PROVIDING ACCESS TO MUSIC-THEATRE WORKS WITH ELECTRONIC SOUND ON TAPE: THE CASE OF CONSTANÇA CAPDEVILLE

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1. Introduction

Constança Capdeville was a composer and one of the most prominent figures in Portuguese contemporary music. She also stands out as the most representative example of the music-theatre genre, which saw its most intense period of activity in Portugal peak between the 1970's and the 1980's. This genre was explored by Capdeville through her close contact with the Grupo de Música Contemporânea de Lisboa (GMCL), conducted by Jorge Peixinho, also a renowned Portuguese composer. They were collectively responsible for bringing to Portugal some of the trends in the contemporary music of their time, for example through attending the *Internationale Ferienkurse für Neue Musik* in Darmstadt.

Regarding the music-theatre genre, Capdeville not only assimilated some of the conceptions of Mauricio Kagel but also developed her own language through exploring the "new sonorities" concept to the limit, creating, rehearsing, and conducting her own compositions. Capdeville additionally founded the ColecViva theatre group with the core purpose of performing her own music-theatre compositions. We would furthermore note that in Capdeville's music-theatre works, every facet of the composition plays a relevant role, even the simplest of objects. She thus explores the concept of "new sonorities" to the maximum. Some of Capdeville's works have also been composed within a context of combining electroacoustic music on magnetic tape and instrumental music. These different dimensions of her compositions mean incorporating a new electronic component, which requires new approaches not only as regards the appropriate analytical processes but also the preservation strategies necessary to retaining the media[1]. Daniel Teruggi argues that magnetic tape brought about new scope for manipulation and higher quality recordings, less degradation through usage and an improved recording duration as compared to other historical mechanical recording formats, such as cylinders, coarse groove discs, and micro groove discs. However, despite being less fragile and more resistant to stress, depending on their chemical composition and format, magnetic tapes recorded a long time ago tend to deteriorate, thus endangering their viability (Teruggi, 2004). Taking into account the previous statements, this article aims to put forward a general reflection on a methodology appropriate to understanding how we can, or cannot, re-perform Capdeville's music works in the future by preserving not only the magnetic tape media but also their performance as well as analysing some of these works within a musicological context.

2. State of the art in Portugal: preservation problems

In Portugal, the preservation and the musicological study of this kind of music, mixing acoustic instruments and electronic dimensions, in particular those including recordings on magnetic tape, constitutes a research field still in its earliest stages, an area hitherto virtually non-existent. Should no action be taken, we shall lose such cultural heritage.

The magnetic tape remained the technical reference benchmark for audio signal storage for around fifty years in Portugal and, as an unstable medium, requires specific concerns regarding its preservation. The short life span of audio carriers, the obsolescence of the data reading systems, and the musical instruments, requires swift intervention in order to avoid the loss of content (Canazza & Vidolin, 2001). This preservation inherently involves a multidisciplinary approach conducted by institutions and experts from different fields of musicology, cultural

1 Henceforth, I will myself refer to the term "music works" since Capdeville´s compositions involve many other components that extend beyond the concept of "electroacoustic music", therefore, further studies are needed in order to properly classify such kinds of works.

heritage, computer engineering, information and communication technology (ICT), and signal processing (Canazza et al., 2010). Electroacoustic music preservation strives to keep alive the musical thought and outputs by preserving masterpieces and instruments, allowing performances and functionality both for musicological research and philological interpretation (Canazza & Vidolin, 2001). The preservation of the performance praxis requires broad knowledge about traditional and electronic instruments. In the presence of these new electronic instruments, the study of a new language and new performance techniques thus becomes necessary. Even though the recording technique represents a testimony to the creative process, which does enable us to properly document the information, this work has yet to be carried out in Portugal where there is currently no structure to undertake this kind of multidisciplinary work and what does exist, what very little has been done stems from individual efforts and the study set out here represents something new within the musicological field.

3. Issues around the analysis of Capdeville's music works

This article also seeks to discuss the pertinence of analysing Constança Capdeville's music works correspondingly raising questions including: What is the relevance of analysing works that include technology? Is a composer creating a work with the purpose of it being re-performed? How can we re-perform a work when some features are missing?

There are indeed several issues that may be decoded from technology. For example, spectral analysis allows us to study the spectrum, with its content containing the timbre, thus analysing frequencies, amplitudes, and understanding whether the composer is actually making recourse to a spectrum as an aesthetical choice or if this spectrum for instance stems just from a noise made by the recording itself. We may however also make comparisons between interpretations and watching sound results regardless of the sound sources. Indeed, there are several tools dedicated to sound analysis, for example, the sonogram, which displays a waveform representing frequencies, amplitudes, and the duration of a sound sample, providing a new understanding of sound and music visualization. Despite both software serving their purposes, consisting of different approaches to sound analysis, some limitations remain as they are not able to distinguish between layers, still only possible by hearing. Thus it would be desirable to propose new methodologies to document music works including recordings in a descriptive sense in order to recreate the sound alongside how such a documentation task requires adapting to the software existing.

With regard to the electroacoustic parts of Capdeville's music, the spatial disposition of the loudspeakers constitutes one relevant aspect of her compositions. However, besides exploring new sonorities, intensities, densities, textures, another of Capdeville's aims was to compensate for the reduced number of performers regularly participating in her representations. Nevertheless, in this, she was only following the trends of other composers of the time, such as Karlheinz Stockhausen, Luigi Nono and Emmanuel Nunes. At a compositional level, alongside the traditional acoustic instruments, Capdeville added other objects as sound sources, which in turn divide into three categories. Firstly, sounds created through instruments but not conventionally, playing strings with other objects, in sound boxes or by piano pedals. Secondly, applying objects to create dry sounds as marbles, cellophane, water, and among others. Thirdly, and the core of this work, electronic objects, deployed by Capdeville to overcome the common sound universe. As Laura Zattra argues, "electroacoustic music analysis is a complex and heterogeneous discipline depending on one musical genre which includes a large typology of subgenres: from tape music to computer music, from concrete music, to mixed music, live electronic music, laptop music […]"[2] (Zattra, 2005). The music, through incorporating an electronic component, completely changes the way of making music and, thus, different approaches to analysing such kinds of music have correspondingly emerged. The composer and researcher François Delalande, in his article "La musique électroacoustique, coupure et continuité", while referring

2 Zattra, L. (2005). "Analysis and Analyses Of Electroacoustic Music. In Proceedings of the Sound and Music Computer Conference (SMC05), Salerno, Italy. Page 1.

himself to the expression "electroacoustic music", points out that "[l]e plus souvent, pas de partition, ou bien, dans le cas d'une électroacoustique instrumentale, une notation prescriptive qui permet difficilement de se faire une idée de la réalisation sonore."3 (Delalande, 1996), and here reinforcing the idea that new analytical methodologies not only should arise but that these also require systematisation. Capdeville applied new symbols in her graphic scores, creating her own particular language in order to conduct performers, even with regard to interactions between the performer and the electronic component, particularly in her recourse to magnetic tape. She also left handwritten parts with several annotations, explanatory scripts about movements, lights and interpretation. All such facets need gathering in conjunction with the sound content included in tape recordings in order to build any new performance. Those aiming to re-perform the works of Constança Capdeville therefore need to understand the meaning of these metadata she herself created.

3.1 Case studies

The work *Mise-en-Requiem* serves here as our case study and was composed by Constança Capdeville for an ensemble (flute, horn, trumpet, violin, viola, cello, harp and guitar), magnetic tape and three spotlights, and falls within the scope of the music-theatre genre. The work was commissioned by the Calouste Gulbenkian Foundation (FCG) and premiered in 1979, following the 3rd edition of Encontros Gulbenkian de Música Contemporânea (EGMC). These encounters, which promoted the contemporary music in Portugal, spanned an almost three decade long period of activity and generated a strong impact on the dissemination of contemporary music in this country.

Mise-en-Requiem presents a structure divided into seven movements, respecting the liturgical order of a traditional "Requiem", which are autonomous in terms of musical framing, material and duration.

The following sequence of images[4] below shows the beginning of the second movement "RÉ, QUIEM". This session starts with only acoustic instruments (live music). A huge unison is played by the strings on the D note (Ré, in the Portuguese language, and the choice of the note RÉ means a sort of pun with the first syllable of the name of the movement "RÉ, QUIEM"). Here, performers need to seek out different effects and sonorities, and at the end of the score there is a warning about a recorded sequence that is coming (as shown in the image on the left below).

In turn, on the right, there is a sequence of pre-recorded sounds of a gong, low and deep, with the pedals functioning. The magnetic tape also contains pre-recorded voices emitting mismatched phonemes about inspiration and expiration: "EHHHHHH, HEEEEEE, UHHHHHH, HUUUUUU, AHHHHHH, HAAAAAA". Both images are representative of typical Constança Capdeville graphic notations, totally different from the traditional version. This example draws attention to the fact that a distinct and particular analytical approach, unique to Capdeville's compositions, is required in addition to how the electronic part also calls for new analytical methodologies.

3 "Most of the time, there is no score, or, in the case of an instrumental electroacoustic, there is a prescriptive notation that makes difficult to have an idea of the resulting sound." Delalande, F. "La musique électroacoustique, coupure et continuité." In ***Musurgia*** 3, No. 3 (1996): pp. 36. (Our translation).

4 All images representing original hand written documents scanned were kindly provided by CESEM - Centre of Music Sociology and Aesthetics Studies, FCSH/NOVA.

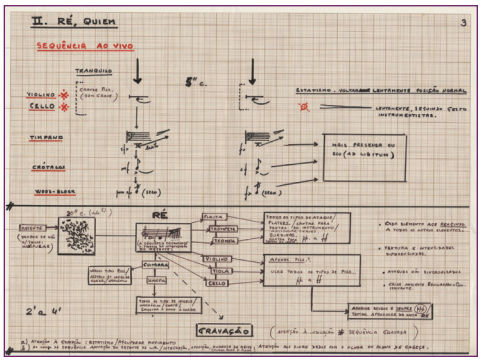

Figure 1. *Mise-en-Requiem*: original hand written document scanned. In the first of the second movements of this work, the live stream is indicated in red.

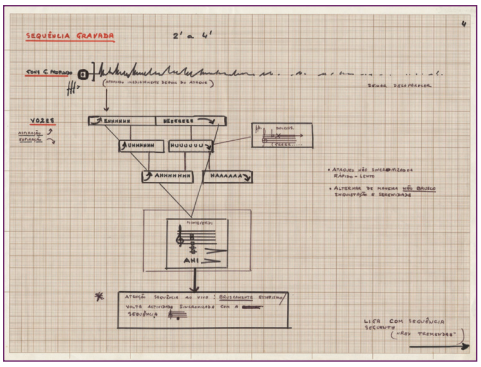

Figure 2. Second page of the same movement, with the recorded sequence also represented in red.

These musical works, combining an acoustic performance and an electroacoustic dimension, may have a traditionally notated part for the acoustic performer, but the electronic component, whether live or pre-recorded, cannot usually be fully notated in traditional ways.

Zattra states that although there are personal approaches, which render musical analysis a delicate and subjective field, some main trends may also be outlined: some analysts skip the technological dimension and base their work on the perceptual dimension; others deepen a genetic approach. Furthermore, any approach proves worthy of consideration given the potential for advances in the interdisciplinary research on electroacoustic music analysis (Zattra, 2005).

This study aims to adopt the musicological perspective with the purpose of outlining a general survey of different musicological and computational approaches made whether by musicologists, computer scientists, composers, sound engineers, with all their respective diverse skills gathered in order to create a multidisciplinary workflow to foster the analytical methodologies appropriate to these particular musical works.

Watching Capdeville's music works, especially those including recordings on tape, performed as an acoustic instrument, another case study *Don't Juan* also proves significant. This complex work is paradigmatic of the theatrical genre and written for voice, piano, double bass, percussion, magnetic tape, mime, dancer and lights. The composer applies fragments of texts, quotations from other composers in several languages, vocal and instrumental music live and spread, theatrical games, mimicry, movement, lights, props, instruments used as characters or scenic elements. Additionally, Capdeville, in close cooperation with a sound technician, recorded an orchestra being tuned, adding noises presented throughout the performance, duplicating instruments, among other means of sound manipulation. The image below displays a prescriptive notation of such tuning up with the following sample from the beginning of the first overture:

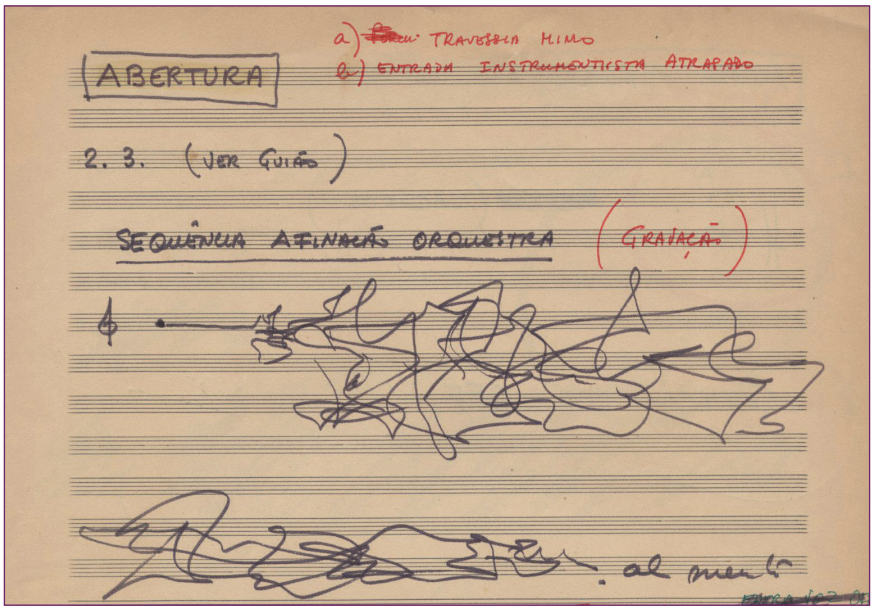

Figure 3. *Don't Juan*: original hand written document scanned, which represents the "Overture" of the work *Don't Juan*, also composed by Constança Capdeville.

The next image depicts a scheme for the entrance of a recording, and the composer indicates the sound of stamps in the first square while in the second, besides stamps, there are indications for water sounds, another example of Capdeville's characteristic notation.

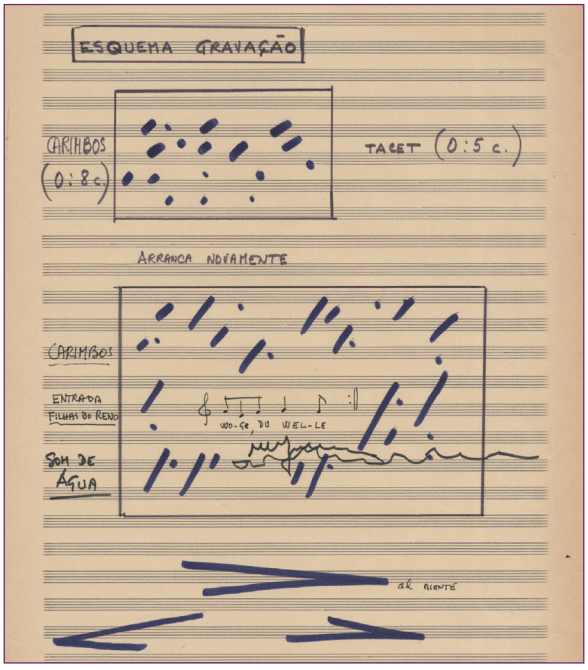

Figure 4. Recording scheme presented for the work *Don't Juan*, representing sounds of stamps and water.

The recording input is described in the score but we cannot ensure that the original magnetic tape for this performance still actually exists as there is, thus far, no documented reference to it. All of the existing Capdeville tape collection is currently stored at the Portuguese National Library, and we have not hitherto been able to playback the recordings mainly because of the lack of a proper workflow. Furthermore, any listening to such recordings should consider the sound migration from the original medium onto a new medium, because for the full perception of this kind of musical work the score alone proves insufficient as the work is not complete and hence it really is strictly necessary to hear the medium. Daniel Teruggi defends how "Digitisation is the gateway to a completely new way of accessing, studying and diffusing music"[5] (Teruggi, 2004), therefore sound content should be included within a digitisation[6] strategic plan, preferably in accordance with IASA[7] standards and recommendations[8], and alongside producing a documentation plan about this entire process. Nevertheless, an appropriate workflow regarding audio preservation remains a non-existent priority within most Portuguese institutions with some actions in this sense clearly necessary. The goal is not just listening to the magnetic media but also the preservation of the media and its sonic content. However, another issue arises at this point: just why do we need to preserve such works?

According to Teruggi, first of all, for historical purposes since such constitutes an example of human artistic production and worthy of preservation for future generations. The author states that electroacoustic music amounts to one of the major human technological revolutions deemed as important as the appearance of musical writing due to it changing the way music gets conceived and composed. The electroacoustic domain was a pioneer in the usage of magnetic tape technology for artistic creation by means of tape manipulation, and has correspondingly opened doors to all kinds of composers, academics and self-taught musicians and furthermore endowed musical creativity with a new perspective, new goals and new publics. From the point of view of preservation, musical works including tape recordings should gain priority because the first tapes produced are now almost at the end of their life spans and thus tending to fade and disappear.

There is a clearly identified need to explore and study this domain; musical analysis has sought out some options, nevertheless these still require improvements and adaptation to the needs of each case, whence new experiments and new theories are required. Due to both different dimensions of this kind of music and the "ambiguity" of their material outcomes, the study of the process of composition must be applied to the tape, score, composer notes, testimonies and so on. As the last resort, these different and particular sources, converging around the work, serve as a support for the understanding of musical intention, and their analysis is essential to reproducing musical thought. Obsolescence and preservation are crucial problems in the study of tape-recorded music (Zattra, 2007). Therefore, additional information about composers, technicians, and so forth, holds importance to the preservation and analysis of musical works. Below, we delve deeper into the magnetic tape collection of Capdeville while also proposing some methods for the preservation of her music works.

5 Teruggi, D. "Electroacoustic preservation projects: how to move forward." In ***Organised Sound*** 9, no. 1 (2004): pp. 62
6 We refer to digitisation as when the sound is transferred from an analogue source to a digital format.
7 International Association of Sound and Audiovisual Archives (<http://www.iasa-web.org>)
8 Mostly presented in the IASA-TC 04 publication, whose reference is: Bradley, Kevin ed., ***IASA-TC 04 Guidelines on the Production and Preservation of Digital Audio Objects (Standards, Recommended Practices and Strategies)***, International Association of Sound and Audiovisual Archives, IASA Technical Committee, Second edition, 2009.

4. Capdeville's magnetic tape collection: preservation of the media

This section presents an overview about the magnetic tape collection[9] of Constança Capdeville, currently deposited at the Portuguese National Library.

The picture below exhibits most of the collection although some tapes still require locating despite their listing as part of the donation with some musicological work about the composer and her role within the Portuguese contemporary music from the second half of the twentieth century also still lacking.

Maria João Serrão[10], a researcher who managed a digitisation plan of Capdeville's scores and screenplays, has listed a great amount of Capdeville's works, although the work is not complete with a huge part of the inventory still to be concluded. As regards the magnetic tapes, these are not yet catalogued as nobody has listened to their recordings, in addition to some of the tapes identified within scores being missing. We believe that some of these are lost or were possibly given to actors in the performances or perhaps friends but there has thus far been no chance to check or explore such eventualities.

Figure 5. The complete magnetic tape collection of Constança Capdeville currently stored at the Portuguese National Library.

Capdeville wrote about thirteen works within music-theatre context that include electroacoustic parts on tape, however most recordings in the overall tape collection are very relevant to Capdeville's compositions as they often served as the basis for leading musicians. Capdeville composed the majority of her music-theatre works between the 1970's and the 1980's, listed in a chronological order as follows: *Ritual One* (1973), *Mise-en-Requiem* (1979), *Libera Me* (1979), *Dmitriana* (1979), *Memoriae, Quasi Una Fantasia I* (1980), *Double* (1982), *Avec Picasso, ce Matin...*

9 All following images with regard to Capdeville's tape collection were kindly provided by the National Library of Portugal.

10 Serrão, Maria João. Constança Capdeville Entre o Teatro e a Música. Lisboa: Edições Colibri / Centro de Estudos de Sociologia e Estética Musical, 2006.

(1984), *Ainda Bem* (1984), *Don't Juan, Uccello* (1985), with the latter the final part of *Don't Juan, Memoriae, Quasi Una Fantasia II* (1986), *Amen Para Uma Ausência* (1987) and *Stabat Mater* (1988). Besides these, Capdeville also composed works for chamber music, music for dance, choir and orchestra/ensemble, among others. Following the compositional trends of the time, especially from the mid-twentieth century onwards, Capdeville was at the forefront of the search for new sounds through recourse to technology, deploying an electronic element that often involved simultaneously electronic sounds (pre-recorded on magnetic tape) with acoustic instruments. In such cases, the absence of the tape, even when the score exists, hinders the performability of the work, which effectively means that when such tapes do not exist, the work are unlikely ever to be reproduced as the tape constitutes another source of the compositional process. As Bernardini and Vidolin state: "Live electroacoustic music is different in that we seek to preserve not only a single, memorable performance but rather the ability to perform, study and re-interpret the same work over and over again, with different performances proposing different interpretations"11 (Bernardini & Vidolin, 2005), and therefore fundamental to the performance.

Firstly, for over twenty years the collection was stored in the house of Capdeville's close friend, Janine Moura. During this time, the tapes were kept at room temperature, which is quite harmful given they are subjected to changes temperature and relative humidity, enabling appearance of fungi, mould, among other types of flagging. Such variations are also undesirable for this type of media, because they cause a decrease in magnetic properties leading consequently to loss of beep.

The Portuguese National Library holds 65 tapes from Capdeville's collection, which are generally not in good condition. Currently, analysis of Capdeville's magnetic tape collection allows us to state that this is still not properly documented, listed, digitised or otherwise under preservation plans.

This collection, stored at the National Library, includes original recordings of her compositions, but also some recordings of concerts. However, the information details are unclear and thus listening to these recordings is an urgent demand. We hope that hearing them is still possible in the future because some look very fragile considering the physical facets of the medium material (acetate or PET), condition (state of degradation of the tape, etc.), state of preservation, number of segments of the tape, etcetera, and it is necessary to determine what kinds of decay they present. Within this collection, there are several kinds of usages, such as: tapes identified as editing materials, such as tapes number 32 and 33, assigned to the work *Molly Bloom*, a music-theatre work based on texts from James Joyce. Here, once more, Capdeville opts to record citations of songs from other composers, using a studio technique, which consists in the "cutting" and "collage" of the tape, mixing different sound sources during the assemblage, creating an expressive sequence that earned its own meaning. The assembly would be presented throughout the performance. Another significant example is tape number 19 entitled *FE ... DE ... RI ... CO*, it is also a music-theatre piece inspired on the poems, songs and illustrations by Federico García Lorca, a homage to the Spanish poet and dramatist, one of the victims of the Spanish Civil War. The National Library also contains an example of cinema soundtrack, a recording in Capdeville's collection indicated as an original of the movie *Cerromaior* by Luis Filipe Rocha, made in 1979. Additionally, in this collection, magnetic tape represents original recordings with transformations of pre-recorded materials for performative purposes such as tape number 7, which consists of the electronic part used in real time during the performance of *Mise-en-Requiem*. In the box of the tape, there are indications on the recording speed, track number, work duration, tape brand (eg.: Agfa-Gevaert), these are also useful indications for the technicians responsible for the content's migration. Nevertheless, hearing is an ability required to check the tape recording speed.

11 Bernardini, N., and Vidolin, A. (2005). "Sustainable live electro-acoustic music." In Proceedings of Sound and Music Computing, Salerno, Italy: pp. 1.

The image on the right is representative of the majority of Capdeville's tape collection in it exhibiting visible signs of degradation, such as mould, dust and dirt, and break down of the back coat. Currently these tapes are kept in an appropriate storage environment but they cannot be replayed, since there is no suitable workflow. We would take this opportunity to emphasise that no single magnetic tape collection, in the care of Portuguese institutions, receives the appropriate protection of a preservation strategy. Such interventions are crucial to retaining this facet of our cultural heritage.

Figure 6. Original magnetic tape used during the performances of *Mise-en-Requiem*, includes general technical information about the recording.

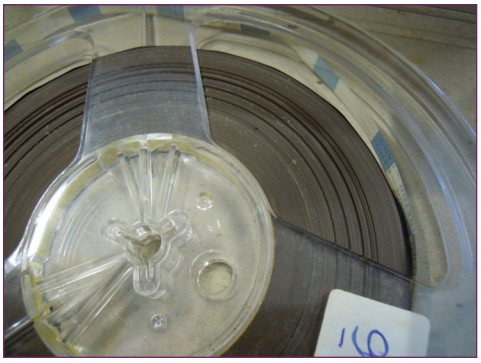

Figure 7. Original magnetic tape belonging to the work *Libera Me*.

For all of the above reasons, there is an urgent need to submit this collection to a preservation plan including its treatment, digitisation, and archiving. Despite the increasing development of new restoration techniques and technological progress, we do not know whether it is still possible to retrieve the sound content of these recordings. Notwithstanding the importance of these procedures and their recurring application, Portuguese institutions are not yet prepared to deal with this; and it is crucial to pay attention to this problem in order to take the first steps in preserving this kind of asset. Unfortunately, the advanced state of deterioration of Capdeville's tape collection only hinders researchers from accomplishing the operation as time is running out. Not only are the tapes at risk but also the possibility of holding future performances of this composer's music. The re-performance of the types of works that contain audio recordings on magnetic tape, which are not accessible, depends on a multidisciplinary effort that should include the work of archivists, musicologists, technical / audio engineers, and must constitute an overall concern of all institutions dealing with sound collections. The development of methodological guidelines for the musicological study of this kind of work contributes as a facilitator system to the public access of such collections, ensuring the availability of recordings or documents that are now partially or totally unavailable and of relevance to all users whether researchers, archivists, or educational institutions.

5. Possible solutions to preserving Capdeville's music works

The magnetic tape collection belonging to the composer Constança Capdeville encapsulates various failures in the way preservation should be undertaken. Most of her works involve traditional instruments and recorded sounds in which musical information and musical sound are closely interlinked with one unable to exist without the other. In this situation, the traditional model has to be applied (score and instruments) while recorded sounds have to be preserved onto new media.

In most cases, Capdeville's music is made up of various components such as a score, recorded music, suggestions for interpretation, and other materials often of importance to understanding the making of the piece itself (Canazza & Vidolin, 2001). Referring specifically to Capdeville's

music, including tape recordings, besides the conservation of the magnetic media, we seek to keep alive the performance; therefore all sources of information must be encompassed. Finally, this requires preserving both graphic and textual materials (score, schemes, directions), and audio materials (musical parts or the whole piece) (Canazza & Vidolin, 2001).

5.1 Methodology

Preserving contemporary music nowadays is really challenging. After the second half of the twentieth century, composers often incorporated new technologies into their works. By that reason, the conservation of music works is actually a great stimulus to institutions in charge of their longevity or even for artists / researchers that intend to re-perform a work from the past. The conservation paradigm is changing and, instead preserving testimonies of works, it is more relevant to preserve a coherent description, or new strategies of documentation, in order to facilitate the access to future transmissions and performances of works involving technology. Several initiatives and institutions are working to develop clearer models to allow this sort of preservation. An example is a methodology developed by Federica Bressan and Sergio Canazza, from Padova University, involving the preservation of audio documents. In conjunction, they have created an operational protocol, which acts as the methodology, and an original open source system that supports and automates several tasks along the process. Their approach reflects two main aspects. Firstly, "the design of a database, which works as a reconciliation of different approaches to preservation or information modelling; and secondly, the formalization of a workflow as an accordance between the theory of preservation and the laboratory practice [...]"[12] (Bressan & Canazza, 2013).

Although, the methodology presented here is based on some considerations from Daniel Teruggi, through unpublished information sent by the author himself, since he is particularly concerned with the preservation of contemporary music, specifically within the electroacoustic music context, and perceived as susceptible to adaption to Capdeville's music works. The main goal is to keep the performability of a musical work in such a way that it can be performed again at any time, and with any future technology. To ensure the preservation of performances of such kinds of music, a certain number of elements hold importance to appropriately understanding the work and its components. These elements consist in scores, instruments, sound producing or processing devices, sound enhancing description, and other complementary information. It may also include information about size, power, speed, location, and so forth. This process can be achieved through a proper identification and description work, as follows:

1) A precise list of the aforementioned elements. It is necessary to identify the active elements within a work: what is really required to perform the work. It will naturally include the score and the instruments if they exist, but also the machines or systems that will transform or produce sound, the number of loudspeakers, microphones or any technical device that contributes to the result.

2) For each intervening element, a description of its function and components as regards to the final result. It consists in a precise description about the role of each element within the work. This is an essential task since it provides information as schemas and standards needed for the work to be performed.

3) A description of the relationships among elements and the ways they correlate. It is a general plan of the work explaining the essential connections between elements and how they are functionally linked. It identifies dependencies amongst elements and difficulty points in the structure that need particular attention. It also helps to identify missing descriptions within the structure.

12 Bressan, F. & Canazza, S. "A Systemic Approach to the Preservation of Audio Documents: Methodology and Software Tools". In ***Journal of Electrical and Computer Engineering***. Hindawi Publishing Corporation, Vol. 2013, Article ID 489515 (2013): pp. 19.

4) Whenever possible; a recording of the work that serves as a result testimony. A description of how the work really sounded or looked like.

5) Additional documentation that helps in building up the process. Any element that describes, shows, explains or comments on the work (by collecting notes or composer's instructions, the testimony of musicians, actors, photos, reviews by critics, video or audio performances, and so on).

Once these are all brought together, a preservation strategy for each component needs establishing in order to minimize the preservation risks.

5.1.1. Organizing the preservation

The last five procedures involve an essential part of the task of gathering the preservation information, however, in order to complete the preservation work other actions need taking:

- Location of the constitutive elements: where are they, who is keeping them, how they can be used, who owns the rights.
- The digitisation of all materials: with regard to their long-term preservation, this represents an effective means of keeping the information together in a structured approach. Hence, it is important to digitise every possible contribution (especially paper and media) in order to convert them into coherent information sets, within which links can be established and efficient metadata gathered.
- A preservation and migration plan for each kind of media. Once the components are identified, located and digitised, a preservation plan requires establishing for each medium and for the ensemble. Migration plans have to be established from the outset in accordance with each media and their average duration time within an information system.

However, Teruggi states that satisfactory preservation work on performances, which includes electronic dimensions, should be perceived as a matter under continuous development.

6. Final reflections and conclusion

One cannot deny that the absence of tape recordings represents a huge problem able to compromise all future performances of *Mise-en-Requiem*, *Don't Juan* and other similar works. The whole magnetic tape collection of Constança Capdeville has not yet been subject to proper documentation and conservation strategies. As in the case of Capdeville's collection, there are many others scattered around, in need of study, preservation, digitisation and documentation. Such collections include the electroacoustic parts of these music works, which are also composed of instrumental performances, and thus the imperative of conserving the magnetic media coupled with the preservation of the musical performance through its documentation.

Concerning analysis of Capdeville's music, the development of a universally applicable analytical methodology constitutes a difficult task yet one nevertheless still needs to opt for the proper process based on some of the aforementioned useful tools while adapting them to each particular situation.

The study of Capdeville's music works including recordings on tape is part of an ongoing PhD research project, which aims, through the score and its analysis, in conjunction with the recordings, their preservation and their documentation, and other complementary information, to make the reproduction of Capdeville's works possible despite their very particular characteristics stemming from her embracing of the music-theatre genre. Future goals involve preserving these works through a simplified description and structuring process but, in order to achieve this, several issues first need reviewing and appropriately establishing. This work may also serve as a basis for future work; and the preliminary methodology aforesaid might contribute to establishing uniform tools that counteract the dispersion of the work done thus far.

The case of Constança Capdeville demonstrates the need to explore methodologies for incorporating the involvement of those recordings used in real time during the performances in order to allow the replay of these works, moreover these recordings are crucial inputs to Portuguese Music History. This should therefore represent a core concern of institutions in charge of collections containing such recordings as the formats and equipment are swiftly becoming obsolete and interventions are crucial. Otherwise, we shall certainly lose this cultural heritage.

7. References

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