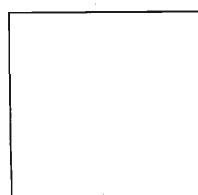
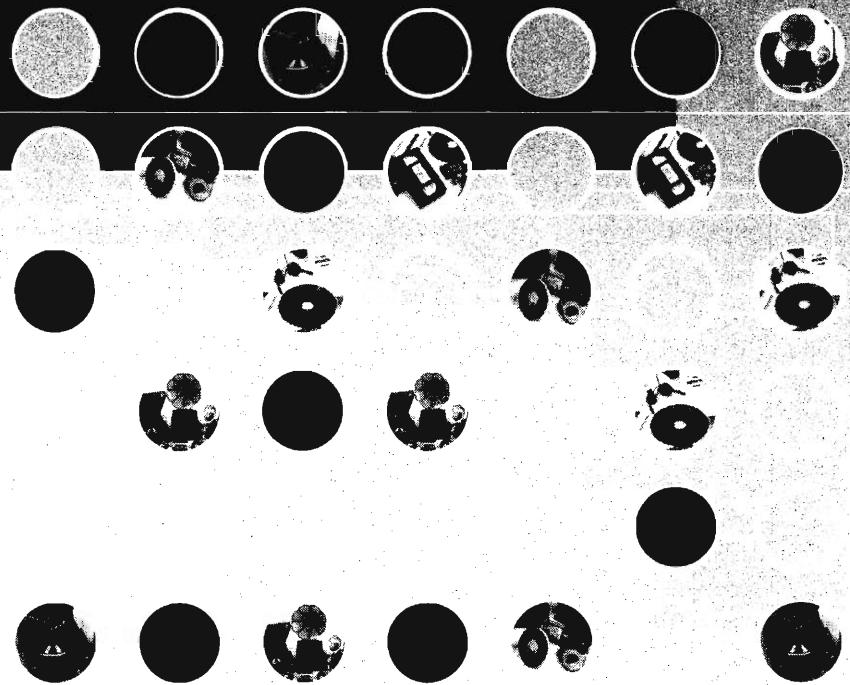


**International Association of Sound
and Audiovisual Archives**

**Internationale Vereinigung der
Schall- und audiovisuellen Archive**

**Association Internationale d'Archives
Sonores et Audiovisuelles**

iasa journal



- Journal of the International Association of Sound and Audiovisual Archives IASA
- Organie de l'Association Internationale d'Archives Sonores et Audiovisuelle IASA
- Zeitschchrift der Internationale Vereinigung der Schall- und Audiovisuellen Archive IASA

Editor: **Ilse Assmann**, The South African Broadcast Corporation (SABC) Sound Archive,
PO Box 931, 2006 Auckland Park, South Africa. Fax +27 (0)11 7144281, email assmann@sabc.co.za
Language Reviser: **Dorothy van Tonder**, SABC

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The Executive Board of IASA

- President:** **Kurt Degeller**, MEMORIAV, Giacomettistrasse 1, Postfach 3000 Bern 15, Switzerland.
Fax +41 31 3509 764. eMail: kurt.deggeller@memoriav.ch
- Vice Presidents:** **Magdalena Cséve**, Hungarian Radio, Documentation, Bródy Sándor u.5-7, H-18# Budapest Hungary. Fax +36 1 3288310. eMail: csevermauzem.radio.hu
Shubha Chaudhuri, Archives & Research Centre for Ethnomusicology American Institute of Indian Studies D-30 Defense Colony, New Delhi, 110 024 India. Fax +91 11 469 8150. eMail: shubha@arce.ernet.in
Richard Green, Music Division, National Library of Canada, 395 Wellington St., Ottawa, ON, Canada, K1A 0N4. Fax +1 613 952 2895.
eMail: richard.green@nlc-bnc.ca
- Past President:** **Crispin Jewitt**, The British Library National Sound Archive, 96 Euston Road, London NW1 2DB, UK. Fax: +44 20 7412 7422. eMail: crispin.jewitt@bl.uk
- Editor:** **Ilse Assmann**, The South African Broadcast Corporation (SABC) Sound Archive, PO Box 931, 2006 Auckland Park, South Africa. Fax +27 (0)11 7144281.
eMail: assmann@sabc.co.za
- Secretary General:** **Eva Fønss-Jørgensen**, State and University Library, Universitetsparken, DK-8000 Aarhus C. Fax: +45 8946 2022. eMail: efj@statsbiblioteket.dk
- Treasurer:** **Anke Leenings**, Deutsches Rundfunkarchiv, Bertramstrasse 8, 60 320 Frankfurt, Germany. Fax: +4969 15687 100. eMail: aleenings@hr-online.de

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It was a mild autumn evening in Aarhus when Chris Clark and I met over dinner in a small, cosy restaurant to discuss the formal hand-over of the IASA editorial. Chris had a long list of carefully planned activities and, as we sat side by side discussing the list, we tried to cover all the details to ensure a smooth hand-over. For the rest of the week, Chris patiently guided me through every other matter we could possibly think of. By the end of the week, we felt certain we had covered everything.

It was not to be that easy! Chris and I hadn't anticipated the speed of 'snail mail' to get the CD-ROM with all the design templates from the British Library. And, more important, we hadn't even given a second thought to the possibility that the software and hardware might be problematic. So it was. But we found a way around all these problems and as proof, although later than normal, you are now holding the IASA Journal in your hands.

It made me think just how vulnerable we are when it comes to electronic records. It also made me realise just how complicated the world has become in terms of electronic compatibility. And how compatibility should never be assumed or taken for granted.

Which brings me to the very stimulating conference we had in Aarhus, which focused on preservation and digital asset management - DAM, or as Grace Koch put it so eloquently, 'DAMN!'. In this IASA Journal you can read Chris Clark's fascinating keynote paper on this issue, discussing the challenges we face with regard to the management of our audiovisual collections. In his paper Chris refers to the *Bibliotheque Nationale de France* in Paris, and I thought it fitting to present you with Alain Carou's paper on the digital asset preservation project at the Bibliotheque Nationale de France. In addition, I have included papers presented by Anthony Seeger and Harald van Hielmcrone, who talked about the challenge of Rights Management Research-Generated Recordings and the Danish experience with regard to selection criteria for archiving radio and television programmes respectively. John Spence, past vice-president of IASA Executive Board, presented the results of the first ever survey on the digitisation of our audiovisual archives. To complement these papers and presentations, you can also read a discussion by Saúl Maté-Cid, from Belgium, of what he calls 'the need for a healthy and wide appreciation of industrial and socio-cultural issues that relate to technology and audiovisual archives in particular'. Sonia Gherdevich and Ian Gilmour of ScreenSound Australia wrote a very interesting and insightful article about the MusicAustralia Project.

The conference in Pretoria, South Africa, is just round the corner and with its theme *Audiovisual Archives: Memory and Society* we hope to present you with stimulating and challenging papers. This will be the first time an IASA conference is held in this part of the world and we hope to see you there.

President's letter

It is a great pleasure for me to write this, the first president's letter of the newly elected Executive Board, and on this occasion I would like to propose some priorities for the work of IASA over the next three years. You are most welcome to send feedback to my e-mail address kurt.degeller@memoriav.ch.

The programme, which has already been determined for the coming months and years, has some inherent focal points. The 2003 Conference is one of them. If this conference is to be a success, the maximum possible exchange of information with our colleagues from Africa must be an objective. From our point of view, two key input areas need to be addressed. The first is financial: we have to ensure that our colleagues can travel to Pretoria. The second is more conceptual: we need to modify our "northern hemisphere" or "western world" view of the problems of audiovisual archiving and listen carefully to what our colleagues from other areas have to say.

IASA has been asked to participate in training seminars on audiovisual archiving in Mexico and the Caribbean in collaboration with FIAT/IFTA (The International Federation of Television Archives). These invitations show that from the periphery our two organisations are considered to be close in terms of the scope of work and complementary to each other. We need to take this further with our colleagues from IFTA. In any case, the important difference between the aims of archiving in broadcasting and the aims of what are known as "heritage institutions" has to be clearly defined. However, we still have to consider that broadcast programmes have become a major source of information that shapes our vision of the world, of history and of culture.

The 2003 programme (the Annual Conference, the above seminars, and the traditional meeting in spring with FIAT/IFTA on broadcasting problems) will take us to the limit, or even beyond the limit, of our capabilities as an organisation based on volunteers. It is hardly imaginable that your institution would pay for all these activities, and IASA does not currently have the funds to cover these costs. We need to find new solutions quite quickly, perhaps in association with other international organisations that are active in our field. Some years ago, after a long period of reflection and discussion, IASA changed its name from *International Association of Sound Archives* to *International Association of Sound and Audiovisual Archives*. The rather confusing formula "sound and audiovisual" was a political compromise and has – at least to my mind – clearly prioritised sound, which is reflected by the topics treated in the annual conferences since then.

The confusion is probably also owing to the fact that "audiovisual" has never been defined clearly, and that there is no clear delimitation between our activities and those of our sister organisations FIAT (Television Archives), FIAF (Film Archives) and AMIA (Moving Image Archives). I think it is high time we worked on these problems. In my experience as director of the Association for the Preservation of the Audiovisual Heritage of Switzerland (Memoriav), I have some ideas on how we could clarify the situation. But once again, this problem can be resolved only in co-operation with the other associations.

Another objective in the same field is our relationship with very large organisations such as ICA (Archives), IFLA (Library Associations) and ICOM (Museums). These represent the large community of heritage institutions, which have a central role in the preservation of people's memory of their own society and culture. The audiovisual part of this heritage has clearly been neglected in this context until now. It will be our task to offer these large institutions, and individuals, specialised knowledge and competence when required. The invitation by ICA to organise workshops during their next General Conference in 2004 in Vienna is the first very important step in this direction.

One of our main tasks over the next three years will be to build up reasonable models for co-operation in the main fields of our activities. The Co-ordinating Council of Audiovisual Archives Associations (CCAAA) is an excellent platform from which to take this task forward. We should not forget that CCAAAs owes its existence mainly to Crispin Jewitt, who drafted its *Terms of Reference* and has pressed us to participate in the building up of the organisation.

I wish all our members everything of the best for 2003, and I hope to meet you all in Pretoria.

Kurt Deggeller
17 December 2002

Do they mean us as well? Managing Knowledge as a Digital Asset

Chris Clark, British Library National Sound Archive
Keynote address to the IASA Conference, Aarhus, 2002

Management challenges for the 21st Century is the title of a book recently written by the acclaimed management theorist Peter Drucker. Among its many predictions we find:

"The most valuable assets of a 20th-century company were its production equipment. The most valuable asset of a 21st-century institution, whether business or non-business, will be its knowledge workers and their productivity." (1)

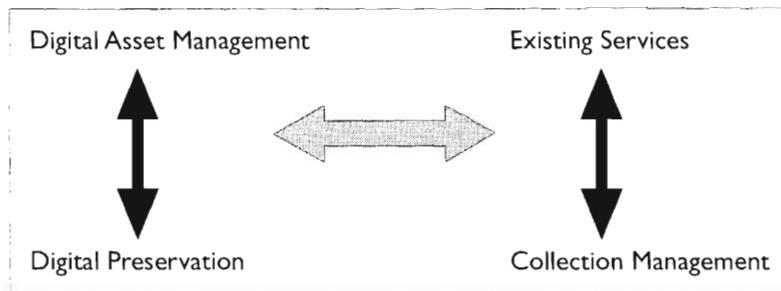
We spend a lot of our time at IASA conferences talking about our collections and the processes we have devised to preserve them and make them available but apart from the occasional paper about training, we have a tendency to ignore ourselves, the knowledge workers, who are carrying out all of this marvellous work. If we believe Peter Drucker's prediction, "we ourselves" have recently acquired considerably greater asset value within our respective institutions. That is the theory and that is the governing hypothesis for this presentation.

I will not attempt to define knowledge as this is not a philosophy symposium but a useful working definition for the purposes of this presentation comes from Tony Brewer, a former knowledge management consultant in the U.K. He defines knowledge as "a packet of information in a wrapping of context that gives it relevance and significance" (2). Knowledge serves as a catalyst: there must be a transfer. As a result of obtaining knowledge, there may be some measurable outcome, good or bad. On the basis of this definition, thousands of companies have adopted as part of their mission statement "delivering the right information to the right people at the right time". I think we all suspect that it's not as simple as this. To begin with, there are two categories of knowledge: tacit, the knowledge we carry around in our heads and explicit, that which we choose to make available, typically in a form that can be documented and archived. We will see that the tacit category presents some stiff challenges to management.

As audiovisual archivists, the range of skills and depth of knowledge expected of us has always been varied and demanding – that is part of the attraction of the job. Our present conference themes, preservation and digital asset management, mark the extremes of that range: at one end is the commitment to the ethics of archiving, ensuring that documents – in the widest sense of that word – are preserved unchanged indefinitely. (One might say that here we are taking care of our liabilities). At the other extreme is the need to generate business from the exploitation of those documents, which may mean creating copies or versions of the originals for a multiplicity of purposes and audiences. This is what I understand to be the locus of asset management (3). The two extremes could be self-supporting in that what is selected for access could also be prioritised for preservation but this cannot be assumed and more often, I think, that they may be in conflict.

The advent of digital technology has stretched the range of skills and knowledge expected of us. But there is now a real tension, not just between these two extremes on the digital axis, but between this axis and its non-digital parallel [see Fig. 1]. As our organisations attempt to manage the processes that correspond to existing services and collection management while introducing, as quickly as possible, new processes for digital it has become clear that resources cannot be stretched to such a degree. We need help.

Fig.1 Lines of tension

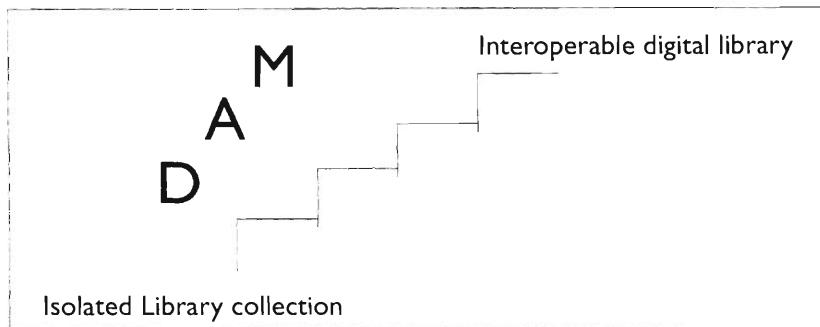


And our users, increasingly interested in what we are up to behind the scenes, have noticed. In a recent study of culture at the end of the last century, *Grammars of Creation*, the polymath and literary critic George Steiner remarked that libraries, particularly national libraries, now seemed to be "part shrine and part futurama" (4); fading museum pieces and heritage in one corner, alluring electronic distractions in the other. Indeed, it often seems of late as though the values of show business have been allowed into our archival stores.

The hope is that this will be a temporary perception while things settle down, but through its close association with technology, the electronic or digital side to our work advances at a vertiginous rate and it is often difficult to identify the components that will endure. However, I think that the position may be more certain for digital preservation than it is for access; digital asset management (DAM, for short) as a technical application, from what I have read, looks like a temporary fixation until the next 'big idea' comes along.

So you can see, I am not about to promote DAM and its numerous providers as the new panacea for audiovisual archives though it does offer some obvious benefits. Most of the DAM systems I know about and that have been applied to audiovisual archives are in broadcasting companies, such as the BBC. As I work in a national library that, at the moment, barely recognises the term this hardly qualifies me as an enlightened spokesperson for DAM. Instead, I want to place digital asset management in the broader context of knowledge management, to explore around the subject in order to define its relationship to the work of audio-visual archives. In particular, I want to place it within the current process of change that sees a typical IASA institution moving from the isolation of an idiosyncratically described collection that people have to visit towards the more generalised exposure of an interoperable digital library whose users link in from the Web.

Fig. 2 DAM in context



I prefer to use the term 'library' rather than archives in most of this presentation. I believe that our collections, which are indeed archival in terms of preservation and storage, will increasingly be accessed alongside other kinds of media delivered by web-based library services and alongside or as a part of services that have nothing to do with libraries and archives. In this respect I will mention some of the development work on web tools for discovery and retrieval carried out mostly in the United States that builds on mark-up languages derived from practices developed by the library and archive community.

Do they mean us as well? By "us" I mean people who mostly work for institutions, but the new technology we have been encountering, and to which we are trying to adapt, causes problems for institutions and their systematised ways of working, whereas it tends to liberate individual action and development: hence the emphasis on the individual in my title.

I want to continue by reading a passage from a recent work of fiction. The author is W.G. Sebald, a German writer who lived for many years in England and who taught at the University of East Anglia until he was killed in a road accident last December. His writing consists of an astonishing blend of fact and fiction. In his last novel, *Austerlitz*, a Jewish evacuee by that name, now an architectural historian, attempts to re-discover his past through a blend of chance, hallucination and deliberate research. For his research, he makes regular use of the Bibliothèque Nationale de France in Paris. Here is his account of working in the old building: the date would be around 1950:

"In the week I went daily to the Bibliothèque Nationale in the rue Richelieu, and usually remained in my place there until evening, in silent solidarity with the many others immersed in their intellectual labours, losing myself in the small print of the footnotes to the works I was reading, in the books I found mentioned in those notes, then in the footnotes to those books in their own turn, and so escaping from factual, scholarly accounts to the strangest of details, in a kind of continual regression expressed in the form of my own marginal remarks and glosses, which increasingly diverged into the most varied and impenetrable of ramifications. My neighbour was usually a gentleman with carefully trimmed hair and sleeve protectors, who had been working for decades on an encyclopaedia of church history, a project which had now reached the letter K, so that it was obvious he would never be able to complete it.

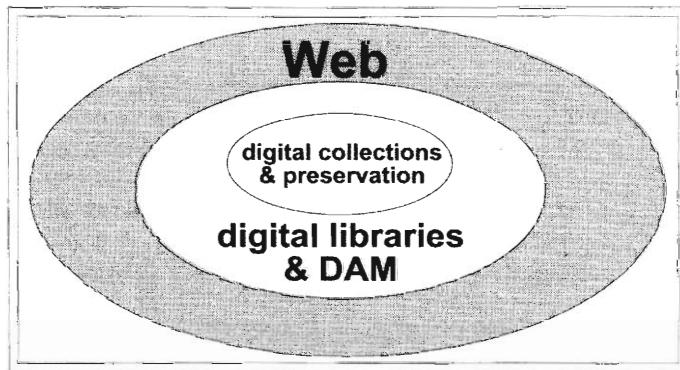
Without the slightest hesitation, and never making any corrections, he filled in one after another of his index cards in tiny copperplate handwriting, subsequently setting them out in front of him in meticulous order. Some years later, said Austerlitz, when I was watching a short black and white film about the Bibliothèque Nationale and saw messages racing by pneumatic post from the reading-rooms to the stacks, along what might be described as the library's nervous system, it struck me that the scholars, together with the whole apparatus of the library, formed an immensely complex and constantly evolving creature which had to be fed with myriads of words, in order to bring forth myriads of words in its own turn. I think that this film, which I only saw once but which assumed ever more monstrous and fantastic dimensions in my imagination, was entitled *Toute la mémoire du monde* and was made by Alain Resnais. Even before then my mind often dwelt on the question of whether there in the reading-room of the library, which was full of quiet humming, rustling and clearing of throats, I was on the Islands of the Blest or, on the contrary, in a penal colony." (5)

Quoting from a work of fiction might seem an inappropriate way to begin this conference given the real and tangible concerns of conservation and asset management, but when I read it a few months ago this personal impression of a very large library, its ambition and its systems for managing knowledge rang all sorts of bells. It sets the scene for the remainder of this address more eloquently than I can.

I'll return to the 'penal colony/Island of the Blest' analogy later. Meanwhile, there are several themes to be drawn from this passage I have just read out that I will try to develop:

- I. The interaction of three separate spaces: the personal space of Austerlitz in his web of footnotes; the surroundings of the library reading room; and its portrayal in the medium of film that subsequently projects an exaggerated image within the narrator's memory. Each of these can equate to personal, institutional and mediated knowledge systems respectively. In this talk I will be considering our conference themes - conservation and digital asset management - within an abstract working landscape that, likewise, includes three related spaces: digital collections (including preservation); digital libraries (including DAM) and the Web.

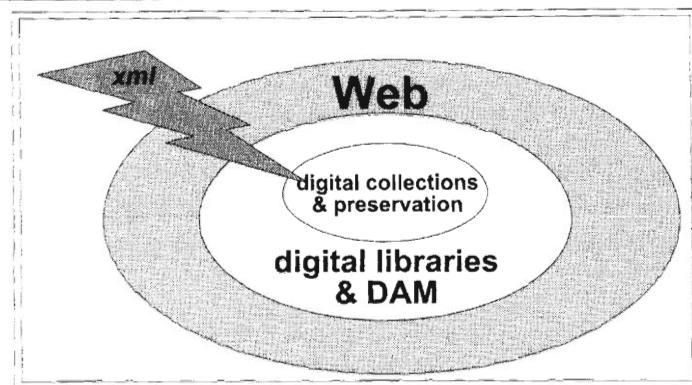
Fig.3 Three related spaces



2. the contrasted working practices of Austerlitz with his disorderly marginal notes and his neighbour's precisely ordered but never to be completed index: this will be developed through a view of individual knowledge systems, such as weblogs and collaborative information systems that are thriving and which contrast starkly with corporate knowledge systems that, however carefully managed, tend to remain unfinished, mis-judge the audience or never even get past the contract stage. We may have been able to define the audience when that audience consisted of visitors to our buildings, but audiences on the Web are resolutely unpredictable. There is also a sub-theme here, in that Austerlitz's footnote-driven research mirrors today's electronic equivalent - the chain of hyperlinks by which we typically navigate the Web.
3. the world of knowledge as an insatiable creature ('informavores', as they are known in certain parts of the West Coast of the United States) fed by technology driven systems. Back in 1950 the pinnacle of library technology was pneumatic post and a decent step-ladder: now we have electronic mail and super archives: we'll look at some American projects involved with data mining and resource linking as well as D-Space and the Wayback Machine, just two of today's attempts to encapsulate "toute la mémoire du monde" (or at least a significant part of it).
4. From our standpoint fifty years later, what was not yet a reality for Austerlitz is also important. The library he used was self-contained, subsidised, and independent. Since then we have seen a gradual evolution in the library and archive world towards mutual dependencies, to a diffusion of roles and this is now having a profound impact on the way we do things, especially on the digital axis where there is greater dependence on partnerships and external sources of money.

The rest of this presentation will develop these four themes and mostly takes the form of a record of ideas and projects I've encountered on a journey taken over the last six months through a landscape made up of the three related spaces I've already drawn - digital collections, digital libraries, and the Web. It's a landscape in which our work as individuals, and as individuals within groups can find the inspiration to work together in order to attempt to preserve collections on the scale we have set out to achieve. It's a landscape in which the provision and discovery of knowledge in electronic form can be managed and in which our institutions and the people that work in them can thrive rather than merely survive. And if these three spaces seem today like separate spheres of activity, physically, as well as logically, then as our work becomes more diffuse and collaborative, so the spaces become more homogeneous. There is one vital ingredient that needs to be added to our scheme: metadata, without which the content in our collections remains a jumble of bits. Metadata in the specific and, I believe, soon to be ubiquitous guise of the extensible mark-up language, or xml.

Fig.4 Three related spaces - and a vital adhesive element



Digital collections

Our journey through this knowledge management landscape starts in familiar territory with the stuff in our collections: we recognise most of the landmarks but are we clear about the terminology? In the light of earlier digitisation projects in the United States the terms "digital collection" and "digital library" were often confused. Since then there has been an attempt to separate the two so that digital collections are now usually defined as the raw content where the emphasis is on its long-term preservation; whereas digital libraries are systems that "make digital collections come alive through various mediating layers, such as catalogues and Web sites.

The main features of digital collections can be listed as follows:

- They contain raw, unmediated data plus metadata that is born-digital or digitised from older originals. (Of course, this raw data may represent works that are rich in stored knowledge, but to the storage system they will just be a jumble of digits).
- We're actually getting expert at digitising (there are plenty of standards): we are now seeing a commitment to optimising practice after the first round of projects that were by and large experimental.
- Commitment to preservation (or safeguarding for perpetuity). The major influence on thinking and planning in this area is the conceptual framework developed by NASA, OAIS (Reference Model for an Open Archival Information System). Its official Web site is ssdoo.gsfc.nasa.gov/nost/isoas/ where you can read about its history and reports of workshops.
- Numerous formats (archive and access audio formats, streamable media, MS Office files, Acrobat PDF) all prone to obsolescence, so we expect to have to adopt a mix of preservation strategies. (This is the real challenge. Computer science progresses by replacement, research by accumulation. The two are in real tension. I doubt this is on Peter Drucker's list of 21st century management challenges, but it is certainly on ours).

Digital preservation is a growth area in the professional literature. How do you keep up? At the British Library our Digital Preservation Co-ordinator introduced a very simple measure called a reading group. Every month each one in the group covers two or three of the main web-based journals that cover digital preservation (e.g. *RLG Digi-News*, *FirstMonday*, *CLIR Issues*) and brings relevant citations to a meeting of the group where the articles are discussed. This ensures that the ground is covered, knowledge is shared, and ideas are better understood through being articulated to a peer group that includes managers. I recommend it, even though your startling discoveries may conflict with corporate programmes already underway.

Some of the projects we have been following are:

- LOCKSS (Lots Of Copies Keeps Stuff Safe) <http://lockss.stanford.edu/>
- OCLC/RLG Working Group on Preservation Metadata
- OCLC/RLG Working Group on Attributes of a Trusted Digital Repository

The group has also been looking closely at some examples of very large and successful digital collections on the Web, all of which contain technical information about how they were created and how they are maintained:

- Brewster Kahle's Wayback Machine - //www.archive.org/
the archive of the Internet that has set itself a very big goal: *Universal Access to All Human Knowledge*.
- Pandora <http://pandora.nla.gov.au/>
the guardian of Australian websites, that Kevin Bradley spoke about at our conference in London last year
- MIT D-Space
a superarchive - collecting research material from nearly every professor at the institute
<http://chronicle.com/free/v48/i43/43a02901.htm> (*Chronicle of Higher Education* 5/7/2002)

Masses of data are being compiled and preserved here. All seem capable of dealing with infinite expansion, but alarm bells have recently sounded at Electronic Records Archive (ERA) run by the National Archives and Records Administration (NARA) in the United States. NARA recently admitted to becoming overwhelmed by the annual growth rate of 36.5 billion email messages that it is expected to manage and has made an open request for the computer industry to help. (6)

As we sigh in recognition and sympathy, we'll leave the digital collection space and move on.

Digital libraries

Digital libraries are what we, and the community of users, make of digital collections. They consist of various layered services and products based on the collections that taken together as an aggregation, over time, may be greater than the sum of the individual objects held in the collection. The best list I've encountered of these layered services appeared in Lorcan Dempsey's *Scientific, Industrial, and Cultural Heritage: a shared approach* (7). It includes:

- Disclosure services (catalogues and other finding aids, such as GIS)
- Content delivery services (streamed audio examples)
- Rights management services
- Ratings and recommended systems (i.e. such as you find at Amazon.com)

And to this list we could add material mediated for different user groups, such as schools or higher education.

This is where DAM makes its appearance, for it can potentially deliver most, if not all, of these services.

But first I want to say more about digital libraries in general.

Digital libraries are only just beginning to emerge, and not all are under the control of the library professionals. A good example is the Perseus Project at Tufts University (8). This Project is computationally linking together multiple resources, so you can take a biographical dictionary and link names to maps or mentions of place names in literary works. It has now added OAI compliance, which means that from Perseus you can harvest metadata (typically object descriptions) from registered OAI repositories, of which there are now well over one hundred. (OAI is the Open Archives Initiative that allows metadata harvesting between organisations - it requires a paper to itself).

Other OAI registered digital library projects include the European Commission -funded *Cyclades* project and *Kepler's home page*. A characteristic of these interactive resources is that they deliberately encourage users to compile their own digital libraries and collections in order to generate new material. This new material will, sooner or later, end up in a library, that will then recycle it to the world as a new born-digital object -- and so the interactive cycle of content will continue, gradually erasing any notion of a definitive edition or canonic text and, by breaking the familiar **author - publisher - distributor - library** chain, and eroding the basis for copyright. But that's another story that we'll glimpse later on.

Data mining is a growing activity that may be enabled by digital libraries. This involves amassing vast quantities of data and then applying computational resources to look for patterns and relationships in it. The more data you have, the more interesting the results. In essence, data mining creates new knowledge out of raw data. Some of what you can do on Perseus can be classed as data mining, and it's certainly widespread in disciplines such as astronomy. There are also possibilities, I imagine, for employing it in the study of recorded words and music.

DAM

Although it is more selective than data mining, there are some parallels between what an organisation can do with a DAM system and what a researcher can do with a data mining tool in that both involve the reuse of existing content. The bibliography connected with DAM is much more extensive than I had expected and it's mostly American. Despite initial doubts it became apparent fairly quickly that DAM is actually something new for IASA: the possibility of multiple re-use of our collection material and maybe some financial gain. The Gistics Digital Asset Management Market Report 2002 (the Bible of the DAM'd) is more explicit:

digital asset management represents a business strategy for accelerating business-process cycle times. (9)

This kind of talk will be foreign to most IASA members, so let me say that my understanding of where it fits in our community is somewhere between this hard business definition and the digital library concepts we have just been talking about. The most useful slogan seems to be one adopted by Gistics - *Unlocking the value of the digital master*.

DAM is now a \$60 billion dollar business with more than 600 DAM solution providers ranging from Cumulus for the individual user at around \$100 to IBM projects for big companies costing \$5million, with Artesia deployments hovering at around the \$100,000 mark. DAM may offer the prospect of a quick win for the company that embraces it, but it may not be a cheap one. And such is the pace at which new technology moves, people are already writing about the demise of DAM around 2005 as it evolves into a set of features within generic content management tools.

The term 'digital asset management' appears for the first time about ten years ago. CNN and Discovery Communications were early customers using DAM to manage their vast video libraries; recent converts include Coca-Cola and DaimlerChrysler who were quick to appreciate the savings to be made by adjusting digitised copies of old advertising footage, for example the hippie era classic "I'd like to buy the world a Coke", rather than create something equally innovative but very expensive. The BBC [specifically BBC Technology, a commercial subsidiary of the BBC] expects its Artesia TEAMS enterprise digital asset management solution to be used in support of commercial sales, developing integrated solutions for "streamlining the production, management and distribution of rich media programming across existing and emerging channels."

Other possible commercial applications of DAM in audiovisual archives might see it included as part of a trusted digital repository package offered, for a fee, to sectors of the recording industry. My own organisation is thinking about this. The ability to re-purpose material also lends itself to supplying content to the educational sector.

A common feature of all DAM systems I've come across is the emphasis on recycling assets, sustaining knowledge and content to be licensed again. There's nothing startlingly revolutionary about the idea of one input, many outputs. Everyone here will have understood that a digital

master may be copied in several ways: as a streamed file, as a compressed segment, etc. But in the context of DAM, digital masters represent a type of digital asset that may contain sufficient data to produce dozens or hundreds of individual reuses.

The extent to which we can engage in this frenzy of recycling and re-purposing will, of course, depend on whether we own the rights or a license to do so. But also, since we have introduced the word 'asset' in this conference in place of the more common word collection or 'holdings', we will need to consider some additional bureaucratic measures. We all have digital objects - but they will only be classed as assets if an auditor can answer questions such as:

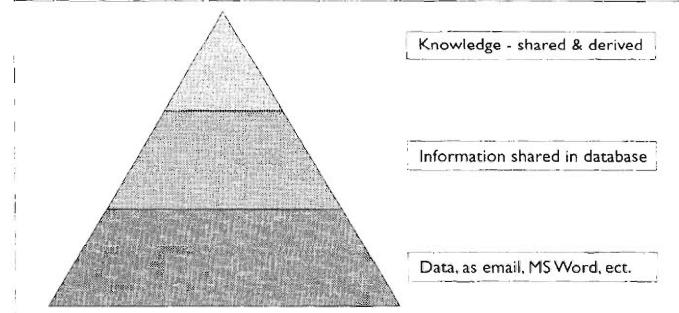
- Has the archive documented the object's development costs?
- Has the archive documented how the object has directly contributed to a sale or an identifiable cost saving?
- Has the archive taken prudent measures to ensure the object is protected from misuse?

These are the specialised data management facilities that a DAM system will provide and which your current cataloguing system will not, in case you were wondering if there is a difference.

I think there is another important dimension to our engagement with DAM, and that is its application to the knowledge that exists in an organisation, whether categorised as explicit or tacit. This could be described as digital asset management in the form of electronic records management and it sits alongside the commercial functionality just described.

My own organisation, The British Library, is currently running a pilot records management project - ERDM (Electronic Records & Document Management). It has been introduced in the department that deals with the management of the building - maintenance contracts, security systems, and so forth. It went live in January 2002. At one level (Records) it consists of a compilation of data, such as emails, file notes in MS Word, etc. (In some organisations .wav files are kept of telephone transactions). At the next level (Information), the data are linked in a database structure. Typical outputs for the department are who transacted with whom, when and how much money was involved, what negotiations took place. In other words, it's a record of business interactions.

Fig.5 DAM as electronic records management



Information, if filed and tagged correctly, can then become 'knowledge', that is knowledge about a particular set of preferences, reasons for the success of a particular service or product. In the next phase of ERDM the system will attempt to embrace knowledge throughout the organisation. This is where they expect to encounter resistance.

Working colleagues are often respected and revered on account of the knowledge they carry around in their heads, their tacit or innate knowledge. How many of us routinely refer enquiries to staff known to carry in-depth specialist knowledge rather than seek answers in "the system"? As John Perry Barlow recently said:

A five-minute conversation with the right person can be more enlightening than five hours online. The most powerful search engines out there are other people.

How we miss those colleagues when they retire. Wouldn't it be better to hold this personal information in refreshable perpetuity for future generations of staff? Managers think this will help with succession planning. Their staff may not because they believe their knowledge gives them a special edge. Knowledge, in some contexts, is power.

There's a curious irony at play here. Individuals may be reluctant to share their knowledge within an organisation, but it is difficult to curb their enthusiasm when invited to contribute to the Web. Maybe there's a lesson for managers here. But maybe there is an alternative technical solution that could combine localised knowledge management with the universality of the Web. David Karger at MIT has had such an idea and I would encourage you to take a look at his Haystack software project (10) as this has been designed with no particular market in mind. Haystack is for individuals, whatever their status, and can be evolved according to personal preference. The bonus for that person's manager is that the information and knowledge held in individual Haystacks can be shared, not just within the organisation but over the Web.

Which is where we enter our third space...

The Web

I don't want to say too much about the Web as this was the subject of Trond Valberg's keynote speech to the Singapore Conference two years ago and he covered a lot of the ground. I just wanted to make some comments here that relate directly to the management of knowledge, but also would like to emphasise that it makes no sense to consider digital preservation and digital asset management without taking account of the Web. This is where our main competition lies: you want catalogues of sound recordings - the Web has thousands; you want profiles of recording artists? However obscure - you'll find something.

Firstly the architecture of the Web, summed up neatly by Doc Searls (11):

nobody owns it, everybody can use it, anybody can improve it.

It is perhaps the greatest engineering marvel on a massive scale the world has seen, but it has happened with no centralised management or control. You add a link and you become part of it: if the link is broken you become invisible. If the link you are following is broken you link to somewhere else, and if the something you are looking for is not there, you're entitled to create it without asking anyone's permission. No wonder people have flocked to it in droves leaving some learning institutions to wonder if they need ever purchase another book.

The links determine the space. A recent book about the Web, *Small pieces loosely joined*, by David Weinberger (12) discusses the nature of space on the Web in the following terms. Nearness is created by interest and the closest distance between points is measured by relevance. This is why I think we are willing to tolerate the apparent mess that confronts us every time we do a search. Suppose you were looking for how much money was spent on CDs in Denmark last year. I typed into Google "Denmark, CD, sales, 2001" and in less than one second it found over five thousand pages that match those words. But none of the ten deemed most relevant by Google were right and only at result no.34 did I find the answer. From a traditional business point of view, this is a spectacular failure: someone asked you a question and you gave them 33 wrong answers - you're fired. But this is just the point: the Web is not a business-like environment in which traditional corporate identities and notions of protected scarcity for competitive advantage can expect to thrive (which may partly explain the spectacular business failures we saw in 2001):

*those that designed the Web weighed perfection against growth and creativity,
and perfection lost. (David Weinberger)*

It's imperfect and fallible on purpose, just like the people who use it. The information you linked to may not be mediated and authorised, but a person decided it should be there. I think there is some truth in what Weinberger and a number of other people have been saying recently that the Web is not a space full of data, but a space full of the sound of human voices. It's an unprecedented environment for individuals to interact and for knowledge to evolve and be shared. (This is perhaps an over-optimistic view in that it conveniently ignores the fact that English, the Web's principal language, is not everybody's first language).

Therefore individual knowledge sites have mushroomed: some of these are very thorough, not to mention very useful. Take weblogs, for instance. Weblogs (or blogs for short) are free, searchable journals of opinions and links updated daily by an individual or a group and they have become some of the most popular Web sites. David Winer, a blog pioneer from 1996, describes weblogs as

kind of a continual tour, with a human guide who you get to know. (13)

They're the nearest the Web gets to a managed information resource in that to be listed and to be listed repeatedly will enhance a site's reputation and thus help locate useful resources.

They are useful gathering points for an abundance of subjects. A very useful knowledge bank about Internet developments, and one of the first to be set up, is Tomalak's Realm (14). It's run by Lawrence Lee for all things related to strategic web design. According to some

It's run by Lawrence Lee for all things related to strategic web design. According to some commentators, Blogs are changing the way we use the Internet; we consult a blog in the same way that we pick up the morning newspaper or tune into the radio news bulletin. There's a dedicated search engine - Daypop, that retrieves pages from 7500 blogs, that's a mere 7.5 percent of what's actually available. (15) Significantly, companies have started hiring professional bloggers.

The presence of large amounts of compelling non-commercial material, such as blogs, was the reason why people flocked to the Web. We can therefore assume that there is a crowd of expectant niche audiences out there at whom we can target our managed collections of unique, non-commercial or public domain recordings. But not everyone is convinced that this kind of opportunity will last. A number of legal experts in the United States are deeply apprehensive about the attitude of the entertainment industry to the Web, or rather to those that use the Web. We've all heard the arguments about peer to peer file sharing and the penalisation of Napster. There's currently a less publicised appeal case Eldred v Ashcroft that concerns the freedom to republish HTML versions of public domain literature, the main issue being a constitutional challenge to the recent extension by twenty years to existing and future copyrights. Also known as the "Free the Mouse" case (as in Mickey Mouse), you can follow the story at eldred.cc/

Another interactive source of knowledge to be found on the Web but which evolves by e-mail between subscribers (and at no charge) is the specialist discussion list or listserv. I imagine many here subscribe to a number of these but if you are involved in documentation and metadata developments, then joining XML4Lib, run by Roy Tennant at Berkeley CA is essential (16). There is no competitive aspect to this and experts and novices alike participate and all questions, however basic, will receive an answer (or forty).

Metadata, as we have established, is vital to this whole scheme I've been describing. There have been many contenders for metadata of choice on the Web but I think it is now clear that one metadata format, XML, is going to prevail. For the following reasons:

1. XML is the focus of a vast amount of development and standardisation, which in turn results in many software tools and applications that can be re-used for digital libraries. What seems to me a major benefit of XML is that it doesn't make other metadata schema redundant: you can incorporate Dublin Core and MARC within it;
2. if something comes along to replace XML, it will be a development of it, not a parallel technology;
3. XML is the only networked data description language.

It is also an essential component of the Web's next phase of development, the semantic Web, as described by Tim Berners Lee in the now famous article he wrote for *Scientific American* last year:

the semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in co-operation. (17)

The Web we know is for people. The semantic web is for people and machines. A new meaning will be given to the phrase "talking book". They'll talk to each other; audio will know it is being listened to...

Before you think all this talk of Web phenomena has deprived me of all good sense, I will start to sum up. In fact there is a very interesting project that could sum up for us. It's called Simile and it's being run at MIT. (18)

Simile is a 4-million dollar project set to last three years and it aims to explore the intersection of three spaces:

1. institutional information management and digital asset management
2. personal and collaborative information management
3. the semantic web

Collaborators are MIT Lab for Computer Science, W3C, MIT Libraries, and the Hewlett-Packard Company. Key technical components are DSpace and Haystack that were mentioned earlier, so there is a clear intention here to try to make metadata uniformity work alongside personal or arbitrary schemas. So you see, Austerlitz and his orderly neighbour can work together.

In advancing the case for the individual in this talk (Do they mean us as well?), I have not sought to deny a future for institutions such as the Bibliothèque Nationale de France or the British Library. These have only just been built as part of a phase of library and museum building that is unprecedented in history. Clearly they have a long and productive future but it is one that will be different to work in and to work for. Libraries and audiovisual archives have already moved well beyond the "quiet humming" of the reading rooms visited by Austerlitz and the task of preserving as great a variety and quantity of material for future generations, just in case it is needed. Existing alongside the Web some of the old certainties have been challenged and our institutions need to draw support not only from formal partnerships but also from the kinds of informal networking that I have described. Our institutions therefore need to provide frameworks, such as DAM systems, that can support this so that knowledge flows freely between individuals and groups of individuals that exhibit complementary sets of skills, thereby fostering the kinds of innovation that enable them to move forward. They will certainly have to learn to relate to a networked environment and understand better how to present a corporate front to the highly individualistic Web. Fortunately, we have in libraries and archives a history of collaborative working and shared activity that extends back over four decades. In our PC dominated workplace the lines of communication by which we derive knowledge or extend our influence are increasingly horizontal and between institutions rather than vertical within a single institution. This, I maintain, is a liberating notion.

I have argued, in agreement with an acknowledged expert, that knowledge workers (like those of you reading this) represent as valuable, an asset as our collections, and the expensive

systems we install. I do not have a management prescription for dealing with this outbreak of individualism, but it seems to me that if the productivity of knowledge workers has become a most valued asset, then managers need to develop more sophisticated techniques for assessing success or failure, such as the measurement of outcomes, rather than relying on the routine reporting and adjustment of inputs and outputs. This is too mechanised. The main space in which our institutions will develop in future is the Web. Therefore, our value as assets might also be measured by the extent to which we have networked our knowledge: I link, therefore I am.

Finally, if you will recall the quotation from Sebald, his architectural historian Austerlitz was unsure if libraries and their tireless devotion to processes of myriad knowledge accumulation were like Islands of the Blest or like penal colonies. To me it still feels like we have sufficient freedom of action and that there are less barriers, and even though this means that some of our knowledge may be starting to become less specialised and proprietorial this is a cause for celebration rather than regret. The Web has reminded us that seeking and managing knowledge can be fun and that we don't require the same degree of centralisation and control to make knowledge management systems work. Our institutions should study this phenomenon closely and manage their assets accordingly. Meanwhile they can also learn from and participate in the shared learning space that the Web provides for that perennial concern of ours – preservation.

If all this is true, then there has probably never been a better time to start out as a 'professional audiovisual asset' but then there has probably not been a more challenging time if your job is to manage them.

Notes and references

- 1 Peter F. Drucker. *Management challenges for the 21st century*. - Oxford: Butterworth/Heinemann, 1999. ISBN 0 7506 4456 7.
In six illuminating chapters Drucker covers management's new paradigms, new certainties, change leadership, information challenges, knowledge-worker productivity and how to manage oneself.
- 2 Tony Brewer. "Why effective information management is needed to enable successful corporate change". In: *Proceedings of the Information Management Conference (IM96)*, 1996, London
- 3 To inform my understanding of Digital Asset Management for the purposes of my talk I used the following definitions to be found in
David Doering's article "Defining the DAM thing: how Digital Asset Management work" at http://www.emedialive.com/r2/2001/doering8_01.html

Content Management: The strategy and technology for storing and indexing information from and about analog or digital media.

Data Mining: The strategy and technology for retroactively locating, retrieving, and processing

information from a company's records or digital storage.

Digital Asset Management: The technologies used to locate and retrieve specific digital content objects for possible resale or repurposing.

Knowledge Management: An overall strategy to index and retrieve information proactively from whatever medium a company has. This differs from data mining, which is a reactive strategy.

Media Asset Management: The technologies used to locate and retrieve specific content objects from analog or digital media.)

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- 6 William Matthews. "NARA seeks ideas for e-records archive" *Federal Computer Week* 19.8.2002 www.fcw.com/fcw/articles...
- 7 Lorcan Dempsey, in Ariadne (22, January 2000) <http://www.ariadne.ac.uk/issue22/dempsey/>
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- 9 The Gistics Digital Asset Management Market Report 2002
<ftp://access30:a30cgtx30@ftp.serversmiths.com/DAMMRep02Bro.1.6.pdf>
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- 16 XML4Lib Electronic Discussion. <http://sunsite.berkeley.edu/XML4Lib/>
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<http://www.sciam.com/article.cfm?articleID=00048144-10D2-1C70-84A9809EC588EF21>
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Digitisation and Digital Asset Preservation at the Bibliothèque Nationale de France

Alain Carou, Bibliothèque Nationale de France

Paper given at the IASA conference, Aarhus 2002

Bibliothèque Nationale de France holds a wide variety of sound and video carriers. This is due to:

- 1) the heritage of the Archives de la Parole (before WWI) and their followers of Musée de la parole et du geste, who have collected a large number of dialectal and ethnological recordings;
- 2) the institution of a legal deposit on every recording published or sold in the French territory (since 1940 for sound recordings, since 1975 for videos);
- 3) acquisitions, deposits and donations, including carriers from the pre-legal deposit era, such as cylinders and mechanical music.

The materials are estimated as follows:

Wax cylinders : 6.000 units

Shellac discs : 300.000 discs

Acetate discs : 12.000 discs

LPs : 300.000 titles

Open reel tapes : 8.000 reels

Audio cassettes : 100.000 titles

Video cassettes : 100.000 titles, including 85-90% VHS, 8-10% U-Matic, 2-3% other formats.

CDs : nearly 200.000 titles

Preservation by copying from one analogue carrier to another was a traditional practice at the Phonothèque Nationale (the ancestor of what is now called Département de l'Audiovisuel – Audiovisual Department). Access or preventive copies of unique material, such as recordings on acetate discs, or sometimes tapes, were produced whenever they were needed, in the old days on acetate discs, later on tape, and more recently on CD-R. However, around 1998 the risk of progressive yet massive loss led, with the help of reinforced means, to the drafting of a preservation plan based on comprehensive digitisation of the endangered material and the management of a homogeneous digital archive.

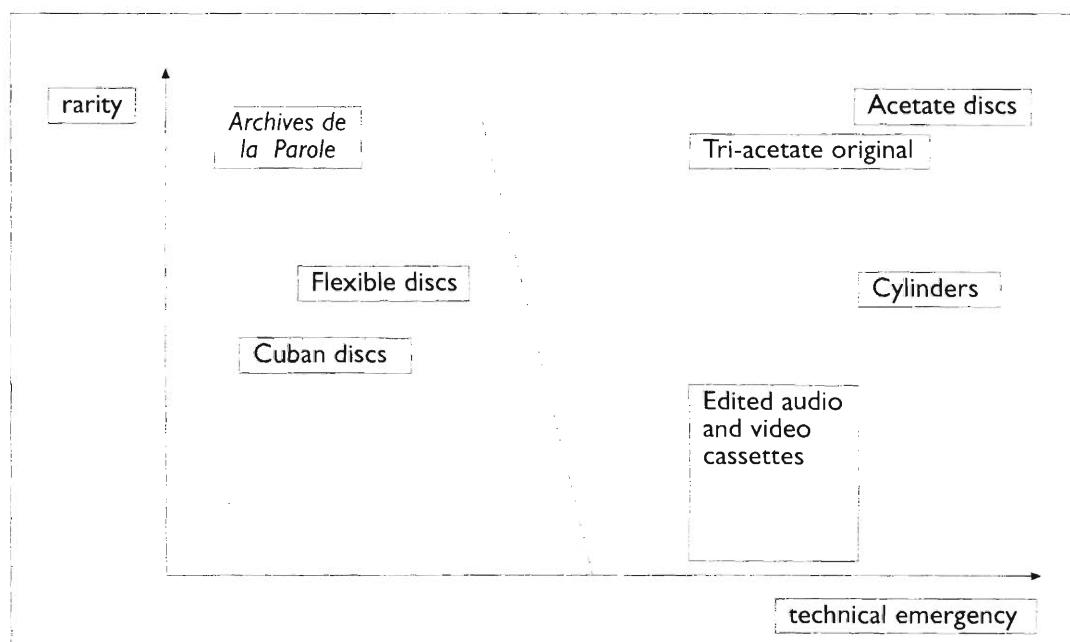
As a consequence of former practices, we often hold two or three generations and as many as eight items of the same sound recording. These items have to be saved together in order to make up the «raw» digital archive. From this material (sometimes from a mix of several items) a restored copy will be produced later. All the preliminary work of assembling items and telling originals from copies first of all requires inventories that are more precise than what they were for both acetate discs and tapes.

Prioritisation

Our priorities for digitising can be understood by crossing the technical emergency criteria with others as they are defined in the 2002 Task Force report on digitisation.

On the first graph [Diagram I], two criteria have been crossed: technical emergency and rarity of the documents. Each block corresponds to a set of documents that have been, or have to be, digitised. Sometimes it is a type of carrier as a whole, sometimes a documentary set, but always fixed on the same type of carrier. The positions cannot be evaluated positively with figures: they make sense only relative to each other. Another remark: the quantities of material behind each block are not the same at all. The biggest sets cover a relatively wide range of positions on the graph. So, the definition of the sets could be refined.

DIAGRAM I



So we can see, for example, that our "home-made collections" (acetate discs and triacetate tapes) are rarer than cylinders, which are rarer than most of our VHS videos. Nevertheless, *Archives de la Parole* was fixed on sapphire discs, which means there is no immediate technical risk. The same applies to the collection of flexible discs. These carriers are not endangered, but digitisation is the way to make them easily accessible. On the other hand, cylinders and consumer audio and video tapes are at risk, sometimes at the same level as cylinders for the oldest, worst produced or preserved cassettes.

The second and third graphs [Diagram 1 & 2] show different hierarchies: here technical risk is combined successively with the institutional responsibility, as defined in legal texts, and with real or expected demand.

DIAGRAM 2

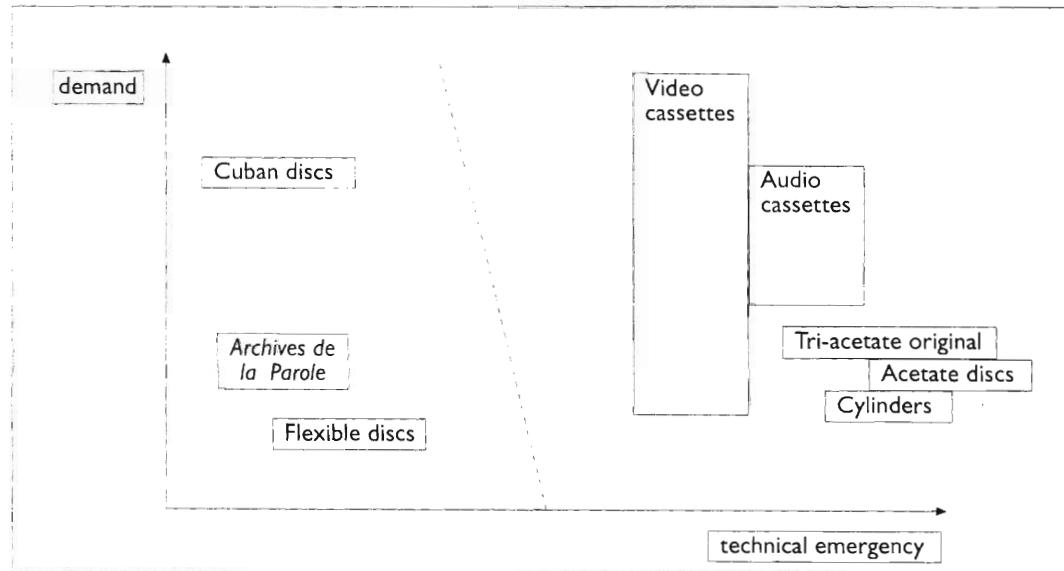
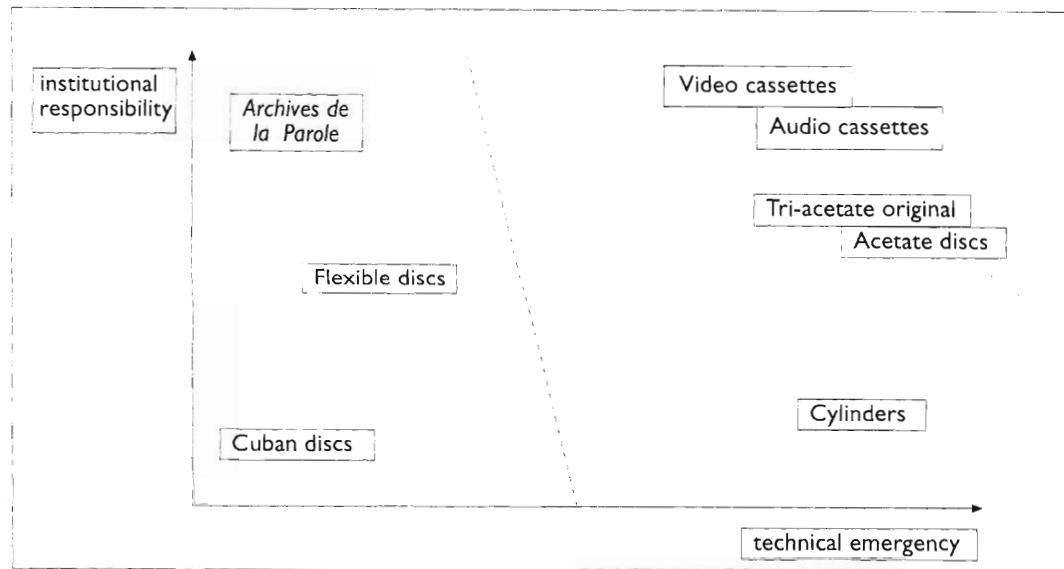


DIAGRAM 3



Obviously on every graph a line separates the preservation priorities on the right and digitisation made purely for wider, easier access on the left. No surprise: technical risk is the decisive factor; nevertheless, rarity, responsibility, and demand influence the decision, which is not a straight vertical line.

Now, these two kinds of tasks have to be managed side by side, not one before the other and not one against the other. It would be absurd, for example, to delay access to *Archives de la Parole* until transfer of all the endangered carriers had been achieved. How many years would it take? A part of the solution lies in dedicating permanent means for each kind of objective. Purely access-oriented transfers can also fill holes in the preservation agenda that are caused by the complexity of inventories.

To detail a few priorities of the preservation plan:

- A great many of our open-reel tapes and acetate discs cannot be found elsewhere and they are an essential part of the heritage of our institution. That places a great responsibility on us for their preservation. Even if they are not going to attract most of the users, they have been our highest priority.
- Edited cylinders rank lower because most of them are not unique items and have not been received in the course of our legal duties. On the other hand, though, they are quite rare, especially in the national context, and technical emergency is a serious concern. Therefore, they can be considered a second-rank priority.
- Video cassettes present an interesting case:
 - We have to face two risks: firstly, a survey based on a sampling of the whole collection confirmed degradation owing to age and accelerated by poor storage conditions until 1996; secondly, the obsolescence of technology - already a reality for the rarest and oldest formats – can be expected for all the others in the short or medium term. Even VHS players (at least professional ones, that is) will disappear sooner or later, and the market for maintenance will be extremely narrow.
 - Regarding the contents, some are very rare documents (institutional video, made for internal use in private companies, for example) but others are quite common, such as movies that also exist on a much better carrier: celluloid. Scholars and students working on cinema are attracted by this collection, probably because they cannot have access so easily to so many documents anywhere else, even in film archives. Intensive use of these cassettes heightens technical emergency for them. Consequently, parallel to systematic transfer of the whole collection beginning with the oldest item, a cassette is digitised directly any time it is requested for viewing.

Sound Transfers and Preservation on CD-R

All the recordings are being digitised in PCM 16 bits/44.1 kHz for the time being. Several types of carriers are processed by private contractors, mainly if their use and their state of conservation allow it. This is a way of focusing our human resources on the most complex operations.

This arrangement can change. Acetate reel tapes were transferred in our own studios at first. When they proved to be in a good or very good condition, their transfer was externalised. However, we also received the transferred cylinders to examine them before the actual transfer. This was done in order to choose the best item, control all the parameters, and where necessary, to assemble different parts of the same recording.

We have three goals in planning to replace our 4-year-old studios with new equipment, :

- To be able to digitise at higher bitrates (e.g. 24 bits/96 kHz)
- To produce WAV files, especially in order to store secondary information about the original (such as matrix number and recording speed) in metadata along with the data¹
- To integrate equipment that will have wider compatibility (this is very important concern for us, as we are unable to change our model of CD writer for a more satisfactory one).

CD-R has been chosen as an intermediary medium for storage of our digitised sound holdings. Since archival use of a WORM medium such as CD-R is unsafe if you cannot check native quality and ageing, we have a CD analyser that provides us with data on error rates and optical properties of the medium. AFNOR (the French standardisation organisation) published its standard Z42-011 in 2001, which defines five levels of quality, based on error rates, and retains only the two highest for archival purposes. It is also likely to monitor the latest after a third of the CD life expectancy claimed by the manufacturer.

Our CD analyser (CD-CATS SA-3) is used in three steps:

- to validate newly received sets of blank CD-Rs
- for regular quality control after writing
- to check ageing every 2-3 years and regenerate by copying before the CDs have reached the maximal tolerated error rates.

Since analysers work in real speed, ageing checks can be done only on samples. Having samples as representative as possible of the whole collection is thus a major concern. That is why we keep in a database the serial numbers of the CD-Rs, which correspond to the items manufactured by a certain production unit at a certain time.

Mass Video Transfers

The digitisation format that has been chosen for video is MPEG-2 MP@ML with a constant bitrate of 6 Mb/sec. The cost of storage dictated the choice of compression. We are not constrained by broadcasting and interchange necessities, for which MPEG-2 is designed. Nevertheless, choosing an open, widely accepted standard was the best guarantee of retaining access to the digital files in the future. From a qualitative point of view, the profile, level and bitrate chosen are completely satisfactory, if one takes into account the original formats of our video holdings. The risk was to maximise the use of material and human resources in order to transfer 100 000 hours in 10 years' time.

¹ Cf. G. Brock-Nannestad, « Today's decisions that future users will have to live with », paper presented at IASA Congress, 2002

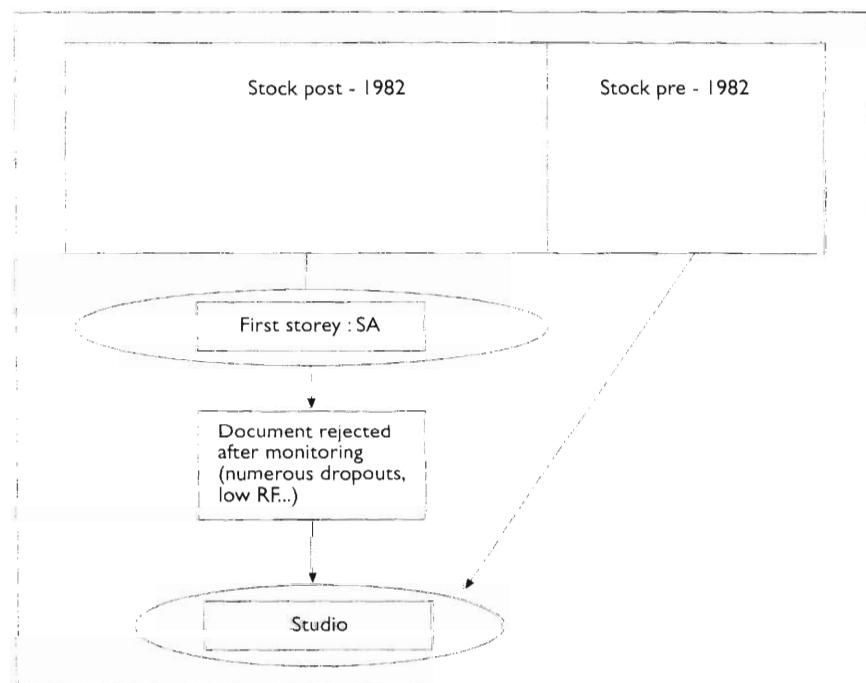
Obsolete or endangered formats (such as V2000, Betamax) were transferred by specialised companies before proper facilities had been completed. We have had an intermediary digital Betacam master made, so that it can wait safely before we compress it more severely in several years' time and manage it, like the rest of the digital archive, in the long term.

The larger part of the collection needs mass treatment, for which specific facilities have been implemented. These facilities take advantage of the existing networked access system that was designed initially only for users. Putting the cassettes in the VCR is an automated process so that the user can navigate from one document to another without depending on human handling. Software and hardware changes now allow use of the VCRs for another purpose as well, which is the automatic digitisation of documents – especially at night.

The programs are checked afterwards by operators who have diversified their work: they alternately serve the users and watch digital files to validate the result.

The second level of the facilities consists of a specialised studio with a well-trained technician. Its capacity is about 1500 hours per year (compared with the potential 8 000 hours of the first storey), but it can do good work on poorly issued (which is often the case with such formats) or poorly conserved material. The two levels have similar basic equipment, and the main advantage of the studio is a restoration tool.

DIAGRAM 4



For digitised video, high-capacity LTO storage tapes (a high-capacity format designed by a consortium of manufacturers) have been chosen as the target media. MPEG-2 is embedded in TAR files. The tapes are stored quite 'traditionally' in the stacks, with air regulation optimised for magnetic tapes. As for CD-Rs, backup copies are stored in watertight polypropylene boxes and in a distant place (30 kms from the main building in Paris): they protect us against losses owing to disaster, or simply destructive mishandling.

In a domain that is still young, it is quite difficult to formulate a long-term vision. Hence the interest in following the activities of a working group named PIN (*Préservation de l'Information Numérique = Preservation of Digital Data*). Initiated by the National Centre for Spatial Studies (CNES), its members are institutions and individuals who work mainly in the public records and electronic publication fields, not in audiovisual. However, the problems of preservation, regeneration and control are very similar, if not identical. In the digital era, we can expect fruitful co-operation with unexpected partners.

The Challenge of Rights Management Research-Generated Recordings

*Anthony Seeger, University of California at Los Angeles
Paper presented at the IASA conference, Aarhus, 2002*

This paper was presented as part of the first participation of the Research Archive Section of IASA, in Aarhus. We prepared the session to contribute to the conference focus on *Digital Asset Management (DAM)*. As you will see, however, this paper might be considered an introduction to the challenges of *Digital Liability Management (DLM)*. In this paper I shall (1) define what I mean by "research collection," (2) describe the kinds of intellectual property rights that apply to research collections, (3) discuss the relationship between archive "collections," "assets," and "liabilities" as these relate to research collections, and (4) briefly introduce the Smithsonian Institution's Global Sound Network project, which takes a new approach to some of these issues in an endeavor to make archive collections more accessible whenever possible.

Definition of a Research Collection¹

A research collection is a collection of audiovisual materials produced as a side effect of a research project. The materials are usually not recorded for commercial purposes, but rather obtained as documentation collected for other purposes. The results of the research projects of which the collections are a part often appear in other formats: for example in books, scientific articles, and Internet dissemination. Research collections often include large amounts of supplementary information. The audiovisual recordings are often supplemented with a wide variety of other materials assembled by researchers during their work. These may include written notes, photographs, drawings, posters, material culture such as musical instruments, and sometimes surprising amounts of miscellaneous paper such as receipts for food and lodging.

In some research projects, for example ethnomusicological research, the audiovisual recordings may be a principal objective of the researcher, who uses them as primary sources for analysis.

In other research, for example ethnographic investigation, the recordings may be of less importance and no analysis of them undertaken.

It is probably easiest to define a research collection through contrast. Imagine a popular music producer who wants to create the best-selling recording in the world. He or she assembles lawyers, audio engineers, composers, and lyricists, and a group of musicians. They all sign contracts and make an audio and video recording whose purpose is to make money quickly, to be played on all radios and television sets and sold through all commercial outlets. The purpose of the recording requires clear definition of all the intellectual property rights of every party in the transaction, and these are established prior to making the recording. If an archive wishes to use the recording during the period of copyright, it can easily contact publishing companies and collection agencies (which may or may not permit the desired use).

¹ The purpose of establishing a definition at the start of the first session of the Research Section was not to fix a single definition, but to articulate one that could be refined, refuted, or reworded. There was no discussion of the definition at Arhus, so I have left it as presented, for future discussion. I have written on related topics before (Seeger 1996 and 2001).

Contrast that popular music recording with audio tapes made by a researcher who painstakingly records 41 versions of the same epic, performed by members of a small linguistic group in a language understood by only a few thousand people, of which all but five are too poor to purchase recordings. The purpose of this research is to understand the relationship between text and musical features in epic singing. The researcher records both the best performers and the worst ones, in order to compare stylistic features. Since the purpose of the recording is to analyze the performances, rather than to sell them, the researcher probably doesn't even think about obtaining contracts from the performers. Publication is not commercially viable, partly because some of the performances are not very good, partly because the songs are so long, and partly because the language is understood by so few people. At the end of the research--often after the researcher's death--such recordings may be donated to audiovisual archive. As such they pose particular problems for archivists.

Research Collections and Intellectual Property Concerns

Research collections present some specific intellectual property challenges rarely encountered in commercial recordings originally prepared for sale.

First, the researcher is an important figure in the collection, and often claims rights to the materials. This feeling of authorship and ownership of collections is felt strongly by most researchers, even though such ideas may not be reflected in national or international copyright legislation. Collectors usually insist on retaining some rights over the materials. They often seek to restrict access to all or part of their collections. Some of these restrictions make a great deal of sense, for example limiting access to sensitive material that might affect either the people recorded or the researcher or publication restrictions until the researcher's book is completed and published. Other restrictions more difficult for the archive to justify are also common: prohibiting access even to the families of the performers or restricting access because the collector does not trust the archive to protect the materials. These restrictions must be considered by archivists in addition to copyright laws and ethical obligations when they consider dissemination of their collections.² The collector's restrictions on the use of his or her collection are usually regulated by a contract between the archive and the collector.

Second, because no commercial use was imagined when the research were made, typically no contracts transferring the rights of the performers to the collector were created or signed. Thus the collector is unable transfer any dissemination rights to the archives because they were never obtained. Since research collections often come to the archives long after the research, it may be impossible to find the original performers to obtain their consent to dissemination through the archives.³

² The 1957 Statement on Copyright in Folk Music of the International Folk Music Council (adopted by its General Assembly on August 26, 1957) makes this point clearly: "The Council considers that the collector should be entitled to the fruits of his labour and it therefore approves the practice of regarding the folk music collector as the 'first owner' of his particular written copy or recording, and of giving him the same protection for his work as would be granted by the laws of his country for an original composition, it being understood that the collector is free to cede his rights by contractual agreement to others" (IFMC 1957 paragraph 6).

³ Not all research collections are plagued by such problems, however. When research institutions make their own collections, these are often more quickly deposited in the archive, and institutional policy may encourage more clearly documented rights management. The problem described here is more common in archives that acquire collections made by other researchers.

Third, many communities around the world have different ideas about "creativity" and "composition" than those envisioned in European-derived copyright legislation. For instance, in the example above the performers could believe that the epics were revealed to them by gods. The true creators of the epics might thus be immortal. This creates distinct problems for copyright laws based on the lifetime of a composer plus seventy years: what is the lifetime of a god? Such differences between local concepts and international legislation are unimportant as long as the performer and the researcher agree on how the materials are to be used. They may become very important in further use of those materials by archives, record companies, and other forms of dissemination

Fourth, the artists may also hold very different ideas about ownership of ideas and performances than those underlying international copyright legislation. Some communities argue that a piece of knowledge is owned by a lineage, or clan, or gender, or an age group. It can thus be very difficult to obtain permission for a recording even when the researcher tries to do so. Who signs the forms? The gods? A newborn child? All the members of the lineage?

Clearly, the variety of rights to research materials and the number of permissions required in order to obtain authorization to widely disseminate them can very large. Instead of being able to obtain clearly defined rights from a publishing company or collection agency, archives with research collections may have to deal with creations by gods, music owned by groups, and recordings also controlled to a certain degree by collectors—none of whom are easily accessible.

Digital Assets and Digital Liabilities

In the language of U.S. corporations, collections controlled by gods, lineages, and scholars are rather difficult to call "assets." In his keynote address at the IASA conference, Chris Clark presented a diagram that distinguished between a "collection" and an "asset" as part of his discussion of managing knowledge as a digital asset (Clark 2002).

The extent to which we can engage in this frenzy of recycling and re-purposing will, of course, depend on whether we own the rights or a license to do so. But also, since we have introduced the word "asset" in this conference in place of the more common word collection or "holdings", we will need to consider some additional bureaucratic measures. We all have digital objects [in our archives,] but they will only be classed as assets if an auditor can answer questions such as:

*Has the archive documented the object's development costs?
Has the archive documented how the object has directly contributed to a sale or an identifiable cost saving?
Has the archive taken prudent measures to ensure the object is protected from misuse?"*
(Clark 2002)

It is possible that many research collections deposited in archives will never be counted as "assets" by archival auditors. If we are to apply business models to archives (and they seem to be the operational models for most early DAM projects), then we must acknowledge the possibility of digital liabilities--collections that are not assets, which may cost more to preserve than they will ever generate in income, which are apparently repetitious and obscure to the general public, and to which the archive does not possess most rights. In addition to Digital Assets Management (DAM), archives need to come up with plans for "Digital Liabilities Management" (DLM) as well.

Even though some research collections might be considered a liability because among other things the lack of clear rights may prevent an archive for making them widely accessible, that does not mean they lack significance. Evaluating the potential uses of research collections must be done very carefully. The community whose epics were recorded by the researcher might, in subsequent decades, find in those epics the key to its identity and social and cultural renewal. Even the recording of a very poor singer might become significant if, for example, the prime minister discovers it is his grandfather's performance, and makes the epics an obligatory part of elementary education.

Rarely heard recordings may have an unexpectedly large influence on the directions of music and culture. For example, it is widely recounted that Bob Dylan heard a recording of Woody Guthrie at a party and was so influenced by it that he emulated Guthrie's style and made it popular in a way it never had been before. Thus one could argue that a fairly rare recording played at a party changed the course of 20th-century popular music. Other examples, such as the influence of the Balinese gamelan on European and American avant-garde composers, demonstrate similar processes. The significance of an archival collection should not be judged only by how many people use it, but also by a collection's impact on those who do so. Thus, even collections that may never be elevated to the status of "assets" for dissemination purposes may be used by communities to forge political and cultural consciousness or may be applied by talented users to transform the music of their era.

How can digital liabilities--collections with highly restricted access--be turned into digital assets or into cultural assets where local communities can access them? This is a question addressed by the Smithsonian Institution's Global Sound project

The Smithsonian Global Sound

Smithsonian Global Sound (SGS), a project of the Smithsonian Institution's Center for Folklife and Cultural Heritage, is an Internet-based distributor of music from research collections in archives from different parts of the world. It was established with the intention of benefiting local artists and research archives as well as users. The project partly derived from my experience as a researcher, as former director of the Indiana University Archives of Traditional Music, and from my experience as the curator and director of the Folkways Collection at the Smithsonian from 1988-2000. It was further developed by colleagues at the Smithsonian Institution's Center for Folklife and Cultural Heritage.⁴ The origins lie in a set of ideas that go back some time.

Six concepts fundamental to the SGS are that (1) commercial music is widely distributed while non-commercial music is difficult to find and hard to get permissions to use; (2) Archives have large amounts of wonderful music in their research collections but often lack rights to disseminate them; (3) Traditional artists often have a low status in their own communities and have difficulty finding students to whom to pass on their arts --partly because only popular musicians make any money; (4) Many archives also have a low status, subsist from grant to grant, and would be greatly assisted by an income stream of their own; (5) For both artists and archives, money is more than a medium of exchange, it is also a symbol of worth; (6) Many archives would benefit from the capacity to digitize their collections and establish new relations with artists that would allow them to disseminate more of their material.

Global Sound seeks to create a network of archives that will put parts of their collections—those for which they can clear rights—on-line for paid uses, including digital download, streaming, and licensing to CD projects, films, videos and other uses. Since the Smithsonian office responsible for the project (the Center for Folklife and Cultural Heritage) recognized that many research archives do not have either the funds to digitize their collections or the necessary clearances to make even parts of their collections available for paid distribution, it applied for a cultural development loan from the Rockefeller Foundation, supplemented with funds from the Paull Allen Foundation, and hired a project Director, Jon Kertzer. Kertzer had a broad experience with multimedia projects at Microsoft Corporation and the Experience Music Project in Seattle as well as graduate training in ethnomusicology.⁵ Global Sound provides start-up funds to selected archives with research collections to enable them to begin digitizing their collections, and also simultaneously to obtain rights to parts of their collections so that they can provide materials for the Global Sound Web site www.GlobalSound.org

⁴ Although I left the Smithsonian in 2000, I have been serving as an informal advisor to the Global Sound Network project since its inception.

⁵ A preliminary launch of the site is anticipated in mid-April 2003.

The project began with the Folkways Collection at the Smithsonian Institution and two other archives, the Archives and Research Center for Ethnomusicology (ARCE) in New Delhi, India, headed by Dr. Shubha Chaudhuri and the International Library of African Music (ILAM) in Graham's town, South Africa, headed by Andrew Tracy. They were selected because they represent very different musical traditions, and were already well on the way to initial digitization. We hope that the experiences they have in digitization, rights clearances from the necessary parties, the design of forms, and experience with artists can be useful to other archives that are trying to increase access to the research collections they have acquired.

The SGS will provide metadata as well as sound files. In addition to basic information about the provenance of the recording, photographs, translations of texts, and other contextual information will be made available--provided by the participating archives. Educators have been recruited to work with project designers to make the site useful to teachers and students at all levels.

Once the Web site is up and running, funds will be divided in an unusual way. The initial plan is that for every \$100 the project receives, the Smithsonian will retain \$50 for maintaining the Web site, paying back the loan to the Rockefeller foundation, and adding new archives to the network. The archive that contributed the music will receive the other \$50, which is to be divided between the archive and the traditional artist(s), whose music was played, downloaded, or licensed. By assisting archives to set up channels for payment to artists or their communities, Global Sound hopes the digital distribution of recordings will help support the archives ongoing efforts to preserve the cultural heritage of the communities in a collection, and also support the artists whose collections they house.

The project envisions a new kind of relationship between research archives, collectors, and performers. Instead of the three being distant and unininvolved, we hope that collectors will do a better job of explaining and transferring rights and that archives will become sources of hope and pride for performers, communities, and collectors alike. In this vision, research collections held in archives will materially benefit traditional artists and encourage a younger generation to learn from them. No less important for the long-term preservation of cultural knowledge, archives themselves will benefit from income to pay for the expense of preserving all the cultural traditions represented in their collections, including their "digital liabilities"—collection to which access always be restricted.

Money is not only a medium of exchange, it is also often perceived as a symbol of worth. During my years at Smithsonian Folkways Recordings, I repeatedly found that artists and communities felt that even a small payment was a significant acknowledgment of their worthiness and high quality. Similarly, when archives receive a small amount of money from outside sources it often becomes easier for them to raise money within their own institutions. For both artists and archives, money from outside is taken as a kind of legitimization of the activity itself. The project participants hope the Global Sound network will thus have a positive impact on the originating artists and archival institutions, as well as on the consumers who may be moved in profound ways by the music they discover on the site.

Conclusion

Institutions around the world are learning that while it is important to increase accessibility to parts of their collections, they must do so carefully, thoughtfully, and ethically, or not at all. Research collections present specific challenges to Digital Asset Management because of the complexity of the intellectual property rights that apply to them. Addressing these challenges, and turning Digital Liabilities into Digital Assets will take a lot of effort and training on the part of archives and their staff. Smithsonian Global Sound focuses on those collections that can be made accessible. Some research materials, however, can never be made available for widespread dissemination. For example, epics composed by gods, or owned by lineages that do not wish to share them, or performed poorly, may never become archival assets. Research archives may continue to hold some collections accessible to only a few users--but not without influence on that account. It is extremely important to budget for, plan for, and learn to manage these digital liabilities as well. Even as we may move to transform some of our digital liabilities into digital assets, we must take care to manage them both.

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Selection Criteria for Archiving Radio and Television Programmes - The Danish experience

*Harald v. Hielmcrone, State and University Library, Aarhus, Denmark
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Abstract

In 2001, a working group was commissioned to describe a project for archiving a representative selection of Danish radio and television programmes. The process involved two preliminary steps: establishing selection criteria and developing a common typology for classifying the programmes.

It was anticipated that the interests of researchers and broadcasting companies would differ considerably. In the end, however, there was a considerable degree of agreement on what kind of programmes should be archived.

Introduction

In 1999, a working group finished a report to the Ministry of Culture on digitising the archives of the two public service broadcasting companies, Danmarks Radio and TV 2. The purpose of digitisation would be preservation, re-use and - where probable regarding copyright regulations – public access to archived material.

The total costs were estimated to be approximately 600 million DKK.

For obvious reasons the ministry was not able to launch such a project, and instead in 2001 commissioned a new working group to describe a project within a budget of 80 million DKK for archiving a *representative selection* of Danish radio and television programmes, primarily to serve the needs of research and preservation of cultural heritage. Re-use of programmes by the broadcasting companies was a secondary goal. It was anticipated that the interests of researchers and broadcasting companies would differ considerably, and it was therefore necessary that the Ministry took a decision on priorities.

The working group consisted of representatives of the two broadcasting companies, Danmarks Radio and TV 2, the Danish Research Council for the Humanities, and the State and University Library of Aarhus.

Selection criteria

The development of selection criteria for identifying a representative selection was primarily done by the representative of the Danish Research Council for the Humanities, Prof. Dr. Phil. Klaus Brun Jensen.

Three different types of selection criteria were identified

1. Formal criteria
2. Structural criteria
3. Content based criteria

I. Formal criteria

The formal criteria have the following dimensions:

- 1.1 Periods of time
- 1.2 Completeness v. incompleteness
- 1.3 National v. foreign production

I.1 Periods of time

The criteria for selection should be defined per decade as the condition of the archived material varies dramatically depending on period of production and the media used.

I.2 Completeness v. incompleteness

One must distinguish between a) complete, b) very incomplete, and c) less incomplete collections

In the case of a) complete collections, structural criteria and criteria based on contents come into play. In the case of b) a very incomplete collection, the whole collection is preserved. The problem arises with c) less incomplete collections. This has to be operationalised.

When is a fragment sufficiently informative to be preserved? An important factor for deciding this might be whether the fragment has already been registered in the Archive, and whether manuscripts or other documents relating to the fragment exist.

I.3 National v. foreign production

The main rule has been that for copyright reasons only the broadcasting companies' own productions have been archived. This amounts to approximately 50% of the programmes. Foreign productions have normally been returned after use. From a research point of view this is, of course, very unsatisfactory. Foreign (especially US) productions play a very important role in Danish television. Without them much of what otherwise happens in society and in the cultural sphere will not be properly understood.

2. Structural criteria

Structural criteria may be decisive for purposes of research and preservation of the cultural heritage.

A characteristic feature of broadcasting of radio and television programmes is the *flow* of different kinds of content. An important goal is to be able to represent the content of the media in the same structure as when originally broadcast.

2.1 Programmes

Singular programmes or broadcasts are the basic units. They are the equivalents of literary or artistic works in other areas of culture production, e.g. a book or a painting. Programmes are categorised in different genres, e.g. fact, fiction, entertainment, sport etc.

2.2 Serials

Serials are the most important and the most common form of all radio and television broadcasting. Serials include serialised stories and episodic serials. *The News* may be the longest serial in history. The criteria should define to what extent serials should be archived completely or only in part.

2.3 Program structure

Radio and television broadcast consists of a *flow* of content. Therefore, it is vital that this flow can be preserved or reconstructed at defined intervals. This should have the same priority as the preservation of single programmes or serials.

In practice, it will be extremely difficult to reconstruct the program structure. It can only be preserved by tape recording the entire broadcast. In Denmark, broadcasters are by law obliged to keep control tapes of everything that is broadcast for a period of 6 months. After this period, the tapes of DR and TV 2 are deposited in the Media Archive. This means that from 1987 we may show the whole program schedule for a given period.

2.4 Cultural hypertext

Radio and television programmes are produced in a social context of other cultural productions, e.g. literature, music, movies, &c. and are often connected to such products. It is important to identify the nodes that connect the radio and television programmes to other cultural productions.

3. Content based criteria

An important aim is that the selection is not influenced by subjective preferences. Therefore, the influence of content-based criteria should be minimised. Formal and structural criteria are means to counter such tendencies.

This said, however, the formal and structural criteria must be supplemented by criteria relating to specific subjects and individuals.

Before the criteria can be applied, they have to be operationalised, i.e. defined in operational terms.

Genre typology

A precondition for making a representative selection is that the programmes are classified or categorised according to the same principles to get an overview of what kinds of programmes there are, and how many of each kind. On this basis one must make a statistical calculation in order to determine how many programmes of each kind, period and place in the programming schedule are to be selected.

There exists no common classification system used by the Danish broadcasting companies. Therefore, the working group decided to develop a classification system. This was co-ordinated with systems used by Danmarks Radio and TV 2, and the EBU draft standard.

There are eight main groups

- Fact
- Fiction
- Entertainment
- Public Access
- Juvenile programmes
- Local and regional programmes
- Presentation
- Advertisements

These have then been subdivided and agreed upon by the committee.

Once done, the broadcasting companies, Danmarks Radio and TV 2, were asked to indicate on the list if programmes of the different genres were to be digitised, and to what extent.

The result is summarised in the following list:

Facts	DR-TV	TV2
• News	All major events, domestic and foreign.	All
• Current events	All major events	All
◦ Debate and dialogue	All that reflect the political, social and cultural development in DK	
◦ Magazine programmes	All that reflect the political, social and cultural development in DK.	
◦ Reports	all	
• Documentary	A large selection, representative of the practitioners of this genre	All
◦ Short films		
◦ Radio documentary		
◦ Reality TV		
◦ TV documentary		
◦ Portraits	all	
• Education	A representative selection	All. Priority to programmes less than 5 years old
◦ Children & youth		
◦ Grown-ups		
• Transmissions	A representative selection	All
• Service and consumer programmes (e.g. weather and traffic reports etc.)	A representative selection of DR history	No interest. Consumer programmes if less than 5 years old

Fiction**All TV 2 -
productions**

• Animation	
• Puppet films	A representative selection of serials
• Cartoons	A representative selection
• Trick films	
• Computer animation	
• Drama	
• Theatre plays	
◦ Transmission	All
• Radio plays	
• Television plays	All
• Music drama	All DR productions
◦ Ballet	
◦ Transmission	All
◦ Dance	
◦ Transmission	A representative selection
◦ Opera	
◦ Transmission	All
• Musical	
◦ Transmission	All
• Short features, short films (<i>everything under 65 min.</i>)	All
• Recitation	All
• Radio montage	
• Feature films	All if DR has copyright
• TV films	All if DR has copyright
• TV series	All if DR has re-transmission rights
◦ Episode series	
◦ Serial stories	
◦ Miniseries <i>(2-6 sections)</i>	

Entertainment	All entertainment programmes are of interest, either for re-broadcasting or for reuse in other programmes.	All TV 2 - productions
<ul style="list-style-type: none"> • Miscellaneous programmes • Stand-up entertainment <ul style="list-style-type: none"> • Circus • Transmissions • Talkshows • Satire and revue <ul style="list-style-type: none"> • Transmissions • Competitions <p>(incl. quiz and game show)</p> <ul style="list-style-type: none"> • Transmissions • Music (incl. music videos) <p>(subdivided according to genres)</p> <ul style="list-style-type: none"> • Transmissions • Sport <ul style="list-style-type: none"> A representative selection. All major Danish victories • Transmissions 	<ul style="list-style-type: none"> All. Priority to programmes less than 5 years old 	
Public access	A small selection to document DR-history	All TV 2 - productions
<ul style="list-style-type: none"> • Public access in the editorial process • Programmes with contributions from viewers/listeners • Request programmes 		

Children and youth	A selection on the significant programmes reflecting children's place in society, their attitudes and the attitudes of grown ups towards children	All TV 2 - productions
<ul style="list-style-type: none"> • Subdivided according to age • Subdivided according to the designations of genre 		
Regional programmes	All that reflect the political, social and cultural development in the region	
<ul style="list-style-type: none"> • Programmes of regional stations • Other regionally or locally focused programmes, transmitted on a national channel 		
Presentation	A representative selection	No interest in reuse
<ul style="list-style-type: none"> • Station identification • Programme parades • Trailers and spots • Licence spots 		
Commercials		No possibility for reuse without permission

When one looks at this list, it becomes clear that the interests of researchers and broadcasting companies coincide to a large extent.

In general, the companies are interested in preserving all of their own productions or a representative selection of it. This means that if one is to make a representative selection of all programmes, one cannot avoid selecting programmes which are also of interest to the broadcasting companies.

There is one important difference, however. When forced to choose broadcasters would prefer to take the "good" programmes. Researchers also need the bad ones.

Conclusion

An important result of this work was a generally applicable typology of genres together with criteria for selecting and preserving Danish radio and television programmes for posterity.

The development of the typology shows a considerable congruity in the way of categorising used by researchers and broadcasting companies.

Finally it must be noted that the work on defining selection criteria led to a greater awareness of the importance of formal and structural criteria in order to balance the bias that inevitable will result, if only content based criteria are used.

There are three possible roads to ruin – women, gambling and technology. The most pleasant is with women, the quickest is with gambling, but the surest is with technology'

Georges Pompidou (1968)

Long Life to History and Audiovisual Technology!

Saúl Maté-Cid, Belgium

Paper given at the IASA conference, Aarhus, 2002

Abstract

Generally speaking, technology may be considered a cornerstone of twentieth-century life, especially in the Western World. However, because there seems to be a need for a healthy and wide appreciation of industrial and socio-cultural issues that relate to technology in general and audiovisual archives in particular, this article basically proposes to give some thought to this. Some of the issues include education and university-industry partnerships, problems of manufacturers and users, standardisation, and obsolescence of products.

As a recent member of IASA, the author would like to acknowledge the relevant work of the Association in strengthening an increasingly popular aim to make history live healthily. In order to increase the efficiency of collaborative efforts in the preservation and dissemination of audiovisual material, the nature of the problems relating to technology should be pondered. This article is thus intended to call the reader's attention by expressing an overall view of both the new configuration of the audiovisual sector and the process of rapid change throughout the world. And it is within academic and industrial contexts that the article has been written since the author is a student of audio technology, and has just finished a one-year placement in the acoustical predevelopment laboratories of a multinational company. Furthermore, it is also intended to highlight the significance of actual and prospective developments in digital technology since the start of the world-wide liberalisation of telecommunications in 1996. The expansion of private service providers in the telecommunications industry and the convergence on information technology may be considered the main reason for the impending digitalisation of technology. The result of this being a larger capacity to deal with information.

Before continuing, it should be noted that the performance of a system, which denotes here a set of essential elements or subsystems, is dependent on the interactions of its elements and not on the individual performance of the parts (this resembles teamwork). According to Andrew [2001], the synergy that makes the entire system (the team) greater than the sum of its parts (members of the team) is a factor of the relationships between its subsystems. Consequently, the presence of controlled entropy (disorder) should be recognised and managed by paying sufficient attention to each other and the rest of the world.

Some contribution towards the development and construction of audiovisual systems or products maybe expected from students. This is because there is a general necessity of both qualified constructors of new systems and maintainers of old ones, but no way of graduate students who know a bit of everything and nothing about the technical procedures, which may be taught in a professional environment such as a vocational qualification or an industrial placement. Since a few years ago, the innovation of education systems has constituted an essential factor to control the rate of technological changes and its repercussions on the organisation of work. The appearance of new technologies and active consumers has originated a great amount of products and services to handle a great amount of information, which powers the creation and development of companies that evolve towards new strategies of promotion, commercialisation and distribution of audiovisual products. From transnational policies of production, changes, and new developments, new formative necessities are deduced to obtain both a suitable qualification and a capacity for fast adaptation to the new organisation of the product creation process. In this respect, decisions made by Research and Development departments affect manufacturers of electronic equipment. In other words, economic strategies transform audiovisual markets, as explained below.

We are floating along in a stream of industrial revolutions, the current one being the result of improvements in information processing. Human capital plays a vital role in the digital transition and training people, as part of the economic strategy, costs money. As a consequence of economic changes and the complexity of digital techniques, it is crucial to qualify people who are able to make good use of technological innovations. At the moment, society has a great capacity to process information, which has always been highly valued in order to manage situations. These may range from trivial everyday duties to more important matters, such as problems persisting from generation to generation. One of the problems is disorientation that makes access to suitable information difficult; this problem is now more acute due to the increasing flood of messages that engulfs us. Another example is the lack of critical capacity to distinguish between veracity and manipulation. Nevertheless, the solution to these problems requires the training of people in the first instance.

Turning back to the product creation process, Békésy [1960] has characterised the path of scientific research as follows:

'Of great importance in any field of research is the selection of problems to be investigated and a determination of the particular variables to be given attention. No doubt the verdict of history will be that the able scientists were those who picked out the significant problems and pursued them in the proper ways, and yet these scientists themselves would probably agree that in this phase of their work fortune played a highly important role. When a field is in its early stage of development [as it seems now to be the case with digital technology in audiovisual archives], the selection of good problems is a more hazardous matter than later on, when some general principles have begun to be developed. Still later, when the framework of the science has been well established, a problem will often consist of a series of minor matters.'

He goes on to enumerate some of the forms scientific problems may take. These range from the "classical problem", which has been under attack, unsuccessfully, for a long time, to the "pseudo problem", which results from alternative definitions or methods of approach, and is not really a problem at all. Békésy warns us to beware of both the "premature problem", which is poorly formulated or not susceptible to attack, and the "unimportant problem", which is easy to formulate and easy to solve, but does not increase our fund of knowledge.

Two types of problems produce most of the worthwhile scientific results. First, the "strategic problem", which seeks data to support an intelligent choice between two or more basic principles or assumptions. Second, the "stimulating problem", which may open up new areas of exploration or lead to re-examination of accepted principles. Of course, the strategic problems when attacked and solved, lead to great steps forward. But one must not spend so much time and effort searching for strategic problems – they are very hard to come by – that one does nothing at all except search. It is really the "stimulating problem" that comprises most good research. A series of stimulating problems may, in the end, lead to a "strategic result".

Midwinter [2000] has also noted that a few decades ago, the challenge in engineering appeared to consist in trying to find a technical solution to a well-defined problem. Innovation at this level often spawned highly detailed work at the component level leading to new components, which could be used to solve the problem. Today, one finds that the major activity is much more market focussed, concerned with identifying market niches for new products and then selecting the best possible solution out of many possible ones in terms of cost-benefit and rapid delivery to a global market ahead of one's competitors. There seems to be an eagerness for moving quickly towards solutions rather than spending more time understanding the problem. And the solution is likely to involve a complex system that draws upon a wide range of different disciplines for its implementation.

At this point, particular attention should be paid to the concept of technology. McOmber [1999] delineates three meanings of the term technology assumed in popular and academic discourse: technology-as-instrumentality, technology-as-industrialisation, and technology-as-novelty.

- Technology-as-instrumentality: 'One might refer to stone tools as a technology together with technologies of cooking, agriculture, writing, and all the objects and practices that any culture deploys to manage its existence. This definition emphasizes the instrumentality of technology [...] That is, what makes something a technology is simply its status as a tool [...] A more academic use of the instrumental definition [...]: "the organisation of knowledge for practical purposes".'
- Technology-as-industrialisation: 'Considering the social significance of technology, often assumes a more specific meaning. To many scholars, technology as an object of criticism or analysis dates from the eighteenth or early nineteenth century. In other words, many assume that technology is coexistent with the industrialisation of the West. [...] Technology is the product of a specific historical time and place.'

Technology-as-novelty: 'Considering a headline in the Chronicle of Higher Education: Survey shows record number of professors use technology in their teaching [...]. According to the first [definition of] technology, the classroom is a technology. According to the second, classrooms have been pervaded by technology for at least a century. [...] In much popular discourse, technology refers simply to the newest or latest instrumental products of human imagination, and especially to devices not yet widely available or understood. [...] A clear example of this definition and an implied ahistorical narrative arises in the U.S. business press. One can read about and invest in "technology stocks" that trade frequently on the NASDAQ exchange. Interestingly, whereas IBM and Microsoft are technology stocks, General Motors and Consolidated Edison are industrials. If it appears strange that automobiles and electric power are not technological, this is perhaps because of the pull of one or both of the two definitions of technology discussed above. To be labelled a technology stock, apparently, a corporation must be involved in the manufacture of something novel, widely inaccessible, and perhaps even mysterious. Although automobiles or electric power once shared these characteristics and could have been considered technologies, their availability and relative age have removed them from the menu of technological options for investors. [...] One often finds that developed nations have now plunged into "the computer age", the "information age", or, at a somewhat earlier time, "the age of television". The ahistorical character of such labels arises from the way in which the profound social importance of older technologies is forgotten once new technologies take hold. [...] In popular discourse new technology often becomes both amoral instrumentality that differs little from its predecessors and radically new instrumentality that holds the promise of revolutionising everyday life.'

According to McOmber, a definition of technology-as-cultural-practice, which stresses the way in which all technologies arise in the interest of solving problems for some person or group, needs to stand alongside technology-as-instrumentality, technology-as-industrialisation, and technology-as-novelty. So far, it may be said that we are in a 'knowledge-based economy', in yet another 'industrial revolution', and at the risk of experiencing product obsolescence due to 'the business system'.

In general, the driving force for all current technological changes appears to be an economic (and hence political) one since the demand of the audience for new standard products feeds product planning and manufacture. The following increase of sales and product innovation gives rise to a more competitive manufacturing industry. Additionally, it is well known that all technology that affects the public and the equipment they buy affects social habits and consumption directly. Therefore, in the view of the inevitable avalanche of future developments through the 'information highway', some multimedia products should, perhaps, be considered. This reflection will help people to realise superfluities and therefore control the digitalisation at industrial, domestic and educational levels.

Conclusively, electronic products have developed into a mature field for a wide range of audiovisual applications and the role of standardisation is decisive. As Sikora [1997] summarises, the increasing commercial interest in audiovisual communications creates the need for international standard products and services. Commercially, there are two purposes for the

international standardisation of audio-visual communication systems: interoperability and economy of scale. Interoperability allows smooth international data exchange via storage media and communication networks. This is desirable for users and equipment manufacturers. Further, the increasing attractiveness and demand for buying and using communication equipment generates economy of scale, that is a reduction in costs because of an increase in the scale of production.

Although prospective developments for the twenty-first century seem hard to visualise, Handy [2001] predicts how the coming years will see an increasing division between large engineering organisations (elephants) and their smaller counterparts of self-employed individuals (fleas). According to Handy, we are leaving behind a century of institutions and employees and entering a more fluid world of independence, partnerships and coalitions in which the elephants will have to think their structures and their relationships with the fleas. Further, it is the latter that will increasingly own the intellectual capital and provide the flexibility and innovation essential for the elephants' survival and growth. The structures of society, and in particular the systems of education, Handy believes, are still designed for a world that is passing and they too need urgent reform. For Handy industry-based training is of key importance to develop the competencies of newly qualified graduates to fit them to become leaders of R&D in academe as well as in industry.

Some technological analysis has been hitherto outlined regarding economy and society. If the reader is wondering why computerisation is becoming so pervasive, the following may also help to better understand the commercialisation of digital services and products. The question is whether there will exist any other choice apart of computers. To tackle this question, it may be worth saying that humans have always had the aptitude to expand or transform the status quo. Particularly, engineers or technicians are prone to enhance somehow the stimuli perceived from their surroundings. This especially applies to the mass media, through which the average spectator receives the world we live in and then shapes or transforms it according to their perception. At the end of the day, life is all change and motion. Are not then our 'e-motions' and feelings what make everybody move and everything change? No Mr Spock here – the stimuli we receive and perceive keep us moving and we tend to transform what is surrounding us. So it is as if we are going round in circles, spinning, spiralling round the central pillar of our emotions. One example of this may be the development of the telephone. Apparently, the driving force behind the commercialisation of the telephone was actually musical, rather than speech transmission. The telephone made it possible to broadcast a musical performance to many people about one century ago. At that time it caused a sense of wonder, it was amazing. Nevertheless, it is said that there are around four billion people on Earth who have not yet made a telephone call.

Finally, it may be appropriate, briefly, to place some time perspective on the evolution of electrical technology. The reader is encouraged to refer to Bray [2002], who writes about the origins and development of the technology that has transformed telecommunications and broadcasting and created the Internet. The book shows the impact of each innovation upon today's world of communications technology, and looks to the future for the innovations to come. Moreover, Andrew [2001] states that the use of electrical energy dates back to at least

500 BC. We know that during the period 625–546 BC the Greek mathematician and philosopher Thales postulated the idea of electricity. We also know that the abacus was first used in 500 BC, and that in 1642 Blaise Pascal invented the first mechanical calculator. In 1667, the physicist Robert Hooke created the tin-can-and-wire telephone, and in 1876 Bell patented the electrical telephone. When one considers the current state of the art in the computing and telecommunications worlds in relation to these inventions, one begins to get a picture of the explosive evolution of electrical technology. It took approximately 200 years from the tin-can phone to Bell's telephone, but just about 130 years from the telephone to where we are now in terms of communication technology. It took 2142 years from the abacus to Pascal's mechanical calculator, and a little over 350 years from this calculator to where we are now.

Extrapolating over the next 20 years, Moorer [2000] concludes that the main problem facing digital audio engineers will not be how to perform a particular manipulation on sound, but how the amount of power that will be available at that time can possibly be controlled. The quest for power over the medium will lead us into situations of unprecedented complexity. It will require significant ingenuity to package this power into something that human beings can understand and manipulate. In this kind of progress, it is the techniques and discoveries from the professional industry that gradually become accepted into the consumer markets. What is done today in the studios will determine what will be seen in the home in the next 20 years.

Interestingly enough, the synchronoptic World History Chart [Nothiger], which includes 3000 years of world history timelines, as well as numerous biographical lifelines and maps, has been credited as a fantastic use of technology to enable us to leap backward in time and expand our intellectual horizons. Karl Marx said 'The one who forgets history is condemned to repeat it', so he would be certainly amazed by such a handy chart! A glimpse at the timeline of the twentieth century pairs audio with the speeches of representative figures... and why not John Lennon's famous song *Imagine*?

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The MusicAustralia Project

Sonia Gherdevich and Ian Gilmour

ScreenSound Australia, the National Screen and Sound Archive

Abstract

In December 2001, ScreenSound Australia, the National Screen and Sound Archive and the National Library of Australia formed a partnership to develop a web-based service to bring together and deliver music resources for a wide range of collecting institutions and agencies across Australia. In August 2002, the pilot service website was made available online. This article provides an overview of the first phase of development in the MusicAustralia project from the ScreenSound Australia perspective.

Background

Australian national collecting organisations provide an extensive array of web-based music resources and services via the Internet. Even though these services are individually of a high quality, they use different standards for metadata and a multiplicity of systems for delivery.

Users need to locate a variety of sites, using an assortment of search and navigation tools, in order to access national music collections. Example being, ScreenSound Australia has a primary role in collecting and preserving published sound recordings and NLA mainly focus on print based resources. Both organisations provide access to the music collection through their respective websites. Motivated to improve and facilitate user access to music collections spread across Australia, it seemed logical to bring these resources together into a federated service that uses a central pool of common descriptive metadata and applies technology in a sustainable and holistic manner.

During 2002, ScreenSound Australia and the National Library of Australia (NLA), worked jointly to develop a prototype (www.musicaustralia.org) of the MusicAustralia service.

MusicAustralia Project

The vision for the MusicAustralia service is, "to develop a web-based music service to provide integrated access to Australian music resources and information to all Australians and other interested users".

Once the MusicAustralia resource has been fully developed and implemented, users can expect the service to:

- identify and locate music resources in all formats held across a range of collecting institutions;

- access Australian digitised music in multiple formats;
- search for music resources across multiple websites and databases;
- search directories providing access to information on people; organisations, events and related services; and
- access additional services such as reference, interlibrary-loan, publishing online, self-archiving, ISMN Agency, exhibiting and marketing online and communicating with others in the music community.²

First things First: the Pilot Phase

Realising the magnitude of the task, the NLA has appointed a dedicated project manager (Dr Marie-Louise Ayres³) to coordinate and implement the assignment and provide regular progress reports to the Project Management Board, which comprises of senior representatives from both organisations.

The project was divided into manageable stages, from pilot to full production. As an initial step, both the ScreenSound Australia and NLA committed to developing the Music Australia pilot service.

The aim of the pilot is to test the requirements for a resource discovery service that will deliver digital music objects across different formats, organisations from a single web interface. Staff from both organisations meets regularly in joint working groups covering the main areas of service integration: content development, metadata, IT and user interface. These teams have achieved agreed standards relating to:

- a set of sample content with a focus of matching records across institutions;
- metadata mapping and harvesting to enable federated searching across disparate databases; and
- the underlying technical infrastructure and software to interrogate data and related digital music objects for web delivery.⁴

Content Selection

The Content Development Working Group (CDWG) established agreed objectives of the prototype phase which included testing relationships between:

- sheet music and published audio materials;
- published audio and archival recordings;
- published music and manuscripts;
- different audio formats;
- pictorial images;
- different manifestations of the same work; and
- synchronising sound with image (of sheet music) and lyrics.

¹ <http://www.musicaustralia.org/about.html>

² <http://www.musicaustralia.org/about.html#vision>

³ Dr Marie-Louise Ayres, Project Manager – MusicAustralia Service, National Library of Australia (mayres@nla.gov.au)

⁴ <http://www.nla.gov.au/wgroups/projectma/Documentation/MAPIlotSummary.doc>

Criteria for the content selection for the prototype included:

- demand and public appeal;
- relationship to other organisational initiatives;
- collection strengths of both institutions;
- relevance to collaborative projects with other institutions; and
- representativeness of gender, style, historical period, etc.

The CDWG generated a priority list of works that included a cross-representation of the major music styles and genres, such as:

- war, topical and location songs;
- various performances of Australian iconic songs, e.g. Waltzing Matilda;
- radio commercials and jingles;
- music relevant to national celebrations, anniversaries of significance, anthems;
- music of the 1960's; and
- some examples of classical music and jazz.

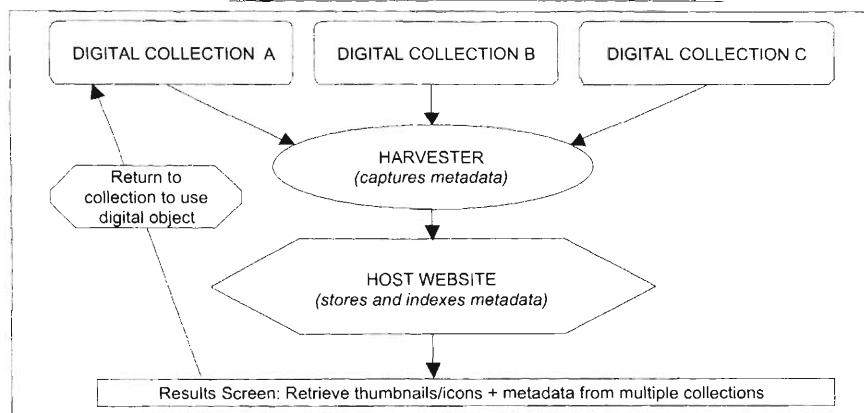
Throughout the selection process, concerns were continuously raised about obtaining copyright clearances for contemporary works. For the purpose of providing sample content, ScreenSound Australia mostly selected performances that did not have copyright restrictions. However some contemporary works are represented in the pilot service and the challenge to obtain permission to digitise modern performances has not been relinquished.

The Technicalities

Service Model

Experience from previous projects, clearly indicated a need to keep the MusicAustralia resource discovery service model simple. The website prototype includes a central repository of existing but re-purposed metadata, hosted by the NLA and a distributed digital resource repository, where each partner organisation maintains, stores and delivers its content.⁵ The following diagram illustrates the service model:

Fig1: MusicAustralia Service Model⁶



Metadata Standards

The Metadata Working Group (MWG) was tasked to establish a metadata standard that would allow users to search and retrieve information from a variety of catalogue records and descriptive schema formats, e.g. MARC records from NLA and accessioning records from ScreenSound Australia's collection management system, MAVIS (Merged AudioVisual Information System).

Although innovative metadata models have been introduced recently (e.g. FRBR⁷, METS⁸, MODS⁹) the Dublin Core¹⁰(DC) standard was selected because:

- it offered a straightforward, uncomplicated approach that most organisations could readily adopt;
- most staff were familiar with DC;
- it has proven successful in other NLA projects;
- is compliant with Australia Government Locator Service (AGLS) requirements; and
- is an internationally recognised standard.

NLA and ScreenSound Australia underwent several exercises in mapping data fields to DC elements using existing catalogue records from both organisations. A data field crosswalk (MAVIS to DC and MARC to DC) was achieved and a set of DC qualified metadata elements for the pilot service was established.

The following table details all elements, qualifiers and definitions relating to the MusicAustralia pilot DC metadata element set, as applicable to sound recordings. Elements denoted by an asterisk are mandatory fields. Qualifiers and definitions are based on common professional understanding and usage¹¹. The NLA has documented a similar table pertaining to printed music.

⁵ Holmes, Robyn. MusicAustralia: a digital strategy for music, August 2002. (<http://www.nla.gov.au/nla/staffpaper/2002/iam18Aug02.html>)

⁶ ibid.

⁷ Functional Requirements for Bibliographic Records (<http://www.ifla.org/VII/s13/frbr/frbr.htm>)

⁸ Metadata Encoding Transmission Standard (<http://www.loc.gov/standards/mets/>)

⁹ Metadata Object Description Schema (<http://www.loc.gov/standards/mods/>)

¹⁰ Dublin Core Metadata Initiative (<http://dublincore.org/>)

¹¹ Example: IASA Cataloguing Rules, June 1998. (<http://www.llgc.org.uk/iasa/icat>) and

European Broadcasting Union core metadata set for Radio Archives (http://www.ebu.ch/tech_t3293.pdf)

Table I: Metadata Standard for Sound Recordings

Element	Value	Definition for Sound Recordings
Title*	.maintitle	Main title of a work
	.subtitle	Subtitle to the main title of the work
	.otherTitle	Any other title that may be associated with the work
Contributor	.principalRole	For any contributor that has been flagged as having a principal role in relation to a work
	.unqualifiedcontributor	For any contributor where a specific contributor category cannot be assigned
	.composer	Contributor who creates music
	.lyricist	Contributor who writes words to music to create a song
	.librettist	Contributor who writes words to opera or musical arrangements to create a book of lyrics
	.musician	Contributor to plays a musical instrument in a performance
	.group	Contributor group who performs the work
	.arranger	Contributor who adapts a composition
	.conductor	Contributor who directs a group of musicians.
	.singer	Contributor who performs the work
Publisher	.publisher	Prefer to use: Record Label
	.recordLabel	The company label name of the recording
	.place	Prefer not to use for sound recordings
Date	.produced	Prefer not to use for sound recordings
	.released	Date the work was commercially released. Year will suffice.
	.recorded	Date of recording session, or date the sound was originally recorded regardless of whether or not it is subsequently published or broadcast. Note that a recording session may extend beyond a single date. Year will suffice.
	.created	Prefer to use: Date Recorded
	.published	Prefer not to use for sound recordings
	.broadcast	The date a work is broadcast via Web and/or

		radio or television programme. Year will suffice.
Type	-	Values include: Recorded sound Radio Musical sound recording Non-musical sound recording Performance
Format	.medium	Value is: Audio file
Element	Value	Definition for Sound Recordings
	.extentFileSize	The mp3 file size and noted in megabytes, e.g. 2.77 MB
	.extentDuration	The duration of a work. Prefer to use 00:00:00 time code standard display.
	.extentSource	Physical description of the recording carrier, e.g. Shellac disc, 10" Standard Play
Identifier*	.persistentIdentifier	Institution specific
	.persistentIdentifier.PI	Institution specific Persistent Identifier
	.persistentIdentifier.objectType	Values is: Audio/Sound
	.persistentIdentifier.mime	Value is: Audio/mpeg
	Type	
	.persistentIdentifier.URI	Institution specific Unique Resource Identifier
	.standardIdentifier	Prefer not to use for sound recordings
	.matrixNo	Number relating to the recording session. Include entire number: Prefix-Number-Suffix
	.catalogueNo	Company label catalogue number relating to recording. Include entire number:: Prefix- Number-Suffix
	.plateNo	Not pertinent to sound recordings
	.publisherNo	Not pertinent to sound recordings
	.systemNo	Institution data catalogue number
Source	.source*	Institution identification: contact for access to original, rights queries, or purchase of reproductions

Language	-	The language of the recording
Relation	.isPartOf [hasPart] .isVersionOf [hasVersion] .isFormatOf [hasFormat] .isPerformanceOf [hasPerformance] .isRelatedTo	to be determined to be determined to be determined to be determined to be determined
Rights	-	Institution identification
Subject	.genre .heading .classification .name	Class description of the content Subject heading assigned to the content Sub-class level of classification Name assigned as a subject descriptor
Description	-	Description of the content. Include noteworthy information about the sound recording. Exclude information mapped to metadata elements.

Data Quality

ScreenSound Australia reviewed all its data records contributed to the pilot service. Data quality checking was performed in order to provide records with accurate information and, complete intellectual, physical and technical description, so to minimise the number of empty fields in the XML reports. Undertaking quality checking of catalogue records was sustainable given the finite number required for the pilot service. However, due to the way MAVIS accessioning records are structured, some manual editing of fields in the XML reports was required.

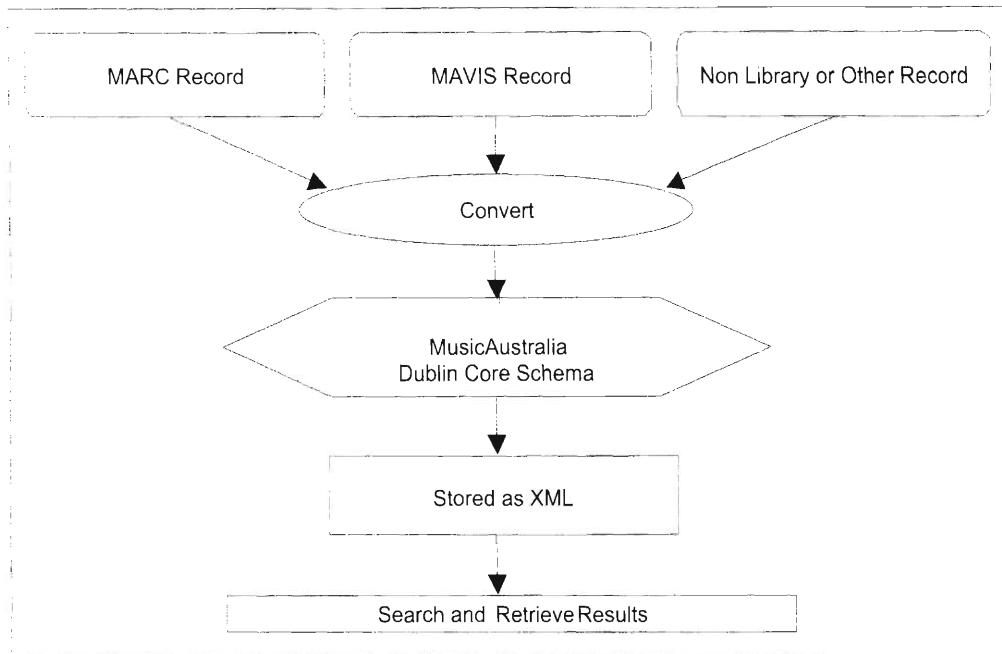
Mindful that a much more streamlined automation of metadata batch processing is needed for tackling the greater scale of work envisage for the full production site, finding solutions to eliminate manually correcting of XML reports will be an imperative for the Archive.

When the first batch of XML records was viewed on the test web site, some inconsistency of data became clearly evident, e.g. ScreenSound Australia and NLA do not share the same subject classification scheme and dates appear anomalous in some instances. For example, in the case of 'Aeroplane Jelly', the date the jingle was originally recorded and broadcast was c.1935, however the Archive had to create a digital audio file from a copy of the recording, released on a compilation album in 1984. These types of matters will need to be addressed in the next stage of development.

Data Sharing

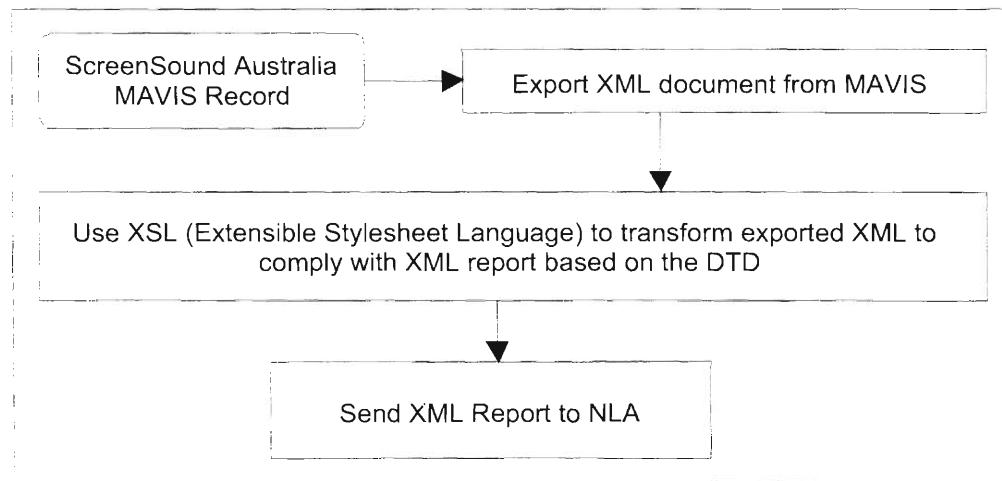
Having decided on the metadata element set, a Document Type Definition (DTD) was established to define the XML (Extensible MarkUp Language) report. The model can be illustrated as follows:

Fig 2: MusicAustralia Metadata Model



Following the service model, the metadata conversion procedure used by the Archive can be illustrated as follows:

Fig 3: ScreenSound Australia metadata conversion workflow



¹² Holmes, Robyn. MusicAustralia: a digital strategy for music, August 2002. (<http://www.nla.gov.au/nla/staffpaper/2002/iaml8Aug02.html>)

An example of metadata supplied by ScreenSound Australia in XML format for jingle 'Aeroplane Jelly' is provided:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE metadata (View Source for full doctype...)>
- <metadata>
- <title>
  <mainTitle>[AEROPLANE JELLY : I LIKE AEROPLANE JELLY : FULL VERSION : ADVERTISEMENT]</mainTitle>
  </title>
- <contributor>
  <principalRole>Wigglesworth, Joy</principalRole>
  <principalRole>McCormick Foods Australia</principalRole>
  <singer>Wigglesworth, Joy</singer>
</contributor>
- <publisher>
  <recordLabel>Telmak</recordLabel>
</publisher>
- <date>
  <released>1984?</released>
  <recorded>1935?</recorded>
  <broadcast>1935</broadcast>
</date>
<type>Radio</type>
- <format>
  <medium>audioFile</medium>
  <extentFileSize>1.07 MB</extentFileSize>
  <extentDuration>00:01:51</extentDuration>
  <extentSource>Vinyl disc, 12" Microgroove Long Play 33rpm</extentSource>
</format>
- <identifier>
- <persistentIdentifier>
  <objectType>soundFile</objectType>
  <mimeType>audio/mpeg</mimeType>
  <URI>http://www.screensound.gov.au/olcmedia/audio/00009118.mp3</URI>
</persistentIdentifier>
<matrixNo?</matrixNo>
<catalogueNo>140</catalogueNo>
<systemNo>MAVIS: 537268</systemNo>
</identifier>
- <source>
  <institution>ScreenSound Australia, the National Screen and Sound Archive</institution>
</source>
<language>English</language>
```

```
- <relation>
<isPartOf?></isPartOf>
<isVersionOf?></isVersionOf>
<isFormatOf?></isFormatOf>
<isPerformanceOf?></isPerformanceOf>
</relation>
<rights>Contact: ScreenSound Australia, the National Screen and Sound Archive</rights>
- <subject>
<genre>Advertisements/Commercials/Promotional</genre>
</subject>
</metadata>
```

Note the 'relation' elements have been left blank. To further enhance research, documenting relationships between the content is considered highly desirable. Given the limited amount of content delivered through the pilot service, relationship data was hand coded. Realising this practice is not sustainable for the expected large qualities of content in the future, further testing and implementation of automating content relationship through selected data fields is pending.

Digitisation Standards for Sound Recordings

Audio

The NLA has taken a leading role in establishing standards for digitising printed music and other documents, while ScreenSound Australia has the primary role in digital audio. Original audio recordings are digitised in Archive's ongoing preservation and service workflows at high resolution ranging from 16-bit, 44.1 kHz up to 24-bit, 96 kHz (depending upon the quality of original material) and stored as broadcast wave format files (BWF). Uncompressed wave files are a widely used standard, and are easiest to edit or process, but they take up more data storage space and need more time to transmit over networks. An hour of audio at CD resolution will occupy 600 Megabytes (over 600 million bytes) or more.

Internet Delivery

Much of Australia does not have access to broadband data services for Internet access. A large number of households within Australia, and overseas have dial-up modems operating at a maximum of 56kb/s. Data reduction or compression is used for distribution, therefore. Lower compression rates produce larger files usually with better quality, but will they take longer to download. Small files at lower bit rates are faster to download, but will often have lower quality. MPEG-1 can reduce uncompressed audio files to a quarter to a third of the original size with only a small loss of quality, or even smaller files, with a more noticeable loss of quality.

Standard or simple MPEG-1 works best at compression rates of 2:1 or 3:1. A more complex encoding in MPEG-1 (layer-2) can reduce uncompressed audio files more effectively to about one-quarter to one-third the bit rate with less deterioration in quality. A much more complex process known as MPEG-1 layer 3 (or mp3 for short) can reduce this from one-quarter down to one-twelfth of the original size. In this range, at bit rates of 64 to 192 kbytes/s, audio can run in real-time over the slower broadband connections, including single ISDN (Integrated Services Digital Network), and can be downloaded over a dial-up modem in a more realistic time - typically two to four times the actual running time. MPEG-4 is the most recent encoding standard in this family, and represents a wider range of data-reduction tools, including object-based encoding.

Streaming

At bit rates of less than 90-100 kbytes/s, more effective bit-rate reduction can be provided by streaming CODECS such as Real Audio or by low-resolution files such as MPEG-4 or QuickTime®. Streaming uses special software to encode and decode content, and monitor delivery so that a continuous stream of real-time playback is achieved, even if the quality varies. There are many different systems used for compressing files and streaming, including MPEG, QuickTime® and AVI. The most widely supported formats and standards are illustrated in the following table:

Table 2: Popular audio streaming and file formats

Connection Type	Connection Speed	File/Stream Type	Bit Rate	Comments
Local network	100Mb/s up	Wave/PCM or MPEG-1 layer 2	256 kb/s to 1.4 Mb/s	Depending upon number of users
	10Mb/s	MPEG-1 layer 2	256 kb/s	
Broadband	512 kb/s	MPEG-1 layer 3	192 kb/s	Reliability of real- time streaming will depend upon network and traffic
	256 kb/s	or MPEG-4	128 kb/s	
	128 kb/s		96 kb/s	
Dial up modem	56 kb/s	Real AudioTM	34 kb/s	Reliability of real- time streaming will depend upon network and traffic
	28.8 kb/s	Quicktime® or	20 kb/s	
	14.4 kb/s	MPEG-4		

While it may be useful to have many versions of the same content available at different resolutions, and using various types of compression, this may be confusing to some users. Greater complexity is required for the delivery infrastructure, and distribution may be more difficult to manage.

Music Australia participants have decided to adopt a simple set of standards which will enable access and usage by a wide range of clients, without requiring a large administrative overhead. Audio recordings from ScreenSound Australia destined for delivery on the Archive's website (www.screensound.gov.au) are firstly restored as necessary to remove the worst scratches, hiss and other audible damage, then encoded into MPEG-1 layer 3 [mp3] files at 128 kb/s which is a common standard with a good balance between quality and download time.

The future production site will probably allow a low bit-rate streaming version of audio as well as the higher quality mp3.

Presenting www.musicaustralia.org

The MusicAustralia Pilot was released on 1 August 2002. MusicAustralia's content base includes 170 digital resources essentially used for testing the infrastructure. The digitised music items were provided by ScreenSound Australia, NLA, AMC (Australian Music Centre) and the ACA (Australian Council for the Arts) and include:

- published music,
- manuscript scores,
- audio recordings,
- multimedia presentations, and
- links other music resources which are available online.¹³

Users are able to search the service and retrieve a result set that display both preliminary information with the ability to navigate to detailed metadata relating to the work. By selecting the relative icon, users can view sheet music and play individual or multiple audio recordings. For selected works, synchronised versions of score images and sound – using SMIL (Synchronised Multimedia Integration Language) – have also been provided.¹⁴

The service also offers samples of large multi-movement contemporary scores, generated by propriety music software (Finale, Sibelius). These allow the user to manipulate the object with all the advantages of MIDI (Musical Instrument Digital Interface), transposition, and tempo variations that web versions of the software allow.¹⁵

We encourage you to visit the site and discover the service. You may need to install an audio player and plug-ins to enable interaction with the content. Your feedback and comments are most welcome.

¹³ ibid.

¹⁴ ibid.

¹⁵ ibid.

Conclusion

Music Australia is an ambitious project, and the pilot phase has provided both opportunities and challenges for ScreenSound Australia. The Archive has been able to:

- learn from practical experience in applying standards for description and delivery;
- prove the importance of detail quality cataloguing and technical practices;
- explore the potential of database interoperability using metadata for resource recovery;
- heighten appreciation of the IT infrastructure required for digital audio delivery as well as digital rights management;
- test the performance of our digital platform; and
- foster content partnerships.

Notably, ScreenSound Australia delivered on all requirements pertaining to the pilot phase within existing resources and in parallel with descriptive cataloguing and technical workflows.

The pilot model is proof of concept on a small scale. It well serves the purpose of evaluating and highlighting the technical, metadata, content and delivery issues that require additional attention.

The project enables a collective approach to service and access provision to national music collections and reaches a wider audience than a single institution. The future aim of MusicAustralia is to live up to its name, on a geographical basis, by involving other agencies such as state libraries and members of the recording industry. It is projected that by mid 2003, a complete resource discovery service will be in full productio n.

Dams & Digitisation Preparedness

*John Spence, ABC Sound Archives
Survey presented at the IASA Conference, Aarhus, 2002*

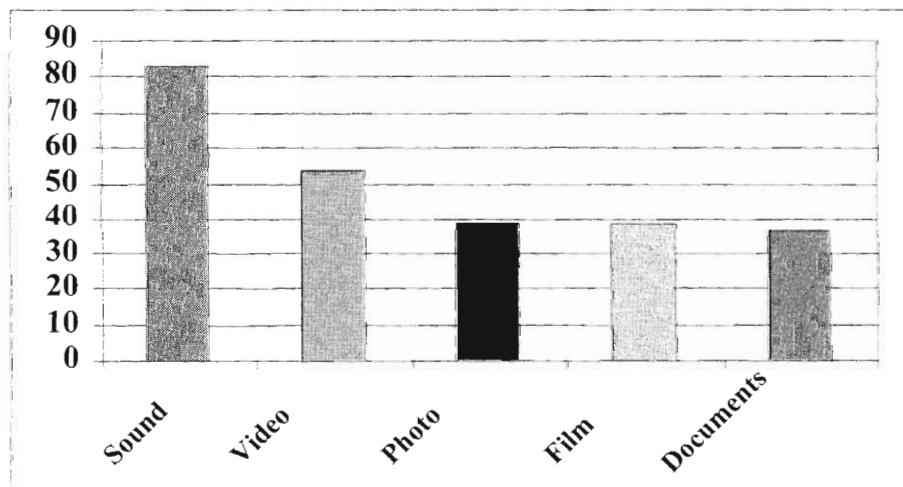
The audiovisual (AV) archiving community – us – has been standing at a crossroad. Behind us is the analog past; ahead the digital future. Many of us are faced with a choice of roads. Many of us cannot see the signposts. If we are lucky we may see a colleague scurrying down one particular road. We may turn and follow ... in good faith? ... blindly? Or we may call out to them and if we're lucky they may turn around, come back, take our hand and lead us on into the great unknown.

This is the first time that the institutional membership of IASA has been surveyed about their digital intentions and preparedness. Which road are they choosing ... how far down the road are they ... are they around the bend and out of sight.

The survey was drafted by me in consultation with the IASA TC, ScreenSound Australia's Technical Department and the technical staff of ABC Archives. It was developed by ABC Research staff and posted to the ABC's Internet site – ABC Online (www.abc.net.au). The link to the survey was sent by email to institutional members of IASA. As many of you know the survey process did not proceed without hiccup. Technology based around the not so humble computer can be very unforgiving and data gathering was made difficult by the vagaries of a survey software program that the ABC has just begun using.

Eighty-four institutions responded to the survey and, of these, 83 had sound recordings, 54 video and 39 film, photographs and documents about their AV holdings. These results support the belief that many of IASA's member institutions include amongst their records both sound and vision.

Fig. 1 Collections



Just out of sheer interest the survey asked about the size of our collections. Some could not quantify the magnitude whilst some didn't care. Maybe I should have offered these terms: small, medium, big, too big to contemplate digitisation. Well, of the respondents the smallest sound collection was 8 items and 11 hours; the biggest was 6 million and 1.4 million hours. The smallest video collection was 10 items ... 10 hours; the biggest 1.1 million items, a half million hours.

The results also show that the membership is well on the way to digitisation. 52, or 62% have already started digitising their holdings, whilst a further 30% are in the planning stages. Only seven respondents said they have no plans.

Of those 49 respondents who have already started digitising 93% are digitising sound, with 24% digitising video and 19% film.

And why are our members digitising. The main reasons include:

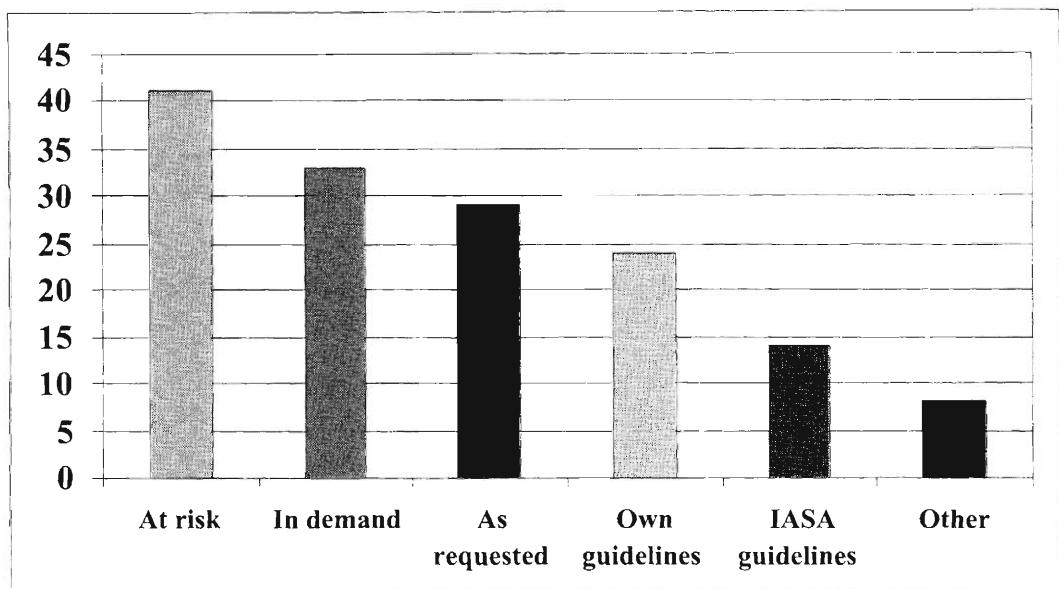
- imminent obsolescence of analog technology
- preservation – of original as well as the information
- stable storage medium
- faster easier retrieval
- increased access
- security
- storage savings
- income generation

Digitisation of our collections is a major project. And, in many cases, the resources available to an institution are proportional to the size of the problem. Just because a small collection exists doesn't mean the project will be a short one. None of the respondents saw their digitisation project being done within two years, whilst only 18% thought that it could be completed in a 2 to 5 years time frame. For 44% it was a project that will take in excess of 5 years – while 38% saw it as an ongoing project. I guess this often means as resources become available. And, of course, the reality of resourcing of our institutions often means that we cannot deliver the largess we may like. Eighty-two percent will digitise selectively. My institution – and I am sure a number of you – have special funding to digitise the collection which may be the only reason 18% said that they would digitise everything.

The responses to the question about digitisation selection criteria indicated that we usually apply a number of criteria – these sorts of decisions are rarely black and white. There were four criteria that stood out:

- Material that is most at risk
- Material most in demand
- As access is requested by our users
- And the institutions own guidelines – which could be a combination of the above as well as many others.

Fig. 2 Criteria

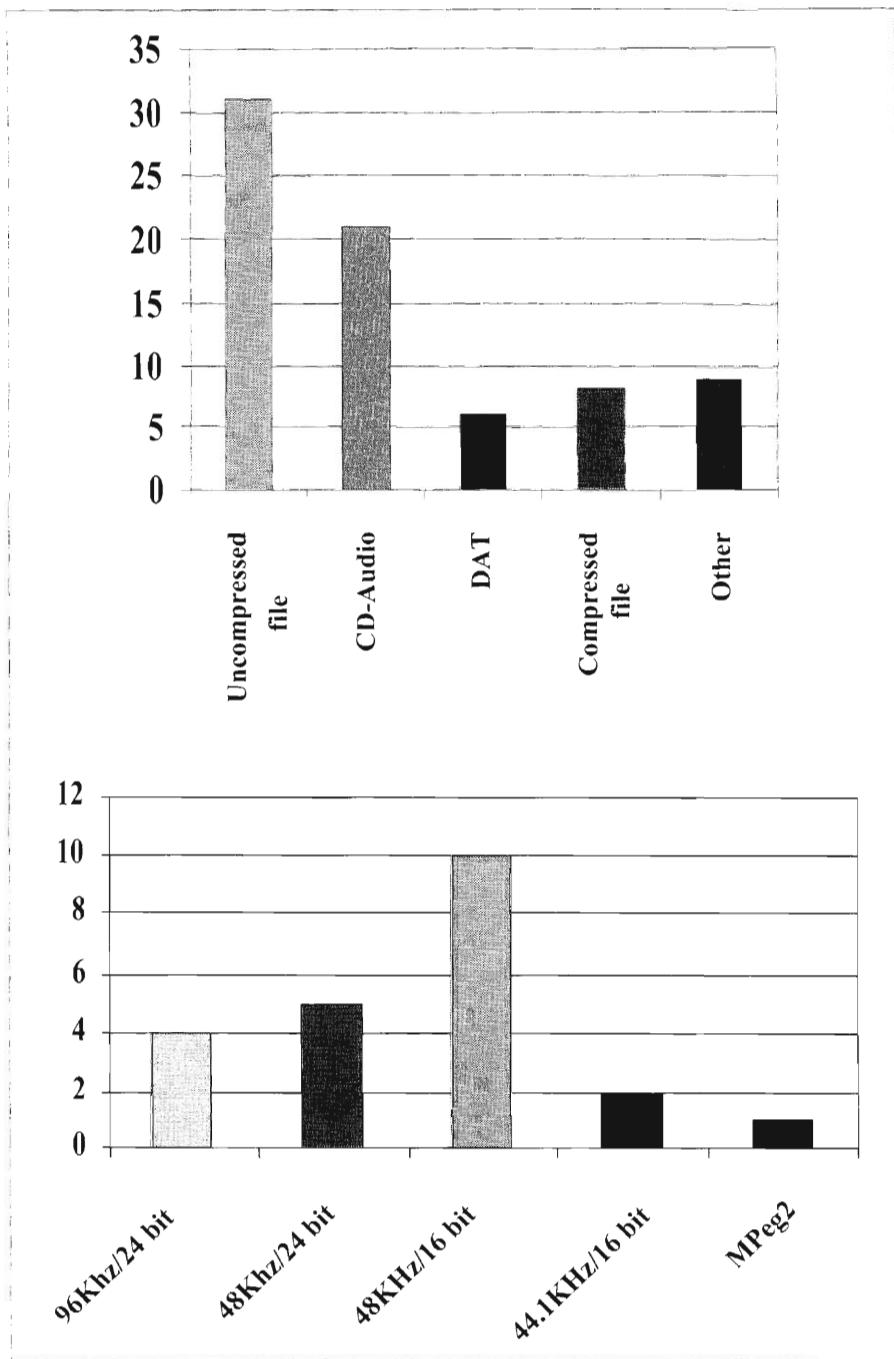


Thirteen responses (27%) indicated that they would possibly use the IASA guidelines which we have had reported to us this week by the IASA Task Force on Digitisation Selection.

Audio Digitisation

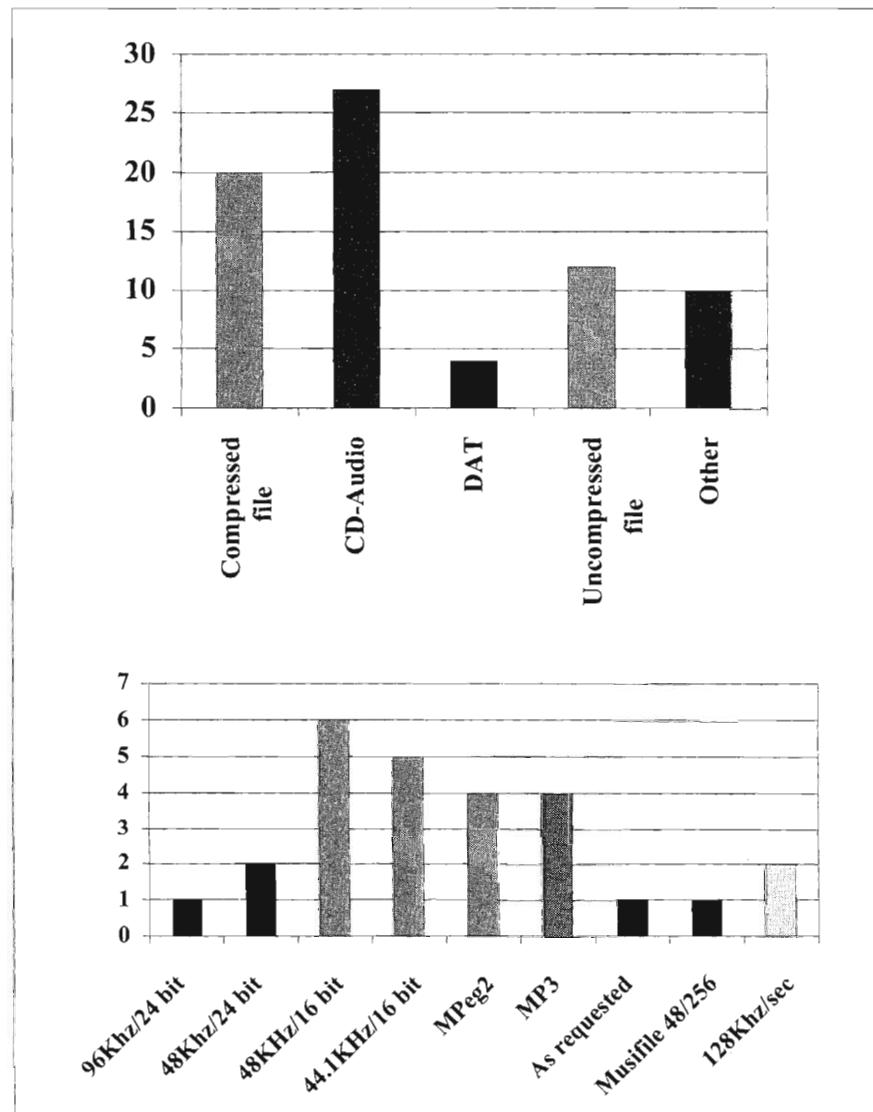
Let's look at audio digitisation. Firstly, what formats are being chosen for the preservation copy. Sixty percent have chosen an uncompressed file format, whilst 14% have chosen the compressed form. I suspect this may occur where broadcasters or other power brokers in the organisation have dictated what the "in-house" format is to be. Forty-one percent nominated CD-Audio attesting to the ongoing commitment to this technology. At the same time 11% nominating DAT is perhaps indicating a waning in support for this technology. And if the future of audio is that it is stored as a file – what standards are under consideration. 48KHz 16 bit was dominant with 10 of the 15 responses. Some respondents actually nominated a couple of standards for both the preservation and the access copy.

Fig. 3 Audio digitisation – Formats for preservation copy



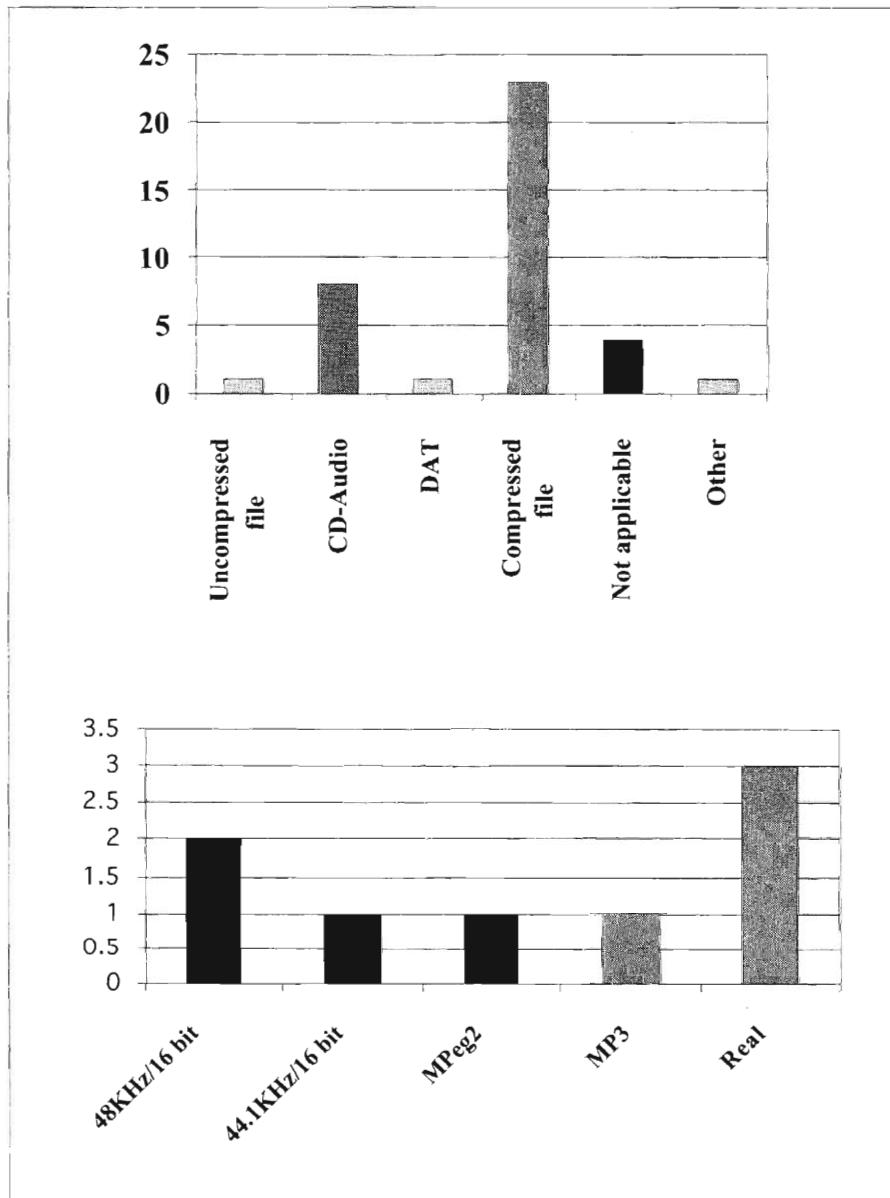
CD-Audio was by far and away the format chosen for access or distribution. Fifty-seven percent nominated it. In this category the numbers for compressed and uncompressed file formats were reversed. Forty-one percent chose compressed for access, whilst a still healthy number – 25% - chose uncompressed. The file standards chosen ranged across the board – 48K 16 bit, 44.1 16 bit, MP2 and MP3 were the main contenders. I guess for distribution a lot depends on what the client needs rather than what will last the longest or prove the most stable.

Fig. 4 Audio digitisation – Formats for Access/Distribution Copy



When it came to the Browse copy, 66% have chosen a compressed file format, while 23% went for CD-Audio. Of the standards MP3 was well ahead of Real as the preferred Internet access standard.

Fig. 5 Audio digitisation – Formats for Browse Copy



Secondly, we move to the storage formats chosen for audio. Data tape for the preservation copy dominated these responses with 50% choosing from the range available. These included 5 for DLT, 3 for LTO and 2 for each of AIT and IBM Magstar. Forty-five percent were still backing CD-R as a preservation format, whilst 26% have chosen hard disc. It appears from the responses that institutions have sometimes chosen a combination of formats for preservation purposes. This does not necessarily suggest indecision – more to the point it may be suggesting doubts about the ability of new digital formats to be as reliable as their analog ancestors. As I said before CD-Audio was the format of choice for access/distribution and CD-R is, of course, the dominant storage technology, though one respondent has chosen DVD-R. Forty percent will store on hard disc and 14% on data tape – 3 on LTO and one on DLT. This may suggest that access and distribution is still seen as predominantly a manual process with CDs being taken off a shelf and played in a listening booth or taken away to a more convenient listening place. The hard disc (48%) as expected, dominates browse copy storage medium. CD-R and data tape – 3 on LTO, one on DLT - scored with 20% each.

Fig.6 Audio Storage- Formats for Preservation

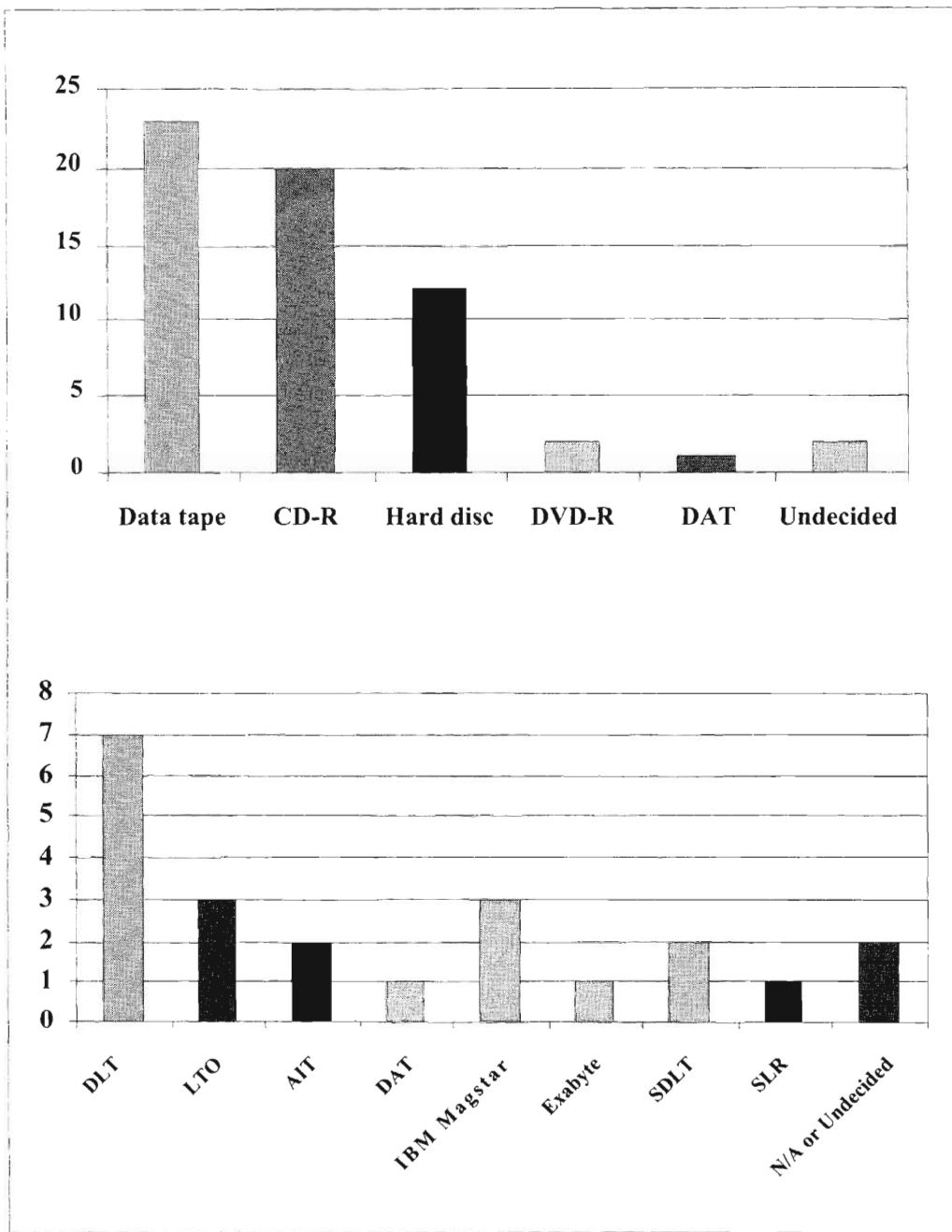


Fig. 7 Audio Storage – Formats for Access/Distribution

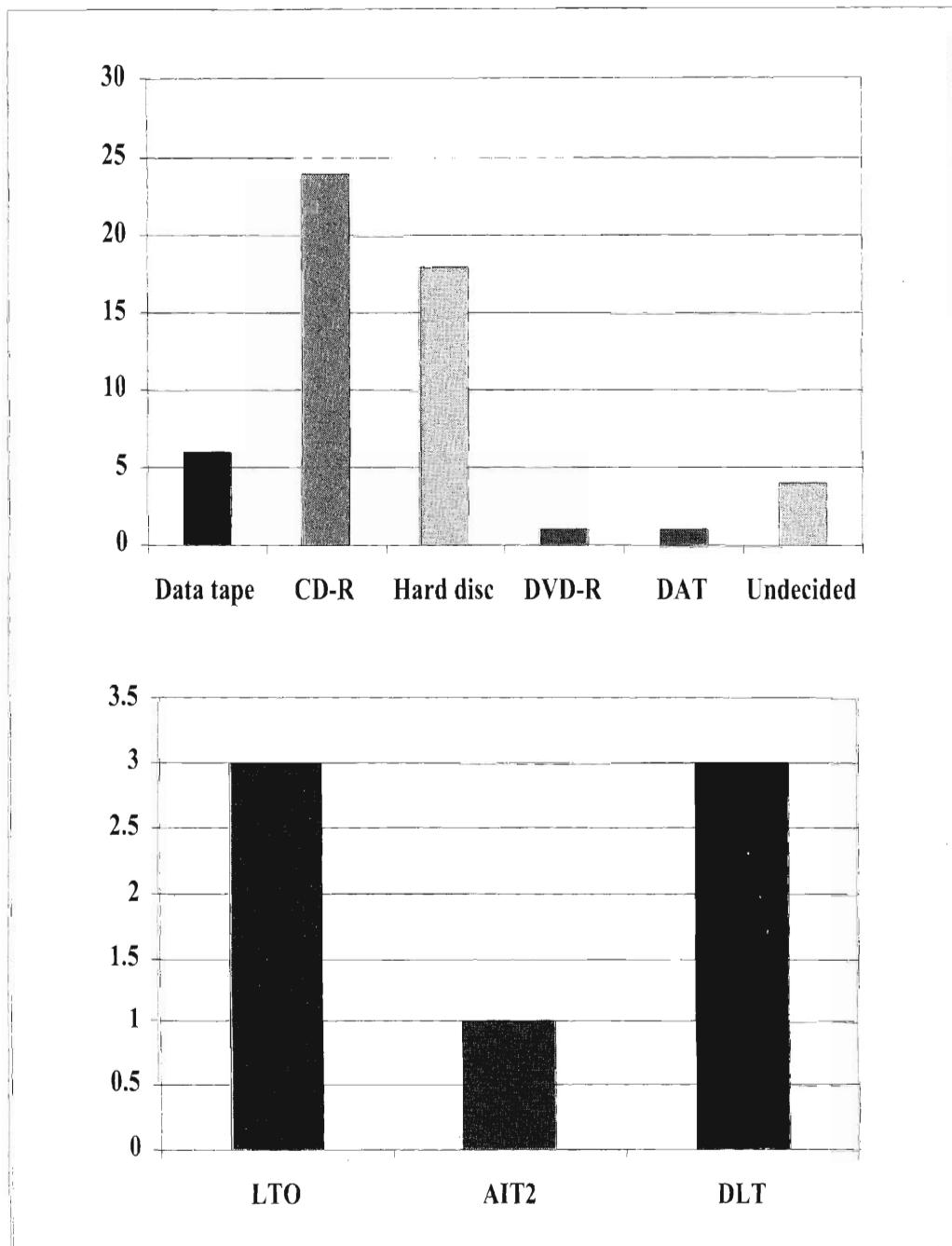
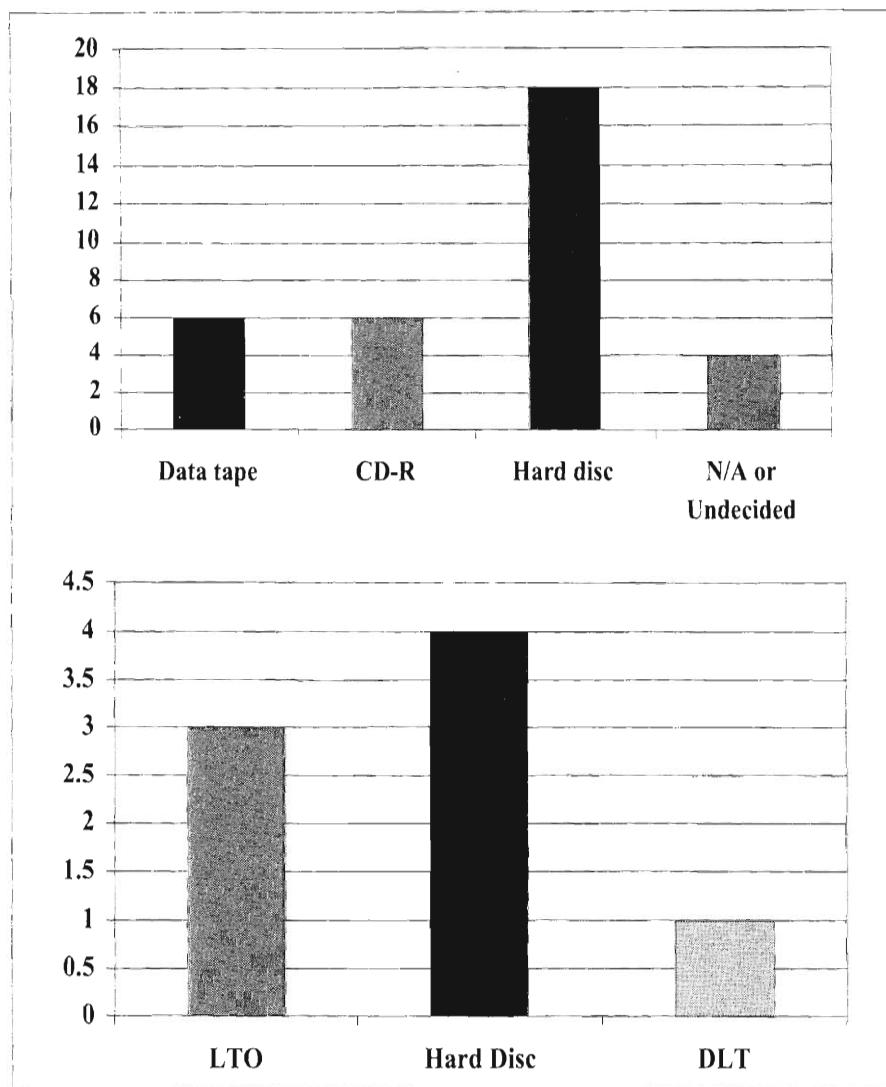


Fig. 8 Audio Storage – Formats for Browse



Video Digitisation

I now come to video digitisation. Digital Betacam was the dominant format with 48% of responses. IMX scored well but it is not clear whether the four responses for each of IMX50 and IMX was, in fact, just 4 responses for the one format. As a storage medium videotape dominated with 88%. Two respondents nominated DVD-R but none chose data tape. 73% percent will store their media on a shelf, with only one respondent storing video in a robotocised library or silo.

Fig. 9 Video digitisation - Formats

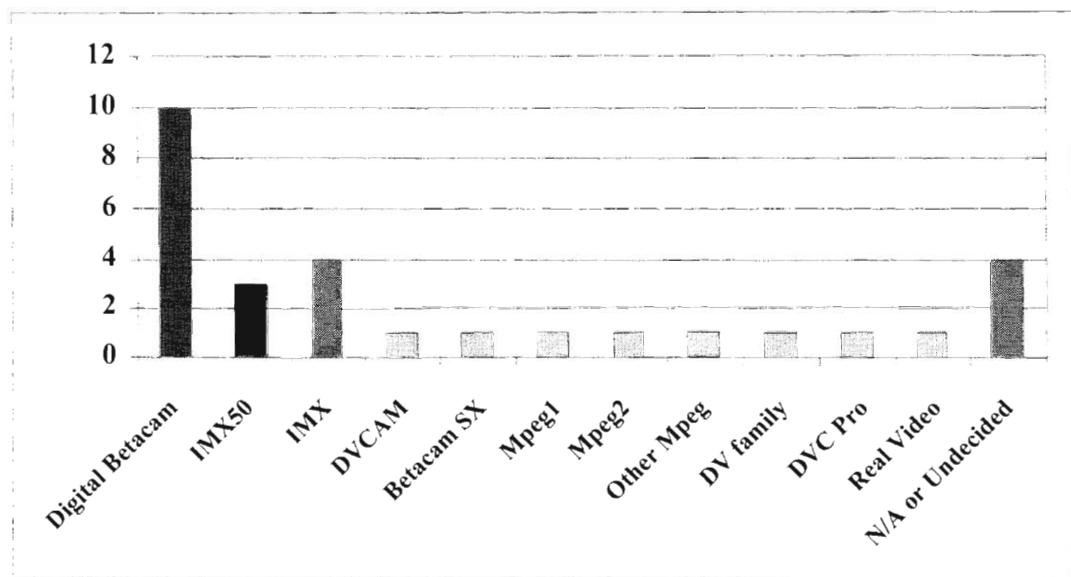


Fig. 10 Video digitisation – Storage media

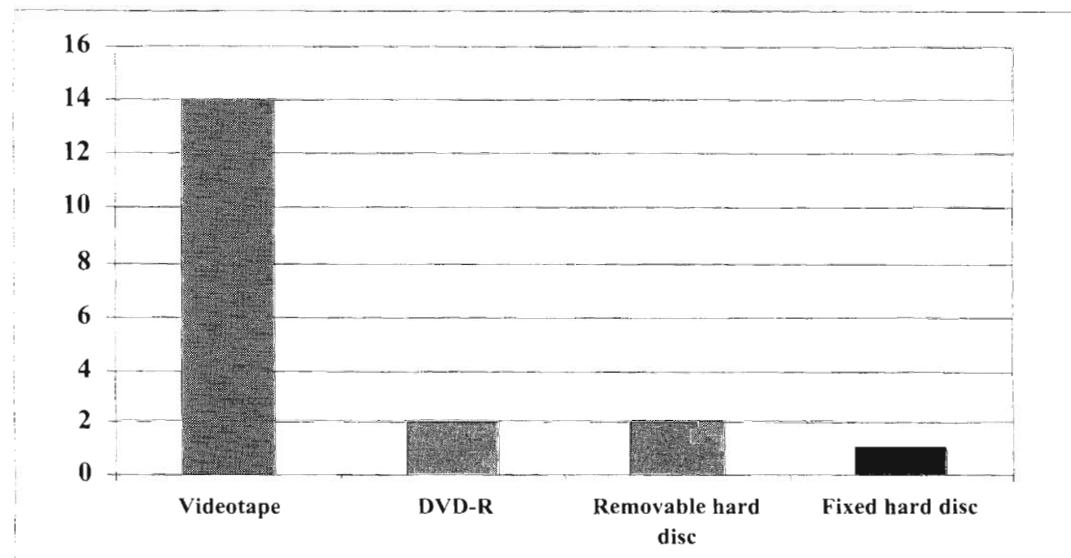
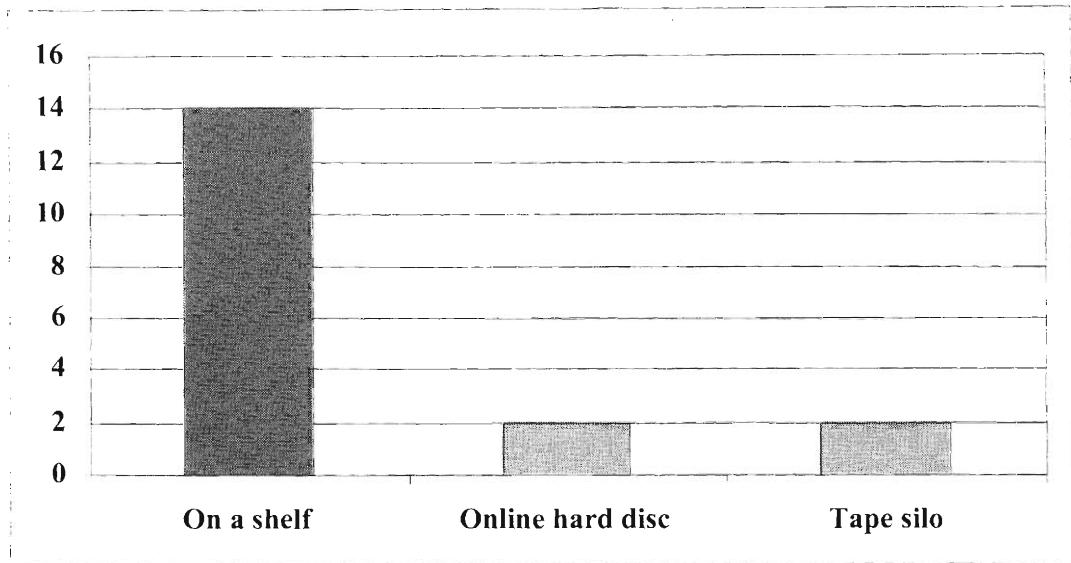


Fig.11 Video digitisation – Video stored where?



The comments about digital video storage suggested that video digitisation is, indeed, well behind that of audio. Much of the action is in planning for mass storage and decisions, in many cases, have yet to be made.

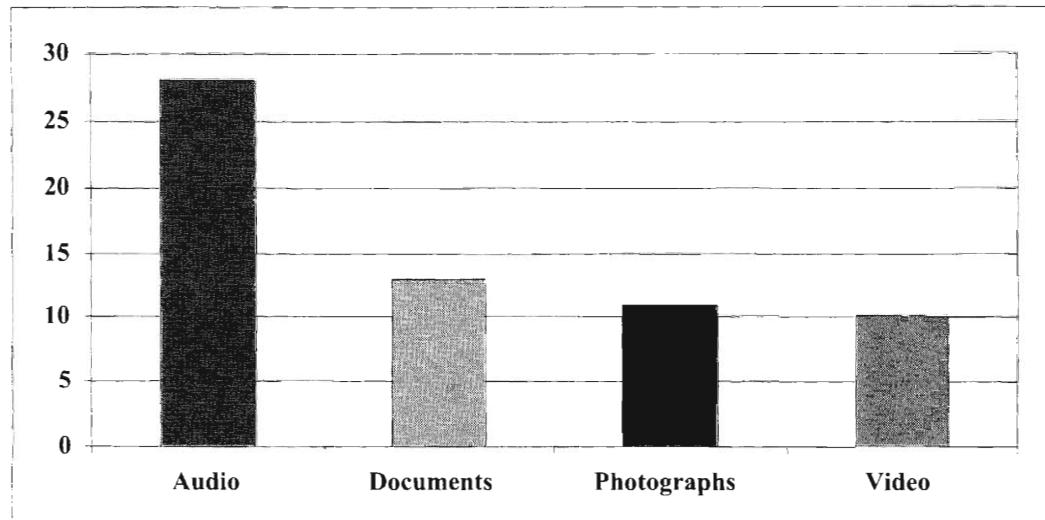
There were insufficient responses to the question about digital storage media for photographs. There is still a lot of work to be done in this area.

Digital Asset Management Systems

Now we'll turn to the part of the survey dealing with digital asset management systems.

Fifty-three percent have installed or are planning a DAM system according to the responses to this question. Though taken in the context of the number of respondents 28, in fact, equals exactly one-third. Of those nearly 99% of systems will carry audio. That is to be expected. 35% will have video, 46% documents about the AV collection and 39% photographs. It was encouraging to see that 46% already have their system in operation. The others are in planning or pilot stage.

Fig. 12 Media in DAM



So where will or is this AV material stored when access is made via the DAM system. For 72% it is on hard disc ... a server in other words. 37% will come off data tape in some roboticised tape library ... or silo as the ABC's technical boffins call it. 14% will access CDs or DVD – probably in a jukebox of some variety. Perhaps a Wurlitzer seeing we are archives.

What will the quality be like for users of the DAM system? Well if MP2 is classed as high quality – and in many broadcasters it is – then 75% say they will have both high and browse quality. Only 8% will be browse quality only. A DAM system is a major investment and most organizations seek greater functionality than the ability to browse for auditioning only.

And how will the system be accessed. Only 11% are launching it onto the Internet. The rest will be for access in-house only – either via Intranet (64%) or through a dedicated system (25%). For exactly half our respondents the DAM system is for the archive only ... the other halving saying it is a corporate wide system. These results are deceptive, as for some of our members the corporation is the archive.

Who has access? Well, unfortunately, in about 60% of the cases the public has no access. The good news is that in 40% of cases they do have access – either through the Internet or access at the institutions.

Conclusion

Now, in conclusion, what can we draw from these results?

Like any survey the results will not give us the full picture. It is not a census that provides a snapshot of what is going on everywhere. There are many more than 84 institutional members of IASA and not all will have received the call. And not all that did will have lodged a response. I accept that.

- The results tell us we are a multi media association.
- The majority of us are already on that digitisation road.
- Sound is the medium that is most being digitised – certainly no surprises there.
- We have found all sorts of reasons to digitise our collections – all of them valid.
- Digitisation for many is an ongoing project. This means that often additional staff is required on a permanent basis or it signals a shift in the balance of numbers between technical and non-technical staff.
- The preservation standard chosen tends to be the EBU/ABU standard of 48KHz 16 bit uncompressed file. This is being stored on mostly data tape or CD.
- As to access – CD Audio is carrying out a battle with compressed files. Despite what we hear about concerns over the stability of CD-R it is still attractive to us. It is portable – great for distribution – almost everyone has a playback device. Not everyone has a computer where they need it, and not everyone has a DLT or an LTO drive, nor the connection to it. And CD offers an alternative format to file storage on data tape. We're famous for not wanting to put all our eggs in one basket. We're also a suspicious bunch and may not entirely trust every new technology that promises to change the way we do our business.
- It is not surprising that MP3 and Real Audio are battling it out for the preferred browse format for this is the case in the “real” world.
- The cost of digitisation and storage formats seems to be driving us towards Digi Betacam for video. And broadcast archives – like my own – are being powered along by the corporation's broadcast needs.
- The fact that already one-third of respondents has already installed or is planning to install a DAM system is a credit to the progress we have made. In fact, more have it up and running than are planning it.
- I, for one, was surprised that more access will come off a hard disc than from a data tape. But I suppose the rapid and regular drop in the price of hard disc storage is shaping this trend.

- Internal business requirements seem to be driving DAM implementation. We're mostly providing access internally – within our own institutions. And most of the time it is our institutional clients that have access, not the public. This will change as the new digital world makes it easier for us to open up our archives to the world and at the same time to control access and preserve copyright and our precious collections.

IASA President Kurt Degeller presents his Top Ten

Since Kurt Degeller had been elected the new President of IASA, I invited him to be the first member of the new Executive Board to participate in the Board Charts.

Before presenting my Top Ten, I need to explain the three main influences on my choice:

1. My traditional gramophone had been out of order for several years but was fixed recently. I was therefore able to rediscover my favourite LPs, so some of them are included in the list.
2. Before becoming an audiovisual archivist, I worked in the field of Early Music as an assistant at the Schola Cantorum Basiliensis. This is why most of my recordings come from that part of the repertoire.
3. The past 10 years of my life have been extremely busy, for several reasons. As a result I stopped buying records, which explains why my choice is, in a certain sense, 'old-fashioned'.

Here are my Top Ten:

1. Dietrich Buxtehude, Arie 'Muss der Tod denn nun doch trennen' (Elegy on the death of his father). My favourite interpretation is by René Jacobs and the Kuijken Consort, recorded in 1979. It has been reissued on CD by Accent ACC 77912 D (Title of the album: 'German Church Cantatas and Arias')
2. Franz Schubert, 'Winterreise'. There is a beautiful version by Dietrich Fischer-Dieskau and Gerald Moore from the early sixties, which has been reissued on CD (sorry, I do not have more information).
And another, which I like not so much for the singer's performance but for the pianist's: Max van Edmond (baritone), Jos van Immerseel (pianoforte), recorded in 1989, issued in 1990 by Channel Classics CCS 0190.
3. Johann Sebastian Bach: 'Matthäus Passion'. My favourite recording is still the first one Philippe Herweghe made in 1984 for Harmonia Mundi France with La Chapelle Royale, Paris and Collegium Vocale, Gent. LP: HMC 1155.57. I hope it has been reissued on CD.
4. Wolfgang Amadeus Mozart: 'Don Giovanni'. I became familiar with this opera through a 1967 recording under the direction of Karl Böhm. It was made in Prague with the Orchestra of the National Opera of Prague, Dietrich Fischer-Dieskau as Don Giovanni and Birgit Nilsson as Donna Elvira. It is published by Deutsche Grammophon. I have a special French edition, which has no serial number. The discs are numbered from 104 948-104 951.
5. Alessandro Scarlatti: 'Passio Secundum Ioannem'. Read the text carefully in the Bible. This text is composed in a pure recitative style sung by René Jacobs, the best recitative singer I have ever heard. Originally recorded in 1981, and reissued on the CD 'Harmonia Mundi', Editio Classica, GD 77111.

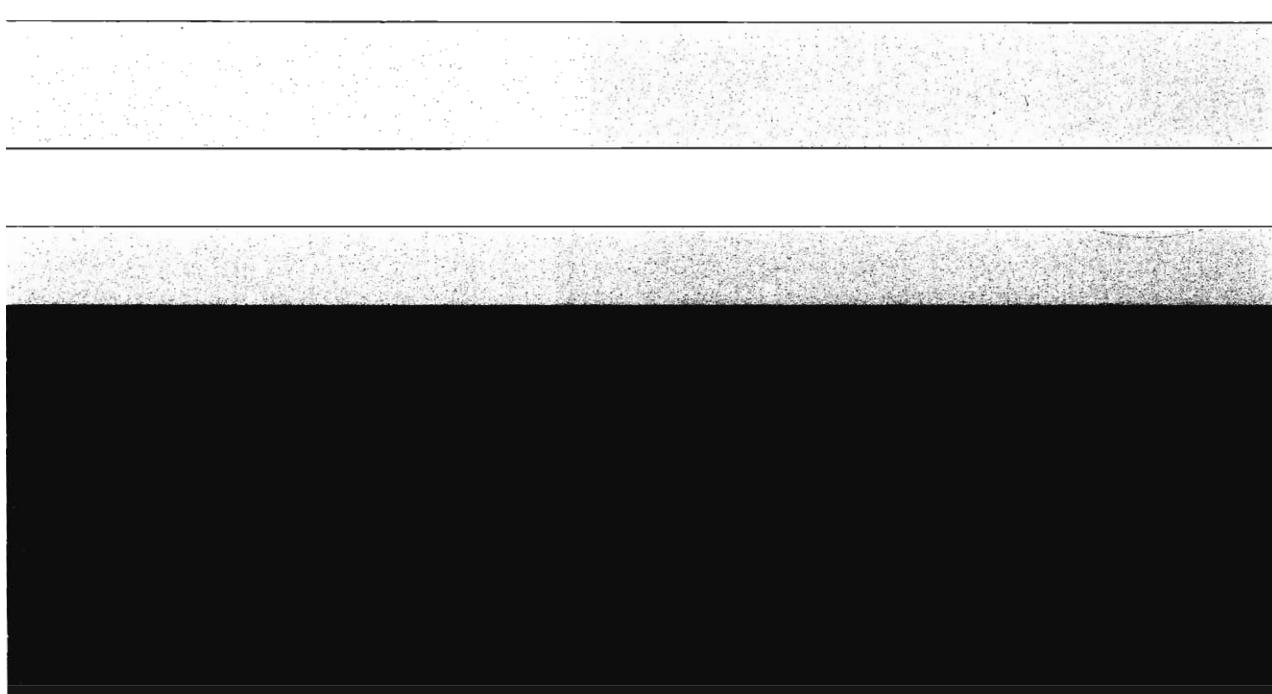
6. Wolfgang Amadeus Mozart, 'Piano Concerto KV 271', with Jos van Immerseel on the pianoforte with the Anima Eterna orchestra. (Channel Classics 0590). Both the second and the third movements are fabulous to listen to.
7. Joseph Haydn, 'Die sieben Worte Christi am Kreuz', version for String Quartet. Recorded in 1992. 'Quatuor Mosaïques'. 'Astrée' E 8742.
8. Franz Schubert, 'Sonata in A minor D 845' and 'Klavierstücke D 9946', Andreas Staier (pianoforte) – my second favourite pianist after Jos van Immerseel - recorded in 1995 by Teldec, 'das Alte Werk', 0630-11085-2.
9. 'Delight in Disorder, the English Consort of Two Parts' 1640-1680. Pedro Memelsdorff (Recorder) and Andreas Staier (Harpsichord). These two excellent musicians are obviously enjoying themselves, as you will be when you listen to them.
10. I am not particularly fond of organ music recordings but one album I listen to regularly is the Swiss organist Pierre-Alain Clerc, 'Autour de Jean Sébastien Bach', recorded in 1996 and issued on the Swiss label Gallo (CD-919).

**IASA Journal is constantly looking for material to publish:
articles, reviews, reports of meetings or new developments.**

Please send articles, letters or reviews that you consider to be of interest to IASA to the Editor at the address on the front inside cover. Please send text copy on PC floppy disk in ASCII format or Word for Windows version 2 or version 6 or simply as text in an e-mail. If this is not possible, then please send good quality hard copy, double spaced. Abstracts (maximum 250 words each) must be in French, German or English. Images can be sent as photographs or drawings to be scanned or as digital images in GIF or TIFF formats.

The final date for copy of the next issue, Number 21, to be published in June 2003 is

16 May 2003



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