The Value of Broadcast Archives

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Abstract

Audiovisual Archives are special - they capture the 20th century, with an immediacy that text cannot achieve. The 20th century was the first to be recorded (literally). This record is a unique development in the history of civilisation -- and is in danger of being lost. Audiovisual collections are mainly analogue, but their future depends on digital technology. This paper covers the status of audiovisual archives across the world, the crisis in preservation, and how digital technology is used to preserve this record and make it available for commercial and public access.

1 The audiovisual dilemma

Moving image and sound recording, both developed at the end of the 19th century, provided the technology for making a record of the 20th century. Much of the audio, film and video of the 20th century is already lost, and current audio and video recordings have a life-expectancy of a few decades at most. Many estimates now agree that analogue recordings of audio and video now on shelves will need to be transferred to digital files within the next 15 to 20 years. After that time, there is little chance of finding, repairing and operating players (open-reel audio tape recorders; a range of video tape formats) from the 1960s to 1980s. By 1980, videotape formats became obsolete in ten years or less: U-Matic was replaced by BetaSP, which was replaced by Digibeta and then by DV – all within 20 years.

There are two parts of the current audiovisual preservation dilemma: a great expansion of material being broadcast, and a great reduction in the life-expectancy of that material.

2 The current situation

At present, European audiovisual archives hold an estimated 50 million hours of material, and the global estimate is 200 million hours.[i] This material is valuable: a significant part is professional, such as the 5 million hours found in 10 broadcast archives by the Presto

project[ii]. Material in national, university and specialist collections has been selected for value.

In India, the national broadcaster has two main collections: Doordoshan and All India Radio. According to a recent article[iii], Doordoshan is "custodian of more than 100,000 tapes in different formats including AMPEX , U-Matic, BCN, Beta, DVC, VHS, Film Rolls. … DD-Archives has … recordings of all path breaking events in the cultural, scientific, social and agricultural history of India in the last five decades."

The website of All India Radio[iv] says "The Sound Archives of All India Radio can be called as the National Audio Archive of the nation as it is the treasure house of precious recordings of more than 17,000 hours containing music and spoken word recordings in different categories. It is the largest library of Indian Music recordings." Although the website contains various lists of classical recordings (as PDF files), there does not appear to be any online content.

The general estimate from Presto is that 70% of material in broadcast archives is under immediate threat: chemical decay, physical damage, obsolescence of format and playback equipment. All this material, excepting of film, will be threatened within a few decades.

2.1 Obsolescence: At least 2/3 of the material in archives cannot easily be used in its existing form, because the medium is too specialised (film) or obsolete (2" videotape) to allow easy access. For audio, this includes the massive holdings on ¼" open-reel tape.

2.1.1 Deterioration: Approximately 1/3 of the material has some form of deterioration:

- Dye fading on colour film
- Weakening of binders/adhesives holding magnetic particles to the polymer tapes used for both video and audio recordings; this problem is expected to become acute for ¼" tape in audio archives over the next decade, and is already a major problem for 1" and U-Matic material in video archives.
- Decay of the polymer material itself, becoming brittle or non-uniform
- Degradation (to the point of failure) of tape splices; this is a problem for the majority of TV news material from the 1960's and 1970's, which was 'direct recorded' onto film, spliced by journalists, and stored in newsrooms.

- Formation of acetic acid from acetate tape (vinegar syndrome). This acid, primarily from film soundtracks, can then attack both film and video (or even audio) material if held in the same room.
- Nitrate film – all archives have segregated this material, which is extremely combustible and can be explosive, but not all archives have copied the material onto safety film.

2.2 Fragile media: A large part of the holdings cannot be released for access because the media are too easily damaged. Examples are: all film negatives; all film prints except for access by qualified professionals; all shellac and vinyl audio recordings.

Film can last for centuries – if kept frozen and not used. The 35mm format has lasted for nearly a century. It is a matter of speculation whether current film projection technology will last another century, or will be made obsolete (within two or three decades) by digital projection. Digital projection of cinema has virtually taken over in just the last ten years. Most European and North American commercial cinema houses ("movie theaters") are now digital, including an estimate that 90% of Indian cinemas are now digital.[v]

The huge amount of film, video and audio that individuals hold in their personal collections is not even considered in this account, though that material is most at risk.

3 History of an Accident

Generally, people notice something when it becomes a problem. Audiovisual archiving started when the material had already started to disappear. Consequently, for the first few decades of the 20th Century there were few official audiovisual collections. Film stayed with the companies that produced it. Many such companies lasted only a few years. Their accumulated negatives were seen as 'used goods' of no great value, and so roughly 2/3 of the film production pre-1940 no longer exists[vi]. Commercial film distribution relies on the production of multiple prints (thousands for current major releases), and this multiplicity of 'projection copies' is the main reason that the losses were not worse.

Commercial music recordings, on wax cylinders and then on discs, also required multiple copies. This heritage survives almost entirely because of these copies, and because

these copies passed into the hands of the general public. Audio originals (masters) from pre-1940 are rare.

Broadcasting developed 20 to 30 years after the advent of cinema and commercial audio recordings, and relied on the most ephemeral 'copy' of all – the voice and later the voice plus image went out into the world – and disappeared at the instant of its creation. Only a tiny amount of radio from pre-1940 was recorded. Fortunately the major broadcasters had the largest amount of pre-recorded material, and hence the largest archives. The bulk of the audiovisual record of the first half of the 20th Century, at least for news and current affairs material, is in the archives of the dozens of cinema newsreel companies across Europe – 22 in the UK, though only five were considered major[vii].

During the 1950's television news replaced cinema newsreels. Again, as with the demise of film companies 20 years earlier, the archives of a defunct newsreel company were not necessarily seen as any form of asset – so some survive and many do not. "What is old news worth?" was the obvious question. It takes an historical and heritage perspective to understand the enduring value of such material.

Since 1950 the situation regarding collecting audiovisual media has improved. Major broadcasters now archive as a matter of course, and many nations have national audiovisual collections. Some nations have introduced 'legal deposit' legislation covering commercial audiovisual products, and some also include broadcasting. The consequence has been development of large collections – the Swedish collection SLBA[viii] (which includes all radio and TV broadcasts, national and regional) is around 5 million hours, five times bigger than the BBC's archive.

However, bigger collections mean bigger preservation problems. Broadcast archives have budgets for routine maintenance, but almost never have a budget for transfer of the entire collection from decaying and obsolete formats onto modern technology. National archives may have a better tradition of curatorial budgets, but again insufficient for what is now required: massive transfer of, essentially, the entire audiovisual record of the 20th century.

4 Facing the present crisis

Collections of audiovisual recordings have shifted from famine to glut. In 1960 the BBC had one TV channel and 3 national radio channels, and television was only broadcast

for a few hours per day.. Forty years later there were eight of each (most running 24 hours per day) plus many more local radio channels plus several hours per day of local television. The problem with maintaining collections has also shifted – from one of trying to find material, to one of trying to preserve what has already been found, catalogued and shelved.

Three issues dominate the preservation of this material: technology, funding, and rights.

5 Technology

The bulk of the audiovisual heritage is on aging carriers. The signals on these carriers need to be migrated to current technology to be accessible and to get a few more decades of life. Current technology is mainly digital, so preservation begins with digitisation of these old materials – a labour intensive, expensive process. With conventional technology the throughput is two to three hours transferred, per person per day. There is a need for automation and much higher throughput. Equally there is a need to make this automation – these preservation factories – available to small collections on a pay-per-use basis. The goal of EC project PrestoSpace[ix] was to encourage the 'better, faster, cheaper' preservation factory approach across Europe: automation, division of labour, high productivity and low cost.

6 The Preservation Factory: for audio and for videotape, the cost of preservation work can vary enormously. The primary factors controlling cost are:

- accessing the material: it costs A LOT to search, fetch, and transport the old material, and then shelve the new material. If material is being accessed anyway (for issuing or research), then preservation work can be done at the same time (preservation on demand).
- throughput: a conventional transfer consists of one person playing an item from an old format onto a new format, and then checking the result. This takes about 3 hours per hour of material, and is the LEAST effective way to transfer a lot of material. A dedicated facility operated as a transfer factory, with each operator running not one but four or five simultaneous transfers, and with maximum automation of checking and labelling (the basic metadata) – can save about 2/3 of the cost as compared to a conventional transfer.

The above two points are in serious conflict. Preservation on demand usually needs to be tied to a conventional, one-at-a-time transfer. A 'factory' approach is required to copy a whole collection in a reasonably short time with maximum cost-effectiveness.

The most expensive way ("the obvious way") to do preservation is to access the material specifically for preservation work, and then do the one-at-a-time transfers. The following are the PRESTO rough estimates of the costs of the three options:

Preservation project method	**Rough cost per hour for ¼" audiotape, UK£**
"the obvious way"	150
On demand, when the material is coming off the shelf anyway	100
Mass transfers, factory method	50

The problem with the above table is that cost information is notoriously incomplete and imprecise. "Cost" ultimately is what a departmental or institutional budget has to pay – visible cost. If a department has the staff and the equipment and the time, the visible cost for the 'obvious way' may be zero, rather than £150/hr! In contrast, shipping it out the door to an efficient audio transfer factory would incur the very visible £50/hr.

It is important to consider not just cost but time. If the material is already old and causing enough problems to motivate thinking about copying to a new format, then this copying may need to be done in months, not years. The total time as well as the total cost must be calculated for each of the options, and then the better choice is the cheapest one within the allowed time, not the cheapest overall.

Digitisation itself is not preservation. All technology ages and has to be replaced, so there will have to be a sequence of migrations – but each becomes more automated and cheaper.

7 Funding

There is no area of heritage that does not have to compete for resources. There are tens of millions of hours of material; only a few hours can be transferred per person per day. The consequence is that the budget for audiovisual preservation will be in the tens of billions of Euros.

Money cannot be generated simply by changing attitude, but such a change that is fundamental to funding. Audiovisual archives have a history of having budgets just for their daily operations. The required shift in thinking is recognition that these collections need preservation budgets built into the standard funding, not seen as an optional extra.

This change raises the expectations both of archives and of their funding bodies or mechanisms. All archives need to understand this situation – so the preservation need can be faced honestly. Whether all the needed money will arrive in time is of course not guaranteed – but archives must ask for what they truly need. Governments and other funding bodies – and the public and archive commercial customers – must expect to be asked.

To justify the funding, archives can promote a recognition of the general value of their holdings, in all dimensions, rather than being limited to a focus on narrow commercial value. Certainly heritage collections and all other collections need to try to raise money however they can, but they should never agree that their value is defined by their commercial potential. The larger value – as shown by the history of the 20th century – may be realised decades after audiovisual material has been lost because of lack of immediate commercial value.

The successful approach to funding preservation is, in the experience of several major collections, to concentrate on the 'value of the loss' – not the return on whatever commercialisation may be possible. Such possibilities are usually short-term, and loss of unique material is definitely long-term. The funding for preservation of the BBC archive and for the Danish Film Archive[x] was based on "avoiding the loss of the asset".

The conclusion is that archives should:

- seek funds appropriate to the size of the problem
- include preservation funding in their standard budget, from now onward
- justify funding in proportion to the overall value of the archive
- avoid limiting funding requests to the amount of commercial revenue that can be obtained in the short term

8 Rights

Whatever the value of a collection, it requires access to unlock that value. Any limit on access is a limit on value. Once technology and funding are solved, two limitations remain:

1. rights – the institution may not own all the inherent rights; and
2. rules – the laws governing the institution may restrict access.

Copyright is a major issue with broadcast material, and there are rights issues with much other material. Copyright duration has been extended – up to 75 years – meaning much of the material from the 20th century can get caught in the *copyright trap*: it is "in copyright", but if nobody is asserting that right, the material is seen as untouchable: nobody can use it, nobody has a good reason to preserve it – it sits and decays.

There are positive ways to deal with copyright. If the owner cannot be found, it is both legal and acceptable to use the material anyway, and pay up if the owner turns up. Broadcasting does this every day, and cultural institutions could be more assertive – about the public's right to the material.

There is now a movement to get such material – and many other forms of knowledge and heritage – overtly "donated to the public" under a Creative Commons[xi] licence, so institutions can proceed with preservation and access projects.

The final access restriction is often written into the legislation which establishes heritage collections. Often they are only for 'researchers', with access only within the institutional premises. This model for access to cultural heritage cannot stand. Socially it is undemocratic, and technically it is obsolete. The institutions need to be creative about breaking out of their walls and the legislation needs to be updated.

9 The key role of Digital Technology

Audiovisual archives are digitising – that is, converting analogue media to digital media – for the purposes of preservation, because the analogue media is obsolete, fragile or decaying. The main limitation on the ability of archives to 'digitise and survive' is the availability of funding. Knowledge, equipment and operators are also in short supply, but the essential problem is with funding.

The main way to increase funding, or the potential for funding, is to increase access. Donors, patrons and governments may have little interest in funding digitisation purely for

preservation, but could be more interested in the opportunity for the greater access associated with digital media, mass storage and electronic delivery. Digital technology removes the traditional barriers to access, breaking down the 'bricks and mortar' barriers by supporting direct electronic access.

A revolution in access technology is taking place. Millions of people – in fact the majority of citizens in Europe and North America – now have internet access[xii]. In addition, the switch to broadband (high data rate, allowing access to good quality video) is very rapid – 135% increase across Europe in one year (April 2002 to April 2003)[xiii]. In India, there are 250 million Internet users, though only about 60 million have a broadband connection[xiv]. While the public is moving to broadband online, heritage institutions are moving in the same direction: providing websites, moving catalogues online, and moving their collections from analogue to digital carriers – or onto hard drives which can supply material direct to the internet, and which have dropped sharply in price.

10 Web access

An anomaly is forming. Public institutions are increasingly aware of their responsibilities to the general public, and are rushing to provide improved access – with such innovations as late-evening openings, elimination of access charges, and of course launching websites that give not only detailed information about the institution but also often give direct access to catalogues, and increasingly give direct access to 'digitised collections'. Generally these digitised collections are scanned books, paintings and photographs. Relatively small amounts of film, video and audio are online – from heritage and broadcast archives – and then more as tasters or samples than as substantial collections. At the same time, audiovisual material is widely available by internet, and indeed 'electronic delivery' (download) has largely replaced sale of music on CDs. So while both the public and the heritage/broadcast institutions are rushing to the web, these institutions are not putting their audiovisual collections on the web.

11 Digitisation for Preservation

The anomaly deepens. Simultaneous with this move to web technology, by all parties, there have been major investments in digitisation: converting audio, video and film to digital formats. For audio and video this has been for preservation. The old carriers are obsolete, they are deteriorating over a timescale measured in decades, and so most audio and

video collections have projects for transferring content onto digital carriers: CD, DVD, digital audio tape (now itself obsolete), digital video tape, datatape and hard drives (eg UCSB wax cylinder project[xv]).

11.1 Online storage costs

Almost as though technology were wilfully intensifying the pressure, the price of hard drives has dropped faster than that of other forms of mass storage. Discrete media such as DVD require robotics to create a mass storage system. Datatape also requires robotics, but can produce relatively larger storage systems because of its greater storage capacity (a modern datatape can hold 1000 times as much as a CD).

The point is not whether disc or tape is cheapest. The point is that disc storage is now (2016) roughly 1000 times cheaper that it was in 1997, and so it is possible to put large volumes of storage online at relatively low cost. The Amazon Glacier service is now US$0.012 per GB / month, meaning US$12 per terabyte per month[xvi]. This author stores approximately 30,000 personal photographs 'in the cloud' at a cost of about UK£2 per year.

12 Facing the future: chance or intent

The history of the audiovisual heritage of the 20th century is largely based on chance: certain things happened to survive, and we're lucky to have them. If this heritage is to be maintained through the 21st century and into the future, the attitude must shift from chance to intent. Thorough planning is required, and cultural heritage institutions must include preservation funding within their standing budgets.

In return, these collections and institutions must provide far better access. There is no technical reason why all this material cannot be available in every citizen's home, via the web. The rights and legislative barriers are already under pressure, and will have to come down – to free this material and provide uniform, democratic access.

References

[i] Making Audiovisual Contents Available, Dietrich Schueller, EuroChina 2002;

http://www.eurochina2002.com/docs/Online%20after%2024%20May%202002/Conference_Presentations/Dietrich_Schuller.pdf

[ii] http://presto.joanneum.ac.at/

[iii] http://www.ddindia.gov.in/Business/Pages/DD-Archive.aspx

[iv] http://allindiaradio.gov.in/profile/pages/archives.aspx

[v] Figures presented at 2016 Film Preservation Workshop, Pune (FPRWI 2016)

[vi] Film Preservation Study, National Film Preservation Board, 1993. http://lcweb.loc.gov/film/filmpres.html

[vii] BUFVC Newsreel Database – history: http://www.bufvc.ac.uk/databases/newsreels/history/index.html

[viii] Statens Ljud-Och Bildarkiv, Stockholm, Sweden http://www.ljudochbildarkivet.se/

[ix] http://www.prestospace.org/

[x] Preserve Then Show, Danish Film Institute, 2002

[xi] http://creativecommons.org/

[xii] www.nielsen-netratings.com/pr/pr_030220.pdf

[xiii] http://www.nielsen-netratings.com/pr/pr_030529_uk.pdf

[xiv] http://www2.deloitte.com/content/dam/Deloitte/in/Documents/technology-media-telecommunications/in-tmt-broadband-noexp.pdf The average 'broadband' speed was reported to be 1.5 Mbps, the lowest in the Asia-Pacific region

[xv] http://www.library.ucsb.edu/speccoll/pa/cylinderstech.html

[xvi] https://aws.amazon.com/glacier/pricing/