the acquisition hardware and the storage devices are far above the limits of e.g. home video equipment that relies on heavy data compression. Data transfer speed has to be maximised between the capture station and the storage device, but also between the storage device and the research station.

Outlines of the New Concept

The capture station will be connected to the various players through an interface box, designed to cope with all the different formats that have been outlined in the results of the market analysis. The interface box contains the converters (currently 12-bit resolution). Since this part is critical for the overall performance of the capturing process, physical separation from the rest of the capture station is advantageous in the case of the need for an upgrade to higher resolution or better accuracy.

The capture station must provide enough storage space for a day's work (estimated at about one hour of footage) with another two to three days in case there is a minor problem with the daily overnight transfer of the data to the file server. The capture station generates the different file formats and provides access to every single frame.

The video capturing and storage system is currently based on a SAN (storage area network) but is also connected to the institute's 100 Mb/s ethernet (soon to be upgraded to 1 Gb/s).

Low-level research activity is based on S-VHS or SVCD material or available online. High-level research is possible on demand only, and must be retrieved from tape.

Tape libraries are under consideration and a matter of financial or legal considerations rather than technical conditions. Web access will in any case be based on low-resolution formats but is prohibited (at the moment) owing to legal problems.

Practical Implementation

September 2001 marked the starting point for our new department of videography. For the time being, we aim at setting up the necessary infrastructure and selecting materials for archiving. The stocks of the Phonogrammarchive, and endangered video documents of Austrian scholars and research institutes, are given priority during the initial phase.

Parallel to the intake of old holdings, newly produced materials will be incorporated gradually, too. Following the example of audio, the Phonogrammarchive is already engaged in videographic field work by actively supporting field workers with methodological and technical advice, and the loan of adequate equipment. The new video research archive will be equipped with studios for digital video archiving and copying, a video viewing booth, a service lab, and a projection and seminar room. A part of this infrastructure is already available, but the full implementation of our concept is still under construction.

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Preserving Our Past/Guarding Their Future: The Role of Information Professionals in Archiving Cultural Heritage

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Introduction

I want to reflect on issues pertaining to archiving the African heritage. Central to this is the fulfillment of our responsibility as information professionals to ensure that we preserve our past. By so doing we will be guarding the heritage of future generations. I have chosen to look at one particular aspect of archival work, one to my mind that is often neglected in our diaspora, which is archiving the musical heritage of our societies. There has been considerable neglect by our profession in failing to ensure that the musical heritage of the Third World is husbanded for future generations. Undoubtedly my concern with archiving our cultural heritage is, in large part, dictated by my deep passion for one genre of the Caribbean musical heritage - the calypso.

Calypsos are protest songs somewhat similar to the songs and dances associated with the well-documented South African struggle against apartheid. This struggle did not escape the creative comment of Caribbean calypsonians. Several Caribbean calypsos were penned to protest against this diabolical system, while others were penned in support of the fledgling democratic process in South Africa. Of the calypsos that have been penned about South Africa, three spring readily to mind: from Barbados there are *Oh Mandela* by **Red Plastic Bag** (Stedson Wiltshire) and **John King's** (John King) *Mother Country*; from Trinidad and Tobago, the **Mighty Sparrow's** (Slinger Francisco) *I Owe No Apology*.

Calypsos were the cultural response of slaves - my forefathers and yours - to a very unnatural embargo. This was prevention of interpersonal communication between those whose unfortunate lot it was to be transported across the Atlantic Ocean from your continent to my region. While engaged in their forced labor, by putting music to their words, the slaves developed a way to communicate. Thus, despite the harsh circumstances under which they lived, these chattel servants found a creative response to circumvent this regulation against a very natural pursuit. While the art form was decried in its early days as one of insignificance and relevant only to the lower socio-economic class, Caribbean cultural renaissance has placed calypso very near the pinnacle of Caribbean cultural expression today. To this day calypso remains the premier channel of Caribbean protest, to the angst of many a Caribbean politician! Though much altered, modified and changed, calypso has survived. But change is endemic to culture. Dynamism and an ever-changing landscape are par for the course. Culture is an evolving entity. Despite changes, what remains is culture's quintessence, traceable to the past, linkable to the future.

In addition to its creative aspect, culture also has an economic arm. Internationally, one of the most vibrant thrusts in tourism marketing is the area of cultural tourism. People travel considerable distances to satisfy their curiosity about how others are, including how they express themselves, creatively. There is also a high degree of enjoyment and recreation in cultural tourism. In Barbados, Crop Over [1] accounts for an injection of approximately US$30 million into the Barbadian economy annually. Culture is indeed big business.

In addition to enjoying calypso at a recreational level, my interest in cultural archiving is also occasioned by the nature of my day-to-day professional practice. As the Audio-Visual Librarian for the Cave Hill Campus of the University of the West Indies located in Barbados, I manage the Campus' collection of non-print materials. As the curriculum includes courses in popular culture, it is imperative that the collection includes audiovisual materials for cultural studies relevant to the academic and research needs of the campus' students, academics and researchers.

This interest also has a personal side - I am a researcher of calypso. I therefore need to have access to a variety of sound carriers of Caribbean music. Original releases (regardless of vintage), versions of the same song by different artistes, or re-releases of songs by their original performers are all part of my research field. Access to a sound archive would considerably enhance my research work and make my research efforts considerably easier. Lamentably, there are no dedicated sound archives in the English-speaking Caribbean. Although on each island sound archiving functions are performed by a number of institutions, on none of the islands is there a single institution performing all the tasks associated with preserving the aural heritage of either an island or the entire region. I am therefore personally aware of what the absence of a national sound archive means.

Recent Interest in Cultural Archiving

The collection, documentation, protection, preservation, conservation and exploitation of the cultural heritage of developing and newly emerging nations is of recent origin as 'on the ground' work. By 'on the ground' I mean work that is carried out by nationals and national institutions in the country of origin of the cultural product. Regrettably, in many countries in the parts of the world that are the focus of this paper, namely Africa and the Caribbean, preserving the cultural heritage has traditionally been undertaken by others rather than by ourselves.

The current interest in national and regional culture is also occasioned by the commodification of cultural goods, expressions and services, as well as current thinking about intellectual property and the bundle of rights covered by this concept. The notion of an economic value being attached to the creative output of individuals and nations has changed the way we perceive and archive cultural products. In short, the wealth of a nation now comprises both tangible and intangible goods and services, of which culture is one arm.

[1] Crop Over is Barbados premier cultural festival. Celebrated during the summer, calypso is the pivot around which the festival revolves.

One only has to think of the fight over the late **Bob Marley's** estate, the number of **Bob Marley** records that are sold annually, the incredible range of posthumous **Marley** compilations, and the consequent financial gain that these sales make to this estate to appreciate the economic weight of culture. This becomes even more apparent when one recognizes that the economic gain from **Marley's** creative output increased considerably after his death. **Marley's** creative prowess was further confirmed when his composition No woman no cry and album Exodus were voted the song and album of the 20th century respectively. Unfortunately, **Bob's** popularity at home came after he achieved fame and popularity in Europe and elsewhere. It was after this external recognition that **Marley** was embraced in Jamaica and the wider Caribbean for the genius that he was. **Marley's** importance musically is demonstrated by the fact that there are more **Marley** archives and archival materials outside of Jamaica than there are within the island. Thus, a considerable part of **Marley's** archives, as well as those pertaining to that most famous of rhythms, reggae, are located outside Jamaica. This is also true for ska (another Jamaican musical and choreographical creation currently experiencing a revival in the United States). I have no doubt that there are comparable examples that can be found pertaining to South African culture.

Many of us, for various reasons, take culture for granted. That, in my view, is wrong. We live, breathe, use, create and recreate culture every day. Culture embodies our being. Culture is us. Culture is the essence of our souls. Our culture is our birthright. Like the air, we tend to take culture for granted. It is only when something happens, or there is a discussion about the authenticity, source, creator or some other cultural issue, do we stop and take stock of that which is ours. We may even consult an archive to establish our point. Sometimes to re-establish contact with our cultural roots we may also consult an archive.

Culture is that 'thing' which distinguishes continents, regions, nations, groups and sub-groups from each other. Every country, region, nation, group or subgroup has citizens who, through their creative work, typify and encode the soul of their society. The culturescape of a people is one of the key characteristics that differentiate societies and regions from each other. Preserving and protecting the plethora of a society's cultural expression and manifestations are two of the most important obligations and responsibilities that information professionals of each age must fulfil. Successive generations need to have access to authentic sources, artefacts, documentation and regalia that comprehensively represent their cultural heritage. This will be possible only if information professionals act responsibly towards archiving the culture of their day.

In many developing or newly emerging regions and countries such as the Caribbean, and - for the purposes of this paper - South Africa, serious attention to the protection, preservation and husbanding of our culture is a recent phenomenon. The current underdevelopment of archival sources of the cultural heritage of such nations is a cause for concern. How will future generations be able to become familiar with

their cultural heritage, know what was, recognize the impact of time, technology and natural changes, if there are no authentic sources they can consult? The retroactive development of collections of our cultural heritage is a pressing need. We have to act now, before more of our cultural heritage is lost through time, pilferage, decay, or any of the other pests that corrupt the national cultural heritage. Developing and maintaining top quality archives of national cultural heritage is therefore an imperative for information professionals in countries and regions such as ours. Whereas many Africans and West Indians have not paid much attention to archiving their cultural heritage - others have. European nations have always displayed a deep interest in the culture of other societies, particularly those they considered 'exotic'. One of the spoils of war or colonialization was the annexation of items of cultural expression of the conquered or oppressed.

One only has to think of the rich treasure troves of cultural expression and artefacts of African, Asian, Caribbean and other non-European countries in the archives, museums and similar institutions of countries such as Belgium, England, Holland, Spain and Portugal to appreciate the validity of this point. In the absence of archives in the country of origin, non-nationals become >experts< in our culture. We need to redress this situation by developing archival collections of our culture at the point of origin. In addition, individuals resident in the locus of the cultural expression need to become authorities on the subject.

The current heightened interest in the culture of the black diaspora is a post-World War II (WWII) phenomenon. The 1970s rise of black consciousness in the United States was an important moment in the renaissance and reaffirmation of Afro-centric culture. A renaissance and revaluation of the black culture, including its African origins, was one of the main aspects of the Black American struggle. Efforts to assert and reaffirm the cultural roots of Black America did not go unnoticed elsewhere. Similar efforts to re-establish roots and reaffirm cultural connection were to follow in other countries, regions and continents.

The political independence and autonomy movements during the second half of the last century were also causes for renewed and invigorated interest in traditional cultural expression. This was certainly true in the Caribbean. In addition to spearheading the creation of symbols of nationhood, the attainment of political sovereignty fuelled an interest in the cultural heritage that, for a number of reasons, had either been denied, forgotten, subjugated, suppressed, relegated and/or marginalized. All these developments provided very fertile ground in which the present level of interest in cultural archiving could take root.

Role of Archives

The scope of archival work is as wide as society itself. Archives provide present and future generations with windows on their past. Archives reinforce a sense of nationhood. Archives reaffirm the quintessence of a people. Archives are the memories of their societies. Archives enable present generations to interpret their

history from their perspective, rather than remain locked into and dependent on external constructs of that heritage. In short, archives husband the past and preserve the now so that present and future generations will have an accurate understanding of all the aspects of their forefathers' lives, activities, achievements and environment.

Archiving the culture of a nation ensures that its future generations can be aware of their heritage and understand their present in a meaningful way. Knowledge of one's cultural ancestry provides exposure to the historical, human, physical and other attributes that contribute to the development of one's cultural heritage. Historical records and knowledge validates what we are and what we do, as well as how and why we do certain things in a particular way.

Before examining the role of information professionals in the archiving culture, there are two of myths that need to be dispelled:

MYTH ONE: That archives are solely text-based institutions. Whereas this remained true for almost four centuries, inventions in the 19th century[2] irrevocably changed the format, presentation, recording, storage and preservation of information. The use of non-print[3] materials for communication and information storage of sound and visual data has changed the scope of archival collections. Internationally, archival collection policies have been broadened to include the gamut of non-print information encoders currently available on the market.
MYTH TWO: That the various sectors of the information profession such as librarianship, records management, archiving and knowledge management are separate and distinct from each other.

In reality, these specializations are interrelated points along the spectrum of information management and utilization. Where they differ is their approach, collection policies and processes utilized to manage and provide access to information. Information seekers have little interest in which information source satisfies their information quest. Their principal concern is they have access to the right information in a timely fashion to satisfy their information need. To use a term currently in vogue, information professionals must "connect the dots" of information management instead of seeing each branch as a separate entity. In other words, we need to stop fighting for territory and see ourselves as a unified group of professionals committed to serving the needs of our clients. This we must do by providing the information seeker with the right information, at the right time, in the most appropriate format regardless of location or sectoral approach to information management. This is not only a responsible philosophy, but it is an approach that will help to strengthen and return to its former glory one of the world's oldest professions.

[2] The Guttenberg Press, a 15th century invention, enabled the mass production of information and ideas. Thus, communication was no longer dependant on oral or hand written channels of communication. Daguerres (1839) demonstration that images could be captured on a still medium and Edison's (1877) mastery in recording sound were seminal developments in the art of communication. The combination of these two inventions gave rise to the development of audio-visual information carriers. Consequentially, these inventions and their sin-off technologies have meant that archival collections are no longer restricted to text-based formats.

[3] In this paper the terms non-print, AV and audio-visual will be used interchangeably. The scope of these terms is very broad and includes all formats of aural recordings, computer-generated works, fixed photographic images, moving images, regalia etc. In short, they cover any medium used to sore information other than the printed word.

Whatever the driving force, since the 1950s considerable interest has been directed towards non-Western cultures. This interest has manifested itself in a variety of ways at the highest levels of international relations. There are a number of international agreements, declarations and conventions that have been adopted by a several countries. These documents seek to protect the panorama of world heritage and are of importance to any information professional involved in archiving the cultural heritage.

International Developments in Cultural Heritage that have Impacted on Cultural Archiving

One of the key international organizations involved in the protection and archiving of the cultural heritage of all the nations is UNESCO (United Nations Educational, Scientific and Cultural Organization). This international body has, through a number of international agreements and conventions, sought to establish a legal framework that can be used to protect the cultural expression and heritage of every nation. While there are a number of these conventions, the following four UNESCO documents provide a flavor of UNESCO's work in the area of preserving and protecting the world's cultural heritage.

The CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE, 1972 states *inter alia* in its preamble that

> "Noting that the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction ...
> "Considering that deterioration or disappearance of any item of the cultural or natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world ... [and that]
> "Considering that protection of this heritage at the national level often remains incomplete because of the scale of the resources which it requires and of the insufficient economic, scientific, and technological resources of the country where the property to be protected is situate..."

These statements clearly map out the challenges associated with protecting the world's cultural heritage. They also indicate some of the threats that affect cultural protection and preservation.

The CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE delineates what is covered by the term "world cultural and natural heritage". Monuments, buildings, or groups of buildings and sites of "outstanding universal value" and are deemed to be the "natural heritage".

Each contracting state to this Convention is charged with ensuring "the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage referred to in Articles 1 and 2 of the said Convention".

The RECOMMENDATION ON SAFEGUARDING OF TRADITIONAL CULTURE AND FOLKLORE, 1989 states that:

> "More than other forms of cultural expression, traditional culture and folklore require both creators and the public to be alerted to the problems involved. This can be achieved through education and through other forms of access to culture which pay particular attention to minorities. The protection of traditional culture and folklore raises complex legal problems that are identified, such as the concept of "intellectual property", which can apply here, and also the protection of communicators, collectors and the material collected".

Among the recognitions of this recommendation is the need to conduct a global educational effort in order to sensitize people to the importance of, and need to, safeguard traditional culture and folklore.

UNESCO's MEMORY OF THE WORLD PROGRAMME (MOW), 1996 was conceived to support the aims of the World Decade for Cultural Development. MoW's remit includes safeguarding the endangered documentary heritage of the world. MoW's goals are "to guard against collective amnesia calling upon the preservation of the valuable archive holdings and library collections all over the world ensuring their wide dissemination". This is guided in the main by the principle that the "documentary heritage reflects the diversity of languages, peoples and cultures. It is the mirror of the world and its memory". MoW also speaks to both the dynamism of and threats to cultural tradition when it states, "but this memory is fragile. Every day, irreplaceable parts of this memory disappears forever".

A user-friendly flash presentation on the goals and work of MoW can be found at http://webworld.unesco.org/production/mow/about.html

UNESCO's UNIVERSAL DECLARATION ON CULTURAL DIVERSITY OF 2001 in its preamble states the following:

> "Reaffirming that culture should be regarded as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs...
>
> "Noting that culture is at the heart of contemporary debates about identity, social cohesion, and the development of a knowledge-based economy...
>
> Article 1 of this Declaration describes cultural diversity as follows: "Culture takes diverse forms across time and space. This diversity is embodied in the uniqueness and plurality of the identities of the groups and societies making up humankind. As a source of exchange, innovation and creativity, cultural diversity is as necessary for humankind as biodiversity is for nature. In this sense, it is the common heritage of humanity and should be recognized and affirmed for the benefit of present and future generations".

A draft convention on Safeguarding the Intangible Cultural Heritage is being considered by UNESCO's member states. The draft delineates what is covered by the term "intangible cultural heritage". The four main categories are Oral Expressions; the Performing Arts; Social Practices, Rituals and Festive Events, and Knowledge and Practices about Nature. Appendix I of this paper provides an extensive list of expressions and practices that are facets of the intangible cultural heritage. Scrutiny of this list indicates that the intangible cultural heritage is broad-based and multifaceted. It also involves skills and knowledge systems that are unique to a particular group of people or a specific geographical region. The list also suggests that what is considered by some, as "indigenous culture" is synonymous with the term "intangible and tangible cultural heritage".

The European Union's (EU) successor to the Lome conventions with the ACP (Africa, Caribbean and Pacific) Countries, the COTONOU ACCORD, has as part of its programming support for the cultural industries in the ACP Countries that are signatories to this accord. In addition to helping individual countries and regions, this accord also facilitates south-south exchanges in culture.

With the exception of the MoW programme, none of these international arrangements specifically mentions archives, libraries or museums. However, from their spirit it is clear that information units have a vital role to play in protecting and guarding the cultural heritage of the states in which they are domiciled.

There may be some doubt in the minds of some as to how the preservation of culture is relevant to the work of the information profession. Culture is part of the intellectual capital of a nation. Culture is as worthy as any scientific, economic or technological activity. A primary responsibility of information professionals is to protect, preserve and conserve information supported by a liberal access policy. Therefore, developing and maintaining collections of cultural expression is but another arm of our professional responsibility.

Cultural Archiving

The renewed interest in culture, as well as developments in information storage, management and facilities, have had a profound impact on the work of information professionals. Preservation of the tangible and intangible cultural heritage of a society ensures that future generations will have accessed all the aspects of their cultural heritage. In the past, cultural archiving was predominately text-based. The recognition that non-print formats are valuable and important information carriers has changed the scope of collections held in different types of information units, including archives. Indeed, there are some aspects of our culture that the only way that they can be gathered and stored is through the use of an appropriate audiovisual medium.

For oral-based societies such as those in the Caribbean and in many African countries, the use of non-print materials for archival purposes is an enriching development.

Extending archival collections to include non-print materials facilitates the collection and preservation of a range of cultural expressions and icons that hitherto were not ably represented or presented in archival collections. Non-print materials capture cultural expressions such as nuances, non-verbal communication, body and eye movement, shades color and markings representative of pursuits such as hunting. Many of these are of especial symbolic representation in many societies and none of them can be adequately represented or portrayed on paper.

How better to record and preserve the Xhosa click sound than through an aural recording and a video of the mouth as it forms the sound? No text-based description can adequately describe the marvelous and colorful spectacle of the Barbados Grand Kadooment Crop Over costume parade complete with music and choreographed movements. Non-print materials provide elements of realism that neither the written word nor a static medium can portray. AV materials in archives ensure that future generations will be able to understand, enjoy and appreciate their cultural heritage to the maximum.

I return to **Sparrow** who, in his *Document the Pan*, chides my university and information professionals in the Caribbean for their "cultural neglect" of the only musical instrument to have been invented in the 20th century. Capable of some of the most glorious of harmonies, the steelpan (also called pan) is a supreme example of man's ability to recycle. Invented in Trinidad and Tobago, original steelpans were fashioned out of the oil drums discarded by troops from the United States who were stationed in Trinidad during World War II. Pan registers are now found in most electronic keyboards. In his song, **Sparrow** encourages information professionals to take a more positive attitude towards cultural archiving and in particular in documenting the origin, personalities associated with, and capabilities of pan, and the contribution it has made to the culture of Trinidad and Tobago.

Impact of Archiving the Cultural Heritage on the Work of Archives

Archiving the cultural heritage has impacted on archival operations and activities in several ways. Text, the predominant format of many archives, is not a suitable format for encoding cultural and creative expressions. Text is unable to convey adequately the pulse of a rhythm, the emotions of lyrical oratory, or the fluidity of well executed choreographed routine.

Hickerson identifies the need to devote greater resources for non-textual holdings as his second of ten challenges facing the archival profession in the 21st century. He states that:

> "In today's society, where text is of decreasing centrality, we must be a more image- and sound-literate profession. We have often acted as if we assumed that text-based communication has always been the chief method of communication for all cultures, largely ignoring the long oral tradition in all societies, and the importance of art, architecture, music, ritual, dance, theater, and other non-textual and non-linear means of expression and recording. We must balance our resources to address these important segments of our collections, using these records more effectively to engage the broad interests of our users ..."

While these words were directed at a North American audience, they are equally relevant to archives in, and archiving the cultural heritage of, the geographical areas under consideration.

Archiving the cultural heritage is a responsibility that has suffered much neglect on the part of information professionals. There are many reasons for this neglect. However, changes in the attitudes to culture; the commodification of culture; the rise of cultural industries; the acceptance that all cultures are important and part of the global patrimony, and advances in the technology available to collect, store, preserve and disseminate cultural expression make it considerably easier to include cultural information in archives and other information units. The need to ensure that future generations have access to accurate sources and resources for their cultural heritage make it an imperative for information professionals protect the cultural heritage of yesteryear. Discharging this responsibility will make it possible for future generations to enjoy, study and appreciate heritage. By having archives of their cultural heritage, future generations will be able to extend the influence of their cultural ancestry to their peers and those who succeed them. By ensuring that successive generations have access to their cultural heritage, information professionals will have guarded the future's cultural birthright.

The Role of Information Professionals in Archiving Cultural Heritage

Culture is an important part of every society, not only creatively but also as a symbol of the intellectual capital of mankind. Information professionals have an important role and responsibility in preserving the cultural heritage of their societies. While there are many things that information professionals can do to archive their cultural heritage, the following four roles are fundamental to the development of a cultural archive of quality.

ROLE 1 - DEVELOPING A POSITIVE ATTITUDE TO CULTURAL ARCHIVING

Information professionals must develop and practice a positive attitude to culture. We have to see culture as being as important as achievements in other disciplines such as law, science, economics and medicine. A positive attitude to culture will ensure the development of a cultural archive that adequately represents the heritage of the host society.

Personal preferences, values and beliefs have to be put aside when deciding which cultural expression will be archived. The choice of cultural items for archiving must be dispassionate. The only guiding factor must be whether the item is culturally important, or relevant to the host society.

ROLE 2 - INFLUENCING THE DEVELOPMENT OF A LEGAL FRAMEWORK SUPPORTIVE OF CULTURAL ARCHIVING

Although information professionals are not directly involved in drafting legal instruments, they can and must have a positive influence on the development of a legal framework that is supportive of cultural archiving. We must be proactive in the drafting of any legislation that directly affects information management. Networking with the drafters of new legislation is one way of having a positive influence on the creation of a legal framework that is supportive of archiving the cultural heritage. This includes close scrutiny of all the drafts of legislation that is being proposed.

Even legislation that on the face of it does not have anything to do with information management should be perused, as such acts often have in them clauses that are of importance to information management. The new WIPO (World Intellectual Property Organization) and WTO (World Trade Organization) agreements both have clauses that affect the work of information professionals.

Jamaica recently passed a new legal deposit Act replacing the one that had been in existence since the late 19th century. The new law brought Jamaica's legal deposit instrument into alignment with current thinking on legal deposit, including that which pertained to cultural information and archiving. Colleagues involved in archival work and audiovisual information management perused each draft of the Act with a view to ensuring that their needs and concerns were addressed in the new legislation. The diligence of these colleagues will undoubtedly strengthen Jamaica's cultural archiving activities.

ROLE 3 - DEVELOPING NETWORKS WITH INDIVIDUALS AND INSTITUTIONS INVOLVED IN CULTURE

The initiation of networks with individuals and institutions involved in culture positively supports and enhances the cultural archiving efforts of information professionals. Specialists in the various fields of culture will help archivists and other information professionals to identify and preserve the best cultural exemplars in their collection. Artistes, researchers and support personnel in the various branches of culture are best placed to ensure that information professionals gather and preserve.

ROLE 4 - EXPOSING AND EXPLOITING THE CULTURAL HERITAGE

One of the beliefs that many people have about archives is that they are of no immediate relevance to humankind's day-to-day existence. Through the organization of events such as fairs, festivals, films, exhibitions, seminars, symposia, workshops, training courses, and congresses, archives can demonstrate their importance to the entire community and not just to researchers.

South Africa's annual celebration of Heritage Day in September is a golden opportunity for South African archives to expose their cultural holdings. The arrangement of such events will greatly assist in the development of a sense of nationhood, given your country's new democratic status, empowerment goals, and desire to raise the self-esteem of many of your country's citizens.

Exploitation does not always have a negative connotation. Exploiting our cultural archives is beneficial in two ways. It exposes the wealth of a nation's culture, while at the same time providing some valuable revenue for the archive. An example of exploiting one's cultural archive is the commissioning of various items that are representative of some of the archival holdings. Personal wear (scarves and ties) as well as functional pieces (mugs, place mats and plates) featuring items from the cultural archive are all potential sources of revenue for the archives. Archival items or artefacts, upon payment of the appropriate royalties, have also been featured in films.

The catalogues of large museums, such as New York City's Metropolitan Museum, will provide several examples of how such institutions exploit their collection to the benefit of the institution.

Conclusion

Archiving the cultural heritage represents more than the mere collection of materials and depositing them in a repository. Cultural archiving ensures that the creative achievements of a people are made available for present and future generations. A society's cultural heritage serves as a beacon from which its members derive a sense of self-esteem and self-worth. Balindlela in an examination of the African Renaissance makes a number of points that are as appropriate to cultural archiving as they are to examining the African Renaissance. Of the Renaissance, she states that it:

> "provides a tool for balancing the scales, for rediscovering neglected or marginalized sites associated with our heritage, for removing the imbalances of the past, for reinterpreting our history, for rediscovering African achievements and values, for restoring pride and dignity in our people, for recapturing neglected traditions and customs, for rediscovering neglected aspects of culture like music, stories and dance, for shaping an identity that take us forward to the kind of society we would like to create in South Africa".

Evident from Balindlela's remarks is the central role that cultural archiving has in the African Renaissance. Cultural archiving reaffirms the rich and diverse cultural heritage of the continent in general and South Africa in particular. How better to support the South African concept of Ubuntu than to ensure the existence of archives that positively husband the creative capital of your nation? As information professionals, we must stop being guilty of cultural neglect. We have to preserve our present in order to guard the future of generations to come. Through our efforts they will be able to recognize and appreciate their cultural birthright with pride and dignity.

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Appendix I

Categories of the intangible cultural heritage as specified by UNESCO in its first preliminary draft of an International Convention for the Safeguarding the Intangible Cultural Heritage[4].

ORAL EXPRESSIONS - i.e. Performances of poetry, history, myths, legends, and other kinds of narrative of significance to cultural communities.

THE PERFORMING ARTS: i.e. Performing arts in festive or ceremonial events of cultural communities involving, among other forms of expression, body language, music, drama puppetry, songs, dances.

SOCIAL PRACTICES, RITUALS AND FESTIVE EVENTS: i.e. Life-cycle rituals - birth; rites of passage; weddings, divorce and funerary rituals; games and sports; kinship and ritual kinship ceremonies; settlement patterns; culinary arts; designation of status and prestige ceremonies; seasonal ceremonies; gender-specific social practices; practices relating to hunting, fishing and gathering; geonymic and patronymic nomenclature; silk culture and crafts (production [fabrication], sewing, dyeing, cloth designs); wood carving; textiles; body-art (tattooing, piercing, painting).

KNOWLEDGE AND PRACTICES ABOUT NATURE: i.e. Concepts relating to the natural environment, such as temporal and spatial frameworks; agricultural activities and knowledge; ecological knowledge and practices; medical pharmacopea and therapeutic practices; cosmologies; navigational knowledge; prophecies and oracles; magical, spiritual, prophetic, cosmological and religious beliefs, and practices relating to nature, oceanography, vulcanology, environmental conservation [and] practices, astronomy and meteorology; metallurgical knowledge; numeral and counting systems; animal husbandry; aquaculture; food preservation, preparation, processing and fermentation; floral arts; and textile knowledge and arts.

[4] Reprinted from: UNESCO. Draft convention for the safeguarding of the intangible cultural heritage. Paris, 2002.

A Survey of the Position of Audiovisual Archiving in the ESARBICA[1] Region.

Violet Matangira, National Archives of Zimbabwe

Introduction

This account is the result of a survey carried out after the workshop for archivists in the ESARBICA region held in Harare in October 2001. The workshop was funded by the Netherlands Filmmuseum and hosted by the National Archives of Zimbabwe. During the proceedings, participants strongly expressed the need to form a body to represent audiovisual archiving and archivists in this part of the world. Participants felt that the region needed to make great strides in audiovisual archiving, which they felt was lagging behind compared with archiving of paper documents. As a result, a Steering Committee was formed. The Committee, to which the writer is the Secretary, was tasked with the responsibility to establish first what the body should be like, and secondly, to work towards formation of the body. At the workshop, however, participants gave an account of the position of their audiovisual archives; this will be the basis of part of this paper.

After the workshop, the Committee drafted a questionnaire that was sent to member countries and other institutions in the region. The questionnaire aimed to establish opinions regarding the nature of the proposed body. The result of this survey is given in the latter part of this paper.

Background to Archival Activity in the ESARBICA Region

Archival activities at national level have been in operation for a fairly long time in most countries in the ESARBICA region. Some national archival institutions in the region were established as far back as 1935 (Zimbabwe), 1947 (Malawi and Zambia as regional branches of the Central African Archives), 1954 (Zanzibar), 1958 (Lesotho), 1963 (Mozambique), 1965 (Kenya), 1967 (Botswana), and 1971 (Swaziland). The focus during these years has been on archiving of paper documents. Faced with the usual financial and human inadequacies, these archival institutions have been struggling to define proper archival acquisition methodologies, preservation, cataloguing and/or descriptive procedures for their institutions in line with international standards and archival ethics. Generally, however, most of these institutions are now on a better footing as far as archiving of paper documents is concerned, save for operational problems owing to inadequate facilities and resources. An acknowledgement of the growth and establishment of most of the institutions in the region and how active ESARBICA has been regarding archives management in the countries was given by T M Lekaukau in 1989[2].

[1] ESARBICA is an abbreviation for East and Southern African Regional Branch of the International Council on Archives. Member states are Angola, Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zanzibar and Zimbabwe.

[2] T.M. Lekaukau, "The National Archivist in the ESARBICA Region: A perspective". In ESARBICA Journal, Vol. 11, Oct. 1989.

However, the situation is different with regard to audiovisual archiving, which still has a long way to go for it to be properly defined and clearly spelt out for operations to take recognisable shape. It is only in recent years that most of the archival institutions in the region have begun thinking more seriously about audiovisual archives. Many institutions, and indeed the whole world, are increasingly appreciating that vital information is also found in the audiovisual medium, not just paper documents, and there is more awareness of the need to preserve this medium of information. This is also a reaction to the fast growing film making and sound industries as well as an increase in the use of the electronic media. Archives, of late, have been encouraged to play their part in ensuring that all these new forms of information are captured and preserved.

Most of the archival institutions in the ESARBICA region are still struggling to develop its audiovisual collections. It must be appreciated that audiovisual records are much more complex and expensive to handle, preserve and provide access to in comparison with paper archives. Audiovisual archiving requires more technical skills and equipment, which is not good news to the overstretched budgets of the Third World.

Nature/Operation Parameters

The nature of the collecting institutions under review (in the ESARBICA region) is that they are all national collecting institutions with the mandate to preserve archival documentation, regardless of format or medium, and this includes audiovisual archives. However, no country in the region has legislation specifically for audiovisual material. In fact many countries throughout the world have no legal deposit provision for audiovisual materials, although a trend towards this is now clear, encouraged by UNESCO policy stances and protocols adopted by the European Community. Mandatory deposit systems for audiovisual material now operate in twenty-one countries (including China, France, USA and Russia)[3]. An analysis of the mission statements of some of the countries in the region shows that there is a general acknowledgement of the need to preserve archives in any medium or format in the definition of the mandates given to them:

- The Botswana National Archives and Records Services "*collects, preserves and makes available for public inspection the nation's documentary heritage (archival)*".
- The Kenya National Archives' mission is "*To preserve valuable public records as part of the information resources of the Republic of Kenya and to make them accessible to present and future generations*".
- The Namibia National Archives "*Collects, preserves, and gives access to records of national importance in all media*".
- Seychelles National Archives "*acquires and preserves archival resources to make them available for research purposes*".
- The South African National Film, Video and Sound Archives is *responsible for collecting, preserving and making available audiovisual material made in or about South Africa.*

[3] Graham Evans, "Acquisition methodologies", ScreenSound Australia, *Charles Sturt University Study Guide*, 2002.

- The Swaziland National Archives aims "*to foster national identity and protection of rights by preserving a national archival heritage for use by the Government and people of Swaziland and promote efficient, accountable and transparent Government*".
- The Zambia National Archives aims "*to collect and preserve records; to preserve research services to the public and all stakeholders*".
- The Zanzibar National Archives aims to "*provide service for efficient management of Government records of whatever format and preserve them for posterity*".
- The Zimbabwe National Archives aims "*To acquire, preserve and provide access to documentation, in whatever format, which comprises a legal and historical record of Zimbabwe's past and present*".

Acquisition and Collection Size

As mentioned, the focus has been on paper documentation. However, over the years that the institutions have been in operation, somehow they found themselves, not by deliberate policy, with a growing collection of audiovisuals, starting with a very insignificant collection that grew significantly over the years to levels that required attention. In most cases, these audiovisuals found their way to the Archives through donation or someone deciding to "dump" them at the Archives after experiencing a shortage of space.

The situation at the **Zimbabwe National Archives** is that, whereas the Archives was established in 1935, the AudioVisual Unit was established only in 1988. Before this, the few audiovisuals were kept as part of the Library Section of the National Archives. These were "dumped" in a room with none of the temperature and humidity controls required for films and other audiovisuals, and were catalogued second-class to traditional library material. By 1987, the collection had grown significantly, prompting management to start thinking seriously about opening a separate audiovisual unit. When the new large Records Centre building was opened in 1988, space was reserved for housing the audiovisual collection, and this included converting some of the rooms to cold rooms for the storage of film. Plans were also made to acquire equipment such as editing tables, telecine machine, splicing machines, projectors, television, sound equipment, and film-cleaning machinery. The Unit also worked to acquire the bulk of the film collection (about 2500 catalogued and a few thousand unprocessed, mostly negatives) that it boasts today, from the Ministry of Information, dating back to the 1940s. The Unit's next biggest collection is the gramophone records (10200) from the Zimbabwe Broadcasting Corporation. It also has a significant number of videos (+250 VHS and Umatic), 1045 slides, +600 audio cassette tapes (music and oral history interviews), 386 reel-to-reel tapes, and 7 CD-ROMs. At present there is no legislation covering audiovisual material. The National Archives is however working towards some co-operation with the Zimbabwe Broadcasting Corporation regarding preservation of television and radio programmes, and an agreement between the two institutions is under way.

South Africa's National Film, Video and Sound Archives in Pretoria is another well established audiovisual archive in the region. The audiovisual archive is separate from the main paper documentation archive. Some of the material is obtained from originating offices that fall under the Archives Act. Donations of private productions may be accepted if they supplement official sources. While no legal deposit provision applies regarding audiovisual material, the Archives has been successful in arranging contracts with many producers.

Namibia National Archives also has a substantial number of audiovisuals, the bulk of them being from the national broadcasting institution (Namibia Broadcasting Corporation, formerly South West Africa Broadcasting Corporation). Some of them were acquired by private donation. The collection has 700 films, 250 videos, 1000 audio cassettes and over 100 slides.

Zanzibar National Archives has not started collecting audiovisual material, but has a small collection of videos and audio cassettes, which are mainly from a few government institutions. The Archives, however, works closely with both Television and Radio Zanzibar regarding preservation of their productions, resulting in the opening of a Sound Archives Unit in the main library of Radio Zanzibar in 1989.

Zambia National Archives' collection of films (+ 200), 2500 microfilms, 200 microfiches, 25 video and ±200 audio tapes was acquired mostly through legal deposit. Some of the collection is from recordings from the Zambia National Broadcasting Corporation and the Zambia Information Services.

Swaziland and the Seychelles each have very small collections that found their way to the Archives by donation, with very few having been acquired by direct purchase.

Kenya has a separate unit for audiovisual archives. The collection is mainly from Government institutions, which is covered by Chapter 19 of the Laws of Kenya, which makes it mandatory to receive all the publications from government institutions, including audiovisual material.

Botswana has an audiovisual section under the Archives Administration Division. It does not have a defined acquisition policy, but has recently entered into an agreement with the Botswana Television Station (BTV) regarding acquisition of programmes of historical value. Some of the material in the collection at present is from Radio Botswana, and collaboration with film producers has been established regarding depositing copies of their productions with the National Archives. Part of the material is from the Oral History programme carried out by the institution. Copyright requirements are adhered to. The collection holds more than 400 titles.

Malawi has a large collection of audiovisuals with about 4000 films, 1000 videos, 7000 audio cassettes, 120 vinyl records, 20 CDs and about 5000 reel-to-reel tapes. However, the institution suffers from a lack of expertise to handle this huge collection.

Tanzania National Archives does not hold any audiovisual archives because the responsibility for collecting and preserving audiovisual materials lies with the Audio-Visual Institute of Tanzania, which is now known as Tanzania Television (TVT).

Storage Conditions

Most of the audiovisuals found in the institutions under review are kept under very inadequate conditions, which at most are just air-conditioned rooms. Most of the institutions lack the resources and skills required for audiovisual preservation. It is very important to maintain proper storage conditions in order to ensure long-term preservation of audiovisual materials. Archives are there for long-term preservation, and if possible, the aim should be for permanent preservation. As mentioned, preservation of audiovisual is much more complex and technical than preservation of paper documents. Most of the materials under review are collections that have accumulated over the years that the Archives have been in existence. The institutions suddenly found themselves with audiovisual material without proper prior planning on how to handle the collection. Furthermore, most of the Archivists responsible for the audiovisual collections in these institutions lack the necessary technical know-how for handling and storage of archives in those media. Films and tapes, for instance, need to be kept in conditions with temperature and humidity control, and a dust free environment, and require periodic rewinding to keep them flexible and avoid magnetic print-through. Film reels can deteriorate owing to 'vinegar syndrome', which needs regular testing to detect, and is worst in tropical countries. Many of the institutions also keep videocassettes in VHS format, even though it is not designed for long-term preservation and may have a short life span. They keep them because they do not have or cannot afford better options, such as Beta or digital technology.

Access and Use

Access to audiovisual collections at the institutions under review varies. In some cases, access is not given to the collection because the institutions do not have playback equipment. In other cases, access is given to preservation/original/master copies because that is the only copy available, and in most cases, institutions cannot afford to have multiple copies of the same material. The negative effect of this is that there is no guarantee of long-term preservation of the original/master copy. Sometimes access is not given because the material is not catalogued or described, owing to a lack of viewing or listening equipment in order to describe the content. Access is sometimes difficult on obsolete formats and institutions often do not have the resources to change to new formats.

Evaluation

The general assessment of the region is that very little has been done to develop audiovisual archiving programmes. Archival work in most of the countries in the ESARBICA region suffer from a severe shortage of skills, trained staff, finances and

proper facilities. Awareness of the need to put more effort into audiovisual archiving is growing rapidly, but these efforts are being hampered by a lack of both skills and resources. There is a need for more exposure to audiovisual archiving through both formal and informal training. Informal training can be done through archivists working together in the region with assistance from well-established institutions. This can be done through organising workshops under the auspices of, for instance, ESARBICA. This will give Archivists more interaction forums in which they can share ideas with professionals in the field. The workshop in Harare in October 2001 was a good starting point. Archivists who attended the workshop showed a lot of enthusiasm to learn and move forward. Despite the eagerness shown by participants, Committee work failed to take off owing to a lack of funding.

However, an assessment of the responses to the questionnaire sent to institutions in the region revealed the following: Seven (7) countries and three (3) institutions (universities) responded, and the assessment below is based on these responses:

- All the institutions strongly support the idea of a regional body to represent audiovisual archiving, and they feel that it is long overdue. Even young universities are very eager to be involved.
- Most (60%) of the institutions preferred to have a body that would work under some other established body such as ESARBICA or IASA. The reasons given are that these bodies are already established in the field of archives/audiovisual archives and would be a source of support to the new body. Some felt that ESARBICA represents mostly archival institutions that have a mandate to preserve all records regardless of their format, so the new body could work under it without going outside normal operational parameters. Others felt that IASA would be more appropriate as it specifically represents the interests of sound and audiovisual archives.
- A few (30%) of the institutions were opting for an independent/autonomous body, which they say has the advantage of being independent. However, they admitted that the body may fail to take off due to financial constraints, as most institutions are already struggling to meet their financial obligations to bodies they are already affiliated to, and this would add an extra burden. Thus, the question of sustainability comes into play. Furthermore, they fear that there might be a conflict of interest or duplication of responsibility with other bodies. In fact, UNESCO recommends that associations/bodies dealing with the same subject should, as far as possible, be regrouped under the same umbrella.

What is the Way Forward?

This is the big question. As reported before, despite the eagerness shown by the archivists, nothing has materialised since the Harare workshop, owing to a lack of funding. What, then, is required?

- A lot of support is required for the initiative to start a regional body. Once in place, the body can work towards finding a working solution to the common problems faced by audiovisual archivists in Africa – training, technical skills, knowledge, and resources.
- Exposure and/or training – This will empower institutions to formulate Collection Development Policies for their institutions, which will become working documents for archivists and stakeholders on what exactly they require in order to carry out effective audiovisual archiving. Through this, institutions will be in a better position to budget and source funding for specific projects. This exposure and/or training can be achieved through organising workshops, attachments to well-established institutions, attendance of short training courses, such as the FIAF Summer School, and enrolment in formal training.

Conclusion

While it is true that budgets of most archives in Africa are minuscule, or at the extreme, non-existent especially for audiovisual archives, I believe that to some extent this is the result of a lack of knowledge of what we want regarding audiovisual archiving. Our audiovisual activities seem to be done haphazardly, with no clear direction (admittedly, more so owing to the lack of resources). However, I believe that if institutions take the time to spell out their goals and operational parameters clearly, it will be easier for them to put up a budget for specific target areas, and seek outside assistance in specific areas. It is better for institutions to look for support when they are focused on what they know and want to achieve, than without. A group effort such as the proposed regional body will help very much to shape the process of audiovisual archiving in Africa through the exchange of ideas and sharing of similar problems and, subsequently, solutions.

VisualAudio: An Optical Technique to Save the Sound of Phonographic Records

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Abstract

The optical retrieval and storage technique called VisualAudio described in this paper provides a way to retrieve sound information from an analogue disk without any mechanical contact. The process is straightforward: we take a picture of each side of the disk using a dedicated analogue camera, we store the film as our working copy, and when needed, we scan the film and process the image in order to extract the sound. This technique can be used to retrieve the sound of old records that are in such a bad shape that no regular turntable can be used. A working prototype has been built and has retrieved the sound from several records.

Introduction

Cutting a disk was in practice the only way to preserve sounds until the introduction of magnetic tape in the early 50's. Therefore, there are huge collections of phonographic records, for example in national sound archives and radio station archives. Such archives include pressed disks produced by record companies, as well as direct cut disks obtained by the direct recording of radio programmes that often have great cultural value. There is an increasing demand for republishing those materials, often for historical research.

Disks, and in particular acetates and shellacs, are fragile, and handling them requires special care and extensive training. Many records are in such bad shape that the sound can be considered as definitively lost. Many other records would be destroyed by the movement of the stylus from even the best turntable. Worse, all the records are deteriorating with time [2], and direct cut disks of radio programmes are usually available only as a single copy. We risk loosing an important cultural heritage. This is a big concern for the sound archivists.

We are proposing a technique called VisualAudio to preserve the old records. In the proposed solution, the records are read optically (without any contact) and the sound is extracted from the optical information. Based on this idea, a prototype has been built and has demonstrated that this technique can be used to extract the sound with good quality. We hope that this technique will be able to help the sound archives to preserve our cultural heritage.

In this paper, after introducing phonographic fundamentals, we will present the VisualAudio concept, and describe the different steps. We will finally analyse the results obtained by the prototype.

Phonographic Fundamentals

How do we Capture and Reproduce Sound?

We capture and reproduce sound by using several kinds of transducers. This is explained by an example:

Recording

The microphone transforms the acoustic vibration into an electrical signal. The tape recorder transforms the electrical signal into a magnetic field. The magnetic field is applied to a magnetic tape.

Cutting

The magnetic tape is read by a tape recorder. The tape recorder transforms the magnetic field into an electrical signal. The signal flows through a number of electronic devices reaching a disk recorder. The disk recorder transforms the electrical signal into a mechanical displacement of the cutting stylus. The cutting stylus cuts the groove into the surface of the lacquer.

Reproducing

The reproducing stylus reads the groove of the disk. The mechanical displacement of the stylus is transformed into an electrical signal. The signal flows through a number of electronic devices reaching a loudspeaker. The loudspeaker transforms the electrical signal into an acoustic vibration

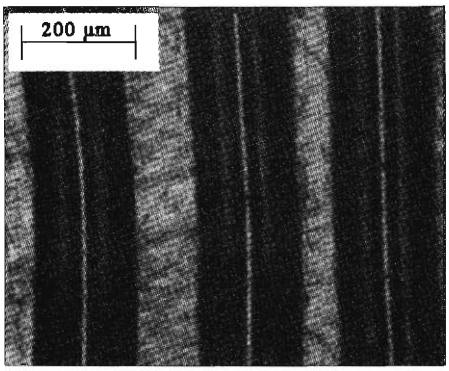
Disk characteristics

Typical disk characteristics are given in the table below:

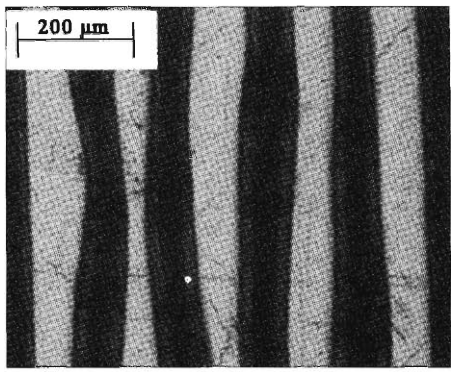
	78rpm records	**33 1/3rpm records**
Groove width:	31-187 μm	25.4 μm
Groove deviation	75 μm	28 μm
Distance between grooves	200-300 μm	85-125 μm
Bandwidth	100-12000 Hz	30-16000 Hz
Signal to noise ratio	32-40 dB	45-60 dB
Groove shape	round	triangular

Figure 1 shows pictures of records as seen through a microscope and *Figure 2* shows the shape of the groove. It should be observed that in the picture below the sound information is contained in the horizontal position (it is the radial stylus displacement on a turntable), while the vertical axis corresponds to the time. The dark lines are the grooves. Notice also that the 78 rpm record is in bad shape.

Fig. 1: Picture of a record as seen through a microscope: a) 78 rpm record and b) 33.3 rpm record

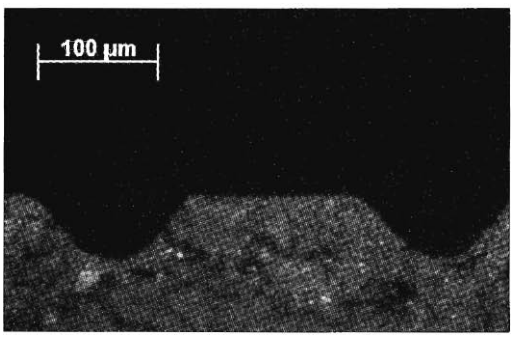


a)

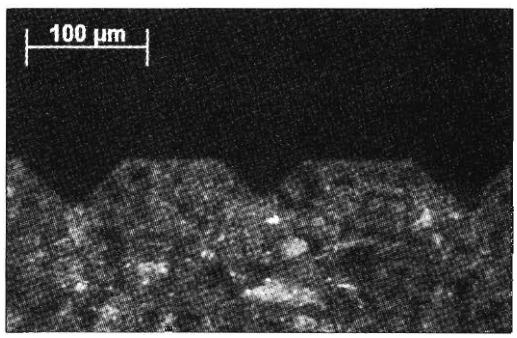


b)

Fig. 2: Profile of the groove: a) 78 rpm record and b) 33.3 rpm record



a)



b)

The VisualAudio Concept

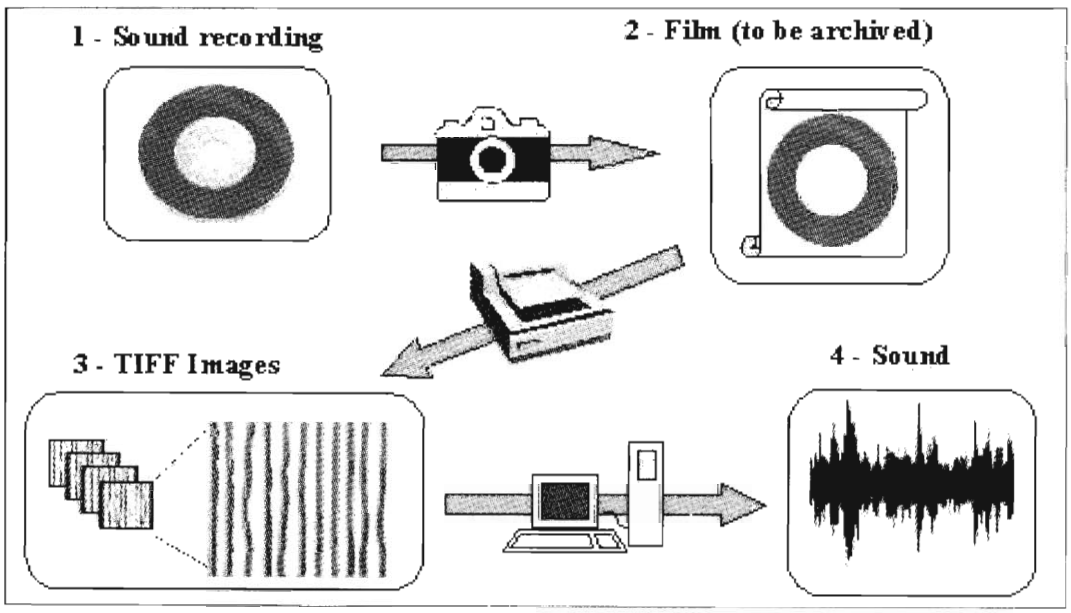
This concept is based on observation of the disk surface, using a microscope as shown on *Figure 1*. We can "see" the sound. In fact, the groove that contains the sound is quite visible. If it is visible, it means that the sound information is contained in the image of the record. It is the radial displacement of the groove that contains the sound (which is also affected by the depth, for stereophonic and vertical-cut records). This concept leads to a 3-step concept (shown in *Figure 3*):

1. An analogue picture of each side of a disk (either 33 1/3 or 78 rpm) is shot The film must have a high spatial resolution and be relatively large, since we

want to catch the finest details of the groove. This can be done quickly. The film is cheap, and can be stored for a long time (more than 100 years). That way, the sound information is preserved in case the original disks deteriorate.

2. When anyone wants to recover (i.e. to listen to) the sound, the film, with the picture of the disk, it is scanned using a specially designed rotating scanner, and digitised. At this point, a digital image of the record is stored.
3. The sound must then be extracted from the digital image. This requires image processing techniques in order to extract the radial displacement of the groove (which contains the sound), to detect cuts and to correct other defects. Digital signal processing must be applied to the groove signal to extract the sound.

Fig. 3: The VisualAudio concept.



In the next sections, we will analyse the different parts of this system, as well as the result obtained with the working prototype.

Picture Taking

With such tiny groove deviations, 75µm (78rpm) or 28µm (33 1/3rpm), particular care is a must in the picture-taking phase. High-resolution films have a resolution of about 600 lines, corresponding to 1200 dots/mm.

Taking into account the optical degradations, the resolution is of about 1.3µm. With such a resolution, the optics and the conditions for shooting the picture must be chosen carefully. The film must have about the same size as the record. Our pictures were made in a photo laboratory. *Figure 4* shows the photographic system and *Figure 5* enlargements of the films.

Fig. 4 Photographic system used for the picture taking

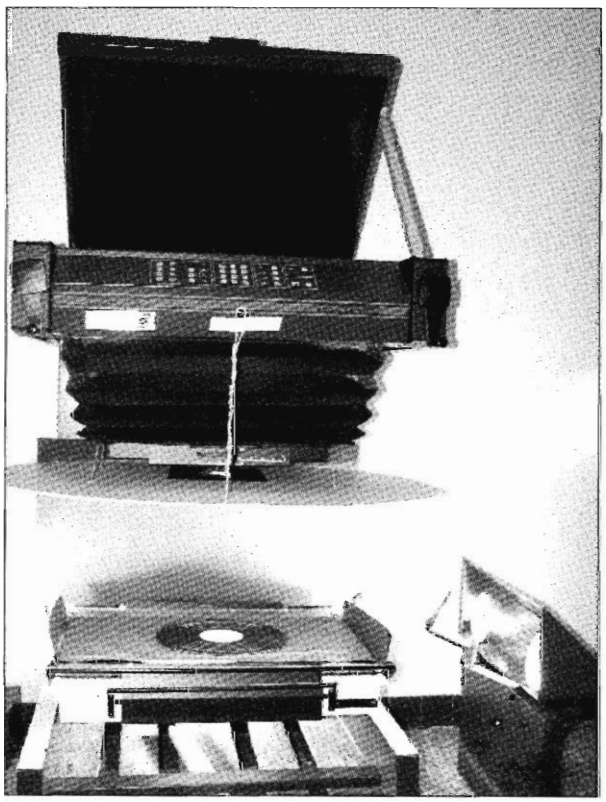
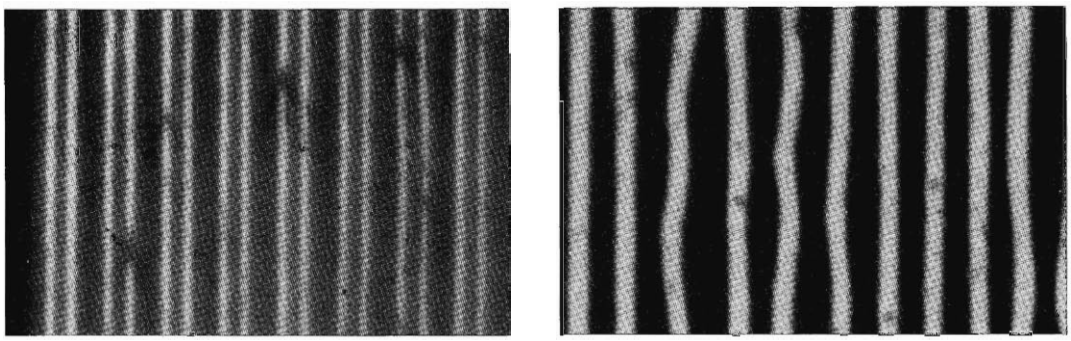


Fig. 5: Enlarged extracts from the films of a) a 78 rpm record and b) a 33.3rpm record



a) b)

Notice that the films are negatives. The black parts correspond therefore to the regions with the greatest illumination, i.e. the flat parts of the disk. The white parts correspond to the grooves that are regions with less illumination. We observe that for the 33 1/3 rpm record we see a single line, while for the 78 rpm record we see 2 parallel lines corresponding to the 2 sides of the groove, while the middle of the groove is flat and therefore black.

Film Scanning

The specially built circular film scanner is shown in *Figure 6*. The scanner uses a linear scanner element with 2048 pixels. There is a light source under the glass disk. The film is put on the glass disk. The disk is turning at a constant speed. That way we get, after one rotation, the scanning of a ring of a record that becomes a matrix. Notice that the ring contains several rotations of the groove. A motor moves the disk radially. Thus by making several scans we get the picture of the whole film.

Fig. 6: Rotating scanner for the films

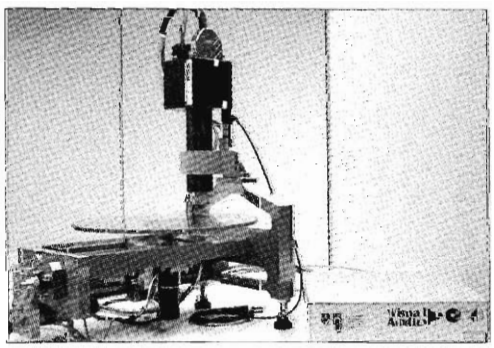
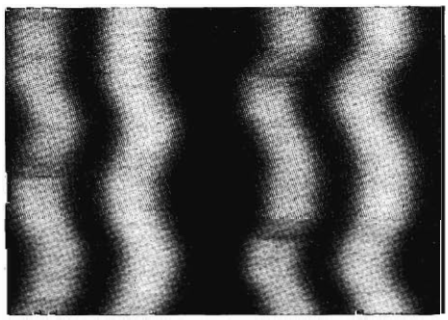


Image Processing

The digitised image is transferred to a computer (PC) and must be processed in order to extract the sound from the scanned picture. This processing must be sophisticated, as can been seen from the pictures shown above, as well as an extract from the digital image obtained from the scanner and shown in *figure* 7.

Fig. 7: An extract from the digital image obtained when scanning the film of a record.

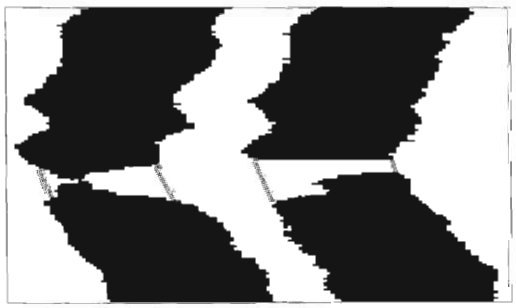


The main steps in the process are:

- Suppress spurious points
- Extract the groove borders with (if possible) sub-pixel accuracy
- Avoid cuts in the groove or a merge of neighbouring grooves

Owing to irregularities in the groove illumination, the threshold to detect the groove position should be adaptive. If not, additional cuts and merges of grooves will appear. Spurious points might appear when processing the pictures. Such points can be easily cleaned. Cuts in the groove can be corrected using interpolation as shown in *figure 8*. Merges of grooves can be processed the same way. With 78 rpm records, having 2 parallel white lines for each groove can be helpful.

Fig. 8: A simple cut suppression technique.



Extracting The Sound From The Groove Position

The sound signal is obtained by extracting the radial position of the groove. Often, the sound is oversampled (the sampling frequency depends on the tangential distance between pixels). In an example, the sound was sampled at 197kHz. As the necessary sampling rate is only 30kHz for 33 1/3rpm (15kHz bandwidth), there is an oversampling factor of 6. This allows a reduction in the noise, since most of it is above 15kHz.

Signal To Noise Considerations

Getting a good signal to noise ratio is the most important part of this project. There are many sources of noise and distortion. The most important are:

- The record might be dusty, or the groove border dented.
- Non-constant illumination over the whole disk.
- The optics for the photography and the scanner can lead to distortion.
- The film (the granularity) causes noise.
- The radial position of the groove is quantized and the time is sampled by the scanning.
- The rotation speed of the film must be constant. If not, we will get irregular sampling corresponding to a frequency modulation of the sound.

The scanning process must also have high resolution. A resolution of about 1_m is necessary. With such a resolution, we are near the light wavelength, and a monochromatic light source is advised.

Results

Several prototypes have been built - [3], [4] and [5] before the current one - each one leading to better results. Several music extracts from the latest prototype are available on the web site www.eif.ch/visualaudio . As you can hear, the sound is already of a reasonable quality.

The processing time was a limiting factor in the beginning. Extraction of a few seconds of music took several hours. Several algorithm improvements have decreased the processing to nearly real time, meaning that sound can be extracted from a film in just a little more than the time it takes to play the record on a turntable. We are working on several improvements in the picture taking, the scanning and the digital processing. An important improvement in sound quality is expected.

Conclusion

A solution to extracting the sound from records has been proposed and demonstrated with good sound quality. This technique has several advantages. The picture is shot without interfering with the surface of the disk. There is no need to manipulate the disk except for placing it on the photo stand. Disks in virtually any condition (even delaminated, broken, deformed, etc.) can be read and the sound can be restored. Many disk formats (size, speed, cutting, etc.) can be read using the same equipment. Image processing is very well established. It is relatively easy to make all kinds of corrections to the physical incoherence of the disk. Film is quite a stable, small, and cheap carrier for storing sound information. This means that it might as well be used as a long-term storage medium.

We hope to be able to transform this prototype into a system that can be used on a large scale to save our sound heritage.

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Eva Fønss-Jørgensen, IASA's new Secretary-General, presents her Top Ten

Eva was quite surprised when I asked her to present her Top 10 or all-time favourites to us. But, typically Eva, she found time and did it.

My Top Ten? My favourite music? – What a question to ask a busy career woman!

To be honest, my musical CV is not very impressive: As a child in the 1950s I had some piano lessons (level obtained: a rather poor performance of "Für Elise", which only impressed my mother). Like all teenagers in the 1960s, I bought a guitar and learned from friends 4-5 basic chords with a few variations (do you know how many wonderful songs you can sing using only those few chords?). Further – with a few exceptions - my musical inspiration came from listening to many of the broadcast folksongs and mainstream pop music while cleaning or doing other housewife things.

Nevertheless, music is an important part of my life. Nothing else affects you like music: you feel the rhythm, you want to dance, to sing, to forget, to be happy, to be sentimental etc. So, my immediate Top Ten selection is based on such criteria:

1. Swing Sisters: In the Mood
2. Santana: Evil Ways
3. Cuban song: Canción de cuna para dormir a un negrito
4. Billie Holiday: Miss Otis Regrets
5. John Denver: Dreamland Express
6. Bob Dylan: All Along the Watchtower
7. The Foundations: Back on my Feet Again
8. The Beatles: I Will
9. Jimi Hendrix: The Wind Cries Mary
10. Bee Gees: Heart Breaker

Further references to the above can be provided on request: efj@tatsbiblioteket.dk!

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