SAFEGUARDING THE INFORMATION OF AUDIO HERITAGE IN THE DIGITAL AGE: A CASE STUDY ON SOUND ARCHIVING

Biswadeep Chakraborty,
Research Fellow, School of Cultural Texts and Records, Jadavpur University, Kolkata

Abstract

Preservation of any kind enables us to provide our future generations with as much of the information or data of any kind (audio, video, text etc.) contained in our holdings as possible - to pass-on the heritage. Archives therefore are very much important in this regard, though the responsibility of an archive is to provide access to its systematically arranged data to its users, who can be both current and future. Obsolescence—of playback machines, technical expertise, tools, and audio formats—combined with degradation of carriers represent the twin evils that impede archivists' race against time to preserve important holdings and force us to ask the question – **"have you digitized your collection yet?"**

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In today's world, everything around us is going 'digital'. The so-called "digital revolution" started with the personal computer technologies from the 1980's and *cloud-computing* technologies of the 2000's completely changed how we store and preserve, rather 'safeguard,' our data or information. Preservation of any kind enables us to provide our future generations with as much of the information or data of any kind (audio, video, text etc.) contained in our holdings as possible - to pass-on the heritage. Archives therefore are very much important in this regard, though the responsibility of an archive is to provide access to its systematically arranged data to its users, who can be both current and future. Many data carriers, especially modem high density formats, are, by their very nature, vulnerable. Additionally, there is always the risk of

accidental damage through improper handling, malfunctioning equipment or disaster. For the long term storage of many types of documents it is increasingly becoming necessary to review the strategies for preservation and preservation with the – Digital Imperative, in mind.

Now first we have to take into consideration that what is characterized here as the "digital imperative" influences all aspects of human activity and creation, and is not confined to the verbal/ literary/textual. Thus, for a poem, the digital imperative has ensured that not just the text of the poem but also its spoken or sung/music avatar, along with its links to other forms of art are now members of the digital universe created as a consequence of this digital imperative, moreover versions of the same are all members or potential members of its digital afterlife. In Prof. Samantak Das's words, "We are at an age when no text is an island, entire of itself, each text is a piece of the rapidly expanding universal digital continent"[1] – including sound or music documents, on which I will focus in this paper.

One strategy that is widely used over the archives is the creation of access copies of documents. A lower quality copy can act as an adjunct to the catalogue to aid researchers to decide what documents they wish to study. A good quality copy may be acceptable for study in place of the original. The use of copies to reduce the frequency of access to the original sound document will reduce the stress on the original and help to preserve it. A clear policy about the classes of researchers allowed access to original documents - particularly fragile ones - will also help documents survive. It is clearly impossible to totally prevent access to originals but many users can perform their research using good quality access copies and, thus, aid the preservation of the original sound document. It is imperative, therefore, to have at least two copies of each document - one preservation master and one access copy. These should be stored in two different locations, ideally under different climatic conditions. Several archives have established a policy to produce, in addition to the preservation master, an additional safety copy.[2] Both the master and playback safety copies should be saved in uncompressed audio formats like PCM wave (.wav) or BWF

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[1] Das, Samantak, *Digital imperative: A text is no longer an island, entire of itself*, The Telegraph, Nov 10, 2017, https://www.telegraphindia.com/opinion/digital-imperative-184737

[2] Boston, George and Keynes, Milton (Ed.), *Safeguarding the Documentary Heritage: A Guide to Standards, Recommended Practices and Reference Literature Related to the Preservation of Documents of All Kinds*, General Information Programme and UNISIST United Nations Educational Scientific and Cultural Organization, United Kingdom, 1998, p.4

(Broadcast Wave Format) with industry standard resolution of 24-bit 48 or 96 kHz, where the user access copy should be in a compressed format like MP3 or AAC with a resolution of 128 or 256 kbps bitrates.

In terms of preservation of audio records or data this digital-revolution changed the ethical consequences resulting from the technical aspects of recording, preserving and accessing sound documents within the framework of the technical development. Sound archives have to ensure that, in the replay process, the recorded signals can be retrieved to the same, or better, fidelity standard than was possible when they were recorded. For this it is integral to the preservation of audio that the formats, resolutions, carrier and technology systems selected adhere to internationally agreed audio standards, like IASA (International Association of Sound and Audiovisual Archives) etc. appropriate to the intended archival purposes. Non-standard formats, resolutions and versions may not in the future be included in the preservation pathways that will enable long term access and future format migration. Other important digital principles to adhere to are industry standard sampling rate[3], bit depth[4], analogue to digital converters[5] and data reduction.

Advances in the 'digital' technology often enable modern replay equipment to retrieve more information from the old physical carriers than was possible at the time of the original analogue recordings. Digital heritage is made up of computer-based materials of enduring value that should be kept for future generations. Digital heritage emanates from different communities, industries, sectors and regions. Not all digital materials are of enduring value, but those that are require active preservation approaches if continuity of digital heritage is to be maintained.[6]Audio Heritage as a term for sound archivists is of primary importance, because it is on the basis of this definition that the collections are built up and all of its activities, ranging from long-term archiving to documentation and to making this heritage available to all interested parties, are

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[3] When producing digital copies of analogue mat+erial IASA (International Association of Sound and Audiovisual Archives) recommends a minimum sampling rate of 48 kHz for any material.
[4] IASA recommends an encoding rate of at least 24 bit to capture all analogue materials.
[5] IASA recommends the use of discrete (stand-alone) A/D converters.
[6] Guidelines for the Preservation of Digital Heritage, National Library of Australia, Information Society Division United Nations Educational, Scientific and Cultural Organization, p.28,
http://unesdoc.unesco.org/images/0013/001300/130071e.pdf

carried on.[7] In terms of audio heritage, both primary and secondary information and data are important, although the relative importance of the two will vary depending on the content, the type of carrier and the needs of users. Primary information consists of the sonic content while secondary information may take manifold forms like information on the shellac or vinyl record covers etc.

One major part of an audio preservation system that requires significant attention is the task of selecting recordings for preservation. Sound recordings freeze moments in time – and when played back allow us to relive those moments. Yet preserving the recordings and making them accessible is a huge challenge as recordings can rapidly decay and with rapidly changing technologies, formats quickly become unplayable. It has been estimated that over 50 million hours of audio recordings exist worldwide; most of them are analog, many are unique, and none reside on permanent carriers. Obsolescence—of playback machines, technical expertise, tools, and audio formats—combined with degradation of carriers represent the twin evils that impede archivists' race against time to preserve important holdings and force us to ask the question – **"have you digitized your collection yet?"**

The life of most audio carriers cannot be extended indefinitely but efforts must be made to preserve them in useable condition for as long as possible. Preservation requires several aspects to be checked for example performing routine maintenance and cleaning of the carrier, distinguishing primary and secondary information sources and a perfect storage area or environment where the life of the original carriers are maintained. Further in the data front, maintenance also includes the regular checking of test tones, if available, on analogue carriers and of the data integrity of digital carriers. Another important aspect of maintenance is not using the original source material or carrier but using the copies made from the original archival source as I discussed at the beginning. Because the life expectancy of carriers and the availability of hardware are limited, the preservation of the original content in the long term can only be achieved by copying the contents to new carriers or systems, for example the audio originally recorded on the 'Shellac discs' after extracting by an archive have to be stored in some kind of modern digital storage systems like hard-disks etc. This is mainly important because in the

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[7] Definition of "Swiss Audio Heritage" for the acquisition policy of the Swiss National Sound Archives, http://www.fonoteca.ch/aboutUs/audioHeritage_en.htm

analogue domain, the primary information suffers an increase in degradation each time it is copied and it is only in the digital medium where the copying process doesn't affect the primary data. Hence for the long-term preservation of the primary information contained on an analogue carrier it is necessary to first transfer it to the digital system or medium. After the completion of this process secondary information becomes a crucial factor in the authentication of primary information once the sonic content has been transferred from its original carrier for preservation purposes because removing the primary information from the original carrier raises the question of future authentication of the sound. Future users may only have access to the primary information of a sound document in the form of a copy on a new medium, and it is then that the importance of adequate secondary information increases.[8] Therefore the archives need to record the secondary information or data in a systematic manner like through a metadata sheet preferably following the 'Dublin Core' metadata standards to make this information accessible together with the copy of the primary information so that future users can be sure of the authenticity of the primary data.

There are many different reasons why records and archives deteriorate. Perhaps the most significant factor is the nature of archival materials themselves: many records in archives are composed of materials that are acidic, which means they are inherently fragile and prone to degradation, for example the magnetic tapes and the Sticky-shed syndrome[9]. Other factors in the degradation of archival materials are fluctuations in or excessive levels of temperature and relative humidity; excessive exposure to light; air pollution; water damage; destruction from biological agents such as mould or insects; or abuse and mishandling.[10] The biggest challenge for any audio archive in terms of safeguarding the information is the 'obsolescence of formats'. Any kind of system or carrier is susceptible to change. And in this era when technology is changing almost every day, format obsolescence is one of the major threats to the longevity of archival data. As Erica L. Wilson noted that, this is due to the fact that we are in a time when

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[8] See Schüller, Dietrich (Ed.), *IASA-TC 03The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy*, International Association of Sound and Audiovisual Archives, Technical Committee: Standards, Recommended Practices and Strategies, Version 3, December 2005

[9] Sticky-shed syndrome is a condition created by the deterioration of the binders in a magnetic tape, which hold the iron oxide magnetizable coating to its plastic carrier, or which hold the thinner back-coating on the outside of the tape. This deterioration renders the tape unusable.

[10] Roper, Michael and Millar, Laura (Ed.), *Preserving Records: Managing Public Sector Records A Study Programme*, International Records Management Trust, London, 1999, p.10

technologies and the media are changing so rapidly rendering formats unplayable in such a short time. Files must be migrated or emulated by the archives as they become obsolete, to ensure that they can still be rendered and used in the future.[11] Obsolescence can be of three types physical, where the physical carrier of the digital file becomes obsolete like the shellac discs etc.; hardware, when the hardware needed to access the digital file becomes obsolete like the record players etc. and software, when the software needed to access the digital file becomes obsolete.

Therefore in terms of 'safeguarding the information', selection of best copy and carrier restoration is very important since mainly with mass replicated carriers the replay quality of different copies may vary considerably because of the way that they have previously been handled and stored. Thus, it may be advantageous to extend the search for the best copies since; when it comes to the preservation of audio heritage the major threat faced by the sound archives as we discussed is the - obsolescence of different formats. For example analogue formats are being phased out as systems since carriers and hardware are no longer manufactured in many cases and also because the product support is also not available. Similarly even after extracting the sound from the obsolete physical carriers the digital domain where it will be stored is also not very stable since none of the digital recording systems developed specifically for audio has achieved a proven stability in the market place, let alone in an archive. All specific digital audio formats are getting obsolete after a short period in the market leaving many carriers still in good condition but without the machines required to access the sounds. Hence in terms of 'safeguarding the information', the original carriers and suitable play-back equipment must be preserved due to the possibility of a re-transfer in the future.[12]

Now some may ask, but what about the "digital divide" in this magical digital revolution?
To answer this, let us try to think of the sound documents as a process, rather than a mere product, which, in turn, leads to an inevitable expansion in its domain. In her provocative essay, "Rethinking Comparativism", Gayatri Chakravorty Spivak wrote that we need to "acknowledge as comparativist any attempt that the text makes to go outside of its space-time enclosure, the history and geography by which the text is determined. Thus disciplinary convention expands

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[11] Wilson, Erica L., *Audio Preservation: An overview of issues and concerns for the creation execution and maintenance of an audio archive*, New York University Press, 2010, pp.2-6
[12] Op. Cit., Schüller

toward what would otherwise escape it, and the field expands greatly, in many ways."[13] So with the coming of the digital imperative as sound recordings have been digitized many archives felt that it is now essential to establish their own online music repositories for the user end. One major example is the 'British Library Sounds'[14] website, where a large number of the recordings of the 'British Library Sound Archive' are freely available for listening online though some are restricted to users in accredited higher education establishments. The major works of Bach, Beethoven, Brahms, Haydn, Mozart and Chopin in recordings made before 1958 are available. There is also a specialist collection of rare early chamber music recordings made mostly before the First World War, experimental music by composer Hugh Davies, the documented career of British violinist Derek Collier, an Oral History of Glyndebourne Festival Opera and cylinders apparently recorded by violinist August Wilhelmj. Similarly in India the Archive of Indian Music (AIM) launched their website[15] in 2013 as an online repository of gramophone recordings. These 'digital' sound archives available online have no doubt eased the pain of many researchers but still the – digital divide is the reality. Hence everything written above depends on the availability of certain infrastructural facilities on the user front – electricity, broadband connection, availability of laptops, and so on – which are still not available in large tracts of India. Yet, as have seen from the astonishing spread of mobile telephony, the digital divide is not likely to remain there forever. 75% of Indians access the Internet not through broadband but on mobile devices. With the fall in smartphone prices, being "online" is no longer the prerogative of the privileged few. As Prof. Das argued that the digital divide is real, but not unsurmountable.[16]

Hence I will end with the lines of T. S. Eliot's *Choruses from The Rock*, written in 1934, but beautifully sums up the whole dilemma of this digital age we are living, where preservation of the audio heritage is somewhat easy yet not a rock steady process.

"The endless cycle of idea and action,

Endless invention, endless experiment,

Brings knowledge of motion, but not of stillness;

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[13] Chakravorty Spivak, Gayatri, *Rethinking Comparativism*, New Literary History, Volume 40, Number 3, Summer 2009, p.615
[14] British Library Sounds, https://sounds.bl.uk/
[15] Archive of Indian Music, http://archiveofindianmusic.org/
[16] Op. Cit., Das

Knowledge of speech, but not of silence;

Knowledge of words, and ignorance of The Word.

All our knowledge brings us nearer to our ignorance,

All our ignorance brings us nearer to death,

But nearness to death no nearer to God.

Where is the Life we have lost in living?

Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information?"

   - T. S. Eliot, Choruses from *The Rock* (1934)[17]

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