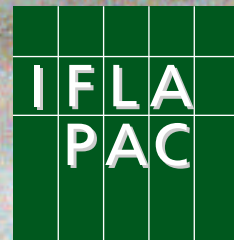


International Preservation News

A Newsletter of the IFLA Core Activity
on Preservation and Conservation



No. 46
December 2008



**Preservation of Audiovisual
Collections
Still Images & Sound**

ISSN 0890 - 4960

International Preservation News

is a publication of the International Federation of Library Associations and Institutions (IFLA) Core Activity on Preservation and Conservation (PAC) that reports on the preservation activities and events that support efforts to preserve materials in the world's libraries and archives.

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PAC Newsletter is published free of charge three times a year. Orders, address changes and all other inquiries should be sent to the Regional Centre that covers your area. See map on last page.

IPN is available on line at:
www.ifla.org/VI4/ipn.html

IFLA-PAC Mailing List at:
<http://infoserv.inist.fr/wwwsympa.fcgi/info/pac-list>

Any request for distribution should be addressed to:
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Front cover:

Lucien Le Saint, opérateur film des Archives de la Planète, avec une caméra Gaumont.

Sans lieu ni date.

Autochrome 12 x 9 cm, photographe non mentionné.

Collection privée.

Image reproduite avec l'aimable autorisation du Musée Albert-Kahn.



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Gramophone Monarch Junior, ca 1908
(collection Charles Cros, BnF)

When, at the beginning of 2008, we planned to deal with the preservation of audiovisual collections in *IPN* 46, we were intending to end with a flourish with still and moving pictures and sound in a single issue.

But we promptly noticed that one *IPN* would not be enough: it is not that we had imagined to exhaust the subject in 44 pages but the great number of papers which were proposed to us, the magnificent collections that we wanted to evoke, led us to change our project: two issues will thus be dedicated to that topic.

You will not find, in the following pages, a lecture on the preservation of still images and sound but some points of view and perspectives, on an international level in order to abide by the rules of our review.

In the same week that we are going to print *IPN*, a conference, in the Paris Opera, celebrates a nice story of preservation: the opening of urns, buried in 1907, and containing the recordings of the most beautiful voices of that time; the objective was to control their state of preservation, one hundred years later. These urns, preserved since then by the French National Library, are a sort of guiding thread of what you will discover in this issue: the progress made since the first techniques of sound-recording and images printing to the latest digital technology. Digitization which not only gives access to these buried voices but also fixes them... for ever? Preservation of contents, carriers and devices of reading.

The marvellous autochrome plates from Albert-Kahn Museum, the “*Au clair de la lune*” song fixed on the phonograph soot-coated sheet and brought back to life by Berkeley, are telling us the story of the birth and evolution of new media, long after books, not to mention the advent of a new kind of archivists and librarians, often visionary, who contributed by their works and projects, sometimes considered as “utopia”, to the beginnings of what we can discover today at the end of 2008 in Europeana: books, sounds, films, images, music... in several languages.

The topic of our next issue will allow us, among other things, to deal with moving pictures, films and TV archives. We wish you an excellent year 2009 and a good reading.

Christiane Baryla
Directeur d'IFLA-PAC



Guiniphone, 1925
(n° 173 à l'inventaire de la collection Charles Cros, BnF)

Lorsque, début 2008, nous avons envisagé de traiter de la conservation des collections audiovisuelles, nous pensions terminer l'année en « fanfare », avec des images et du son, en un seul numéro. Nous nous sommes vite aperçus qu'une seule livraison n'y suffirait pas : non pas que nous avons imaginé épuiser le sujet en 44 pages mais très vite les nombreux articles qui nous ont été soumis, les collections merveilleuses que nous avons souhaité évoquer, nous ont conduits à modifier notre projet : ce sont donc deux numéros que nous vous proposons sur le sujet.

Vous ne trouverez pas, dans les pages qui suivent, un cours sur la conservation des images et du son mais des points de vue, des éclairages que nous avons souhaités

internationaux pour respecter les règles de notre revue.

Cette même semaine où nous allons imprimer *IPN*, un colloque, à l'Opéra de Paris célèbre une belle histoire de conservation : l'ouverture des urnes, ensevelies dans les caves, en 1907, et contenant des enregistrements des plus jolies voix de l'époque ; l'objectif déclaré alors était de contrôler leur état de conservation, cent ans plus tard. Ces urnes, confiées depuis à la Bibliothèque nationale de France, sont un peu le fil conducteur de ce que vous découvrirez dans ces pages : le chemin parcouru depuis les premières techniques d'enregistrement du son et d'impression des images jusqu'aux toutes dernières avancées du numérique. Numérisation qui non seulement donne accès à ces voix ensevelies mais aussi les fixe pour l'éternité ? Conservation du message, de son support et de l'appareil de lecture.

Les merveilleuses autochromes du Musée Albert-Kahn, la chanson « Au clair de la lune » fixée dans le noir de fumée du cornet de papier du phonographe et ressuscitée à Berkeley, nous racontent l'histoire de la naissance et de l'évolution de nouveaux médias, bien après le livre. Ils nous montrent aussi l'avènement d'« archivistes » et de « conservateurs » d'un genre nouveau, des visionnaires souvent, qui ont engagé par leurs travaux et leurs projets quelquefois « utopiques » les prémices de ce que nous découvrons, en cette même fin d'année dans Europeana : des livres, des sons, des films, des images, de la musique...dans plusieurs langues.

Le thème de notre prochain numéro nous permettra entre autres choses d'aborder les images animées, le film et les archives TV. Nous vous souhaitons une excellente année 2009 et une bonne lecture.

Christiane Baryla
Directeur d'IFLA-PAC

Socio-technical and Socio-cultural Challenges of Audio and Video Preservation

by Dr. phil. Dietrich Schüller

Special Preservation Projects

Phonogrammarchiv, Centre for Linguistics and Audiovisual Documentation, Austrian Academy of Sciences

Slightly updated version of the paper prepared for the 3rd Memory of the World Conference, Canberra, February 2008.

Audio and video documents are the most significant primary sources of linguistic and cultural diversity. With all respect to the role of language and written texts in human communication, the limits of these traditional tools to communicate and describe cultural phenomena are obvious and undisputed. It must be noted that scientific interest was the driving force for the invention of audiovisual recording technology: the study of language and the human voice paved the way for the invention of sound recording while the interest to analyse fast movements, which could not be explored by the naked eye, triggered the invention of cinematography. Several disciplines like linguistics, ethnomusicology and parts of anthropology did not really flourish until the advent of audiovisual documents which - more or less perfectly and more or less objectively - permit the creation of adequate primary sources of or about the phenomena of interests themselves: language, music and dance, rituals, artefacts, etc. Consequently, it was the academic world that installed the first sound archives, 1899 in Vienna, 1900 in Paris and Berlin, 1908 in St. Petersburg.

Commercial exploitation, though not at the cradle of the new recording technologies, started even before 1900: the products of the phonographic and film industries soon quantitatively surpassed the academic activities. It is noteworthy, however, that systematic collection and archives for the products of the entertainment industry emerged only by and by in the 1920s and 1930s, as libraries and archives started to include audiovisual materials in their collections. In those years, independent units in forms of sound archives were created (e.g. the *Discoteca di Stato* in Italy or the French *Phonothèque nationale*), while film archives were founded in the Netherlands, the UK, the Soviet Union, France, and Germany. As Radio Broadcasters also developed from 1922 onwards, radio sound archives came into existence.

The consolidation of audiovisual archiving only happened after World War II, heavily supported by the international spread of magnetic tape recording technology for audio, which had been in existence in Germany already since the mid-1930s. From 1956 onwards magnetic video recording became available and gradually replaced film recording in television stations. Outside broadcasters, magnetic tape recording, specifically the availability of battery-operated portable equipment, enormously furthered the production of research materials, as it became possible to record language, music and rituals everywhere in the world in good quality. This also created the corpora that constitute the primary source materials of our present-day academic knowledge of the linguistic and cultural diversity of

mankind. While the creation of film documents for research was not very widespread because of the considerable costs involved in the production and development of film, moving image documentation for scholarly and cultural purposes mushroomed, since in the 1908s truly portable video-recorders became available which permitted the creation of video documents in a fashion similar to what had already existed over the past decades for audio.

These three creative sectors in audiovisual production - the record and film industry, the radio and televisions broadcasters, and the academic and cultural bodies - have accumulated a remarkable legacy of primary source materials, which form the most significant sources of cultural and linguistic diversity of mankind. They are partly artistic creations in their own right, like films and music productions, and partly documents of political, historical and cultural events and phenomena. Most justifiably, audiovisual documents have been called the media of the modernity: no adequate understanding of the past 100 years would ever be possible without them.

“Most justifiably, audiovisual documents have been called the media of the modernity: no adequate understanding of the past 100 years would ever be possible without them.”

Concentrating now on audio and video recordings, the worldwide holdings are estimated to be 100 million hours for each of the two categories. While photographic materials and films can be preserved as originals, provided stringent storage and handling conditions are met, this is not possible for audio and video recordings in the long term. Historical cylinders become brittle and mouldy, unique instantaneous disks deteriorate beyond retrievability, life expectancy of magnetic tape can be assumed to be only in the order of decades, and recordable optical disks must be considered to be at great risks, unless produced under tight quality control, which practically can hardly be met in practice.

Carrier instability, however, is only part of the problem. As machine-readable documents, all audio and video recordings depend on the availability of format-specific replay equipment, some of considerable sophistication. Thanks to the technical development over the past 20 years, we have experienced ever shorter commercial life cycles of dedicated audio and video formats. Whenever a format had been superseded by the next, industry swiftly ceased production of new equipment, spare parts, and professional service support.

Around 1990, this foreseeable development led to a shift of paradigm amongst sound archivists: it was realised that the classic aim to preserve the document placed in the archives' care would ultimately be in vain, because even if carefully kept carriers survived over longer periods, the unavailability of replay equipment would make these stocks soon irretrievable, and thus useless. Audio preservation has to concentrate on the

“Around 1990, this foreseeable development led to a shift of paradigm amongst sound archivists...”

safeguarding of the content, not of the original carriers, by copying contents losslessly from one digital preservation platform to the next. Analogue contents have to be digitised first.

This new paradigm met with some scepticism from traditionally-minded archivists; however, German radio broadcasters took the lead to develop digital mass storage systems, which soon became state of the art in audio archiving. The incentive for their installation was not so much preservation, but automated access to huge archival holdings, which was considered to become a strong weapon in the fight of these previously monopolistic institutions against upcoming competition from private broadcasters. Video archiving is following that path, with some time delay however, as storage quantities for video are significantly higher. Outside the radio world, national archives and libraries, but also some research archives followed.

Feeding analogue and single digital carriers into digital repositories is a demanding and time-consuming process. Principles have been standardised by the International Association of Sound and Audiovisual Archives (IASA), which had also issued practical guidelines for the production and preservation of digital audio objects. The transfer of originals is in need of modern replay equipment, of test equipment and expertise for their proper maintenance. The time needed for one transfer operator must be estimated to be at least triple the duration of audio, and even significantly more in the case of video documents. Bigger radio and national archives are solving that problem by simultaneously transferring three or four audio tapes at one time, making use of special quality control software to replace the aural control of the operator. This works with fairly homogeneous source material as typically available in radio archives. Holdings of research materials, because of their diverse technical nature, hardly lend themselves to this kind of “factory transfer”.

Yet there is more to it than solving the transfer of originals. Digital preservation is equally demanding, as it requires an ongoing investment to keeping digital data actively alive. Appropriate professional storage technology and management software is expensive and needs subsequent renewal at least at the pace of migration intervals, which are generally in the order of five years. It must be clearly stated that the use of recordable optical disks as sole digital target media constitutes a great risk, although it is unfortunately widespread, specifically amongst small and less wealthy institutions. Professional digital preservation currently costs 5 USD/GB/year, however with a clear tendency to come significantly down in the short term. According to latest developments, costs in the order of 1 USD/GB/year, a mid-term vision only a year ago, may be within realistic reach pretty soon.

It can be assumed that the challenges as outlined above will be met by the radio and television archives as well as the national collections of fairly wealthy countries within the next 20 years. Because of the impending unavailability of replay equipment, this is the time window generally considered to be available for safeguarding what we have accumulated so far. Several post-communist and developing countries, however, will face con-

siderable problems in safeguarding their holdings, even in a selective manner. The most significant problem is lack of funds. While it is fairly popular to finance digitisation projects in the course of international development cooperation, the lack of commitment to finance long-term preservation of the digital files makes many such projects a dead end road.

The great majority of small and hidden collections in all parts of the world, which preserve a considerable part of the world resources of cultural and linguistic diversity, have a different, generally much greater problem. The first is awareness. While generally «digitisation» is recognised to be an action to be carried out, there is little knowledge about prerequisites needed and standards to adhere to. Most typically, inadequate replay equipment is regarded to be sufficient, and there is no realistic perspective about standards and costs to preserve the digitised documents. The other notorious problem is lack of money, which mainly - apart from, of course, unfavourable general economic situations - means lack of awareness on the part of parent organisations, governing financing bodies, and/or of the public at large.

From the technical prerequisites, the required expertise, and the necessary financial resources it becomes clear that autonomous audio and video preservation requires critical mass amounting to several thousands of carriers within each format. As many important collections are held by relatively small institutions, many even still at the private homes of the researchers that had recorded them, the only viable solutions

for these holdings are cooperative projects, which can be arranged in different forms: the transfer of original contents to digital files should be seen separately from digital preservation. And even the transfer of originals could be sub-

divided according to the various formats. Often very specific formats, like cylinders, are outsourced, while e.g. magnetic tapes are transferred inhouse. A typical cooperative model at universities could be the recording and annotation of new audio and video materials by the institutes concerned, accompanied by the transfer of analogue and historical digital single carriers in specialised audiovisual units, while the computer centres of the universities take responsibility for the long-term preservation of digital files.

On the way to improve the situation of audiovisual collections within the academic world, which often amount to considerable sizes, different obstacles can typically be spotted in the Western and the former Eastern Block world.

Typical of the Western World and its socio-economic situation is the fact that success of research institutions is measured by the degree of advancement in their respective disciplines, generally expressed in the number and size of publications, and not by preserving resources for future generations. Hence, unless they have a specific mission as an archive, institutes have the tendency to emphasise research at the expense of archiving, specifically when it comes to financial constraints. Sad experiences can be told especially of the fate of audiovisual collections at American universities, which are notoriously endangered by their parent organisations whenever financial re-allocations have to be made. Even internationally highly respected archives have come under severe threat, which has often triggered international rescue rallies; once, however, a renowned collection was frozen, and another even dissolved.

“Audio preservation has to concentrate on the safeguarding of the content, not of the original carriers, by copying contents losslessly from one digital preservation platform to the next.”

The most efficient counteraction to such inherent threats is to enhance the use by making catalogues of the holdings available on the Internet. This has been started successfully by collections within libraries and is now gradually followed by dedicated audiovisual research collections, which generally provide more detailed descriptive metadata on their holdings than libraries. Another factor serving to enhance attractiveness of archival materials is a recent shift of research priorities in anthropology and ethnomusicology. While previous schools have overemphasised the importance of relying on self-generated materials, there is a clear tendency to re-discover the potential of already existing sources, provided, however, the limitations of those materials are critically examined and understood.

A stereotype found in post-communist countries is the notorious mistrust in contracts and in the honesty of partners. Typically, researchers were working in relatively small units, all more or less orderly shelving their respective field tapes. Often research units with similar aims work under the same umbrella organisation, without ever having shared audiovisual field equipment or archiving infrastructure. Although these resources have been gathered with institutional, indirectly governmental support, they are considered to be private possessions. With analogue field recordings, predominantly open reel tape and compact cassettes, this has so far worked but sub-optimally, because recording equipment was generally amateur standard, and tapes have suffered from bad storage condition and from being used for transcriptions, as working copies were rare. Against this background, specifically the older generation has developed a notorious mistrust in sharing resources such as archives, because of the firm belief that this would lead to an expropriation of their recordings by their scholarly competitors. There is also a remarkable mistrust in the reliability of contracts granted by official institutions.

“ The veritable challenge of a worldwide strategy of audiovisual preservation is to spot these [hidden] collections and to organise their physical survival...”

This typical and strong attitude would of course be an obstacle to any attempts of solving the problems of safeguarding small audiovisual collections through cooperative projects. A recent study, however, seems to indicate clearly that almost two decades after the political changes in post-communist countries this notorious mistrust is being eroded. In a survey of 107 European field workers, predominantly ethnomusicologists, 80% expressed their readiness to safeguard their field collections in the course of cooperative projects. The percentage of western vs eastern respondents was almost the same.

In summarising, it can be stated that the greater part of audio and video collections, held by the broadcast and national archives of wealthy countries, will be safeguarded and made available in the long term. Whether also in developing countries these kinds of institutions will be able to solve their problems within the time window of the next 20 years, remains open. Much will depend on the political will of these countries to safeguard their audiovisual cultural heritage and to allocate the necessary funds. There is some reason to hope that the development in this field in the West over the past 20 years can be optimistically extrapolated to other parts of the world. This concerns, however, only the greater part of the accumulated collection.

In terms of importance, a major part of the entire audiovisual heritage is held in small and scattered, often hidden research and cultural collections all over the world. Without them, our view of the cultural and linguistic diversity of mankind would be incomplete. Their loss would mean a substantial deprivation of cultural, linguistic, and ethnic minorities in terms of their heritage, their history and their identity. The veritable challenge of a worldwide strategy of audiovisual preservation is to spot these collections and to organise their physical survival.

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Desafíos socio-técnicos y socio-culturales de la preservación de audio y video

Los documentos de audio y video son las fuentes primarias más importantes de la diversidad lingüística y cultural. Es importante señalar que el interés científico fue la fuerza que impulsó la invención de la tecnología de la grabación audiovisual y que varias disciplinas como la lingüística, la etnomusicología y partes de la antropología no florecieron realmente hasta el advenimiento de los documentos audiovisuales, que permitieron la creación de fuentes primarias adecuadas de la lengua, la música y la danza, los rituales, los artefactos, etc., o acerca de ellas. En consecuencia, fue el mundo académico el que instaló los primeros archivos sonoros, en 1899 en Viena, 1900 en París y Berlín y 1908 en San Petersburgo.

La explotación comercial se inició incluso antes de 1900: los productos de las industrias fonográfica y filmica pronto superaron cuantitativamente las actividades académicas. No obstante, cabe destacar que la colección y archivo sistemáticos de los productos de la industria del entretenimiento surgieron poco a poco en las décadas de los años 20 y 30, a medida que las bibliotecas comenzaron a incluir materiales audiovisuales en sus colecciones. En esa época, se crearon unidades independientes en forma de archivos sonoros (como por ejemplo, la *Discoteca di Stato* en Italia o la *Phonotèque Nationale* francesa), mientras que en los Países Bajos, el Reino Unido, la Unión Soviética, Francia y Alemania se fundaron archivos fílmicos. Debido a que las emisoras de radio se desarrollaron a partir de 1922, hicieron también su aparición los archivos sonoros de radio.

La consolidación del archivo de materiales audiovisuales tuvo lugar apenas después de la Segunda Guerra Mundial, apoyada en gran medida por la expansión internacional de la tecnología de grabación en cintas magnéticas para audio. A partir de 1956, comenzó a utilizarse la grabación magnética de video, la cual gradualmente reemplazó la grabación fílmica en las televisoras. Los transmisores exteriores, la grabación en cinta magnética, específicamente la disponibilidad de equipos portátiles a baterías, incrementaron enormemente la producción de materiales de investigación, ya que hicieron posible grabar la lengua, la música y los rituales en cualquier parte del mundo con buena calidad.

Los tres sectores creativos de la producción audiovisual – la industria discográfica y fílmica, las emisoras de radio y televisión y las instituciones académicas y culturales – han acumulado un legado importante de materiales de fuentes primarias, que constituyen las fuentes más significativas de la diversidad cultural y lingüística de la humanidad. Son en parte creaciones artísticas por derecho propio, como los filmes y las producciones musicales, y en parte documentos de acontecimientos y fenómenos políticos, históricos y culturales. Muy justificadamente, los documentos audiovisuales han sido denominados los medios de la modernidad, sin los cuales no habría sido posible una comprensión adecuada de los últimos 100 años.

Concentrándonos ahora en las grabaciones de audio y video, las existencias del mundo entero se estiman en 100 millones de horas para cada categoría. Aun cuando los materiales fotográficos y las películas se pueden preservar como originales, siempre que se cumplan las normas de almacenamiento y manipulación, lo mismo no es posible en el caso de las grabaciones de audio y video a largo plazo. Los cilindros históricos se volvieron friables y acumularon moho, los discos instantáneos únicos se deterioraron al punto de no poder reproducirse la información contenida en ellos, se supone que la expectativa de vida de la cinta magnética se limita a décadas y se deben considerar en gran riesgo los discos ópticos grabables, a menos que sean producidos bajo estrictos controles de calidad, que resultan muy difíciles de cumplir.

La inestabilidad de los portadores, sin embargo, es solo parte del problema. Como documentos legibles por máquina, todas las grabaciones de audio y video dependen de la disponibilidad de equipos de reproducción para formatos específicos, algunos de considerable sofisticación. Gracias al desarrollo técnico de los últimos 20 años, hemos experimentado ciclos de vida comercial cada vez más cortos de los formatos para audio y video. Siempre que un formato es sustituido por otro, la industria deja rápidamente de producir equipos nuevos, repuestos y servicio técnico.

Alrededor de 1990, este desarrollo previsible condujo a un cambio de paradigma entre los archivistas de sonido: se tomó conciencia de que el objetivo clásico de preservar el documento colocado al cuidado de los archivos sería inútil, ya que incluso si los portadores guardados cuidadosamente sobrevivieran períodos más largos, la falta de disponibilidad de equipos para su reproducción volverían esos fondos irrecuperables rápidamente, y en consecuencia inservibles. La preservación del audio se ha concentrado en la salvaguarda del contenido, no de los portadores originales, mediante la copia de los contenidos sin pérdida de una plataforma de preservación digital a otra. Los contenidos analógicos deben digitalizarse antes.

En términos de importancia, una parte importante de todo el patrimonio audiovisual se mantiene en colecciones de investigación y culturales pequeñas y dispersas, generalmente escondidas, en el mundo entero. Sin ellas, nuestra visión de la diversidad cultural y lingüística de la humanidad sería incompleta. Su pérdida significaría una forma sustancial de privación de las minorías culturales, lingüísticas y étnicas en términos de su patrimonio, historia e identidad. El verdadero desafío de una estrategia mundial para la preservación audiovisual es localizar estas colecciones y organizar su supervivencia física.

Albert Kahn, des images pour la paix : Rappels historiques et choix de conservation

I Article collectif du musée Albert-Kahn, Hauts-de-Seine, France

Autochromes et films des Archives de la Planète, l'héritage d'un banquier philanthrope

par Gilles Baud-Berthier, directeur

Le musée Albert-Kahn, l'un des trois musées appartenant au département des Hauts-de-Seine (près de Paris), est consacré à l'œuvre du banquier Albert Kahn (1860-1940).

Issu d'une famille de la communauté juive d'Alsace, Abraham Kahn est le fils d'un négociant en bétail. Après l'annexion de sa province natale par l'Allemagne, le jeune homme se retrouve en 1876 à Paris. Devenu Albert Kahn, il s'initie à la finance au sein de la banque Goudchaux, d'origine lorraine.

Ses employeurs remarquent vite ses dons et lui confient des sommes à placer. Kahn commence à faire fortune dans l'or et le diamant d'Afrique du Sud vers 1880-1890. Ses affaires prospèrent et il devient associé des Goudchaux. En 1898, il fonde sa propre banque d'affaires.

Dès lors, il va consacrer sa vie et ses ressources à la recherche de la paix universelle. Convaincu que la connaissance est source de tolérance, il cultive auprès des décideurs et des intellectuels une véritable pédagogie du regard ; il développe également une méthodologie de l'information. Entre 1898 et 1931, ses fondations versent des bourses de voyage Autour du Monde à de jeunes diplômés de plusieurs pays qui se destinent

à l'enseignement ; des organismes sont créés pour documenter la prise de décision des responsables politiques, français et étrangers ; des débats sont organisés sur des sujets de société entre spécialistes...

Deux des créations d'Albert Kahn sont aujourd'hui les fleurons du musée qui porte son nom : d'une part, les Archives de la Planète, collection de photographies (principalement d'autochromes, premier procédé en couleurs authentiques¹) et de films noir et blanc (à l'origine sur nitrate de cellulose) ; d'autre part, les jardins de sa résidence à Boulogne-Billancourt.



Le jardin d'hiver d'Albert Kahn.
Photographie Lionel Bard, 1994.
© Musée Albert-Kahn/département des Hauts-de-Seine.

Les Archives de la Planète (1909-1931) ont pour objectif de conserver la mémoire des modes de vie traditionnels voués à disparaître sous l'impact de la modernité – un aspect auquel le financier Kahn, qui investit dans des activités industrielles pionnières, ne pouvait qu'être sensible – mais aussi de sensibiliser à l'universalité du génie

humain – d'où qu'il émane – ceux qui avaient, à l'époque, le privilège de voir ces images.

Dans le même esprit d'ouverture au monde, Albert Kahn fait aménager à partir de 1895 dans sa propriété boulognaise des jardins de styles différents, des jardins « de scène », qui

1. Comme le cinématographe en 1895, la plaque autochrome, mise en vente en 1907, est due aux frères Lumière.



Le jardin d'Albert Kahn vu d'une maison japonaise. Photographie panoramique Ronan Guinée, 2007. © Musée Albert-Kahn/département des Hauts-de-Seine.

illustrent la diversité des rapports à la nature qu'entretiennent différentes cultures éminentes (un jardin japonais, mais aussi un jardin anglais, un français, etc.).

La crise de 1929 met un terme au projet. La propriété et les collections sont acquises aux enchères en 1936 par le département de la Seine. À la suite de la réorganisation de la région parisienne, la propriété revient en 1968 au département des Hauts-de-Seine nouvellement créé. Celui-ci conserve et met en valeur les jardins et cette parcelle de la mémoire du monde que sont les Archives de la Planète. Avec ses 72 000 plaques, la collection d'autochromes est de loin la plus importante au monde.

Les collections d'images : genèse, constitution et thématiques

par Marie Corneloup et Sophie Couëtoux

Chez Albert Kahn l'expérience personnelle du voyage est fondatrice. En 1898, c'est après un périple en Extrême-Orient qu'il conçoit le premier opus de son œuvre : les bourses *Autour du Monde*.

Dix ans plus tard, lui-même effectue un tour du monde. Il en fait un creuset d'expérimentation de tous les procédés de prises de vue envisagés pour le nouveau projet qu'il caresse et qu'il voudrait encyclopédique, tant par le contenu que par l'éventail des supports : les Archives de la Planète.

Il fait alors initier à la photographie et à la cinématographie son mécanicien-chauffeur Albert Dutertre, jeune homme ingénieux et passionné de technique. Au fil de leur voyage, de novembre 1908 à mars 1909, Dutertre s'attache à capturer l'univers en relief (plaques stéréoscopiques noir et blanc), ajoute les couleurs au relief (stéréoscopie autochrome), décline la vie en mouvement (film noir et blanc 35 mm)... Des enregistrements sonores sur cylindres de cire devaient même « donner voix » aux images, mais dès la première traversée maritime, l'aiguille du phonographe est endommagée par le tangage.

En mai 1909, Kahn montre une partie des films tournés par Dutertre à l'occasion d'une projection publique d'autochromes de l'explorateur photographe Jules Gervais-Courtellemont. Sur



Sur la gauche, le photographe norvégien Anders Beer Wilse.
Suède, 25 août 1910. Autochrome 9 x 12 cm, Auguste Léon.
© Musée Albert-Kahn/département des Hauts-de-Seine, inv. A 7 037.

le plan technique, cette séance – combinant l'autochrome pour la restitution des couleurs et le cinéma pour le mouvement – peut être considérée comme l'ultime préfiguration des Archives de la Planète, qui naîtront dès le mois suivant avec les plaques autochromes 9 x 12 cm prises par son premier opérateur professionnel, Auguste Léon.

De juin 1909 à fin 1911, les toutes jeunes Archives de la Planète vivent une période de rodage. Auguste Léon demeure le seul opérateur. Les rares missions à l'étranger continuent d'être couplées avec des voyages personnels d'Albert Kahn, sur le modèle du prélude constitué par le tour du monde de 1908-1909. L'autochrome coexiste encore souvent avec la stéréoscopie, le cinéma est presque inexistant. En parallèle aux images prises par son opérateur, le banquier acquiert des plaques en couleurs réalisées en Algérie et Tunisie par Gervais-Courtellemont.

Début 1912, un pas décisif est franchi. Kahn engage un directeur scientifique pour son inventaire visuel : Jean Brunhes, auteur en 1910 de *La Géographie humaine*, ouvrage novateur qui prône une étude classifiée des traces de l'action de l'homme à la surface du globe.

Stéphane Passet, un deuxième opérateur – à la fois photographe et cinéaste – est recruté. D'autres suivront.

La tenue de registres d'inventaire est entreprise. S'ils ne sont pas aussi précis sur le plan documentaire que l'aurait souhaité Brunhes, ils montrent les choix techniques effectués : la plupart des autochromes sont enregistrées, même rétrospectivement, tandis que les clichés en relief des débuts sont ignorés. Les vues



L'ancienne conservation, qui abritait les autochromes,
les films et le laboratoire des Archives de la Planète.
Boulogne, 5 mai 1930.

Autochrome 9 x 12 cm, Auguste Léon, inv. B 1 418.
© Musée Albert-Kahn/département des Hauts-de-Seine.

stéréoscopiques – qui ne se prêtent pas à l'utilisation collective inhérente au projet – sont ainsi laissées en marge, formant de petites collections satellites. D'autres fonds rassemblent les clichés des villas et jardins du banquier, à Boulogne et sur la côte d'Azur, enregistrés séparément, peut-être par modestie.

Les films sont pour leur part répertoriés par des fiches de développement et un registre des métrages de pellicule confiés aux opérateurs pour chaque mission.

Si certaines productions « internes » sont classées à part, des documents d'origine extérieure sont en revanche intégrés très tôt aux Archives de la Planète : mise en commun d'opérateurs entre Kahn, Pathé et Gaumont, partage des négatifs, échanges contre des actualités cinématographiques ; partage de films des services photographique et cinématographique des Armées ; photographies et films de Léon Busy, autochromiste amateur virtuose, intendant dans l'armée coloniale au Tonkin...

Les Archives de la Planète avaient collecté – en 72 000 autochromes et une centaine d'heures de film – la mémoire visuelle d'une cinquantaine de pays quand les conséquences du krach boursier de 1929 mirent un terme au rêve d'Albert Kahn. Symbolique involontaire, les dernières images prises début 1932, en dehors de la propriété de Boulogne, sont – côté films – les funérailles d'André Maginot ; côté autochromes, celles d'Aristide Briand, signataire en 1928 du pacte mettant la guerre hors la loi...

Dans ses thématiques, le fonds reflète – de plus ou moins près – la pensée de Jean Brunhes. Les préoccupations du mécène, qui pressentait les transformations accélérées du monde, rencontraient en effet le regard de ce géographe précurseur, plus intéressé par la banalité de la vie quotidienne que par l'exceptionnel et le monumental.

Les opérateurs devaient en principe travailler selon la méthodologie de Brunhes, classant les types d'activités humaines en trois groupes : 1) Faits d'occupation improductive du sol : maisons, chemins ; 2) Faits de conquête végétale et animale : animaux domestiques, champs et jardins ; 3) Faits d'économie destructrice : dévastations végétales et animales, exploitations minérales². Ces modes d'occupation d'un territoire se retrouvent par exemple dans les autochromes montrant l'habitat rural de Mandchourie (groupe 1), un système d'irrigation du Punjab (groupe 2), des carrières en Seine-et-Marne (groupe 3). Même si les opérateurs ne résistent pas au plaisir de rapporter nombre de vues de monuments célèbres (Alhambra de Grenade, temple du Ciel à Pékin, colonne Trajane à Rome...) et doivent se plier aux contraintes et imprévus du terrain, les recommandations de Kahn et Brunhes sont néanmoins suivies : de simples scènes de la vie courante sont enregistrées (un jeune Irlandais transportant de la tourbe sur un âne, le départ pour la pêche de marins bretons, un cortège funéraire en Chine...). Entrent également dans cette catégorie les petits métiers (porteurs d'eau en Inde, cardeur de matelas dans les rues parisiennes...), les commerces traditionnels, l'outillage agricole ou le vêtement, considéré comme « fait de civilisation ».

Mais les Archives de la Planète offrent aussi une mémoire iconographique plus historique ou événementielle : la Première Guerre mondiale et ses conséquences, la vie politique (en France surtout), les expositions universelles, des expressions religieuses uniques comme la grande Troménie de Locronan en Bretagne...

Sous forme de portraits autochromes, et parfois de films, la collection garde également le souvenir de nombreuses personnalités, politiques, scientifiques, religieuses ou artistiques venues à Boulogne, invitées par Albert Kahn ou par la société Autour du Monde.

2. Lettre de Jean Brunhes à l'opérateur Stéphane Passet, 8 mai 1912 (Archives nationales, fonds Jean-Brunhes).



Le départ pour la pêche : M. Masson fils avec son équipe de marins-pêcheurs. Roscoff, Bretagne, 6 avril 1920. Autochrome 9 x 12 cm, Georges Chevalier, inv. A 20 840. © Musée Albert-Kahn/département des Hauts-de-Seine.

La conservation des autochromes et des films : d'une collection privée à une collection muséale publique

par Ronan Guinée et Nathalie Clet-Bonnet

Les premières autochromes ont désormais 100 ans. Même si la dénomination d'« archives » a été clairement posée dès leur création, l'attention portée à ces objets photographiques a profondément évolué en un siècle. Du vivant d'Albert Kahn (et dans les années qui suivirent), les plaques étaient manipulées et – pour une partie – projetées, de même que certains films³. Aujourd'hui, prévaut un regard sur une collection muséale, portant un soin particulier à la préservation des œuvres. Les changements de pratique suivent le changement de statut : d'objets d'usage, les images sont devenues pièces de musée.

À l'époque de Kahn, des projections étaient organisées, surtout pour les invités de la société Autour du Monde et pour les cours de Jean Brunhes⁴. Il arrivait alors que quelques plaques soient cassées, perdues ou « brûlées » : au début du XX^e siècle, on utilisait pour les projections de grand format des éclairages à arc électrique très puissants, dégageant une chaleur intense et des rayonnements ultra-violet destructeurs. Par bonheur, seule une minorité d'autochromes furent exploitées : bien conservées, les Archives de la Planète peuvent ainsi remplir le rôle principal auquel les vouait d'emblée leur nom : fournir aux générations futures un « tableau vivant de l'évolution ».

À partir des années 1970 vient le temps du musée⁵. Le département des Hauts-de-Seine, nouveau propriétaire, nomme un

3. Pour les films, la question de la conservation se pose différemment : les projections concernant des positifs, les négatifs sont donc préservés d'office. Mais le nitrate de cellulose est un support qui s'autodétruit, d'où la nécessité de recourir à des matrices de sauvegarde sur acétate, puis sur polyester.

4. Les projections d'originaux perdurèrent un temps avec le rachat des collections par le département de la Seine en 1936, avant utilisation de la diapositive.

5. Pour les pratiques, le statut officiel de musée n'étant acquis qu'en 1986.

conservateur, puis un photographe et des documentalistes (aujourd'hui attachés et assistants de conservation). L'ensemble des collections (photographies, films, jardins) est perçu avec la même approche muséale. Les manipulations directes sont progressivement limitées au strict minimum, d'abord par l'emploi de diapositives, puis d'un vidéodisque, enfin de fichiers numériques. Pratique exemplaire, un laboratoire de photographie a été (re)créé afin de répondre aux besoins au mieux des attentes qualitatives mais aussi pour éviter de recourir à des prestataires extérieurs (risques accrus lors du transport et de la manutention). Les manipulations sont ainsi limitées aujourd'hui au seul laboratoire et au personnel habilité à gérer les mouvements d'œuvres.

Au milieu des années 1990, le Conseil général des Hauts-de-Seine initie un grand chantier de reconditionnement et de déménagement des collections dans des salles d'archivage de haute qualité, respectueuses des normes en vigueur, à proximité immédiate du laboratoire interne modernisé à son tour pour passer en filière numérique. L'effort financier a porté sur l'équipement, mais aussi sur le recrutement durant plusieurs années de restaurateurs diplômés sans lesquels le chantier n'aurait pu être mené à terme.

La salle de conservation originelle était située au rez-de-chaussée du bâtiment dévolu aux Archives de la Planète. Compte tenu des grandes crues de la Seine (1910 et 1924), les boîtes de plaques s'étagaient entre 90 cm et 3,20 m du sol. Si l'ameublement en chêne massif ciré et les jardins qui l'entourent contribuent à son charme, ils ne favorisaient guère la neutralité de l'environnement et le contrôle de l'humidité.

Dans les années 1990, par un échange avec l'État, le département des Hauts-de-Seine récupère, en lisière des jardins, un grand bâtiment propice à l'accueil des collections. La rénovation et l'aménagement des locaux sont menés par le service des bâtiments du département en liaison avec le musée. La société In Extenso est retenue pour concevoir la climatisation et l'installation des réserves de photographies (une grande pièce au premier étage) et de films (deux pièces au second étage), la conception des nouvelles boîtes et la définition des mobiliers (étagères en métal neutre, accessibles sans l'aide d'un tabouret). Chacune des salles est contrôlée par une machinerie individuelle, avec un air filtré. C'est un atout, car la température et



À gauche, l'ancienne salle des plaques ; à droite, la nouvelle réserve des photographies. Photographie Isobel Graziani, 2008.
© Musée Albert-Kahn/département des Hauts-de-Seine.

l'humidité relative sont ainsi optimisées pour les autochromes, les matrices films sur tri-acétate et les matrices films sur polyester. En outre, les salles ne sont pas tributaires les unes des autres en cas de panne. Les photographies sont conservées à 17°C, avec une humidité relative de 40 %. Les machines sont très performantes et les conditions particulièrement stables. Un récent dégât des eaux en 2007, consécutif à des désordres dans la toiture du bâtiment, a démontré l'efficacité des matériaux de construction des salles d'archivage. Les premières boîtes sont à 3,15 m au-dessus du niveau atteint par la grande inondation de 1910 : en cas de crue, seules les machines seraient affectées.



À gauche, l'ancienne boîte d'archivage ; à droite, la nouvelle.
Photographie Isobel Graziani, 2008.
© Musée Albert-Kahn/département des Hauts-de-Seine.

Autrefois, les autochromes étaient conditionnées dans des boîtes en bois, qui contenaient environ 75 plaques autochromes et pesaient plus de 4,5 kg. Il a été décidé de reconditionner les plaques dans des boîtes chimiquement neutres aux normes modernes. Après de nombreux tests de matériaux (carton neutre, aluminium anodisé, plastiques divers), le choix s'est porté sur des boîtes en ABS⁶, garnies de mousse rainurée. Elles garantissent le rangement sécurisé de 30 plaques, en divisant le poids de moitié. Des gouges latérales assurent une excellente prise en main.

Dès l'origine, les autochromes étaient doublées d'un verre de protection, maintenu sur le pourtour par un papier gommé noir⁷. Avec le temps, les papiers gommés se décollent plus ou moins. Une politique de remontage systématique a été très tôt mise en place, privilégiant une approche documentaire : les papiers gommés ont été remplacés par des adhésifs transparents, de manière à visualiser l'intégralité de l'image (cadrage original) et les données manuscrites d'époque parfois inscrites

⁶ Acrylonitrile butadiène styrène.

⁷ Ce doublage d'origine ne concernait que les plaques à développement entièrement terminé. Une des spécificités de la collection est en effet de comporter une importante proportion d'autochromes n'ayant subi que la première phase de développement. Cette question serait trop longue à traiter ici. Signalons simplement que les plaques non terminées ont été doublées récemment.

en bordure (n° d'inventaire, n° de prise de vue, légende éventuelle). Un soin particulier a été immédiatement porté sur les choix d'adhésifs, sur les conseils d'instances scientifiques reconnues⁸. Le personnel du musée a été formé aux bonnes pratiques. Une récente inflexion dans le remontage a été opérée avec l'intervention des restaurateurs diplômés. Le musée s'oriente aujourd'hui vers la consolidation des montages peu abîmés, plutôt que le remontage systématique. Les montages d'origine sont ainsi conservés, mais les informations manuscrites en bordure, parfois intéressantes sur le plan documentaire, ne sont pas accessibles.

Dans le cadre du récolement décennal légal, à remettre en 2014 à l'autorité de tutelle des musées de France, le musée Albert-Kahn ouvre en 2009 un nouveau grand chantier : le récolement et le constat d'état de l'ensemble de ses collections. Le constat d'état déterminera l'état sanitaire précis des plaques ainsi qu'un ensemble de savoirs techniques diffusables aux autres institutions⁹.

La numérisation des collections pour la consultation

par Flore Hervé

La consultation des collections numérisées se fait dans Fakir2 (Fonds Albert Kahn Informatisé pour la Recherche, 2^e version), conçu pour former un système muséographique global d'information, de consultation et de travail, mettant en réseau les fonds du musée de toute nature : images (photos et films), archives papier, matériel et objets, en vue de leur conservation, leur diffusion et leur valorisation.

Fakir2 fait suite au premier Fakir, composé de banques d'images fixes et animées distinctes. Les évolutions techniques permettent de rassembler les différents médias et, par le mailage ainsi instauré entre les différents documents, de favoriser une lecture plus éclairée de l'œuvre d'Albert Kahn et de lui redonner son unité.

Le système participe bien entendu à la conservation préventive en évitant le recours aux originaux pour visionnage ; il s'adresse en effet aux trois profils principaux d'utilisateurs : visiteurs du musée ; professionnels extérieurs au musée ; professionnels du musée.

Côté visiteurs, le musée a fait le choix de ne pas exposer ses originaux pour ne pas mettre en péril la pérennité du fonds. Par ailleurs, les expositions temporaires sont très prisées mais elles ne peuvent présenter que 100 à 200 tirages maximum. Fakir2 constitue donc pour eux, dans le prolongement de la philosophie déjà mise en œuvre pour Fakir1, une exposition permanente et interactive où les reproductions prennent valeur d'œuvres à part entière et non de simples compléments des œuvres originales ; leur qualité de présentation est essentielle. Cette

⁸. Par exemple, le CRCDG (Centre de recherches sur la conservation des documents graphiques), aujourd'hui CRCC (Centre de recherche sur la conservation).

⁹. Signalons la parution prochaine de l'ouvrage *La Plaque autochrome Lumière. Secrets d'atelier et défis industriels* (Bertrand Lavédrine et Jean-Paul Gandolfo, avec la collaboration de Christine Capderou et Ronan Guinée. Éditeur : CTHS).

exigence est atteinte en joignant à la qualité de la numérisation une « mise en écran » particulièrement soignée et une « mise en espace » travaillée.



Un poste Fakir (interface « visiteurs »).

Photographie Pascal Bedek, 2006.

© Musée Albert-Kahn/département des Hauts-de-Seine.

Fakir visiteurs est une « machine à voir » composée de trois écrans : un pour la navigation et deux dédiés au visionnage de séquences scénarisées (audiovisuels d'images fixes et animées) et de films montés.

Depuis juin 2006, quatre postes offrent plus d'une trentaine d'heures de consultation. Trois parcours sont proposés : *Rencontrer Albert Kahn*, *Faire un voyage en images*, *Découvrir le musée*.

Le deuxième accès (« Fakir chercheurs ») a pour objectif de diffuser les collections auprès du public spécialisé : chercheurs, documentalistes, iconographes, journalistes, réalisateurs... À partir d'un noyau de données multimédia, le professionnel dispose d'outils de recherche (multicritère, avancée, plein texte), de sélection (album, extraits), d'organisation, d'appropriation (prise de notes), de commande et d'export des données. Mis en test en septembre 2008, Fakir chercheurs représente actuellement 20 000 autochromes, près de 600 films (montés ou rushes), et 35 documents d'archives papier. En l'état actuel, beaucoup reste à faire pour passer des données de base à une véritable documentation.

Le troisième accès permet à l'équipe du musée de consulter et d'alimenter les fonds numérisés dans un éditeur collectant les différentes informations liées à ces objets : informations documentaires, historiques, techniques, juridiques constituant le dossier d'œuvre... En lui fournissant un espace structuré apte à engranger les différents travaux jusqu'à présent dispersés, ce nouvel outil ambitionne de devenir un pôle de données pour la gestion des fonds (inventaire recommandé par la Direction des Musées de France, constat d'état, localisation, etc.) et des productions actuelles et futures du musée.

La numérisation pour la présentation des œuvres dans les expositions temporaires

par Marie Corneloup

Les autochromes originales sont difficilement exposables : l'éthique de conservation préventive déconseille bien évidemment exposition de longue durée à la lumière, chocs thermiques et variations d'humidité.

Par ailleurs, la présentation de plaques originales ne reflèterait pas l'usage historique des autochromes des Archives de la Planète : en visionnage collectif, ces images de petite taille (9 x 12 cm) étaient agrandies par projection, comme le furent plus tard les diapositives.

Le procédé privilégié pour les expositions temporaires du musée (tirages translucides rétro-éclairés) conjugue les avantages d'une projection (large vision pour une consultation par-

tagée) et les qualités photographiques de l'observation directe des plaques.

Ces tirages sont réalisés « sans trucage ». Les couleurs ne sont pas améliorées par traitement informatique, les altérations ne sont pas gommées. Des restaurations numériques ne sont effectuées qu'à titre exceptionnel, lorsque l'état de l'œuvre constitue une gêne flagrante pour la lecture de l'image.

Il en va tout autrement pour l'autre merveille des collections Albert-Kahn, les films noir et blanc. En image animée, l'œil fatigue vite à suivre le mouvement si la vision est constamment brouillée par des rayures ou d'autres perturbations. C'est pourquoi les films, maintenant transférés en vidéo numérique, sont restaurés. En toute logique, les autochromes, lorsqu'elles sont utilisées dans une narration (film ou diaporama), sont également retouchées : elles obéissent alors aux critères de l'image animée (étalonnage et correction des altérations principales).



Vitrine de matériel de prise de vue à l'entrée de l'exposition *Infiniment Indes*. Photographie Pascal Bedek et Bénédicte de Changy, 2008.
© Musée Albert-Kahn/département des Hauts-de-Seine.

L'actualité du musée

par Vladimir Pronier

L'année 2009 s'annonce sous les meilleurs auspices pour le musée Albert-Kahn avec la prolongation jusqu'au 30 août de l'envoûtante exposition *Infiniment Indes*. Un dialogue au travers de 150 autochromes et de quelques films noir et blanc avec le cœur et l'esprit de l'Inde du début du vingtième siècle. À ce voyage lointain, succédera, à l'automne, une exposition sur les premières photographies en couleurs de la Bretagne, où l'on découvrira que l'approche pittoresque et documentaire des opérateurs est souvent teintée d'une esthétique encore inspirée de la peinture. Mais 2009 sera surtout médiatique pour le musée Albert-Kahn avec la diffusion en février sur ARTE d'une série de documentaires que la BBC a consacré aux Archives de la Planète et, pour la fin de l'année, le lancement du site Internet du musée grâce auquel les internautes du monde entier pourront (re)découvrir les couleurs fascinantes des autochromes.

Données techniques sur la numérisation pour consultation

par Flore Hervé

La numérisation des images fixes pour Fakir2 s'effectue sur une station Macintosh intégrée au laboratoire photographique du musée, composée d'un dos numérique instantané P25+ de PhaseOne 4 000 x 5 000 pixels (20 millions de pixels), monté sur un boîtier Hasselblad, d'un statif de reproduction, d'une boîte à lumière et d'une visionneuse de contrôle à 5 000°K.

Les matrices films Safety 35 mm (acétate ou polyester) sont transférées sur cassettes Beta numériques. Ils sont légèrement restaurés via le logiciel Archangel pour stabiliser l'image et retirer les plus grosses imperfections (rayures, poussières, pompage).

Les séquences sont ensuite numérisées en Mpeg2 à débit constant, main level, main profile. Deux fichiers sont générés : un fichier à 8 mbps pour la diffusion, un fichier à 5 mbps avec incrustation du time code à l'image et du numéro de la cassette d'origine pour la sélection des extraits.

Les données documentaires ont en partie migré depuis le logiciel de Ged Texto (10 000 fiches), utilisé par fakir1. Elles sont stockées en XML dans une base de données faite sur mesure sous MySQL. Chaque objet comporte une fiche établie selon les règles du catalogage de la Fiaf pour les images animées, les préconisations de l'inventaire DMF pour les images fixes, tout en tenant compte de la spécificité du fonds.

L'indexation commune à tous les documents est faite par listes autorités et thésaurus « maison » (inspirés des thésaurus Rameau de la BnF, Joconde, Mérimée et Palissy de la Direction des Musées de France).

La documentation est segmentée selon plusieurs niveaux de lecture : de l'information de détail (annotation des arrêts sur image et des détails du zoom) à l'information générale (« en savoir plus », glossaire, chronologie historique ; biographies, bibliographies).

L'interface de la base de données est en Java. Les consultations « visiteurs » et « chercheurs » sont développées en Flash et Java et tournent sur un serveur Tomcat. Les fichiers Jpeg et Mpeg sont stockés sur un serveur Sun OS Solaris accessible via Apache.

Digitization of Transparencies

by Pierre Hauri

Associate Director, TRIBVN

The photographic reproduction techniques came through quite a revolution during the two last decades. TRIBVN has worked as a pioneer in the field of photographic digitization since 1988, conceiving and building its own digitization boards. Even if every digitization service provider uses now quite the same equipment, it is still, however, interesting to invest in customized systems in order to improve the final quality. TRIBVN gives in this document a point of view on the digitization business.

Introduction

It would not be fair to talk about digitization without mentioning two large institutions which are definitely milestones of the digitization business: KODAK and the French National Library (BnF).

They both helped libraries, museums or archive centres to get involved into the digitization of their collections by defining the rules and technical standards which are still implicitly used in today's digitization projects.

On the one hand, the technical specifications written by the BnF for the first digitization projects involving photography (1995) are still used (maybe too much) and copied/pasted by institutions intending to digitize their own photographic collections. On the other hand, the definition rules elaborated by Kodak and its famous PhotoCD, based on the films datasheets (MTF), are still agreed and used by professionals to determine which spatial resolutions have to be used to digitize transparencies.

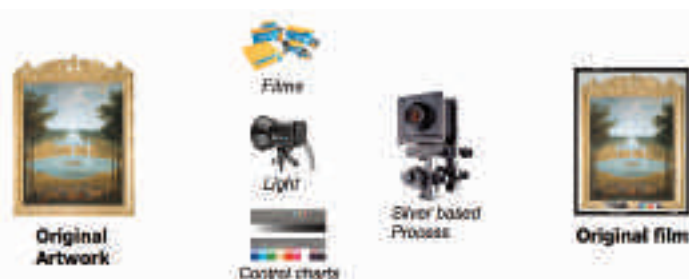
Technical Evolutions

In less than 20 years, we came from relatively stable and vendor-dependent industrial processes to potentially open systems which can be customized (choice of various digital backs, choice of lenses, selection of lenses with test patterns, choice of specific light, etc.). To build customized reproduction devices provides flexibility because any part of the process can be selected and removed. But for the same reason, they can be very unstable.

Analog photography

Photographic reproduction with an analog photography process required the choice of a light source (daylight, tungsten...) and of a film fitting the light source. The stability of the development

process was supposed to provide one chromatic result, whatever the day the picture was taken or the photographer.



Digital photography

A «digital» photographer has to deal with a larger number of parameters when reproducing pictures or any artwork with digital photography: white balance, color profile, sharpness, saturation, etc.

The white balance parameter by itself can generate many different results whether it is used correctly or not. This issue means that several chromatic results can be obtained even for one digital equipment/light source combination. These results will depend on the skills and digitization strategy used by the operator.



Consequences

The control of the process stability has been transferred at the shooting stage. The film processing has been replaced by the file processing and the stability of the whole workflow is now in the photographer's hands.

Digital reproduction can be achieved in two different ways by a service provider:

- Invest in a vendors unique system (flatbed scanner, book scanner) allowing fast installation on any site with a good repeatability of the results as long as vendor technical procedures are followed. These systems can be used with quite a large number of documents. However some documents requiring special attention such as glass pictures, nitrate

films should not be digitized on these type of digitization devices because of mechanical constraint (glass pictures) or thermal constraint (nitrate film).

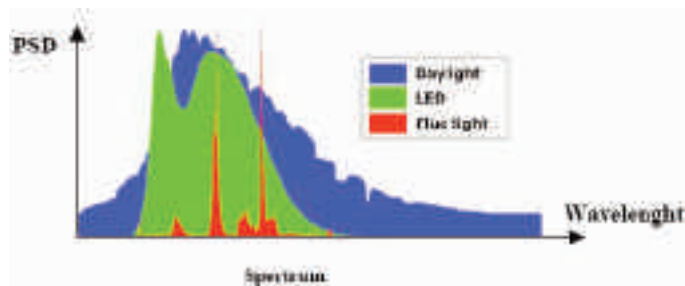
- Build a system based on several vendors parts, in order to choose the best technical elements for a specific need (lens, light, camera body, shutter...). The advantage of such a system is not to be universal but flexible. It is then possible to digitize very specific documents.

TRIBVN uses flatbed scanners for general purposes and builds its own systems in order to fulfil specific customer needs or call for tenders specifications: Chinese rolls, nitrate films, gilded manuscripts, ultra dense glass pictures... These previous examples need special equipment or settings to be digitized safely with a good quality.

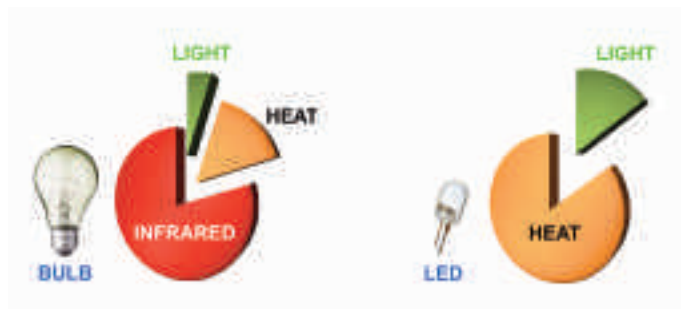
Building up a custom-made digitization station is sometimes a tedious operation but becomes a real advantage for long-term projects.

Example 1: Light source based on LEDs

Professional flatbed scanners and most of the digitization systems are using fluorescent light sources to get a white point close to 5000°K and almost no UVA, UVB or infrared radiance. TRIBVN has worked for one year on finding an acceptable light source to replace (when possible) the fluorescent lights which have a very poor spectrum quality, even if manufacturers are improving the inner coating. In fact, the white point of the fluo tubes is close to 5000°K but their spectrum is far from the D50 illuminant.



The chosen solution is based on the use of LED lights which have a continuous spectrum and no infrared radiance.



Tungsten vs LED



LED light source (TRIBVN)

TRIBVN has selected LEDs from a German manufacturer and has built its own light sources since 2007. They are used at TRIBVN and in our customer's premises. It is therefore possible to digitize very fragile documents without any concern about heating them.

As an example, digitizing a batch of 16 transparencies on a flatbed scanner with resolutions close to 2000 dpi takes more than 20 minutes. Every picture will be exposed to approximately 700 lux during more than one minute, the temperature on the flatbed scanner glass surface being close to 25°C. With a digital back having enough definition to reach the required resolution, every transparency is exposed to 700 lux too but during only 10 seconds, at room temperature.

TRIBVN decided to build this type of source during a digitization project involving nitrate films. IGN¹ and ECPAD² launched respectively in 2007 and 2005 the largest digitization projects (more than 100,000 transparencies per year for each institution, during 3 or 4 years). They are fully equipped with LEDs light sources since TRIBVN was chosen to digitize both image funds.

Finally, a 64 LEDs light source uses a quarter of the fluorescent light source power supply (for an equivalent intensity) during a lifetime 5 times longer than the fluorescent tubes one.

Example 2: Handling of documents

During a digitization project with the French National Library, TRIBVN had to digitize Chinese rolls (Pelliot). Since there were no standard digitization system allowing handling of rolls, TRIBVN built a specific handling device to allow digitization of such rolls without any risk.



The system was based on a specific table with two rolls receptacles designed to prevent each part of the roll from... rolling up! A digital back was used for digitization and a low resolution video camera with a digital field memory was used to keep the long rolls straight from the beginning to the end of the digitization process.

1. Institut Géographique National: French National Geographic Institute.
 2. Établissement de Communication et de Production Audiovisuelle de la Défense: French Defense Institution of Communication and Audiovisual Production.



Device used from 2002 to 2005 for handling rolls.

Methods

Preparation of documents for the digitization stage probably requires the most human resources. Every document must have a call number, every file must have a unique filename and both information will have to be linked to each other in any way. The separation between preparation and digitization is not quite clear. Since human resources are not really increasing it is sometimes necessary for institutions to include in the specifications jobs that are, from our point of view, far away from our digitization skills.

Physical preparation

Depending on the project, physical preparation is either handled by institutions or by the digitization companies. It can include dust removal, identification or packaging in new paper of polyester sleeves. This work is done prior to digitization.

Metadata

Metadata already exist when we begin our digitization work. Our contribution consists in adding to the original metadata some information regarding the digitization stage. This contribution has consequences depending on the required format of these metadata.

Pictures or manuscripts digitization market is relatively small. There are not so many digitization companies having the expertise needed. Keeping this expertise at the highest possible level requires resources if we want to provide accurate digital reproductions and not only dematerialize original pictures. Therefore the production of metadata in addition to image files (our contribution to them is usually an order number) will use more resources than needed because production of metadata are not really part of our expertise. It is difficult for small companies to keep high quality standards in such separated fields, especially because metadata format is always specific. In comparison, file formats are standardized.

In our point of view, asking for digitization AND production of metadata requiring specific development to be part of the digitization process is a bias leading to the fact that only largest companies will be able to compete.

Conclusion

Digital pictures reproduction gives an huge flexibility to users and everyone can experience this, even personally. The other aspect of this flexibility is that it is necessary to take care (at least for professionals) to a great number of parameters to get a stable and accurate result. Even if digital photography seems easy, rigor is needed to reach high quality standards.

Digital reproduction techniques permit institutions to launch ambitious digitization projects requiring important human resources (preparation, identification, metadata...). Reproduction techniques have evolved fast but preparation is still a process with its own human rhythm, slowing down the whole workflow.

Beside diffusion of information, digitization allows a first level of conservation, avoiding access to original documents. Digitization is also pointing out a new technical issue which is the conservation of the digital media... We've come full circle!

For 20 years, TRIBVN has specialized in digital imaging, and deploys its expertise in the service of the heritage and medical industries.

For more information on TRIBVN activities, consult the website: <http://www.tribvn.com>

The Charles Cros Collection

by Xavier Sené

Head of Preservation, Department of Audiovisual, National Library of France

Constituted over the years by French *Archives de la parole* (1911), *Musée de la parole et du geste* (1928) and *Phonothèque nationale* (1938) and always increasing, the collection of historical devices of the BnF Audiovisual Department, named "collection Charles Cros" at the beginning of 1980s in homage to the first who described how sound could be recorded, counts in its inventory one thousand references today, among which a very important set of phonographic recording devices. A documentary set sheds light on the technical, commercial and social history of these devices.

Although it safeguards broadcasting and multimedia technologies made obsolete recently, the techniques of sound-recording, much older, are prevailing and constitute the main interest of this collection.

Historical Overview

Although no detailed study on the collection history, which could rely on the department archives, inventory books, oral testimonies, has been made until now, the collection has two origins.

First, from the very beginning, when the institution renewed its equipments, a recording and/or playing device replaced by a more modern one was frequently safeguarded rather than eliminated. Without a real "heritage awareness", at least before a rather recent date, a large collection in terms of technical history has been gathered, such as: cylinder or disc phonographs coming from *Archives de la parole* and *Musée de la parole*, portable tape and video recorders from *Phonothèque nationale*, etc. Besides their historical value, these devices are also testimonies of these institutions history.



Melodico, ca 1900
(n° 496 of the inventory
of the Charles Cros collection, BnF).

Secondly, the project of a phonograph museum, enriched by acquisitions and donations (notably friends of *Phonothèque*) led from 1950s to look for the devices of the acoustic age (before 1925), although contemporary curiosities were not neglected neither (miniature slot-in record player, for example).



Pathépost, ca 1908
(n° 292 of the inventory
of the Charles Cros collection, BnF).

It is only more recently than both types of devices (utilitarian material declared obsolete, often unattractive-looking, and collected "useless" material, often good-looking) were also taken into consideration and put together in the same inventory.

Documentary Policy

The device itself embodies at the same moment technological, ergonomic, aesthetic conceptions. The collection may thus interest for different reasons: history of techniques, of economics, of listening practices, of furniture. Beyond, the presence of the collection within our department is of particular importance. Indeed, the preservation of the recording and broadcasting devices, by safeguarding the physical configurations for which the carriers preserved in the department were initially intended, contributes to the preservation of the materials required to produce the audiovisual "signal". That is why it can't be isolated from the principle considering supports as cultural heritage. This little museum shows the common reading conditions of our documents: the main collection goal, and its justification within the BnF Audiovisual Department, is to testify of the original concrete configuration, quite different from the current reading room one (universal audio/video sets and PC platforms emulated).

The objective cannot be the disproportionate one of constituting an exhaustive museum of devices including the three categories (sound, video, electronic). It can be, however, to form the counterpart of the department audiovisual documents and to enrich it of a limited number of representative models. From this point of view, the collection of ancient acoustic devices, if not exhaustive (which would suppose to try to look for all the models having existed), has achieved most of these objectives. The disproportion between the three categories and the periods has to be gradually rebalanced, with the view to making of the devices collection the real counterpart of the sound, video and multimedia documents preserved by the department and available for consultation. Its borders are then quite drawn: well chosen video recorders for general public (VCR and videodiscs, DVD, BD readers) and electronic machines (computers, games consoles) would be most certainly enough at first and would exclude, for example, radio receivers.



Scopitone, 1962
(n° 609 of the inventory
of the Charles Cros collection, BnF).

Restoring the devices depends on their state, although the principle is always to respect their original condition. If restoration requires refurbishment or replacing the existing mechanics, we shall then settle for reconstituting a complete-looking device, by taking parts from other copies in poor condition, or by making new spare parts. As restoration is not a purpose in itself, the devices are not being used to playback audiovisual documents of our collections, in order to avoid all risk of deterioration.

Digitization of Sound Archives at the National Library of France

by **Dominique Théron**

Head of the section of digitization technical execution and coordination,
Department of Audiovisual, National Library of France

The sound archives digitization is obvious today for any structure preserving this type of collections. But what for? Preservation? Access? Both? Because of potential difficulties and costs, "killing two birds with one stone" seems to be an attractive idea. And, considering this laudable intention, the "sesame" of digital technology, unchanging series of 0 and 1 easily manipulated, seems "the" solution. Now, the road to digitization, even paved with the best intentions, is long and likely to follow different paths, among which some no way out. Although these two objectives, support preservation and contents on-lining, are obviously closely linked, they can and must be considered separately, with a stage-by-stage progress, as each stage implies a choice. So we may as well take the right decisions, with full knowledge of the facts. Indeed, the change from analog to digital technology has to be made once and for all...

To begin at the beginning, a sound content exists on a carrier requiring a reading skill. As far as consumer discs, on-field recordings, a symposium recording on cassette or even personal archives which have been donated are concerned, the problem of the long-term preservation of contents arises in a more or less short term, according to two technical criteria: degradation of carriers and obsolescence of reading devices.

The carriers degradation concerns for example tapes affected by vinegar syndrome, which makes their reading very difficult, even impossible ("screeching" bands), or acetate discs with cracks, stings or other surface bleaching.

The reading devices obsolescence is linked to the inventiveness of sound reproduction equipment manufacturers. Some technologies have known such a success that, even after the end of manufacturing of the reading machines and spare parts (audio tape recorders), it is still possible to find material on the second-hand market. On the contrary, technical or commercial fiascos sometimes make things more difficult, because machines and documents concerned are rare (magnetic wires, TEF bands). A precision has to be made too: most of the carriers in danger are not necessarily the oldest ones and can even be digital-born (DCC audiotapes, MiniDisc).

Considering these two criteria, and beyond processes and equipments, the human skills are of course essential: that is why it is so important to pass on technicians and engineers' knowledge for archives preservation in the future.

Taking into account these various criteria helps to make a first choice (in the most frequent hypothesis, that is to say: hetero-

geneous collection): which documents to digitize and in which order?

Then, depending on the selected type of document, the digitization operations have to be prioritized and planned stage by stage: on-field tapes, considered as a raw material, have to be digitized not only to be preserved but also to be read by an information specialist intending to restore the order, eliminate the useless parts and index it to make the consultation at the same moment comfortable and effective. As many copies as needed can thus be produced from the master file resulting from digitization. A unique identifier and rules of files naming have to be established to ensure a complete traceability between the initial support and one or several files derived from it.

Other choice, and not the slightest one: the digitization can be made within the institution if the required equipments and staff are available, or by an external provider because of a lack of resources or a too important volume. Of course, it is necessary to control the service execution, ideally thanks to preliminary in-house tests which help drafting the specifications for potential providers.

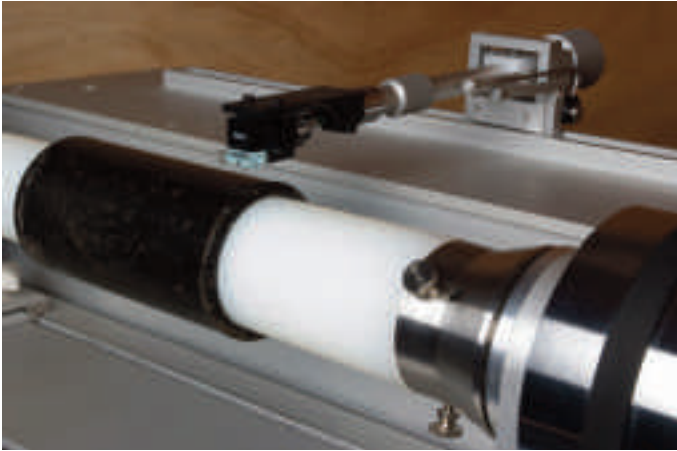
At the different stages of transfer and digitization, choices have to be made too, within the framework of recommendations promulgated by bodies such as IASA (International Association of Sound Archives) or AES (Audio Engineering Society):

- Cleaning: choice of methods and products, from the simple dust removal from a wax cylinder to the use of liquid and brushes for black discs, until the washing and heating of "screeching" tapes.



Cleaning of acetate discs.

- Transfer: choice of reading equipment (cylinder reader, turntable or tape recorder), accessories (cartridges, stylus), reading speed (different for several shellac discs), pre-emphasis curve.



Reading of cylinder.

- Conversion from analog to digital: a fundamental stage where the quality of the chosen equipment (depending on its cost) is determining.
- Acquisition: the equipment quality is important too. For instance, moving a too noisy computer out of the studio can be an alternative.
- Listening and control: linked to the precedent point, determining choices will have to be made in terms of sound insulation, analog-to-digital converter, loudspeakers and display of audio signal.

As it has a direct impact on the whole process from converter to storage support, the file format has to be chosen too. What is currently recommended is the use of the WAV or BWF format in 24 bits and 96 kHz (for analog-born documents), but these recommendations are likely to evolve. So, a sampling frequency of 192 kHz is advised for the later stage of restoration.

At this step, we are only speaking of a "master" file, conceived for preserving the maximum of information extracted from the original document, and realized by a "simple" transfer, without any correction. It is only subsequently that the totality or a selection of the master files will be maybe restored.

At this step, the different choices previously made which, up to there, could be considered as objective, because based on technical and scientific data, become more subjective. The restoration purpose will determine the technical choices depending on whether the point is to get a result as close to the original as possible, and thus offering a listening quality good enough for a researcher, or to get a quality high enough for re-editing which will tend to "smooth" all the defects. Even if directives corresponding to precise and calibrated measures can be given, there is a wide range of scenarii and tools to treat problems as different as decrackle, declick, dehiss, denoise. Indeed, pull-down menus of restoration software allow every

technician to bring a personal touch to his/her work, making it difficult to get a homogenous treatment, all the more over different working periods. Because the evolution of techniques and computing power are so important that a work of restoration realized today has little chance to be considered as adequate in the future. In any case, the sound restoration is a delicate operation, ranging from superficial linear treatments to a real "plastic surgery", requiring time and technical means. Finally, this restored file (as a variation of the master file) will probably be used to create files intended for broadcasting. Which format (MP3, REAL...), which bitrate (96 or 192 kb/s?), which software to create them? Here are the decisions to take at this step in order to put on-line contents that best fit the public needs on a technical level.



Sound digitization and restoration.

Other decisions will still have to be taken, in a context quite far from audio environment: to determine on which support the sound archives will be later preserved and migrated. According to purposes, choices have to be made between the relatively low-cost data cartridges offering an important capacity, and the secure hard disc offering a better accessibility to data but requiring a heavier and more secure technical environment.

Obviously, even in a technical context where specifications and measures are supposed to give all the guarantees of objectivity, the human factor is largely taken into account in the process of digitization of sound documents. It is the reason why two main points have to be developed and preserved in the long-term regarding master file as a matrix of all the possible uses derived from digitization:

- Metadata, only possible source of upgrading and harmonization of archives digitized in different periods, with different equipments, by different technicians. They are the memory of choices made by individuals throughout the process.
- Technicians training, in order to share a common base of knowledge and appreciations to make the most homogeneous possible the worldwide technical choices, which implies:
 - Sharing of knowledge;
 - Exchanges between technicians at an international level;
 - A common structure of training.

New Optical Sound Reading Systems

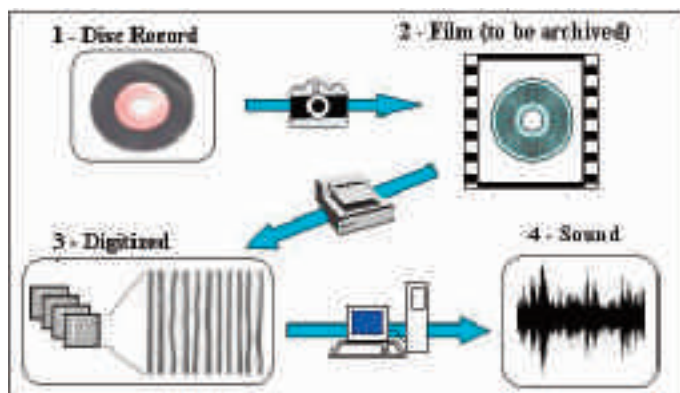
by **Xavier Sené**

Head of Preservation, Department of Audiovisual, National Library of France

Although they are less efficient for the moment than a traditional mechanical reading, the new optical sound reading systems are interesting for at least two reasons: to avoid damaging rare and precious discs by playing them and to provide means of reading strongly cracked acetate discs which are currently unreadable by conventional modes. Four main systems, with their advantages and disadvantages, are presented below.

On ELP turntable, currently at the end of its commercial life, the optical information coming from the groove is directly converted into an analog audio signal, without any signal processing. This solution, which is an excellent tool for reading shellac and vinyl discs in good condition, can meet problems with dusts and scores, coloured or transparent vinyl records, acetate and vertical-cut discs.

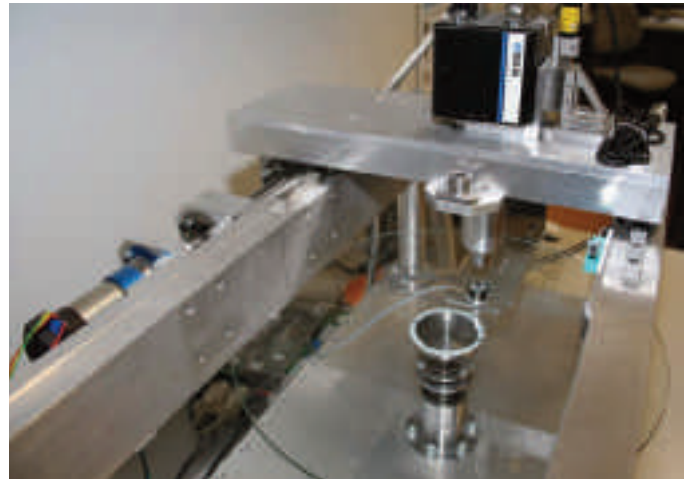
VisualAudio has developed a three-stage system (see at <http://project.eia-fr.ch/visualaudio>): a photography of discs is taken (two photos of each face are taken and preserved in different places for safety reasons); the negative is digitized; the sound is extracted from the digitized image. It can take photographs of all the types of discs, except translucent disc because the photography superimposes the two faces. All the photos can be exploited, except those of cracked discs because of an important grooves translation between both sides of the crack: a current project is trying to resolve this problem.



1. The VisualAudio concept.

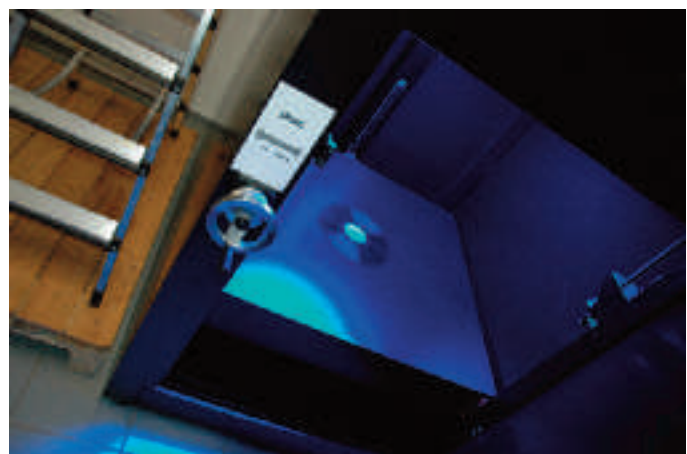
VisualAudio works far better for shellac discs than LPs, on one hand because the groove excursion of vinyl records is weaker (the images acquisition is then less precise), on the other hand because rotation is slower (provoking more audible noise). It is less efficient for stereo because the algorithms of sound extraction consider that the groove has a constant width, which is not the case for stereo. For a metallic matrix, it is necessary to reduce the light and exposure time. At last, reconstituting the

information contained in the two parts of a broken disc is possible only if the operator and/or the software manages to position the diverse parts with a margin of error which must not exceed half the nominal distance between two grooves.



2. Latest version of the prototype.

In effect, the VisualAudio system focused on acetate discs because their initial partners (Swiss National Sound Archives, Swiss French-speaking radio, etc.) were most interested in that type of documents: it is optimized to read lateral-cut shellac or acetate discs, meaning phonograms with wide grooves, and does not (still) allow to play cracked discs.



3. Oblique photograph of exposure chamber (VisualAudio).

The Lawrence Berkeley National Laboratory, specialized in optical metrology applied to the physics of particles, had the idea to make a series of micro-photos of the disc surface which, after treatment, allow to rebuild the complete image of the groove. It is possible to treat the image to correct some defects due to

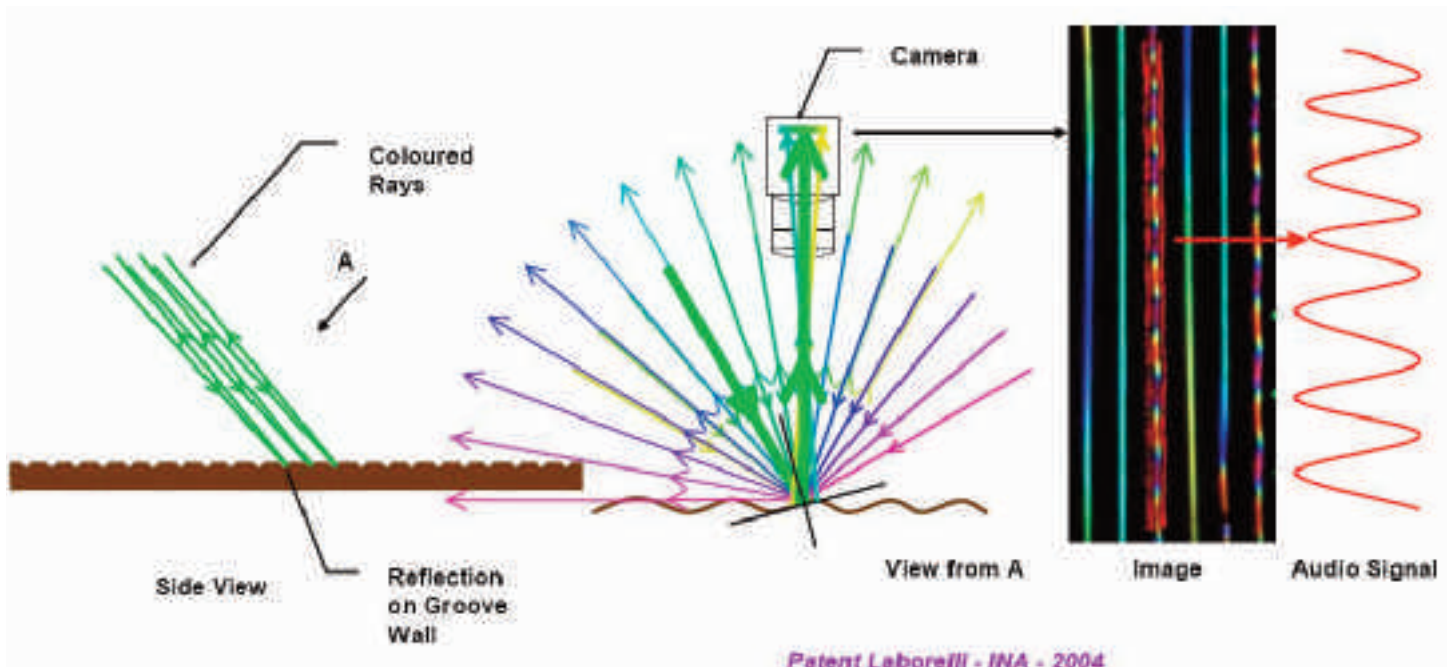
particles, scores or disc wear. This technique only permits to treat lateral-cut discs. Lateral-cut carriers are analyzed by a laser scanning confocal microscope, a very complex technique. It was then possible for the Lawrence Berkeley National Laboratory to replay the recording of the "Au clair de la lune" song made by the phonautograph of Edouard-Léon Scott de Martinville (cf. www.firstsounds.org). See the paper by Carl Haber from the Lawrence Berkeley National Laboratory p. 23.

INA (French National Institute of Audiovisual) has developed an optical playing device which allows, using structured colour illumination, the contact-less reading of shellac¹ and LP discs, as well as acetate discs and stereo discs.

A disc area is illuminated by a beam of rays, with colour depending on the direction of incidence, that are reflected by the groove wall towards a camera image. In contrast with standard methods, measuring the groove velocity at a single location, direct access to the audio signal value is obtained here directly from pictures through colour decoding, and the whole height of the groove wall is exploited. This colour coding allows the detection of occluding dust and automated interpolation of missing audio signal. The objective is to achieve a real-time treatment.



4. Prototype developed by INA.



5. Measure of the groove angle through colour of reflected light. (INA/Indeep)

1. Reading lateral-cut disc requires an orientation of 90°.

Imaging Historical Voices

by Carl Haber

Lawrence Berkeley National Laboratory, Berkeley, California, USA

Historical Coincidences

Any schoolchild can tell you that Thomas Edison invented the phonograph. With his 1877 invention, Edison was actually the first to both record *and* reproduce sound. In fact sound was first recorded as early as the mid-1850's but in a form which was not then reproducible. The earlier distinction belongs to a little known French printer and book dealer name Édouard-Léon Scott de Martinville. Interestingly, Edison was inspired by the mechanical clicks of the telegraph, realizing he could mechanically emboss acoustic impulses into a soft medium, such as tin foil. This mechanical character meant that Edison could play his recording back in a manner roughly inverse to their capture. Scott was inspired by the nascent science of photography and was accordingly inclined to capture sound as images on paper. Scott called his recorder the "phonautograph" – literally "sound self writer". Scott believed that workers would learn to read his "phonautogram" images and thus give rise to a new stenographic technology. Being essentially a form of graphic art, these images, while of significant scientific and technical interest, could not be used for sound reproduction.

Scott's invention developed into a tool of some considerable laboratory use through the later 19th century and led to significant research in the science of speech. Edison's invention was, in practice, more widely transformative leading to the commercial recording industry, dictation, and the broad academic application of sound recording in ethnography and other fields.

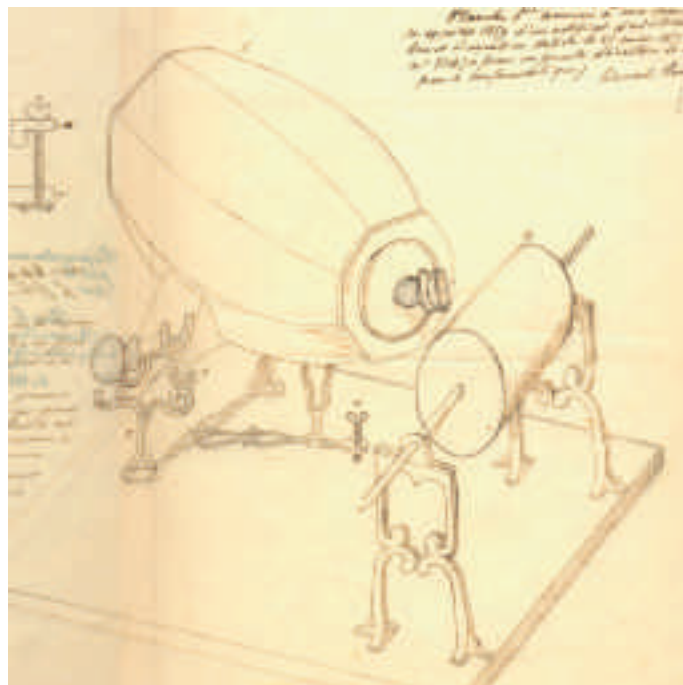


Figure 1: Scott's rendition of the phonautograph, circa 1859. Image from *Institut National de la Propriété Industrielle*.

The phonautograph (Figure 1) is conceptually simple and Edison's phonograph bears strong resemblance to it. Sound waves are collected in a horn and excite an elastic diaphragm at the base. The diaphragm is linked to a "stylus", in this case a pig's bristle. A sheet of paper is coated with soot from a kerosene lamp and wrapped around a hand cranked cylinder. As the pig's bristle moves, under the influence of the diaphragm, a pattern related to the sound waves is scratched into the soot (Figure 2). The patterns are akin to modern oscilloscope traces and in fact Scott's device is a mechanical version of that, now common, laboratory tool.

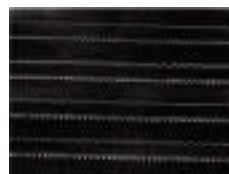


Figure 2: A small portion of a phonautogram. Scott recorded parallel traces of audio and the vibrations of a 500 Hz tuning fork, in order to define the time base. The time direction is horizontal.

Fast-forward some 160 years, sound and light, Edison's and Scott's twin inspirations, are now regularly captured, processed, and rendered digitally. These methods, digital audio and digital imaging, are ubiquitous across the arts, sciences, and technology. In a novel application of both, researchers have recently been studying methods to restore and create digital access to historical sound recordings, on grooved carriers, using digital imaging [1-3]. The first step in this approach, which avoids any physical contact to the media, is to create a high resolution digital image of the sound carrier. These images are either collected with microphotography, resulting in a two dimensional (2D) representation of the surface (Figure 3) or with confocal microscopy resulting in a three dimensional (3D) representation (Figure 4).

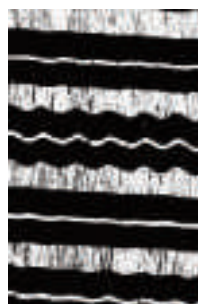


Figure 3: A two dimensional microphotograph of the groove on a shell disc record. The time direction is horizontal. Illumination is coaxial, the groove walls, sloping at 45 degrees appear black, the groove bottom is the narrow white trace and the surface of the disc is the larger white areas. Groove pitch is approximately 400 microns.

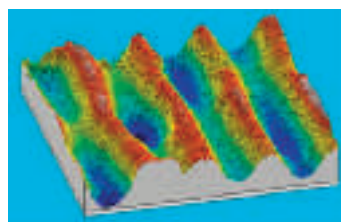


Figure 4: A three dimensional topographic image of the surface of an Edison cylinder. The time direction is along the "valleys". Ridge-to-ridge spacing is 250 microns and depth is about 15 microns (scale is distorted).

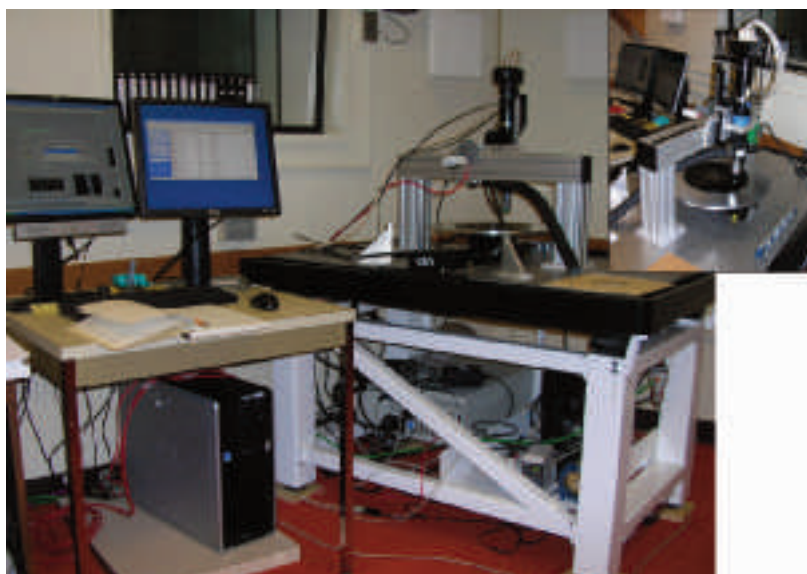


Figure 5: The IRENE hardware in place in the Recording Lab at the Library of Congress. Camera and optics are mounted vertically on support arch. Turntable holds disc on motion stages. Motion control computer and light sources are below. Main CPU and displays are to the left.

The 2D imaging is appropriate for media with a lateral, or side-to-side, groove modulation while the 3D imaging is more general and required for media with a vertical modulation. These images may be analyzed numerically to calculate the motion of a playback stylus and thereby reconstruct the recorded sound. The images may also be processed to remove the effects of damage and debris leading, in some cases, to audio restoration as well.

Applications of digital imaging to recorded sound have been studied by groups in Fribourg[4] (Switzerland), the United States[1-3], Southampton[5] (UK), and France[6]. The American effort, further addressed below, has centered around a collaboration between the University of California Lawrence Berkeley National Laboratory (LBNL) and the Library of Congress. That collaboration has explored both 2D and 3D imaging methods. The 2D effort resulted in an imaging and restoration workstation referred to as IRENE (Image, Reconstruct, Erase Noise, Etc) which has been under evaluation at the Library of

Congress (Figure 5) for about 2 years. The 3D effort focuses on a rapidly evolving application of multi-channel confocal microscopy (Figure 6) and is slated to come to the Library, from Berkeley, in 2009.

One fortunate coincidence of this current activity was a realization that Leon Scott's pioneering photoautograms were quite similar in form to the 2D digital images rendered from the more widely used shellac and lacquer disc media. This relationship is already clear in a comparison of Figures 2 and 3. This similarity meant that the IRENE analysis software would be applicable to audio reproduction of phonautograms. In 2007 the FirstSounds collaboration[7], a loose consortia of audio historians, engineers, and scientists, began a systematic search for original Scott phonautograms. In the 1850's and 1860's Scott had deposited the results of his experiments at the *Institut National de la Propriété Industrielle* (the French patent office) and at the *Académie des Sciences* of the *Institut de France*, both in Paris. By early 2008 these tracings had been located, and some digitized, and analyzed. Two remarkable examples stood out. On April 6, 1860 Scott recorded a girl singing the well know folk-song "Au clair de la lune". The reconstruction is clearly resolved and has been called by some a "ghostly" voice from the past. In May of that year, perhaps the same girl is heard to sing the D major scale. With time perhaps other photoautograms will surface and further illuminate this early pioneering phases in the history of sound recording.

Scott's own experience was not a happy one. When Edison introduced his phonograph to great accolades Scott complained bitterly. History of course decides to assign credit by some complex set of conventions. We can say now however that history has moved forward a significant distance in recognizing Scott's contribution and his creative brilliance. Interestingly, Scott's approach and ideas have much more in common with the later scientific and technical approach to the analysis of signals in general than do Edison's. Perhaps that legacy will be better appreciated in the future as well.

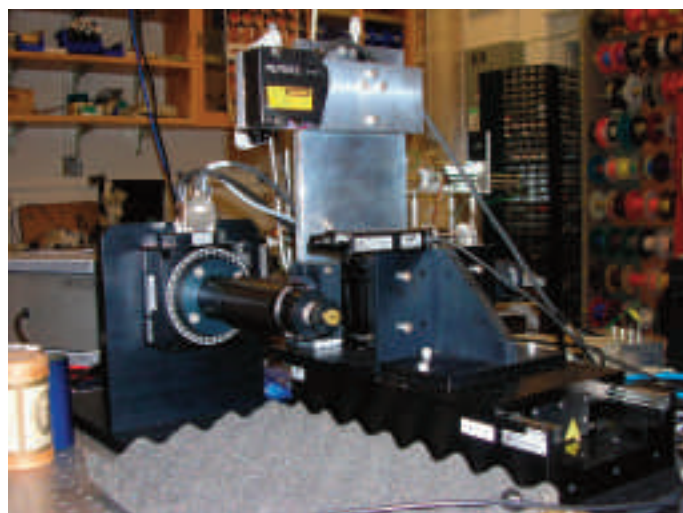


Figure 6: The 3D scanning hardware in place. Cylinder is in foreground. Laser sensor is above.

A General Approach to Recorded Sound Preservation and Access

The ongoing research into optical methods to restore sound recordings transcends Scott and Edison. They are really meant as a broad campaign to preserve and create digital access to historical recordings with as much generality as possible, whilst avoiding physical contact to the carriers. Here generality refers to a set of methods which are roughly independent of material composition, condition, and details of the mechanical recording technology. A goal is to replace the need to maintain a variety of legacy playback systems in the future. Furthermore, the approach is steeped in computer automation and therefore points towards expert systems for mass digitization and preservation – a sort of “Xerox” machine for sound recordings on mechanical carriers.

IRENE and 3D Imaging Projects

The IRENE project has its origins in experiments performed at LBNL in 2002 and published in 2003 [1]. Based upon those, the project received early support for the Library of Congress and was proposed to the National Endowment for the Humanities (NEH) and funded in April 2005. With suitable optics and illumination the groove bottom and certain other highlights of disc records are well resolved with electronic photography. Due to the speed of scientific grade cameras an entire 3 minute 78 rpm disc can be scanned in about 10-15 minutes. Algorithms operating on these images can extract information about the groove trajectory and thereby reconstruct the audio content (Figure 7).

The 2D imaging used by IRENE provides a subset of the potential information which could be retrieved by a full three dimensional (3D) imaging of the surface of a disc. IRENE extracts information from the 2-4 high contrast edge transitions visible

at any point (in time) along the groove trajectory. Three dimensional scanning offers the possibility of greater redundancy, and thus higher quality reconstructions, due to the 20-30 points measured (Figure 8). For this reason IRENE was proposed as an access oriented machine while the 3D approach was seen more as preservation oriented.

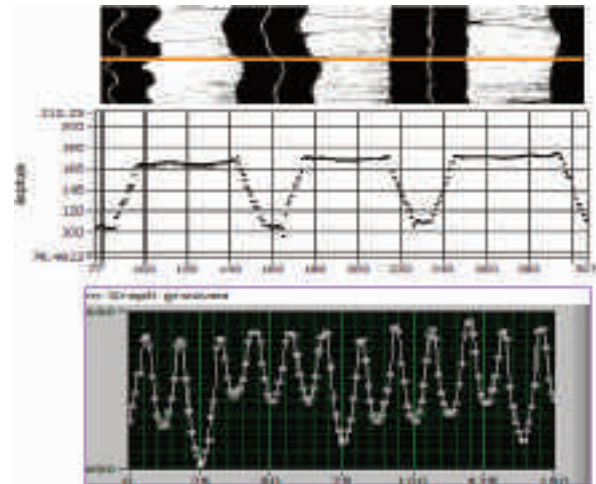


Figure 8: Information is extracted from a 2D image (top) from the 2-4 high contrast edges which are present. In a 3D image of the same disc (center) many more measurement points can be averaged. In a 3D image of a cylinder, again many points may be used to determine the groove depth.

Research into 3D methods to measure groove profiles began in 2003. A variety of technical approaches to surface profiling were considered and studied. The most appropriate method is confocal microscopy [8] whereby the surface depth is measured point-by-point. Each point is measured over an area small compared to variation due to the recorded sound. The basic application of confocal microscopy to cylinder records was worked out in 2003 and 2004 and published in 2005 [2]. The application to disc records is more challenging due to steeper groove profiles there and remains an area of current active study.

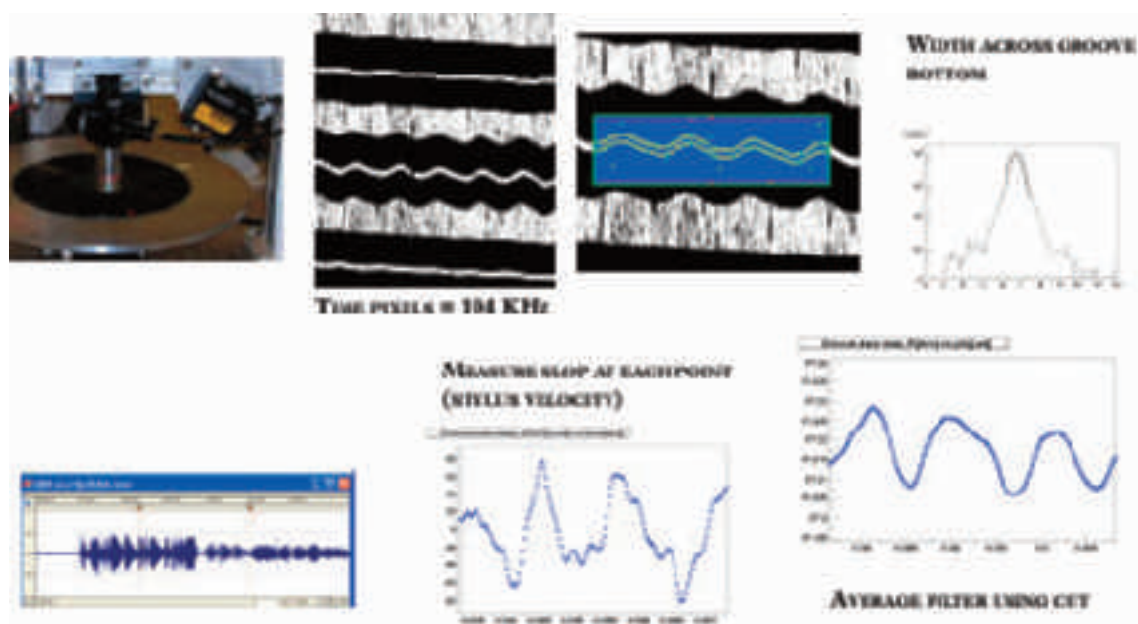


Figure 7: IRENE measurement process. Upper left shows a detail of the IRENE scanner. Shellac disc is on the turntable. Objective is at center. A laser displacement sensor is at right and is used to maintain focus, even if disc is warped. At the middle right are shown acquired images and the result of edge extraction. The groove bottom width distribution at upper right is a basic noise reduction tool. Edges found outside this distribution are due to scratches and debris. A filtered waveform is shown at lower right mapping the groove displacement versus time. At lower middle is a differentiated version of this representing the stylus velocity. This is related to the audio, lower left, by simple scale factors.

The results of the 2003-2005 studies indicated excellent performance on cylinder records however the scan times were excessive. At that time the available confocal probes measured one point at a time at a practical rate of 1000 points per second. This led to a total scan time for an Edison cylinder of several days. In 2007, a new generation of confocal probes were introduced which measure 180 points simultaneously. These devices promised to reduce the total scan time to of order 1 hour or less. In 2007 a 3D project was proposed and funded by the Institute of Museum and Library Services. A multi-point scanner has now been implemented at Berkeley and is under study. Future commercial development of these devices is aimed at 1000 simultaneous point measurements, fueled by applications to dental inspection.

For IRENE, the key imaging technology is line scanning. Rather than digitally photograph an area, one line of 4096 pixels is acquired along a radial segment of the disc, at a set of angular positions. As the disc rotates, an encoder triggers the camera on a fixed angular interval. This interval determines the digital time sampling of the audio waveform. As configured, IRENE can acquire 80,000, 160,000, or 240,000 lines per revolution. For a 78, 45, or 33 1/3 rpm disc, 80,000 lines correspond to 104 KHz, 60 KHz, or 44,444 KHz sampling respectively. The higher lines per revolution options correspond to factors of 2 or 3 respectively. Line scanning unwinds the disc into a rectangular region with periodic associations along the top and bottom edges as shown in Figure 9 (ie: the bottom of the n^{th} track joins the top of the $n+1^{\text{th}}$ track going left to right in the image).

The optics used in IRENE consists of a high quality 5X microscope objective coupled to a tube containing an aperture (to control contrast) and a 50/50 beam splitter. In order to achieve high spatial resolution the optics has a large numerical aperture and a narrow depth of field. The spatial resolution achieved approaches the physical limit at a fraction of a micron and is well matched to the minimum scale of the recorded information. The light source is a 300 Watt Xenon arc with a UV filter. The IRENE field of view is 2 mm radially and covers about 11 tracks. Therefore 25-30 passes are required to cover a 10 inch disc including some overlap at the edges of each image.

Digital sampling theorems require a measurement at twice the highest recorded tone. In addition, aliasing of higher frequency noise must be avoided. It is observed that if the recording is sampled at rather high frequencies, relative to the sonic content, negligible noise power remains to be aliased.

The particular imaging scheme used in the 3D scanner is called extended field color coded confocal microscopy [9], and is described in Figure 10. In this scheme, a polychromatic pin-hole source is used and the optics has an exaggerated chromatic aberration. Now each wavelength comes into focus at a different depth and the reflected in-focus signal is analyzed by a spectrometer. Spectra are processed in real-time within the instrument. Depth of field can vary from 20 μm to millimeters with resolutions of between 10 nanometers and 1 micron respectively. A single point probe, while slow, has a well optimized trade-off between depth of field, spot size, and resolution. The multipoint probes, while much faster, are at present more constrained since geometry dictates also the relationship between spot size and spacing. Understanding and serving this optimization is an aspect of current studies and future concepts for multipoint probes. Data processing within the instrument also becomes an issue but is likely to be less important with improved sensors and programmable hardware.

Like IRENE, the 3D scanner covers the surface with a grid points. Spacing along the time directions sets the digital sampling rate. Spacing across the groove defines the possible profile averaging.

Motion in both systems is controlled for three axes; rotation and translation of the media and perpendicular displacement of the sensors. All motion control is integrated through a dedicated real-time control CPU which communicates with the host via Ethernet. The motion processor includes a servo control loop which is programmed to execute an auto-focus procedure. A laser displacement sensor is mounted near the region under view. As the media rotates, the displacement sensor registers the shape warpage and relays that to the servo loop which moves the sensor in order to maintain a constant focus. Given the narrow depth of field, particularly for IRENE, the camera position is controlled to better than 10 microns.

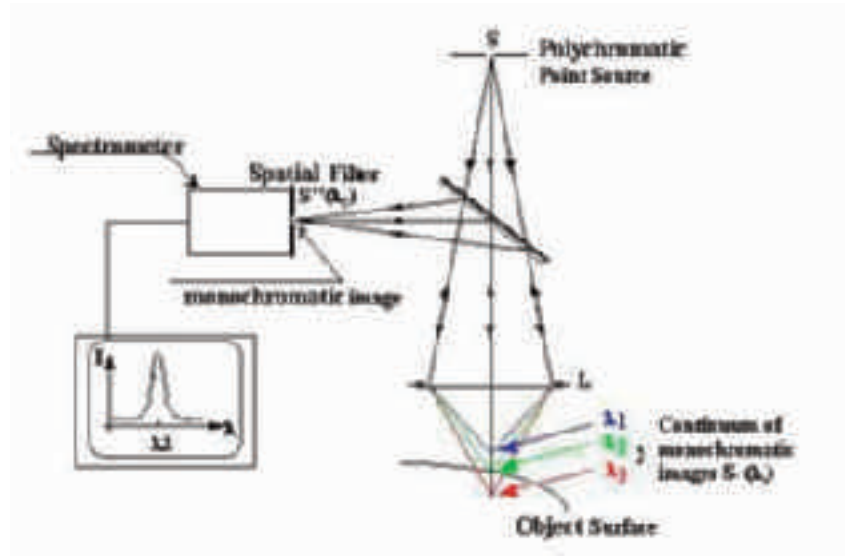


Figure 9: Basic concept of color-coded confocal microscopy. The lens at position L has a large chromatic aberration causing the three wavelengths shown to focus at different depths. Figure is courtesy of STIL SA, used by permission.

All hardware is mounted on an optical bench with air-cushioned suspension. The systems are susceptible to vibrations which, if present, are seen in the data as spurious signals.

The control and data collection software is written in LabView. The user entry is a simple set of choices. Data quality can be assured by inspection of sample images at the front panel. Data directories can be defined also from the front panel. A number of secondary tabs exist for setting specific parameters other than defaults. Basic operational settings are visible as well. A set of auxiliary programs exist to optimize the focus and illumination settings. These can be called by the main control program or executed stand-alone as well.

The data analysis software packages are written in Microsoft C#. A typical GUI (IRENE) is shown in Figure 10. The GUI allows for the determination of many analysis and processing parameters. The code can run continuously and monitor, via the database, the appearance of new images files which will be immediately processed. The key steps in the analysis are: tracking, to determine the groove trajectory; feature detection, to locate the edges (IRENE) or the groove walls (3D); clean-up, to isolate bad regions and defects; extraction of the audio waveform; filtering, re-sampling, differentiation, smoothing, and scaling to determine the stylus response and set the bandwidth and amplitude; and finally conversion to an uncompressed digital audio format.

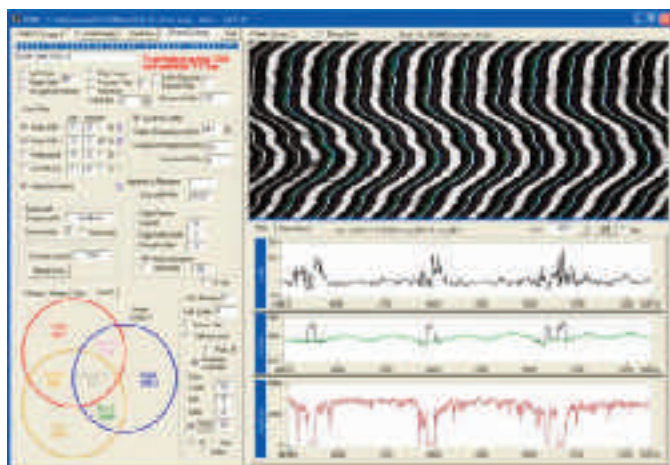


Figure 10: Graphical user interface from the IRENE analysis software. The image at upper right is a measurement summary. Data covers one imaging revolution of the disc and about 11 audio revolutions. Disc is unwound into this rectangular format by line scanner. Plots detail data quality and effects of analysis parameters which are set by the controls at left.

Elements of the system performance are still under evaluation and analysis. A full journal publication is foreseen in the near future. As an example of IRENE performance a set of comparisons files have been posted on the project website [10]. As a general statement, IRENE performs with comparable quality to stylus playback on lacquer discs. On shellac discs, due to the grainy character of the surface, IRENE typically has higher broadband noise than a high quality stylus playback. IRENE analysis algorithms are effective at reducing clicks, pops, and distortion due to damage and wear in the groove. This is achieved primarily with image analysis and processing rather than by manipulating the audio waveform, as is standard practice. Performance in this regard often surpasses stylus playback. IRENE has also been demonstrated on broken, and therefore

otherwise unplayable, discs. Some examples of 3D performance are also on the project website [11]. On cylinders, performance superior to stylus playback has been demonstrated. On discs the 3D effort is still in development.

Current activity in the IRENE project centers on preparation for a "production" like evaluation at the new Library of Congress National Audio Visual Conservation Center in Culpeper, Virginia.

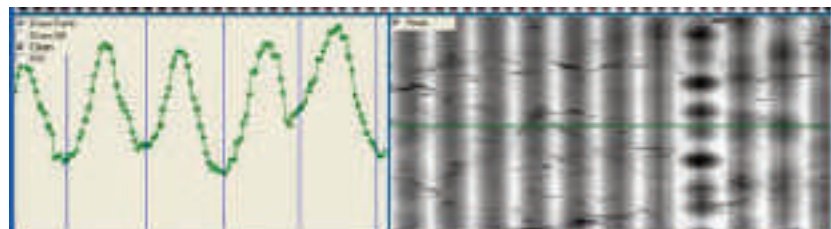


Figure 11: Example of condition assessment. A small region of the groove profile of a wax fieldwork cylinder is shown. In this case the groove profile is rather typical. Top right show a grayscale image which maps intensity to surface depth measured by the confocal scanner. The vertical tracks are segments of the groove. This sample contains a large number of impressions due to fibers which may have been in contact with the cylinder in storage. These impressions could degrade the audio information stored in the surface.

Application to Condition Assessment

In addition to audio extraction, the scanning technology studied here can provide a detailed assessment of the condition of mechanical sound carriers. Considering the findings of the Heritage Health Index [12] which report a large fraction of sound recordings are in unknown condition, this may be a valuable capability as well. By collecting high resolution digital images of the carriers, analyses may be executed to identify and quantify features and defects in the sample. An example of this is shown in Figure 11 which details features measured from a variety of recorded sound carriers using the confocal optical scanning technology.

Education, Outreach, and Collaboration

The research efforts discussed here have their origin in the physical sciences and engineering and operate within the academic and publicly funded laboratory community. The physical sciences, in particular the "big science" disciplines such as high energy physics have a long history of international collaboration. The basic work on confocal scanning was performed as a collaboration between the Berkeley and Southampton (UK) groups. The Berkeley and Fribourg groups have collaborated actively since 2005 with four Swiss students writing theses on 3D scanning studies [13,14]. Overall about a dozen undergraduates in physics, computer science, and electrical engineering have participated in various aspects of these projects. Typically, these students would have been unaware of the connections between preservation science and the other physical sciences and engineering. Conversely, these efforts demonstrate the relevance of quantitative science to other fields of humanistic research and culture.

The project has also had many opportunities for public outreach. It has been featured in numerous newspaper and magazine reports, and radio and television pieces internationally [15]. The story of the Scott phonautograms received front page coverage in the major newspapers in March of 2008 [16].

In the early years of recorded sound, academic ethnographers appreciated and applied the new technology to the task of documenting vanishing languages and cultures. In Berkeley a pilot study has been performed to evaluate confocal scanning on Native American fieldwork cylinders in the collection of the Phoebe Hearst Museum of Anthropology. A future goal could be to optically digitize that entire 3000 cylinder collection. Such materials can be of great use in language preservation and revitalization efforts. The potential impact may also draw individuals into science and engineering from traditionally underrepresented groups.

Acknowledgments: Key participants in this research are Earl Cornell, Robert Nordmeyer, Carl Haber, and Vitaliy Fadeyev from LBNL, Peter Alyea, Dianne van der Reyden, and Eric Hansen, from the Library of Congress, David Giovannoni and Patrick Feaster from FirstSounds, and Mitch Golden.

LBNL is a U.S. Department of Energy national laboratory located in Berkeley, California. It conducts unclassified scientific research and is managed by the University of California. The Berkeley Lab research on recorded sound preservation and access has been supported by the Library of Congress, the National Endowment for the Humanities, the Institute of Museum and Library Services, The National Archives and Records Administration, the University of California, the Dept. of Energy, the Andrew P. Mellon Foundation, and the John webmaster Guggenheim Memorial Foundation.

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South East Asia Pacific: Focus on SEAPAVAA

A reflection by Ray Edmondson

Director of Archive Associates Pty Ltd

In May 1995, as the ASEAN-Australia *Training Seminar on Audiovisual Archive Management* reached its closing stages, participants were unanimous that the time had come to establish a regional professional association, and they appointed a steering committee to take the idea forward. A few months later, the five of us – Tuenjai Sinthuvnik, Teoh Yan Sing, Belina Capul, Jean Wein and me – met in Bangkok to draft a constitution and map out a preliminary path for the proposed organisation. It assumed the name SEAPAVAA (South East Asia Pacific Audio Visual Archive Association) and formally came into being, under Philippine law, at its inaugural conference in Manila in February 1996. There were 20 founding members.

At the time, I don't think any of us had a very sophisticated idea of what it might develop into, much less where the money would come from to keep it going. We were just convinced that it was needed – an organisation that could cover the entire audiovisual spectrum and focus exclusively on the needs of the region. In other words, to do a task that no existing international body could do. The constitution we adopted has required only minor amendment over the last decade, and has turned out to serve us well.

Were we right to set up SEAPAVAA? Yes. Why? The most important reason is probably the least obvious one. In 1995 our region was more or less a black hole on the international landscape. The audiovisual archiving world knew little about our institutions and our audiovisual heritage, and we weren't part of the agenda. We were below the radar.

That's all changed now. Even if SEAPAVAA had done nothing else, it made our region visible. We now sit, on equal terms, with the other associations (FIAF, FIAT, IASA, AMIA, ARSC, ICA and IFLA) on the international peak body, the CCAAA (Coordinating Council of Audiovisual Archive Associations). We have gained formal recognition by UNESCO, which has funded our training program and supported our conferences. I am convinced that by making South East Asia/Pacific visible we have helped to change the global agenda too, as the CCAAA associations, in turn, are now increasingly reaching out beyond the traditional Euro-American axis.

I don't want to go into a recital of milestones. But we all have our personal recollections of "SEAPAVAA moments" that were important to us, so let me share a few of mine:

- The wonderful day in May 1995 when everyone arrived in Canberra for that first training seminar, and our 'virtual' community became a physical reality.

- The establishment of the first "distance learning" postgraduate course in audiovisual archiving at the University of New South Wales – and the ASEAN support scheme which enabled so many in the region to participate.
- Tuenjai teaching me how to do the formal Thai 'wai' greeting before I went on television during the Bangkok conference.
- SEAPAVAA's hosting, also in Bangkok, of the UNESCO Working Group which devised the current "Memory of the World" Guidelines in February 2001.
- The December 1998 premiere of the restored version of *Giliw Ko* at the Cultural Centre of the Philippines, which made an unforgettable impact on a VIP audience.
- The lean year, 2004, when – like other associations in the region - we had to delay, then finally cancel, our annual conference because of SARS.
- The energy, enthusiasm and quality of workshop participants and the fun of sharing with them – most recently, this year, in Hanoi.
- Ricky Orellana's cartoons which grace every newsletter and make SEAPAVAA unique. (We're the association with the sense of humour!)

There is much in the last ten years to be proud of. But as SEAPAVAA now enters its adolescence it can expect to suffer all the traumas of growing up. Many of our member archives have developed in quite exciting ways – but the audiovisual world has moved on too, into the new era of digitization and rapidly expanding production. How are we going to keep pace? How are we going to change government agendas so our budgets grow and our archival institutions are secure? How are we going to raise the audiovisual heritage to the same status as the older media? How are we going to deal with increasingly restrictive intellectual property regimes?

We face our own corporate challenges. There's the need to accelerate membership growth; to increase our involvement in sound as well as image archiving; to be more relevant to individuals as well as institutions; to attract sponsorship and endowments. I think we have some internal reforming of our own to do if we are to achieve these things.

We also need to address generational change in leadership. I was privileged to be the founding president, elected when I was Deputy Director of the National Film and Sound Archive of Australia. Now I'm a retired public servant and a traveling consultant, and at the age of 63 you start to face up to the reality that you won't be around for ever! I've learned that the most crucial test of leadership is to make yourself unnecessary (think about it!).

So to what do we now set our hands in SEAPAVAA's teenage years? Who will take the leadership roles? As such international associations goes, SEAPAVAA is relatively small and financially frugal – even if it is now more than twice the size it was at the beginning. Its leadership pool is correspondingly small. If it is to continue punching above its weight the pool has to grow. At age 10, we're too old to fall back on the excuses of childhood – on the other hand, we're much too young to rest on our laurels and fall into the complacency of middle age. Educators tell us that the teenage years are the best years of your life. And that's where we stand - on the threshold.

What a challenge, and what a prospect, is before us! Can we imagine, by 2016, an effective national audiovisual archive in every country in the region? Can we envisage governments giving the audiovisual heritage a much higher priority than they do now?

Can we imagine a new generation of fully trained audiovisual archivists raising public awareness and taking the work to new professional heights? Can we imagine an egalitarian world where the global memory is not *just* that of the hegemonic cultures?

Imagining is the first step towards achievement. Welcome to SEAPAVAA's second decade!

The reflections above were written for the *AV Archives Bulletin*, the SEAPAVAA newsletter, which published a special issue in October 2006 to reflect on SEAPAVAA's first ten years. It was aimed at an "in group" – SEAPAVAA members – so it is more than usually personal. But perhaps it's best to leave it that way – unvarnished. It's been said of SEAPAVAA that it is not so much an association as a family. That's a better word to describe the relationships that operate within its network.

Since these reflections were published, there have been two further annual conferences – Phnom Penh in 2007, and Manila in 2008. The 2009 conference will be hosted by the National

Archives of Indonesia – in May, and in either Jakarta or Bali (at the time of writing final details have yet to be fixed.)

The generational change I hoped for has happened: in 2008 a largely new and younger Executive Council was elected, and I stepped down at the end of my term as Immediate Past President – having hopefully made myself entirely unnecessary! Of course, like other past Council members I remain involved on a personal basis, and available to undertake projects which might be assigned to me. The SEAPAVAA community is too warm and welcoming, too important and too much fun to step away from it.

The growth of SEAPAVAA has been accompanied by gradual changes in the other CCAAA member associations, which have been evolving from their past Euro-America-centricity to embrace an increasing number of members from across Asia. It's a healthy development which suggests that the surviving audiovisual memory of the 21st century will be more even-handed and representative of all the world's cultures than that of the 20th century.

That is not to say that all the problems in South-East Asia/Pacific have been solved. Far from it. The arrival of digital technology offers many benefits, but it also adds to the complexity and cost of the archiving task. The need for advocacy and training has never been greater. And as the world moves into what appears to be a prolonged economic downturn, resources will be more stretched than ever – especially in developing countries. The temptation to regard archiving as an optional extra, rather than as an investment in nation building, will increase.

I am confident the SEAPAVAA family will continue to respond with imagination to those challenges. And I hope IFLA members will be cheering them on!

Website: www.seapavaa.org

The UNESCO Jikji Prize and the José Maceda Collection

A cooperation between the Vienna Phonogrammarchiv and the University of the Philippines

by **Ramon P. Santos**

Center for Ethnomusicology, University of the Philippines

Dietrich Schüller

Phonogrammarchiv, Austrian Academy of Sciences

The UNESCO/Jikji Memory of World Prize, the first prize in the field of documentary heritage, was established by UNESCO in April 2004 to commemorate the inscription of Jikji, the oldest surviving book made with moveable metal characters, on the Memory of World Register.

The Prize, consisting of an award of US\$30,000, along with a certificate, is given every two years to individuals or institutions that have made a significant contribution to the preservation and accessibility of the documentary heritage.

The Phonogrammarchiv of the Austrian Academy of Sciences is the UNESCO Jikji Prize Winner 2007. In the application for the prize, it has stated that the prize money, donated by the City of Chengjiu, Korea, will be used to contribute to safeguarding an audiovisual collection, more preferably from a country with developing economy.

José Maceda (1917-2004), composer and ethnomusicologist, National Artists of the Philippines, was the pioneer of ethnomusicological research in the Philippines and South East Asia. From the 1950's onward, he has recorded systematically traditional music in the region, thereby building up a collection of recorded sound documents, comprising around 2.000 hours of recordings on reel to reel tapes and cassettes. This collection is the main holding of the University of the Philippines (UP) Center for Ethnomusicology, which José Maceda himself founded in 1997. Because of its universal significance, the collection was inscribed in the International Register of the Memory of the World Program in 2007.

Upon its inscription in the UNESCO Memory of the World Heritage in the same year, the JMC was able to generate an initial allocation from the Philippine government to start implementation of its long-standing plan to rehabilitate and digitize the sound archive, which has reached the end of its analogue life-span and which is in an endangered state of deterioration. In view of the international importance of the collection and its inherent instability, mainly due to the prevailing adverse climatic conditions, the Phonogrammarchiv has decided to use the Jikji Prize money to contribute to the safeguarding of this collection. Because the prize money of 30.000 USD would not cover the entire costs of safeguarding the collection, a constitutive factor for this decision was the fact that UP was able to



1. Trainees receive certificates from Dietrich Schüller. In the centre background the original Jikji-Prize document (blurred, unfortunately).

raise additional funds, sufficient to secure the entire digitization process, including the commitment from UP to take care, after termination of digitization process, of the further maintenance of the archival and access files of the collection.

As partial counterpart, the donation of the Jikji Prize came at an opportune time in supplementing the local resources, especially to defray the cost of procuring custom-built analogue machines and accessories, as well as the training of professional sound engineers in the Austrian Academy of Science in Vienna and the project supervision by Dietrich Schüller.

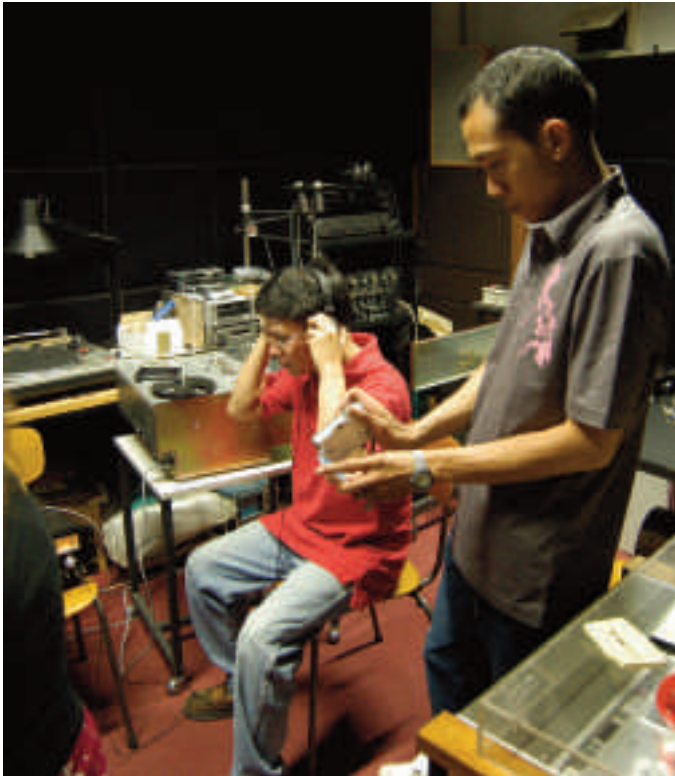
The initial activity that launched the digitization project of the sound archive was held at the unveiling of the permanent marker of the UNESCO Memory of the World Register at the University of the Philippines College of Music which housed the UP Center for Ethnomusicology. At the occasion, Dietrich Schüller gave a lecture on the latest information and techniques in audio-visual archiving, attended by IASA members, the local UNESCO officials, officers of the Southeast Asia-Pacific Audio-Visual Archivists Association (SEAPAVAA), and local practitioners. It was this time that the donation of the Jikji Prize was officially announced during the re-launching of the *Musika Journal*, one of the major activities of the event.

Since its actual awarding from the UNESCO Office in Paris to the Austrian Academy of Science, the Jikji Prize has enabled the Academy to train Filipino sound engineers – David Guadalupe and Mark Laccay to travel to Vienna and undergo a week-long

intensive training on preservation and digitization of audio collections under Nadja Wallaszkovits, chief audio engineer of the Phonogrammarchiv. After the training, two Studer A 807 analogue tape recorders were acquired and modified to suit the playback requirements of the variety of open reel tape recordings in the sound archive of the UP Center for Ethnomusicology. The machines, together with various accessories, have been shipped and received in good condition at the Center on 3rd week of September.

On 12-15 October, the Center organized the *Laón-Laón*: Meeting of Experts in Music Research Centers in Asia, attended by representatives from Cambodia, Indonesia, Japan, Korea, Singapore, Taiwan, Thailand, Vietnam, and various archive and

library institutions in the Philippines. The main objective of the Forum was to create a regional networking and embark on collaborative field researches and other preservation activities on Asian musical traditions among the major stakeholders, sharing capabilities on the different technologies that each center has developed to address their individual research objectives. After the workshop conducted by Dietrich Schüller and the Digitization Team, there was a consensus that the José Maceda Collection and the UP Center for Ethnomusicology, appear to be one major center of sound archiving in the entire region, having started in the early 1950's and has accumulated an extensive and the only collection of recorded music from some 80 language groups from the Philippines and Southeast Asia. The *Laón-Laón* Forum also featured an exhibit of vintage tape recording machines which had been used by Jose Maceda and his team of researchers in storing the vast collection of musical data. Because of its recognized value to humanity, the use of modern technology in the preservation of the Jose Maceda collection comes into central focus, of which the 2007 Jikji Prize plays a significant role in its realization.



2. David Guadalupe and Mark Laccay, trainees from the University of the Philippines (UP), during their training in Vienna.



3. David Guadalupe and Mark Laccay, trainees from the University of the Philippines (UP), with Nadja Wallaszkovits, Chief Audio Engineer.



4. Workshop during Laón Laón 2008 at UP, Dodi is leader of the UP digitization team.



5. Workshop participants: at the UP event.

Challenges of Preserving and Conserving Audiovisual Collections in sub-Saharan Africa

A Case of the East and Southern Africa Regional Branch of the International Council on Archives (ESARBICA)

by Dr. Ruth Abankwah

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The paper gives a brief historical background of the East and Southern Africa Regional Branch of the International Council on Archives (ESARBICA). It examines the contextual nature of the problems facing ESARBICA countries in their efforts to preserve and conserve audiovisual (AV) materials. Challenges include inability to apply the records cycle on AV materials, structural placement of national archives, types of archival buildings, outdated legislation and/or policies, environmental control and climatic conditions, inadequate conditions in storage areas, security and disaster management, intellectual control standards, acquisition of AV materials, appraisal of AV materials, lack of resources and skills, poor handling and use, lack of inadequate equipment to monitor environmental conditions, poor infrastructure, emerging technologies, and inadequate training opportunities in AV archiving. The paper concludes that failure to address the above factors makes it difficult for archival institutions to preserve AV materials.

1. Introduction

While it is a well known fact that archives, manuscript collections and libraries face major challenges in preserving and conserving materials, this paper will only focus on challenges archival institutions in ESARBICA are faced with. The paper develops the following sections: a brief historical background of ESARBICA, the contextual nature of the problems, a discussion of some of the challenges which include outdated legislation and/or policies, limited financial resources, improper archival buildings, environmental control and monitoring, climatic conditions, poor handling and use, level of education and training, differing standards or no standards, management of electronic records, and political environment. The paper recommends ways of overcoming or minimising the challenges.

1.1 Background

A historical background to ESARBICA and the development of AV units is given below.

1.1.1 Brief historical background of ESARBICA

Formed in 1969 to promote an exchange of ideas through regular professional meetings, seminars, workshops and conferences regionally and internationally, ESARBICA's membership stands at 14 countries that include Angola, Botswana, Kenya, Lesotho, Namibia, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Zanzibar, Zambia, Seychelles and Zimbabwe (ESARBICA). Keakopa (a) noted that since its incep-

tion, ESARBICA faces many challenges which emanate from pre-independence period. The organization is concerned with the management and preservation of records in all formats. It is also concerned with provision of relevant training, issues of conservation and preservation of archival materials, budgetary problems and a myriad of other issues such as electronic records management.

1.1.2 Development of AV archives in ESARBICA

AV archival services developed at a slow pace in the ESARBICA region. Matangira (a) stated that most of the archival institutions in the region were "still struggling to develop their audiovisual collections" (44). She further stated that although the National Archives of Zimbabwe (NAZ) were established in 1935, the audiovisual unit (AVU) was only established in 1988. The National Archives of Malawi had a large collection of AV materials which included films, videos, audiotape cassettes, vinyl, CDs and reel-to-reel tapes. The Zanzibar National Archives collaborated with the Department of Broadcasting and Television to open a Sound Archives unit in the Main Library of Radio Zanzibar in 1989 (Matangira (a)).

The National Archives of Zambia were founded in 1947 as a depot of the National Archives of Zimbabwe (then Southern Rhodesia). This led to the opening of a new national archive in Lusaka in 1950. Zambia's National Archives was said to have about films, microfilms, microfiche, videos and audiotapes (Matangira (a)). The National Archives of Botswana (BNARS) stored its AV collections in the Archives Administration division. Although there is no special unit for AV collections, BNARS has an arrangement with the Ministry of Information and Broadcasting where Radio Botswana and Botswana Television Services ensure that programme producers deposit copies in the BNARS (Abankwah, Piet). In Tanzania, the responsibility of preserving AV materials was relegated to the Audiovisual Institute of Tanzania, known as Tanzania Television (TVT) while in Swaziland, the national archives had a photography section with a collection of photographs of national events dating from the pre-independence era. The national archives instituted an oral history project, which preserved oral testimonies of Swaziland history (including pre-colonial history). Nonetheless, the National Archives of Swaziland also relegated the preservation of AV materials to Swaziland Television Services (Abankwah).

1.2 Context

Various authors including Chida, Mazikana (b), Mnjama (a), Ngulube (a), and Olivier depicted a poor landscape of archival

institutions in ESARBICA. Ngulube (a) observed that “materials in most archival institutions in Africa are steadily deteriorating and some have already deteriorated beyond repair...” (125). The preservation of archival materials in South Africa was declared as a crisis (Olivier, National Archives of South Africa).

The management and preservation of AV materials was identified as the greatest challenge to the archival profession in the twenty-first century (Schüller). Previous studies revealed that this problem is prominent in ESARBICA region (Matangira (a) Mwangwera, Ngulube (a). The magnitude of the problem was succinctly captured by Mwangwera, who lamented that the quality of sound and picture archives in the Malawi National Archives was deteriorating at a fast rate. Thurston opined that the deterioration of archival materials in Africa was getting worse despite the ‘new crop of records’ which have dynamic solutions. This paper will focus on the major challenges to archival institutions in ESARBICA.

2. Challenges

2.1 The extent to which the life-cycle model is applied to the management of AV materials

The application of the records cycle is crucial to the effective application of archival policies. The fragile nature of AV materials necessitates the application of the records life-cycle. National archives in ESARBICA do not effectively apply the records management cycle to their collections (Abankwah, Abbott, Cox, Guercio, Harvey, Ngulube and Tafor, Paul). Abankwah argued that failure to manage AV materials through their life-cycle affects their longevity and value to the users. Weak legislation contributes to failure to apply the records cycle to archival collections.

2.2 The impact of Archival legislation on the structural placement of national archives

Archival legislation legitimizes the operations of national archives (Kenosi, Mnjama a). “The placing of the national archives within the government bureaucracy has been a critical question to archivists and records managers because it correlates to their power and influence” (Kenosi 121). Akotia argued that “an archives service involved in a whole range of records management activities must be placed under an office which exercises a degree of inter-ministerial or supra-ministerial authority” (111). The author noted that the decline of the National Archives of Ghana was based on a faulty legislation. Akotia stated that the Public Archives Ordinance was rigid in the way it defined archival functions.

Mnjama (a) and Mazikana (a) revealed great variations between the placements of national archives within government ministries in ESARBICA. Mnjama (a) reported that the placement of national archives was varied, but the majority of the national archives fell under the Ministries of Education, Sports, Art and Culture, as well as the Civil Service Department. However, there were extreme cases, such as the National Archives of Swaziland, which fell under the Ministry of Tourism, Communication and Environment, while in Lesotho “the national archives are a small component of the Department of Culture, which fall under the Ministry of Tourism, Sports and Culture” (459).

In the case of Botswana, the placement of the Botswana National Archives and Records Services (BNARS) under the Ministry of Labour and Home Affairs (regarded as a Cultural Ministry in Botswana), gave BNARS “the much needed power and influence” (Kenosi 121). BNARS currently, falls under the Ministry of Youth, Sport and Culture. Since placement of archival institutions affects their operations, the section that follows examines financial constraints that befall most archival institutions in the region.

2.3 Limited Financial resources

Harrison (a) observed that “the budget allocations for national archives do not compare favourably with other government ministries and departments (147). For instance, the budget for the National Archives of Malawi was only US\$ 4 000 per annum compared to over US\$ 3 million for South Africa. Ngulube (b) revealed that even among archives, “resources allocated for archival programmes showed a great disparity and varied from province to province” (Ngulube (b) 244). Abankwah discovered that national archives in ESARBICA allocated a very small proportion of their budgets on the preservation of AV materials (204).

2.4. Archival buildings

Preservation is considered to be “a basic and general guideline for architects and archivists in charge of planning an archive building” (Buchmann (5). Mazikana stated that many archival buildings in Africa were inadequate. On the other hand, Mwangwera reported that the National Archives of Malawi had not had its own purpose-built building since its inception in 1947. Consequently, the National Archives of Malawi experienced harsh conditions in the preservation of audiovisual (AV) materials, due to a lack of suitable accommodation. Ngulube (b) conducted a study of public records and archives in South Africa. Abankwah discovered that four out of nine archival buildings were multipurpose. This therefore means that archival materials are kept under inadequate environmental conditions in most of the national archives in the region. Ngulube (c) concluded that poorly designed structures in ESARBICA national archives contributed to the disintegration of archival collections in ESARBICA.

2.5 Environmental and climatic conditions

It should be noted that sub-Saharan Africa including ESARBICA is a tropical region. The region is characterised by high temperatures, hot winds, and high relative humidity (Motsi). Most materials such as AV materials are vulnerable to climatic conditions (Abankwah, Bereijo). Harsh climatic conditions and poor environmental control damage AV materials. Causes of damage include dust, water, light, heat, mould, insect infestation, and the vinegar syndrome which results from wear and tear of films magnetic tapes. The situation is exacerbated by financial constraints, making it difficult for archival institutions to maintain air conditioners (Chida, Setshwane). Poor environmental conditions cause other problems such as pests that feed on archival materials. This problem is exacerbated by lack of equipment for maintaining the required temperatures and humidity aggravates this problem.

2.6 Equipment used to protect AV materials

Maintaining temperature and humidity levels requires special equipment. Swartzburg realized a need for air-conditioning equipment, humidifiers and filtering systems, to inhibit atmos-

pheric damage. Previous studies in ESARBICA, such as that of Mnjama (c) and Matangira discovered that most of the national archives were under equipped. She noted that archival institutions in the region did not have adequate equipment. This results in a disintegration of archival collections. Ngulube (c) opined that "the energy and resources to keep an air-conditioning system running are prohibitive for most countries in sub-Saharan Africa" (162). Abankwah visited four national archives and four media organizations in the region and she discovered that some of them were not equipped with the required equipment to maintain constant temperature and humidity where AV materials were stored.

2.7 Poor handling and use

Abuse and mishandling of archival resources is of human origin (Qobo 101, Weber 240). Roper and Millar (1999) identified various ways in which people can damage archival materials. These include rough handling of materials, poor photocopying practices, poor retrieval and filing practices, inappropriate storage, faulty or inappropriate equipment, excessive use of materials, spilling food or drink on materials, handling materials with dirty hands, poor cleaning or housekeeping, deliberate acts of vandalism, theft of materials and inadequate security (29). Chida stated that staff and researchers at the National Archives of Zimbabwe were potential threats to the archives (31). Poor handling and use is associated with the level of skills of archivists and records managers.

Matangira (b) observed that the majority of the audiovisual materials in archival institutions in ESARBICA "were kept under very inadequate conditions...most institutions lack the resources and skills required for managing audiovisual materials" (46). The author noticed dangers to AV materials that included dust, stained casings, scratch marks and fingerprints. Ngulube (b) concluded that "users and staff need to be trained and given guidelines on the handling of archival materials" (296).

2.8 Level of education and training

Matangira (a) stressed that most archival institutions in the region lacked "the resources and skills required for managing audiovisual materials" (46). For instance, Botswana had "no specialized training for librarians involved in the management of sound recordings". This could mean that the librarians, who are responsible for managing AV materials in Botswana, and elsewhere in the region, are not well-equipped to manage AV materials. Nonetheless, Ngulube reported that archival repositories in South Africa trained users and staff in the handling of records in four (57.14%) repositories. Motsi concluded that lack of training was a stumbling block to the preservation of the African heritage. Ngulube argued that lack of professionally trained staff, coupled with failure to retain the few professional staff, was a major draw-back for the National Archives of Zimbabwe. Inadequate skills in the region imply that archivists are bound to have problems of describing, arranging and appraising AV materials, particularly those in electronic format.

2.9 Management of electronic records

Mutiti's study of the challenges of managing electronic records in ESARBICA revealed the following:

- Some archivists were not fully acquainted with their role in national electronic management programmes. "Issues relating to long term preservation of the electronic heritage are often considered inconsequential" (59).

- *Inadequate technical expertise* - Archivists are intimidated by lack of technical expertise yet "technical expertise is required to develop standards and methodologies for record processing and retention, to facilitate information exchange within public institutions and to select suitable storage and preservation media" (60).
- *Ethical issues* – Archivists are faced with ethical issues such as access and confidentiality. While emerging information laws such as Freedom of Information (FOI), National Intelligence Laws, and Security laws may either compel or prohibit access to AV archival materials, archivists have a responsibility to preserve and conserve the cultural heritage (Mutiti).

Keakopa (b) noted that while national archives in Botswana and Namibia did not have policies and procedures to manage electronic records, "South Africa was advanced in the area of policy development" (70). Wato reported other challenges of managing electronic records in the region. These include security of electronic records, systems compatibility for data exchange, failure to attract specialised computer developers in archive results in failure to maintain proper recordkeeping practices for electronic records. The author further noted that authenticity and integrity were compromised in the process of converting archival materials from their original format into digital formats for preservation and accessibility. Wato concluded that electronic systems in archival institutions in ESARBICA fail due to lack of commitment from senior staff. The latter pointed to the "lack basic understanding of computer operations" (133). This problem is exacerbated by the fact that computer experts lack basic knowledge of archival practices. This therefore means that most archival institutions do not have appropriate systems to manage electronic records.

3. Conclusion

The foregoing discussion reveals that archival institutions in the region are still faced with many challenges. Emerging technology aggravates the challenges. This paper makes the following recommendations.

4. Recommendations

- 1) Policy makers should review existing archival legislation to reflect new technologies.
- 2) Directors of national archives should report to a powerful ministry or report directly to parliament. Such a position will enable national archives to fulfil their mandate.
- 3) Senior management should be equipped with skills required to enable them to determine how information is managed in a computerised environment.
- 4) Efforts should be made to train and recruit records and archives staff.
- 5) There is a need for the international community to rescue the dissipating AV materials in the region. This could be done through training, attaching experts to archival institutions as well as financial assistance.

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African Audio-Visual Archives: Bleak or Bright Future.

A Case Study of the Situation at the National Archives of Zimbabwe

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Introduction

“In this great future you can’t forget your past”¹
Bob Marley – “No Woman No Cry”

This great quote from Bob Marley’s song “No Woman No Cry” edifies that an individual’s history is very important because it is that same history that defines ones identity, culture, norms, values and therefore deserves to be preserved for the future generation to acknowledge, where they came from and what they stand for. Audiovisual recordings are vital elements of our collective memory, determining our achievements over the years, documenting our past, present and determining our future. However, audiovisual recordings in the African continent are endangered because of various factors including but not limited to political and economic factors, legal statutes towards audiovisual materials, staffing, lack of training and funding, obsolescence of playback equipment, perception of society towards archives, climate issues, technological awareness and the preservation and access of recordings.

In Zimbabwe, the National Archives is the custodian of the audiovisual heritage. It was established through an Act of Parliament in 1935, now known as the National Archives Act of 1986. Their mission statement is:

“To acquire, preserve and provide public access to Zimbabwean documentation in whatever format, in an efficient and economic manner.”²

The Audiovisual Unit at the National Archives was created in 1989, prior to its creation the audiovisual materials were kept in the library section. However, due to an increase in film and sound materials being deposited at the Archives, there was a need to give more attention to this fragile collection. Through the Japanese Cultural Grant Aid, the Audiovisual Unit received an Inspection bench, Ultrasonic Cleaning Machine, Flatbed Viewer, 16mm and 35mm Telecine and two 35mm film projectors. The staff then received training in-house, when the equipment was installed, and also in 2002 Ray Edmondson served as a resource person at a meeting of heads of national archives in Southern and Eastern Africa, held in Harare, Zimbabwe, to review the situation of audiovisual archiving in the region. The event was organized by the Nederlands Filmmuseum and the knowledge gained assisted in preserving the audiovisual heritage. The equipment and training established the Audiovisual Unit, and through the years, the National Archives was fortunate

to send Archivists to International and Regional Conferences in Audiovisual Archiving organized by established associations like AMIA (Association of Moving Image Archivists), IASA (International Association of Sound and Audiovisual Archives), IFLA (International Federation of Library Associations), ESARBICA (Eastern and Southern Africa Regional Branch of the International Council of Archives), ICA (International Council of Archives) and ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property).

As I write this paper, I would like to acknowledge the importance of these organizations in the African continent, where funding is a huge problem. These organizations have assisted in the preservation of the audiovisual heritage through their training programs, journals, workshops, conferences and scholarship awards. I am one of the fortunate Audiovisual Archivists in my continent, having been awarded a scholarship by Sony Pictures and the Rockefeller Archive Center (RAC) in collaboration with AMIA, I was able to enroll into one of the most established programs in Film Preservation at the L. Jeffrey Selznick School of Film Preservation at the George Eastman House, International Museum of Photography and Film. This education has helped me to assist the National Archives through finding the best possible ways to preserve our collection even in the most difficult of times for the institution and the country.

The situation in Zimbabwe has changed since the Audiovisual Unit was formed, because then the country was politically and economically stable. Events that have occurred during the past ten years have changed this and have affected the National Archives in its daily business since it is governed and funded by the state. The future of the Archives is now determined by the outcome of the situation on the political arena. Preservation of audiovisual materials has been affected through the problems affecting the institution. However, our audiovisual heritage has to be preserved even with the problems that have bedeviled us. The National Archives still looks to overcome those problems through using cheap and convenient means to preserve the audiovisual heritage. This paper will examine the problems and solutions needed for the National Archives and other African Audiovisual Archives in the same predicament.

The Audiovisual Collection

The National Archives of Zimbabwe houses the audiovisual heritage of the nation. This collection comprises of 16mm Acetate and 35mm Acetate and Polyester film, Audio cas-

1. Bob Marley. “No Woman No Cry”, From *Song of Freedom Album*, Disk 3, Track No. 1, 1992.

2. National Archives of Zimbabwe Mission Statement.

ettes, Reel to reel tape, CDs, Video (Umatic and VHS), wire recordings and gramophone records. The bulk of the film collection was from CAFU (Central African Filming Unit) which was created in 1948 to produce and distribute motion pictures to audiences throughout Southern Rhodesia, Northern Rhodesia and Nyasaland. CAFU was state sponsored and made film for two audiences; films made for audiences of European ancestry; and films intended for natives. The collection of film for whites consisted of newsreels, travelogues, and documentaries about the history, economy, and society of the Central African Federation (modern Zambia, Zimbabwe and Malawi). Burns 2002 points that these films project an image of the federation as a vigorous outpost for western civilization. They were intended to popularize the lives of white Rhodesians and encourage immigration to the now-self governing body³.

Whilst films for white settlers were 35mm format with sound-track and relatively high production values, the films made for rural Africans were 16mm silent movies, most of them fictional stories intended to educate and influence their audiences. Apart from CAFU which ceased to exist in 1963, the Archives has films from Pathe, Rhodesian Information Services, ABC (American Broadcasting Corporation), ZBC, Zimbabwe Information Services and Ministry of Information Production Services. The video collection is mostly from the ZBH, individual producers and copies of films on 16mm and 35mm that are mostly requested by users. The audio collection was acquired from Gramma Records which deposited a huge collection, Zimbabwe Radio Services which is part of the Zimbabwe Broadcasting Holdings and some from individual donations. This audio collection defines the history of music in Zimbabwe.

Problems Affecting African Archives (With Special Reference to Zimbabwe)

1. Political and Economic Factors

The problems that affect the National Archives in trying to preserve the audiovisual heritage are inherent from the direct and indirect effects of the political and economic situation in Zimbabwe. One cannot look at the development of the archives and the preservation of the audiovisual heritage without looking at these two factors which are so intertwined and have a major impact on how government manages its departments like the National Archives. All the problems of funding, preservation, climate control, staffing, training and obsolescence of equipment emanate from the fact that the government has no funds and that their priorities are not directed towards the archives but to the humanitarian, political and economic crisis bedeviling the country at the moment.

DFID notes that Hyperinflation has reduced purchasing power. Real Gross Domestic Product has declined by over 35% in the last six years. The year on year inflation is now in excess of

231,000,000%⁴. Agricultural production has plummeted since 1999 and tobacco production for example has gone down by more than 70%⁵. Zimbabwe is mainly an agro-based nation depending on the agricultural products for foreign capital to keep the country running. There has been confirmation of almost total crop failure; with an incessant drought hitting Southern Africa from 1999 and this has adversely affected the economy. The cost of schooling has risen dramatically, posing serious challenges for low income families. The decline in inward investment and development assistance, economic sanctions from Europe and America, and lack of food aid at a time when the country has only reserves to feed half the population has impacted directly and indirectly on government ministries. What makes our economy and inflation unique is that our challenges are multi dimensional emanating from the sense that they have their roots in the differences that Zimbabwe has had with its former colonial master over the issue of land, which has had a domino effect on each and every sector and eventually putting the country in financial and political turmoil. Former Ambassador of the United States of America to Zimbabwe Christopher Dell once said:

"I know of no other example in the world of an economy that in times of peace has contracted so precipitously in the course of six years."⁶

The humanitarian, social and political crisis is of immense proportions. Most significantly in the past months lives have been lost through disease, starvation and acute economic decay. Our main hospitals of Parirenyatwa and Harare Main Hospital have now been effectively closed down in some wings because of the lack of medicines and staff. With these problems government reverts all its attention to the humanitarian crisis and the National Archives is left with less funds to just keep it running. The audiovisual heritage is therefore left to the Archivist to find ways of conserving the materials using the resources available.

2. Financial Issues

There is no institution that can function without funding whether direct or indirect. The National Archives is a public Archive and belongs to the government of Zimbabwe. It is therefore financed through the government budget for its daily functions. However, the current economic situation in Zimbabwe makes it a cumbersome task for the National Archives to function as it did ten years ago because the government has fewer funds and most funds are prioritized in the Agrarian reform, humanitarian crisis, food and fuel purchase.

Every function that the archive needs to operate needs financing in order to create efficiency in the whole system. Most of the problems that will be outlined like training of archivists, acquisition of audiovisual materials, playback equipment, repair and maintenance need financing. It is only through the funds from the government that the institution can function. However, the economic situation has had a negative impact on the National Archives, for example because of the inflationary environment the entrance fee pegged by the government for

3. Burns, James McDonald. "The Central African Filming Unit: Films for Africans, 1948-1963, In *Flickering Shadows; Cinema and Identity in Colonial Zimbabwe*, Centre for International Studies, Ohio University, U.S.A, 2002, p.61.

4. DFID Report on Zimbabwe. www.dfid.gov.uk

5. www.newzimbabwe.com

6. *New African*, 42nd Year, May 2008, No. 473, p10-21

users who access the National Archives to pay is so small than one can not even purchase bread with it. Instead of making the entrance fee, and copying fee for material at a reasonable rate, for the institution to use those funds to assist them in their core business, the inflationary environment has impacted heavily on the changes government makes to the fee.

3. Legislation

The UNESCO document on audiovisual legislation has pointed out that most problems associated with the operation of audiovisual archives arise from a lack of comprehensive legislation concerning the creation, operation and financing of those audiovisual archives, copyright and access to their collections (Kofler, 1997)⁷. There is currently no legislation for audio-visual archives in Zimbabwe. The current deposit legislation only covers paper material and does not apply to feature, non-feature films such as documentaries, animations, film scripts, posters and all other film related documents. The National Archives is governed directly by the National Archives of Zimbabwe Act, Chapter 25:06, and indirectly by the following Acts:

- Censorship and Entertainments Act – Chapter 10:04
- Copyright and Neighbouring Rights Act – Chapter 26:05
- Access to Information and Protection of Privacy Act – Chapter 10:27

These Acts indirectly touch on the issue of audiovisual materials in terms of their copyright and access. However, there is no legislation on audiovisual archives in Zimbabwe unlike South Africa which has a deposit legislation for its audiovisual material. The Legal Deposit Act (No 54 of 1997) specifically designates the National Film Video and Sound Archives of South Africa as a place of deposit for audiovisual material that has been published and made available in South Africa⁸. Currently the National Archives acquires audiovisual material from only government departments primarily the Ministry of Information Production Services Centre. With no Legal deposit Act, individual film and sound producers do not deposit their material to the Archives. The Archives has either to purchase audiovisual materials or get a donation. The National Archives has tried to acquire audiovisual materials from the National broadcaster Zimbabwe Broadcasting Holdings but there has been no progress on the issue. The Television Archives has no storage vaults, climate control and professionally trained staff in audiovisual archiving, which is why, as the custodians of the audiovisual heritage the National Archives wanted to assist in the preservation of their audiovisual material.

4. Preservation of Audiovisual Material

Edmondson 2004 defines preservation as: “Preservation is the totality of things necessary to ensure the permanent accessibility – forever – of an audiovisual document with the maximum integrity.”⁹

This includes conservation, restoration, reconstruction, copying and processing, and maintenance. In terms of conserving the audiovisual heritage the Archives has three storage vaults

which are all climate controlled but with no humidity control because the dehumidifiers are not working and need repair. The storage vaults are only for the film elements but we still need more vaults because we have film material that still needs climate control. The audio and video material is kept under room temperature and is affected by the heat, insects and dust causing sticky shed syndrome for most of the magnetic tape.



1. Inside one of our storage facilities, films stored on static shelving units.
© National Archives of Zimbabwe

The National Archives has never made any preservation copies for its film material because it is expensive for them and there are no facilities functioning in the country at the moment. Audio preservation can be done but the unit lacks funding to purchase the equipment needed to digitize the audio material and preserve it. Preservation is an important factor and determines the access of the audiovisual heritage since the two are so interdependent that access can be seen as part of preservation.

5. Access

Access is hindered by the fact that playback equipment in the Audiovisual Unit is not functioning. Without access of the audiovisual heritage to the users then preservation becomes an end to itself. Audiovisual material is mostly accessed by broadcasting corporations both domestic and foreign, journalists, students studying Media and Information courses and the public in general. The Audiovisual unit does not get as many visitors as the main Archives, because of the lack of knowledge people have of the material housed at the National institution. Currently, with the economic situation they are less people visiting the Archives and this has been made worse because the equipment used for access is not working, and has yet to be repaired.

In Zimbabwe there is more access to the National Museum and Monuments of Zimbabwe than the National Archives because of the location of these two institutions. Whilst the museum is located in the city centre the Archive is located outside the city. Its location is in the posh suburb close to the Presidential mansion. This location has hindered most people from visiting the institution because one has to find transportation to get to the Archives but the museum is just walking distance.

6. Staffing and Training

These two issues complement each other and will be discussed together. Currently the Audiovisual unit has two audiovisual archivists and one technician. The two Audiovisual Archivists have received training in-house, although one of them has attained professional training from the George Eastman House. However, due to the state of affairs in the country the unit has seen a number of trained and experienced staff leave in search

7. Kofler, Birgit (1997). “Legal Issues facing Audiovisual Archives”, In *Audiovisual Archives: A practical Guide*. Paris: UNESCO

8. http://www.national.archives.gov.za/aboutnasa_content.html#nfvs_archives

9. Edmondson, Ray (2004). *Audiovisual Archiving: Philosophy and Principles*. Paris: UNESCO, p.20.

of greener pastures. One of the great difficulties facing the archiving of audiovisual material in Africa in general and moving images in particular is the lack of trained staff to assume various responsibilities in film and television archives. Most of the staff are graduates of disciplines that are totally irrelevant to the film industry or documentation. An example is the Egyptian Film Archive which has 16 staff members and none of them is qualified in Library and Information Science, records management or any audiovisual training. The staff did not get any orientation programs or workshops to qualify them for working in the archive but they are working to preserve a nation's audiovisual heritage.¹⁰

The ZBH archive does not have people trained in film and video preservation. Their Film Archives is in disarray with no standard database to access their material so they have to come to the National Archives to look for footage because they do not know what they have. The issue of arrangement, cataloguing, accessioning and records management has to be taught for audiovisual archivists to understand archival principles and create awareness on the best possible methods of preserving their collection. There is no institution in Africa that teaches Audiovisual Archiving. It is only in Europe and the United States of America where institutions like the George Eastman House, UCLA and East Anglia University offer programs in Audiovisual Preservation. The existing LIS program at the National University of Science and Technology in Zimbabwe does not cater for audiovisual archiving.

7. Obsolescence of Equipment

The Audiovisual unit has various equipment used to inspect, clean, playback and make copies of the most requested material by users. However, at the moment almost all the machines in the Audiovisual Unit are not working. This is not because of misuse but solely maintenance of that equipment and some has become obsolete to use for any purposes.



2. Audiovisual Archivist Blessed Mzezewa switching on the Flatbed Viewer, which is not working at the moment.
© National Archives of Zimbabwe

10. Azmi Hesham Dr. *Egypt's Audio-Visual Heritage: Current Status and Future Prospects*, presented at the World Library and Information Congress: 74th IFLA General Conference and Council, 10-14 August 2008, Quebec, Canada.

From the flatbed viewer, Ultrasonic cleaning machine and the 16mm projector on the Telecine, all this have not been working and cannot be repaired because there are no professionals who can repair the equipment. Apart from that the Archives does not have the funds to repair this equipment. Access to the heritage being preserved becomes a cumbersome task for the institution and this adversely affects the perception and reputation of the National Archives to its users



3. The ultrasonic cleaning machine - is not working.
© National Archives of Zimbabwe

8. Perception

Society has a misconstrued perception of the National Archives due to a lack of awareness, ignorance or location of the Archives. Few people except historians, university students, broadcasters, film producers and directors use the audiovisual material at the Archives. The Unit can get one visitor per week whilst the library can get 50 or more. This is also because of the historical supremacy of the book, which continues to subjugate the importance of audiovisual materials in Zimbabwe.

Solutions to African Archives (With Special Reference to Zimbabwe)

1. Political and Economic Factors

A coalition government created between the main parties of ZANU PF and MDC T will bring back stability, integrity, and trust from investors. At the moment these two parties have agreed to talk about the 19th Amendment to which they had both agreed on the 15th of September 2008, when they signed a power sharing deal. This coalition will bring change to the economy as International monetary organizations will fund Zimbabwe. This will assist in solving the humanitarian crisis in the country. With a better economy and coalition government there is hope for the National Archives in terms of attitude and funding for the audiovisual heritage.

2. Financial Issues

The following will assist the Archives to overcome their financial problems:

- a. Source Funds from private enterprises and individuals in the country that have interest in film production;
- b. Cooperation with local and International institutions that fund Audiovisual Preservation;
- c. Approach organizations like the United Nations with proposals to preserve their film heritage. Currently the Memory of the World Program assists in film preservation projects.

3. Legislation

- a. The National Archives needs to amend the National Archives Act, Chapter 25:06.
- b. The institution needs to write a proposal of their own Legal deposit legislation and explain it to government and private film and music producers so they appreciate the importance of depositing their material for preservation.
- c. There needs to be interest in government to change the current legislation otherwise nothing will change without a positive attitude.

4. Preservation of Audiovisual Material

Preservation entails a number of factors for the problems to be solved:

- a. Government must try to revive the Film Laboratory so the National Archives can make preservation copies of their most treasured film and sound materials.
- b. Staff needs to be trained to be able to use the equipment that is available to their disposal.
- c. Archival principles and standards in terms of cleanliness, inspection and conservation of audiovisual materials should be followed to control any mold infestation or sticky shed syndrome on their audio material.
- d. The National Archives could approach companies in air-conditioning to donate an Air Conditioner and small de humidifier to be installed for the material without climate control.

5. Access

Edmondson points out that Access can be proactive (initiated by the institution itself) or reactive (initiated by the users of the institution). The only limit to proactive access is imagination.¹¹ Some of the best ways to access audiovisual material is:

- a. Exhibitions of the audiovisual material;
- b. Television adverts on the importance of audiovisual archives to the country;
- c. Public screenings of films at the National Archives of Zimbabwe;
- d. Outreach screenings of the film material in cities, towns and rural areas to make people aware of the film history of the country;
- e. Newspaper articles on the audiovisual archives;
- f. Creating a website that is specifically for the audiovisual heritage so university students, journalists, broadcasters and the public know what type of films and audio material is available.

6. Staffing and Training

- a. Various level of training could be offered to AV librarians

through networking with other international audiovisual archives.

- b. Attending International conferences specifically for Audiovisual Archiving for example IASA, AMIA, IFLA and ICCROM.
- c. Apply for scholarship and funding from International Associations in Audiovisual Archiving.
- d. Read Journals, articles on the web and attend regional workshops on audiovisual archival archiving.

7. Obsolescence of Equipment

- a. The institution should network with regional Audiovisual Archives with the same equipment for example the NFVSA (National Film, Video and Sound Archive of South Africa) to assist in repairing their equipment.
- b. Staff should be taught general maintenance work on repairing Playback equipment.
- c. Equipment should always be cleaned and covered to deter any dust particles.
- d. Obsolete equipment should be changed with equipment needed for the particular task even though it is second hand.
- e. Network with National Film Archives from developed countries to donate the equipment that they don't use but is still in good condition. In 2006 through networking the Archives received a 16mm Pageant projector courtesy of Tim Wagner, Inspection bench handles courtesy of the Northeast historic Film, and the George Eastman House shipped it at their expense to the National Archives of Zimbabwe. This cooperation and networking among Film Archives and Audiovisual Archivists should continue.

8. Perception

The only way of changing the perception of the public toward Audiovisual Archives is through educating the nation on the importance of the Archives as the custodians of the country's audiovisual heritage, and what that heritage means in their nations past, present and future history.

Conclusion

"The curious beauty of African music is that it uplifts even as it tells a sad tale. You may be poor, you may have only a ramshackle house, you may have lost your job, but that song gives you hope" (Nelson Mandela).¹² Audiovisual material is important to every citizen irrespective of colour, creed, political inclination, sex and stature in society. When I look at Nelson Mandela quote and his appreciation of the sound of music, I know there is hope in my country when it comes to preserving our audiovisual heritage in Zimbabwe. The political and economic turmoil we envisage at the moment is just but a step in the development and growth of the nation. We will overcome it and when the dust settles, there will be cheers in households and people will dance to the music of the old and watch as we envelope ourselves in the hope of the future of our nation. The problems we face now might still be there, but the magnitude will have changed, and the attitude towards preserving the audiovisual heritage from policy makers will have taken a positive note.

11. Edmondson, Ray (2004). *Audiovisual Archiving: Philosophy and Principles*. Paris: UNESCO, p.21.

12. Nelson Mandela quotes. Thinkexist.com

News from Preservation and Conservation Section

The last issue of the P&C Section Newsletter was published on November. Please see on line at:

<http://www.ifla.org/VII/s19/news/s19-newsletter-November08.pdf>

You will find among other reports, a complete and very interesting description of our joint satellite meeting, in Ottawa called: "Preserving Cultural Heritage into the 21st Century: Current perspectives and new directions" sponsored by IFLA Preservation and Conservation Section, Newspapers Section and IFLA-PAC Core Activity, with Library and Archives Canada and the Canadian Conservation Institute.

This meeting was held just before the IFLA general conference in Québec. In addition to the very dense and fruitful presentations and debates, we had the beautiful opportunity to visit the two universally known and very big Canadian centres for preservation: the Canadian Conservation Institute (<http://www.cci-icc.gc.ca/>) and the Library and Archives Preservation Centre, located in Gatineau, which houses all of Library and Archives Canada's preservation laboratories. You can find more information on: http://www.collectionscanada.gc.ca/preservation/1302_f.html

I invite all of you to explore these websites but also to visit personally Ottawa, Gatineau and these two great institutions for preservation. I was really impressed particularly by the architecture of the last one, a wonderful modern building.

Publications

The Getty Conservation Bulletin

The Getty Conservation Institute launched on October 2008 the *GCI Bulletin*, the Institute's new electronic bulletin. It will complement the GCI's print newsletter, *Conservation*. Published six times a year, the *GCI Bulletin* offers updates on our events, science and field projects, educational initiatives, and publications and videos.

Sign up for the *GCI Bulletin* now by going to: http://www.getty.edu/subscribe/gci_bulletin/index.html

Announcements

"In and Out Air Strategies. From Climate Change to Microclimate. Library, Archives and Museum Preservation Issues", 5-6 March 2009, Bibliothèque nationale de France, Paris, France

The IFLA-PAC Core Activity will organize a series of conferences in 2009-2010 on Preservation and the Four Elements: Air, Water, Earth and Fire. The first one, devoted to Air, will be held in Paris, coorganized with the National Library of France, on March 5-6, 2009. It will focus on: "In and Out Air Strategies. From Climate Change to Microclimate. Library, Archives and Museum Preservation Issues."

Four sessions are planned:

1. Climate Change and Cultural Heritage
2. Microclimate and Indoor Air in Cultural Heritage Institutions
3. Air Management
4. Air Research and Development

A draft programme of the conference and registration forms are available on IFLA website: <http://www.ifla.org/VI/4/pac.htm>

Contact:

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« Entre deux airs : Intérieur/Extérieur. Bibliothèques, Archives, Musées : du changement climatique au microclimat, stratégies de conservation », 5-6 Mars 2009, Bibliothèque nationale de France, Paris, France

Le programme fondamental PAC de l'IFLA proposera en 2009 et 2010 un cycle de conférences sur le thème de la conservation face aux quatre éléments : l'air, l'eau, la terre, le feu. La première de ces conférences, dédiée à l'air, se tiendra à Paris les 5 et 6 Mars 2009, en collaboration avec la Bibliothèque nationale de France, et aura pour titre : « Entre deux airs : Intérieur/Extérieur. Bibliothèques, Archives, Musées : du changement climatique au microclimat, stratégies de conservation. »

Quatre sessions sont au programme :

1. Changement climatique et Patrimoine culturel

2. Microclimat et air intérieur dans les institutions patrimoniales
3. La gestion de l'air
4. Recherche et développement dans le domaine de l'air

Le programme provisoire de la conférence et les modalités d'inscription sont disponibles en ligne sur le site de l'IFLA :

<http://www.ifla.org/VI/4/pac.htm>

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Directrice du programme PAC de l'IFLA
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"Legal deposit of newspapers for libraries: challenges of the digital environment", IFLA International Newspaper Conference, 13-15 April 2009, Moscow, Russia

Libraries in the world are facing challenges of preserving printed newspapers, particularly those received under legal deposit arrangements. New technologies bring fresh issues for the management of both printed and born digital newspapers.

Jointly organised by IFLA Newspapers Section and the Russian Book Chamber, the IFLA International Newspaper Conference 2009 will focus on the rapid advancements of digital technologies affecting the various aspects relating to the legal deposit of newspapers in libraries and archives. The Conference will be held at the Russian Book Chamber from 13 to 15 April 2009.

Who should attend

- Library administrators, librarians, information specialists/managers in the public, national or academic libraries who are working or interested in these aspects of newspaper librarianship.
- Service providers who are interested in new projects/initiatives and approaches in newspaper librarianship.

Why you should attend

The purpose of this conference aims at not only sharing of collective knowledge about how libraries can tackle these challenges but also to open up opportunities for libraries, librarians and associated industry players to interact with one another and work out suitable partnerships that will help to improve the provision of newspaper services at libraries.

There will be 2 tracks of presentations that highlight a particular aspect or issue related to the legal deposit of newspapers:

1. The current situation:
 - a. How decentralised collections deal with legal deposit
 - b. How to make legal deposit collections available
 - c. The historical continuity of legal deposit and gaps in collections

2. The digital future:
 - a. How to pay for digital repositories
 - b. Securing publisher permissions for distribution of digitally produced material (the Singapore model)
 - c. Balance between microfilm and digital collections
 - d. Cataloguing of newspapers as digital objects

It is intended to have both English and Russian versions of each paper available at the conference.

To register

The Conference fee will be 50.00 EURO. Further details regarding registration and payment of the Conference fee will be sent.

Contact:

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email: ed.king@bl.uk

Digital Preservation Workshop, LIBER, 17 April 2009, Koninklijke Bibliotheek, The Hague, Netherlands

A Digital Preservation Workshop, jointly hosted by LIBER's Access and Preservation Divisions will take place in the Koninklijke Bibliotheek, The Hague, on 17 April 2009. Detailed information will follow.

75th IFLA General Conference and Council, "Libraries create futures: Building on cultural heritage", 23-27 August 2009, Milan, Italy

Thanks to libraries, civilisations have gathered and stored evidence of their manual, scientific, artistic, literary, musical as well as religious activity. Assuredly, libraries preserve the bases and the roots of human knowledge. Knowledge transmission today has radically changed: the scope of bibliography has widened immensely. Libraries therefore had to update their role: preservation and access are still the main points to be achieved, though in a new, critical and professional way, in order to assure the adequate standard of the service. In this way libraries keep pace with the change brought about by history and technology, helping to shape the future through the resources inherited from the past for example cultural heritage.

Online registration is now available for the IFLA World Library and Information Congress, Milan, 2009. The direct link to the registration information is: <http://www.ifla.org/IV/ifla75/registration-htm>

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Call for Papers, PAC Core Activity Session, 75th IFLA General Conference and Assembly, 23-27 August 2009, Milan, Italy

Theme: "Convergence in Preservation Research between Libraries, Archives and Museums"

Following the main theme of the conference "Libraries create futures: Building on cultural heritage", future, even if digital, will only rely on the preservation of our traditional cultural heritage collections: manuscripts, printed books, paintings, sculptures, historical documents...

The IFLA-PAC Core Activity would like to present some experiences showing how research in the field of library and archives collections needs and benefits from research in the field of museum collections and vice versa. This session aims at promoting the networking on preservation between all our cultural heritage institutions.

The IFLA-PAC Core Activity invites proposal for presentations at its programme in Milan, 23-27 August 2009.

Papers should focus on influences, transfers, exchanges of expertise and knowledge between the three types of institutions.

Some examples:

- In the field of medieval manuscripts preservation: pictorial layers consolidation, textile or wooden supports restoration...
- Laboratories research on materials and products: fundamental research on ink, leather, parchment...
- Applied research as use of gore-tex and cellulose products...
- Research on optimum storages conditions for all collections: for instance, research on air in storages and identification of pollutants

Proposals

Please send a **detailed abstract**, in **English**, of your proposed paper (1page or at least 300 words), plus relevant brief biographical information on its author(s), **by 31 January 2009**, via e-mail to:

Christiane Baryla

Director of IFLA PAC Core Activity
E-mail: christiane.baryla@bnf.fr

Important dates

Deadline for submission of abstract:

31 January 2008

Notification of acceptance: **March 2009**

Deadline for submission of paper:

15 May 2009

Satellite Meeting "Conservation and preservation of library material in a cultural-heritage oriented context", 31 August-1 September 2009, Instituto di Patologia del Libro, Rome, Italy

Contact person: Per Cullhed,
per.cullhed@ub.uu.se

Audience: librarians, conservators and others with an interest in the ALM-sector preservation problems and solutions
Sponsors: IFLA Preservation and Conservation Section

Co-sponsors: IFLA Preservation and Conservation Programme (PAC)

Report

Report from the Third Annual WePreserve Conference, 28-30 October 2008, Nice, France

DigitalPreservationEurope (DPE) (<http://www.digitalpreservationeurope.eu/>), built on the earlier successful work of ERPANET, facilitates pooling of the complementary expertise that exists across the academic research, cultural, public administration and industry sectors in Europe. DPE fosters collaboration and synergies between many existing national and international initiatives across the European Research Area.

DPE addresses the need to improve coordination, cooperation and consistency in current activities to secure effective preservation of digital materials. DPE's success will help to secure a shared knowledge base of the processes, synergy of activity, systems and techniques needed for the long-term management of digital material.

IFLA-PAC Core activity is member of this network. Christiane Baryla attended the Third Annual WePreserve Conference held in Nice, last October 2008. The full presentation of this event is now available in the current issue of the *International Journal of Digital Curation*. You can find it at: <http://www.ijdc.net/ijdc/article/view/94/112>

The theme for 2008 was 'a new generation of tools and services' and was designed to showcase the tools and services available now for use in tackling the digital preservation challenge.

PAC CORE ACTIVITY

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PAC INTERNATIONAL FOCAL POINT AND REGIONAL CENTRE FOR WESTERN EUROPE, NORTH AFRICA AND MIDDLE EAST

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<http://www.libfl.ru/index-eng.shtml>

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