University of Huddersfield Repository

Karman, Gregorio

Roberto Gerhard's Sound Compositions: A Historical-Philological Perspective. Archive, Process, Intent and reenactment

Original Citation

Karman, Gregorio (2014) Roberto Gerhard's Sound Compositions: A Historical-Philological Perspective. Archive, Process, Intent and reenactment. Doctoral thesis, University of Huddersfield.

This version is available at http://eprints.hud.ac.uk/id/eprint/25442/

ROBERTO GERHARD'S SOUND COMPOSITIONS: A HISTORICAL-PHILOLOGICAL PERSPECTIVE

ARCHIVE, PROCESS, INTENT AND REENACTMENT

Gregorio García Karman

A commentary accompanying the publication portfolio submitted to the University of Huddersfield in partial fulfillment of the requirements for the degree of Doctor of Philosophy

University of
HUDDERSFIELD

The University of Huddersfield

School of Music, Humanities and Media

May, 2014

Title of dissertation: Roberto Gerhard's Sound Compositions: A Historical-

Philological Perspective.

Subtitle: Archive, process, intent and reenactment.

Name of student: Gregorio García Karman

Supervisor: Monty Adkins

Co-supervisor: Mike Russ

Department: School of Music, Humanities and Media

Degree: Doctor of Philosophy (Musicology)

This research advances the current state of knowledge in the field of early tape music both empirically and methodologically. The purpose of this study is to evaluate the impact that the electronic medium exerted in the musical thinking of Roberto Gerhard, one of the most outspoken, prolific and influential composers in the Spanish diaspora whose musical legacy, for the most part unknown, is a major landmark in the early history of electroacoustic music.[1] Gerhard's personal tape collection, one of the largest historical archives of its kind reported in the literature, is exceptional for both its antiquity (50+-year-old tapes) and its abundance of production materials. Through the digitisation and analysis of the composer's tape collection this research argues that the empirical study of audio documents sets out a basis for a broader understanding of textual processes. More specifically, the research demonstrates that the reconstruction of works based on magnetic tape sketches is a powerful method to advance the understanding of early tape music. This research also examines Gerhard's sound compositions in relation to the post-war context in which they were composed. Finally, this research presents performance documentation that proposes an approach to the electroacoustic music repertoire in which creativity is not at odds with rigor and critical discernment demonstrating that archival study can be closely aligned to the concept of re-enactment.

Key terms: early tape music, media archaeology, electroacoustic music preservation, sound archival, magnetic tape sketches, poietic analysis, composition as process, musical borrowing, historically informed performance, re-enactment, Spanish diaspora, Francoism

---

[1] This was the main objective of the research proposal submitted by the author to the Edison Visiting Fellowship programme of the British Library 2009–10 (García Karman, 2009, p.3).

Gregorio García Karman

December 2014

CONTENTS

LIST OF TABLES

SUBMITTED CONTENTS

1. List of Submitted Contents

1.1 Publications

	Bibliographical Reference	Publication	Words	Figures	Tables
[1]	García-Karman, Gregorio. "Roberto Gerhard's Tape Collection: The Electronic Music" In Proceedings of 1st International Roberto Gerhard Conference. Huddersfield: University of Huddersfield, 2010.	Conference proceedings	8,000	2	2
[2]	Adkins, Monty, Carlos Duque, and Gregorio García-Karman. *Roberto Gerhard*. *The Electronic Music* In *International Computer Music Conference*. Ljubljana, 2012.	Conference proceedings	5,791	8	1
[3]	García-Karman, Gregorio. "*Roberto Gerhard's BBC Sound Compositions*." In *The Roberto Gerhard Companion*, edited by Michael Russ and Monty Adkins. Aldershot (England): Ashgate, 2013.	Book chapter	15,500	5	3
[4]	García-Karman, Gregorio. "Sonido y símbolo en Lament for the Death of a Bullfighter de Roberto Gerhard." *Quodlibet: Revista de Especialización Musical*, no. 54 (2013): 53-92.	Journal article	13,875	6	3
[5]	García-Karman, Gregorio. *Uprooted Sounds: International Electroacoustic Output of Spanish Pioneers in Times of Francoism* In *JIEM - Espacios Sonoros*. Madrid: Universidad Autónoma de Madrid, 2014.	Conference proceedings	7,350	1	10
[6]	García-Karman, Gregorio. "*Closing the Gap Between Sound and Score in the Performance of Electroacoustic Music*." In *Sound and Score*, edited by Cathleen Coessens, Paulo de Assis and William Brooks. Leuven University Press, 2013.	Book chapter	8,135	11	-
[7]	García-Karman, Gregorio. *Annotated Catalogue of the Roberto Gerhard Tape Collection*, 2014.	Catalogue of Gerhard's Tapes	67,032	2	1
	TOTAL		**125,683**	**35**	**20**

Table 1.1 List of publications.

All publications were peer reviewed prior to publication. Joint authorship declaration forms have been completed, in respect of all relevant publications, and are appended. The list of submitted items also comprises live performances of Roberto Gerhard's *Lament for the Death of a Bullfighter* (1959) (the author's concert adaptation of this work in both Spanish and English) and the world premiere of *Claustrophilia* (1966).

		Bibliographical Reference	Type	Duration
[8]		*Lament for the Death of a Bullfighter*: Reconstruction of the tape part without the voice of Stephen Murray	Audio	12 min 37 sec
[9]	*1*	*Lament for the Death of a Bullfighter*: Documentation of the concert performance (Barcelona, 26.04.2012)	Video	13 min 29 sec
	2	*Lament for the Death of a Bullfighter*: Documentation of the concert performance (Toronto, 17.08.2013)	Video	12 min 33 sec
	3	*Lament for the Death of a Bullfighter*: Performance materials: "spanish teleprompter"	Video	12 min 49 sec
[10]	*1*	*Claustrophilia*: Film (documentation of the concert performance)	Video	15 min 16 sec
	2	*Claustrophilia*: Interview with Jaume Figueras	Video	12 min 02 sec
	3	*Claustrophilia*: Documentation of the work with Prof. Benjamin Davies' students	Slideshow	02 min 39 sec
		TOTAL		**1 h 21 min**

Table 1.2 Video documentation of concert performances.

1.2 Supporting Materials

		Bibliographical Reference	**Type**	**Words**	**Figures**	**Tables**
[1]	a)	García-Karman, Gregorio. *Roberto Gerhard's Sound Archive at the Cambridge University Library*. Cambridge: Cambridge University Library, 2007.	Research report	3,500	3	-
	b)	García-Karman, Gregorio. *Roberto Gerhard's Tape Collection*. Cambridge: Cambridge University Library, 2008.	Research report	2,250	5	1
[3]	a)	List of references	Index of primary and secondary sources consulted	1,756	-	-
	b)	"What a smashing bloke he was!" An Interview with Dick Mills, London, 16.05.2012	Interview	16,077	13	-
[4]	a)	García-Karman, Gregorio. "Sound and Symbol in Roberto Gerhard's *Lament for the Death of a Bullfighter*." *Quodlibet: Revista de Especialización Musical*, no. 54 (2014): 53-92.	English translation of published article	13,875	6	-
	b)	Structural analysis of *Lament for the Death of a Bullfighter*	Large-scale plot of Figs. 6.1, 6.2, 6.3, and 6.4 in published article	-	4	-
[5]	a)	"La palpitante realidad no es estereofónica" Interview with Jose Luis de Delás, Cologne, 17.03.2013	Interview	19,700	5	-
	b)	"Nosotros acabamos llamándolo una dicta-blanda" Interview with Andrés Lewin-Richter, Barcelona, 20.2.2013	Interview	11,800	2	-
[7]	a)	Concert programme Barcelona	Programme notes	3,012	1	-
	b)	Concert programme Toronto	Programme notes	1,500	-	-
		TOTAL		**73,470**	41	3

Table 1.3 List of supporting materials

2. Problem Domain and Approach

The awakening of my interest in Roberto Gerhard's sound compositions, and particularly in the composer's magnetic tape collection, goes back to my Master's Thesis (García-Karman 2004). On the basis of a historiographical survey of the literature on Spanish Electroacoustic Music, the lack of critical work based on primary sources was cited as one of the major impediments to progress in the field (García-Karman 2004, p.3). Furthermore, the opening chapter set forth the historical significance of Roberto Gerhard's pioneering work in the electronic medium and the scant research previously addressing his electronic output. Thereupon the hypothesis that Gerhard's tape collection would be a valuable corpus to future research on his sound compositions was proposed:

> Roberto Gerhard […] is considered as the first Spanish composer to work with electronic means. In his British exile he composed many works involving tape […] although […] his facet as electroacoustic composer has not been sufficiently studied. The legacy of […] the Spanish pioneer, jealously guarded by his widow, was deposited after her death (1994) in the archives of Cambridge University. It includes a collection of ca. 150 non-inventoried tapes—pending to be restored and to identify their contents—of particular interest for the investigation of his electronic works (García-Karman 2004, p.8).[2]

The basis for this assessment—an article that appeared in a Spanish librarian's bulletin (Estanyol, 1996) and series of secondary sources, all based on (Davies, 1981)—is expounded in (García-Karman, 2007), the earliest record in this portfolio:

---

[2] "Roberto Gerhard […] es considerado como el primer compositor de origen español en trabajar con el medio electroacústico. En su exilio británico compondría un gran número de obras para cinta […] aunque […] su faceta electroacústica sigue estando hoy poco estudiada. El legado […] del pionero guardado celosamente por su viuda fue depositado a su muerte (1994) en el archivo de la Universidad de Cambridge. Contiene [...] una colección de unas 150 bobinas sin inventariar, a la espera de poder ser restauradas e identificar su contenido de especial interés para la investigación de sus trabajos electrónicos." (García-Karman, 2004, pp.7–8)

The existence of Roberto Gerhard's sound archive was first brought to my attention by an article written by Margarida Estanyol appeared in the Bulletin of the Spanish Association of Musical Documentation (Estanyol, 1996). The paper reported about the cataloguing of the non-musical manuscripts from Gerhard's collection […] Sources described include note-blocks, […] photographs and sound recordings. However, […] the two latter were not catalogued due to time and funding shortage. […] Admittedly, Gerhard is the first Spaniard to have worked with magnetic media in his compositions, as well as the first composer overall to have done so in British territory (Davies, 1981). […] in the context of my Master's Thesis […] the hypothesis that the 150 magnetic tapes (in figures estimated by Estanyol) would be a cornerstone for unveiling the details of Gerhard's pioneering work in this field was proposed (García-Karman 2007, p.1).

2.1 Narrowing Down the Subject Area

Following my Master's Thesis, a series of encounters influenced the subsequent course of research. In June 2005, while preparing to give a seminar entitled "Archaeology of Live-electronic Music"[3] (García-Karman, 2005) I took the initiative to attend a gathering of directors of European studios that took place in Paris under the motto of "Meeting for a Network of electroacoustic Music Preservation" (Maison de Radio France, Studio 116, Groupe de Recherches Musicales, 13–14 June 2005). In this discussion forum, local problems, existing solutions, and future actions concerning the decay of analogue and digital media, the documentation and access of electroacoustic music, and problems connected with author/production rights were debated.[4] In retrospect, these were important insights into the management of electroacoustic music assets that would later feed back into the Gerhard Tape Collection re-mediation project. Within the scope of my research at that time, however, I was somewhat disappointed that the problem area had only been confronted in a "fixed-media" context. Still, the Parisian meeting provided a general

---

[3] "Arqueología de la música electrónica en vivo". Seminar talk given at the LIEM-CDMC, the (now-extinct) electroacoustic music laboratory at the National Reina Sofia Museum in Madrid (XII Jornadas de Informática y Electrónica Musical, Museo Nacional de Arte Reina Sofía, 27 June–8 July 2005).

[4] The idea to join forces eventually lead to the development of ElectroMusicNet, a project proposal for the multiannual EU programme eContent+ that sought to structure the activity of an international network of organizations. According to this proposal, the concern of this network would be to preserve "one of the major artistic developments of the twentieth century"—a historical repertoire produced in 252 public and private studios since 1948, of which thus far more than 25000 works had been identified—deemed to be at a significant risk of deterioration (Teruggi 2006).

background, with respect to which, days later, the connections and overlap between preservation and performance of live-electronic music were examined in my seminar.

In January 2006, my appointment as a computer music engineer at the Experimentalstudio of the Heinrich-Strobel-Foundation further strengthened this line of inquiry.[5] Conveniently, it also provided an unparalleled opportunity to study Cristóbal Halffter's live-electronic works composed in the Freiburg studio in the 1970s. Albeit produced in somewhat dissimilar circumstances, Halffter's works were—like Gerhard's—a significant milestone in the artistic output of Spanish forerunners who had approached the electronic medium during Francoism. The first fruit of that research was an article proposing the restoration of Halffter's *Planto por las víctimas de la violencia* (1970/71), for chamber ensemble and live-electronic sound transformation (García-Karman, 2006), which eventually led, some years later, to an engagement to give historically informed performances of *Planto por las víctimas de la violencia* (1970/71) and *Variaciones por la resonancia de un grito* (1976/77) on occasion of the composer's 80th anniversary (García-Karman, Orquesta de la Comunidad de Madrid and Encinar, 2010).[6]

The exceptional circumstances contingent upon the early international electroacoustic output of Spanish composers,[7] together with the scant past research and my new outside perspective, encouraged further inquiry into this particular historical-geographical framework. With the goal to narrow down the subject area of my dissertation, once settled in Freiburg, mid-2007, I resolved to approach the Cambridge University Library and pick up the trail of Gerhard's tapes, which had weathered over a decade since the first attempt of an inventory was hindered by a lack of funding (Estanyol, 1996). By then I had a general overview of the preservation strategies of

---

[5] The connections and overlappings between preservation and performance of electroacoustic music, eventually crystallized in the book chapter *Closing the Gap Between Sound and Score in the Performance of Electroacoustic Music* (García-Karman 2013a), submitted as part of this portfolio.

[6] A live recording of this performance was issued on CD by the Italian label Stradivarius (García-Karman, Orquesta de la Comunidad de Madrid and Encinar, 2015). The liner notes of this CD provide an essay by the author entitled "*Homo electricus*" dealing with Halffter's live-electronic output and the socio-political context of this period (García-Karman, 2015).

[7] See (García-Karman, 2004) and (García-Karman, 2014d), the latter publication submitted as part of this portfolio.

European electroacoustic music studios and had undertaken a study of sound archival standards. The dissemination of audio archiving recommendations thanks to initiatives like PrestoSpace[8] and contemporaneous publications (IASA, 2005; Library of Congress, 2006; Bigourdan, Reilly, Santoro and Salesin, 2006) provided concrete lines of enquiry for the restoration of Gerhard's tapes. But the fact that preservation guidelines were based on the assumptions and priorities of traditional sound archives[9] also raised the question of whether specific inquiry techniques would be required to conduct the remediation and study of Gerhard's magnetic tape sketches.

2.2 Audio Document Criticism

Also informative, while visiting Cologne shortly before my first contact with Gerhard's sound archive, was the opportunity to discuss with the technical director of the WDR Studio, Volker Müller, the ongoing efforts to study the production materials of Karlheinz Stockhausen's *Gesang der Jünglinge* (1955–56).[10] This drew my attention towards a number of articles that started to appear from around that date (Zattra, 2006, 2007; Orio and Zattra, 2007; Zattra, 2008; Cossettini, 2009; Straebel, 2009; Friedl, 2012; Haßler and Lambrecht, 2012) that delineate a gradually emerging field of research devoted to the study of electroacoustic music sources. Several of those authors promoted the idea that concepts and techniques developed by textual

---

[8] PrestoSpace (Preservation Towards storage and access. Standardized Practices for Audiovisual Contents in Europe) is a consortium for audiovisual preservation and access that that was established in February 2004 under the auspices of a European Project. See <http://prestospace.org>.

[9] In short, the objective of sound preservationists is to identify and recuperate a series of valuable contents deemed to be at risk of permanent loss. The generally agreed-upon strategy to combat analogue media decay (degradation of carriers and obsolescence of playback equipment) is to migrate those contents to the digital domain and to take action to slow down the decay of the original carriers. Typically, institutional repositories then undertake the task of safeguarding the heritage's integrity—by regularly migrating the digital information into new storage technologies—and of administering the access to the digital contents.

[10] The author wishes to thank Volker Müller for the inspiring look at the preservation work being performed at that time on the production archives of the Studio for Electronic Music of the WDR. Of particular interest was the documentation of Stockhausen's tape assemblies using a video recording of the tape passing over the playback head (incorporated to the ProTools master sessions as a video track running synchronously with the audio content). The metadata describing the production tapes was stored in an Excel spreadsheet with hyperlinks to the master sessions.

philology can be applied to the study of audio documents, often with a view to the critical edition of electroacoustic music.[11] In all, the criticism of audio documents provided a necessary point of departure for this dissertation: an awareness of the processes of creation and transmission of sound documents over time that urged to integrate the historical-philological investigation of electroacoustic music archives already in the preservation stage (Cossettini, 2009).[12]

This shift of attention towards work derivatives and production materials [13] represented an important paradigm shift for the study of electroacoustic music. By way of example, a review of analytical literature (Brech, 1994; Ruschkowski, 1997; Smalley, 1997; Licata, 2002; Roy, 2003; Erbe, 2009) shows the prevalence of positions that stand firmly on the premise of studying "the work" as a concrete artefact and to being neutral with regard to media and instrumentation. Representatively, to ignore technology and the process of music making is an imperative of spectromorphological thinking (as is characterizing the perception of musical gesture at the expense of disregarding the study of external referents).[14] It could be conjectured that both ideological and practical reasons underpin this way of thinking. Among the former, perhaps, the truism that sees in the electronic medium a means to achieve the pure translation of the composer's ideas—an assumption disputed by composers already from the very start of the electroacoustic tradition (García-Karman, 2013a, p.144)—, as well as the broad impact of the idea of "reduced listening" (Schaeffer, 1966, pp.270–272); and among the latter, the limited access to

---

[11] For instance, applied to the study of conflicting assemblies of a certain piece or to the problem area of the transmission of sound documents over time.

[12] Cossettini's account of the re-mediation of the Archivio Luigi Nono assists in the discernment that the copying process is not merely a transfer of information, but an interpretative operation in which the restorer who makes a conservation copy becomes, with his decisions, an active part of the history of the sound document. "These choices are not possible without a critical awareness and an understanding of the phenomenology of the processes of creation and transmission of documents over time," Cossettini concludes (2009, p.103).

[13] Recording sessions, preliminary experiments, intermediate assemblies, final drafts, variant versions, copies of use, etc.

[14] Smalley, for instance, claims that "we must try to ignore the […] technology used in the music making" and acknowledges that "a spectromorphological approach cannot deal adequately with […] music where a very wide palette of sonic references may be employed" (1997, pp.108–109).

production materials, and the technical and conceptual challenges faced in the study of such evidence.

2.3 The Study of the Composer's Craft

The scant research on audio source criticism primarily concentrates on the historical edition of the classics of the electroacoustic music genre, whose ultimate objective is creating or restoring consistency of the texts being edited (Straebel, 2009).[15] Gerhard's tape collection provides ample room for framing the discussion in such terms. Questions of this nature[16] are eventually addressed in various publications (García-Karman, 2010, 2013b, 2014d), the catalogue of Gerhard's tapes (García-Karman, 2014a) as well as in this commentary.

Much less represented in the literature is the study of production materials with the prospect to discover more about the composer's craft.[17] This gap provides one of the key motivations of this thesis: the desire to understand how Gerhard's pioneering sound compositions were created. To this end, the focus was on the vast amount of magnetic tape sketches identified during the first stages of investigation (García-Karman, 2007, 2008a), whose potential was corroborated by the digital migration of Gerhard's tapes in 2012. The working hypothesis—proposed as early as 2007—was that the study of those sources "would offer an invaluable insight into Gerhard's electroacoustic music and compositional thinking" (García-Karman 2007). This claim essentially captures the central thrust of this portfolio: to consider the extent to which the evidence provided by Gerhard's tapes offers a tangible link to the composer's ideas. This hypothesis naturally opened up two lines of inquiry: 1) the empirical research of manipulations and assemblies as a means to evaluate the composer's

---

[15] Inherent media properties such as alterability, propagability and obsolescence, and the transformative impact of electroacoustic music performance practices positively contribute to this sense of urgency for modern critical editions.

[16] Such as, e.g., 1) the chaotic state in which the tapes were found (García-Karman, 2007); 2) the questions opened up by the composer's catalogue, endorsing a revision based on the study of the primary sources (García-Karman, 2010); and 3) the fuzzy boundary between working materials and finished works that became apparent once this body of documents was digitised.

[17] Beyond the scope of textual criticism and aside from general statements about the importance that such materials have in the absence of notation (Berdux, 2010) the study of magnetic tape sketches dealing with early tape music has, to my knowledge, not explicitly been addressed in the literature.

criteria for arranging and selecting his material; and 2) the need of developing a deep understanding of the cultural context and historical background (considering aspects such as sociology, politics, patronage, economy, philosophy, psychology) that might have influenced the composer's decisions.

2.4 Action research

A further leap into the definition of the scope of research into Gerhard's sound compositions was inspired by my foregoing work on Cristóbal Halffter;[18] specifically, by the two-way trade between the rigorous analysis of sources (leading to historically informed performances) and the intuitive understanding acquired through performance (which created a fertile ground for further reflection [García-Karman, 2013a]). This rewarding experience gave rise to the idea of a research design conceived to exploit the cross-fertilization of scientific and artistic thought.[19] With this in mind, the study of Gerhard's materials was approached from two complementary standpoints.

In the first frame of reference, textual philology served as a critical model for investigating the relationships between audio documents at different stages of production. Particularly appealing, during the first stages of research, was to learn about a method known by philologists as "stemmatology" (see, e.g., Andrews and Macé, 2012), a rigorous approach to textual criticism used to reconstruct the transmission of a text on the basis of relations between the surviving manuscripts. In my research, I explore the inverse application of this method to study the surviving witnesses of Gerhard's operations in the studio. Following the digital migration of Gerhard's tapes, a comparative study of the composer's magnetic tape sketches was conducted with the aim to find relationships between the precursor and product materials. Those relationships were experimentally verified in the digital domain by recreating Gerhard's elementary operations and subsequently comparing the results to

---

[18] See above.

[19] The tension between artistic and scientific research is, of course, well-known to be a significant area of exploration in modern music (Brech, 2013; Ungeheuer, 2013). However, in contrast with the growing interest to exploit this mutual dependence in sister disciplines like Media Archaeology, the notion of "action research" (i.e., research that incorporates acquired feedback evaluation of one's own creative work) (as cited in Landy, 1999, p.63) is still in its infancy in the context of musicology.

the composer's original manipulations. Gerhard's sketches could hence also be arranged as a tree of sound documents, all converging into a finished work. Extending this logic further, the prospect of recreating the production process of one of Gerhard's works eventually materialized in the full reconstruction of the tape part of *Lament for the Death of a Bullfighter* (1959).[20]

The reciprocal perspective (coming back to the intuitions awakened through performance[21]) considers the re-enactment of the composition process as a means to enhance our understanding of the composer's creative decisions and artistic criteria. This forms the basis for the scrutiny of Gerhard's technique performed in (García-Karman, 2013b); and particularly for (García-Karman, 2013c), a *poietically*-oriented analysis of the *Lament* that seeks to interpret Gerhard's decisions in terms of both the composer's own conceptualization of the creative process and his artistic discourse. Besides, the reconstruction of Gerhard's *Lament* is a means to reflect on the act of music making itself. This concern is a central thread linking the materials submitted in this portfolio—the intent to delve into the understanding of composition and performance of electroacoustic music as activities within a musical practice. At this meta-level, the reconstruction is not only a methodology to restore continuity between the artistic product and its conditions of origin (Dewey, 1935) but also a tool to examine the boundaries of composition, performance and research. To this effect, the re-enactment of the *Lament* as a concert performable work[22]—picking up Gerhard's intention to produce a Spanish version of the piece (García-Karman, 2013c, pp.72–73)[23]—further problematizes those divides. Also engaging in reflection along these lines is the staging of Gerhard's autograph *Claustrophilia* (1966), a set of

---

[20] This reconstruction is submitted with this portfolio.

[21] Picking up the old idea that "the technical realization of electronic music can be compared with the composer's interpretation of his own instrumental music" (Koenig, 1960, p.109), the re-enactment of the process of composition can be likened to a new "performance" of the work.

[22] The playing off of the rigorous study of sources against the backdrop of artistic intervention is a pattern can also be observed in (Austin, 2004; Baudouin, 2007, 2008). The adaptation of the *Lament* takes the evaluation of this relationship a step further.

[23] This adaptation was premiered in a concert celebrated at the Conservatori del Liceu, Barcelona, April 26, 2012. The video of this performance, submitted as part of this portfolio, is also available at <http://info.ggkarman.de/node/99>.

performance instructions in the style of John Cage[24] in which Gerhard disguises—with delightful irony—his discrepancy with Cage's views on composition and performance. The plausibility of a contemporary response to Gerhard's playful challenge to Cage is the departure point of my own rendering of the piece.[25] At the close, the contemporary readings of *Lament* and *Claustrophilia* presented here are both participative forms of "action research" (Landy, 1999, p.63) conceived to examine Gerhard's compositional praxis, as much as acts of artistic transgression that speculate on the disciplinary boundaries of music making and on the very notion of "musical work".

---

[24] Both for the resemblance that this autograph bears wit John Cage's *Variations* series and for its embracement of the Cageian definition of "experimental music" as a musical action "the outcome of which is not foreseen".

[25] The world premiere of *Claustrophilia* took place at the Conservatori del Liceu, Barcelona, April 26, 2012. The film of this performance accompanying this portfolio (A Page for John Cage, 2014) is also available at <http://info.ggkarman.de/node/160>.

3. Research Questions Addressed in the Portfolio

This research asserts that the magnetic tape sketches in the Roberto Gerhard Tape Collection, if examined critically, contribute an essential perspective by which the compositional strategies and artistic thought of electronic-music pioneer Roberto Gerhard can be assessed. In particular, the present research seeks answers to the following questions:

1. What do the audio documents in the Roberto Gerhard Tape Collection reveal about Gerhard's commitment to the electronic medium?

2. What conclusions can be drawn from the analysis of Gerhard's working methods and how do they cohere with the composer's artistic discourse?

3. In light of this analysis, how do Gerhard's sound compositions respond to their historical, cultural and artistic context?

4. What implications do the answers to these questions have and how do they impact our perception of the composer's identity?

5. How does research into Gerhard's sound compositions shape our understanding of the creative process?

It is within the scope of this research to adapt or elaborate existing methodologies that yield answers to these research questions. Besides pursuing a traditional musicological approach, the investigation builds on the groundwork laid by methods and techniques from disciplines such as archival science, philology and media archaeology. A prominent expression of the empirical and methodological challenges addressed, is the database documenting Gerhard's tape collection and digital repository (see Appendix 1) on which the edited catalogue submitted with this portfolio is based. Between 2007 and 2014, its design and functionality were gradually extended to suit the needs arising from research, becoming a central resource to efficiently manage the rich set of descriptive metadata and critical commentary as well as a powerful instrument for navigating the tape collection.

In pursuing Question 1, the focus is set on source description, data gathering, quantitative analysis and exploratory research (García-Karman, 2007, 2008a, 2010;

Adkins, Duque and García-Karman, 2012) aimed at assessing the importance of the subject matter. With the digital migration of the tapes content analysis and experimental research based on audition take centre stage. Questions 2, 3 and 4 explicitly introduce the need for critical, analytical and qualitative methods. Supported by historical research,[26] text-analytical methods applied to the study of audio documents predominantly lay the groundwork for the inquiry into the genesis of Gerhard's sound compositions (García-Karman, 2013b; c, 2014d). In addition, in (García-Karman, 2013c) the philological study of Gerhard's manipulations, combined with the methodological perspective of *poietic* analysis, provide deeper insights into those questions. Finally, in Question 5 the focus is placed on developing, through reflective meta-analysis, our understanding of composition as a process. Specifically, the new realizations of *Lament* and *Claustrophilia* (see accompanying media) are themselves experiments that critically examine the traditional temporalities of music making and place an inquiry into the limits of re-enactment by bringing into dialectical tension creativity with historical performance (see García-Karman, 2013a).

---

[26] This body of research is throughout informed by the study of Gerhard's writings, original interviews carried out by the author, and written sources and visual materials preserved at the Cambridge University Library and at the BBC Written Archives Centre, whose administrative records bear unique testimony to the composer's working processes.

4. Research Objectives and Scope

Given the motivating factors and research questions stated, the research presented in this dissertation adopts the following specific objectives:

1. To investigate the circumstances surrounding Gerhard's work in the electronic medium.

2. To develop a general framework for the study of Gerhard's tape manipulations and assemblies.

3. To conduct an empirical study of the audio documents in the Gerhard Tape Collection and to produce a reference catalogue of this corpus.

4. To characterize Gerhard's production methods identifying the salient features of the composer's technique.

5. To determine the commonalities and contradictions between Gerhard's creative decisions and the composer's artistic discourse.

6. To evaluate Gerhard's artistic position in light of his socio-historical background.

Because it is not possible to assess the contents of the tapes solely from their external appearance, the scope for data collection and analysis necessarily covers the entirety of the sound archive.[27] However, in order to provide adequate depth the research scope is shaped by a number of constraints and assumptions. First, a particular emphasis is placed in the study of Gerhard's sound compositions for the BBC. This decision may be justified by the large amount of production materials in the collection that testify to Gerhard's intense commitment to this group of works. In addition, this selection effectively covers the core period of Gerhard's electronic output (1955–64) and offers the opportunity to discuss a number of relevant points related to his working methods. Moreover, the study of unambiguously finished works whose

---

[27] This approach is further legitimized by the fact that Gerhard's sound compositions incorporate materials from all kinds of audio sources in the tape collection.

production processes can be likewise verified against multiple written sources[28] seems to be the best starting point given the limited extent of research to date into Gerhard's sound compositions. Secondly, special emphasis is placed on the comparative study of audio sources through audition. This approach may be justified on the grounds that the direct experience with Gerhard's manipulations and assemblies is likely to contribute to a more complete understanding (in terms of empathic inwardness) of the composer's decision-making processes. Thirdly, particular attention is given to the philological and cultural exegesis of the composer's intent. The strong emphasis that is placed on the study of intertextual relations can be explained in terms of the important role that the dialectic abstract-figurative seems to play in Gerhard's musical practice. Fourthly, considering that the construction of Gerhard's identity as an artist-in-exile is one of the central topics of debate in Gerhard's scholarship, it seems justified to place a firm emphasis in evaluating Gerhard's electronic output against its socio-historical backdrop. In addition, the choice of *Lament* and *Claustrophilia* as case studies is a decision based on a combination of factors. These include their potential as concert-performable works, their inherent value as a means to air Gerhard's views on composition and performance, and the opportunity to actively explore central issues concerning the present research such as the notions of intent, authenticity, appropriation and reenactment.

---

[28] Contrasting with, e.g., Gerhard's *Audiomobiles* for which there is a startling lack of documentary evidence to substantiate claims (see below).

5. Original Contributions to the Field

The present research makes a direct contribution to the field of electroacoustic music studies. It presents both a corpus of original data and a historical-philological framework to guide its interpretation that expand the horizons of critical research into early tape music. Its main contributions are to provide a holistic perspective of Roberto Gerhard's achievements in the electronic medium and, in terms of methodological scope, to design a suitable research strategy that balances empirical, interpretative and artistic research.

The prime goal of electroacoustic music philology has been concerned with the historical edition of early tape music classics. Taking the rigour of source criticism as a model, this research focuses on the study of production materials with the aim to advance in the understanding of the composer's craft. More specifically, (García-Karman, 2013b, 2013c) highlight how the empirical study of magnetic tape sketches can serve to characterize the composer's technical procedures, and how these insights into the composer's decision making processes provide a unique lens through which to interpret the composer's ideas.[29] The present research, thus, also contributes to our understanding that the parallelism with textual philology can be taken a step further by placing the focus not only on the study of sound recordings and on the establishment of their authenticity and their original form, but also on the determination of their meaning.[30]

The methodology developed at the data collection stage may help designing future research-oriented preservation strategies (see Appendix 1). At the documentation level, an important original contribution is the annotated catalogue of Gerhard's tapes (García-Karman, 2014a). Its main achievement is to provide a complete catalogue of both the physical and digital collections that may serve as a work of reference for future research into Gerhard's recordings—potentially changing the way in which we

---

[29] Similar to those insights that the comparison of underdrawings with the finished image may show on how elements were adjusted by painters upon examination of their paintings with infrared reflectography.

[30] The *Random House Dictionary of the English Language*, 2d ed. (New York, 1987) gives as its definition of philology "the study of literary texts and written records, the establishment of their authenticity and their original form, and the determination of their meaning."

currently perceive the composer's work. In terms of formatting and structure, the printed catalogue prioritizes the adherence to existing recommendations and guidelines yet responding to local needs and priorities. In this respect, the catalogue combines "multilevel" and "analytical" features (see Miliano, 1999), presenting a clear, detailed and coherent model that can serve as a starting point for later studies. Its structure also reveals a novel approach to the digital transfer of manipulated tape assets. Specifically, it proposes the adoption of the recording session as container without constraining the number of takes it can hold. This approach endeavours to make room for the issue that different speeds and track formats may coexist on one tape and raises awareness that a digital transfer is merely a representation of the original carrier, whose interpretation demands interdisciplinary and critical thinking skills. In putting emphasis on the implementation of structured repository and production workflow designs (that take into account the expectations mediated by the codicological study of the collection and the scrutiny of Gerhard's equipment prior to transfer) this research sets a new standard for the context-aware digital migration and critical study of manipulated tape collections.

The results presented in (García-Karman, 2007, 2008a) are the first systematic effort to document the Gerhard Tape Collection and the first report ever to assess the importance of this source in relation to the composer's work in the electronic medium. The re-examination of Gerhard's "electronic music" catalogue carried out in the portfolio (García-Karman, 2008a, 2010, 2013b, 2014a) confirms the presence of materials for the majority of compositions reported by (Davies, 1981). It further addresses several inconsistencies of Davie's list and calls attention about a number of problematic works. Directions for future inquiry are suggested, particularly in those cases in which the tape collection provides insufficient evidence to substantiate claims. This research also yields new critical insights into the scope of Gerhard's achievements (García-Karman, 2010, 2013b, 2014d), which however uneven can legitimately be considered to hold a significant place in the history of early tape music (García-Karman, 2014d).

Gerhard's sound compositions represent some of the earliest serious efforts to compose with magnetic tape in British territory (García-Karman, 2013b). The present research aims to put Gerhard's work into perspective, integrating it—for the first time

in scholarly literature—into the narrative of the development of early electronic music in Britain. This survey is significant in that it contextualises the relationship between Gerhard and the BBC, yet shifting the emphasis away from the role that the Radiophonic Workshop played as initiator of the composer's undertakings that is given primacy in the literature. Gerhard's active participation—if always critical—in electronic avant-garde culture aside from BBC circles[31] is keenly demonstrated by works such as *Lament for the Death of a Bullfighter* (1959) and Symphony No. 3 "Collages" (1960), which plainly exceed the scope of the regular productions of the Workshop at that date. This research also sheds light on the debate among BBC policy-makers precipitated by *Asylum Diary* (1959), which provides a new frame of reference to assess the arguments against implementing the continental European models for public support of electronic music in the UK.

A major contribution of (García-Karman, 2013b) is to enhance our understanding of Gerhard's compositional strategies using evidence provided by the Gerhard Tape Collection. In identifying and empirically studying the audio documents related to *A Leak in the Universe* (1955), *Asylum Diary* (1959), *Lament for the Death of a Bullfighter* (1959) and Symphony No. 3 "Collages" (1960) this chapter contributes new insights into the origins and the development of Gerhard's working methods. The cases examined contribute to our basic understanding of Gerhard's techniques of sound montage and bring to light the composer's fascination arising from the assembly of individual components to produce a new overall structure. Fresh evidence is provided confirming Gerhard's widespread practice of recycling all kinds of sound sources—especially quotations and self-borrowings—and adapting them for different purposes and contexts. Evidence also suggests that the study of assemblies that display a maximum degree of elaboration make it possible to develop an opinion

---

[31] This is particularly reflected by Gerhard's visits to leading centres of the moment such as, e.g., the SWF in Baden-Baden and the WDR in Cologne (both in 1955), the attendance at international conferences like the *Semaine de musique expérimentale* at Expo 58' in Brussels (García-Karman, 2013b, pp.315–316, c, pp.55–56, 86–87), as well as his close relationship with Hermann Scherchen—founder of the Experimental Studio Gravesano (García-Karman, 2013b, pp.342–344, c, p.86). The mutual influence of Roberto Gerhard and ONCE is dealt in a forthcoming publication based on the paper, García Karman, Gregorio, "Gerhard, Caligula and the ONCE group", 3rd Roberto Gerhard Conference, Madrid, Universidad de Alcalá, 2013.

about the relative contribution of the BBC Radiophonic Workshop to the last stages of compositional production.

Novel insights into the genesis of Gerhard's *Lament for the Death of a Bullfighter* (1959) are provided in (García-Karman, 2013c). This article builds upon and expands the work undertaken in (García-Karman, 2013b) and presents new evidence on the historical links between Roberto Gerhard and Federico García-Lorca. In looking at specific evidence, a significant finding is the identification of manuscript materials in which Gerhard introduces the concepts of "sound-structure" and "sound-image" and the importance that this dual understanding of a musical entity plays in his process of conception.[32] The goal of (García-Karman, 2013c) is to test those insights against the empirical evidence obtained from the philological study of Gerhard's manipulations and assemblies. Adopting the methodological perspective of *poietic* analysis (Nattiez, 1990) this publication reveals a remarkable degree of consistency between the musical solutions adopted in the *Lament* and Gerhard's discourse. The findings of this analysis can be viewed as a unique contribution to the literature, as these insights into the composer's decision-making processes are, as reported by Gerhard, not limited solely to his work in the electronic medium. The present research also adds a new level of insight into issues that oriented Gerhard's compositional decisions, providing fresh perspectives on the composer's historical, cultural and political background. A further important contribution of (García-Karman, 2013c) is to draw attention to the notions of "emotional involvement," "communication," and "self-expression" and their role in mediating the interpretation of Gerhard's artistic scope.

The reconstruction based on magnetic tape sketches makes an important contribution to experimental methods for the study of early tape music. It provides a framework for the systematic study of production materials with applications to the analysis of immanent structures and the modelling of cognitive processes in music composition. An important result of this experimental method is the reconstruction, using the audio documents in the Gerhard Tape Collection, of the tape part of Gerhard's *Lament for the Death of a Bullfighter*. This reconstruction was performed with two

---

[32] *Lament for the Death of a Bullfighter* provides an unrivalled opportunity to study Gerhard's creative process given the existence of written materials related to this piece in which the composer expounds his conception of the creative process.

complementary aims: firstly, as a proof of concept, with the ultimate goal to produce a tape part indistinguishable from Gerhard's original; and second, as a means to provide a tape part without the voice, facilitating the adaptation of Gerhard's radiophonic poem for concert performance. Likewise relevant for the main questions guiding this thesis, is the world premiere of *Claustrophilia*, which reflects artistically on the divergent views held by Gerhard and Cage on the divides between composition and performance (see also García-Karman, 2013a).

6. Commentary on Publications

6.1 Research reports (García-Karman, 2007, 2008a)

The work leading to the first inventory of the Gerhard Tape Collection is described in two technical reports (García-Karman, 2007, 2008a). The following paragraph taken from the first of those reports submitted to the library in December 2007, encapsulates the outcome of the first hands-on experience with the collection:

> This work constitutes a first step to bring to the surface the body of Roberto Gerhard's sound archive at the Cambridge University Library. It is hoped that this effort might have contributed to raise an interest in the significance and the condition of the archive, a cultural treasure of 20th century European music suffering an immediate risk of permanent loss. In first place, further work should be made to complete the inventory of the tapes, and to propose a coherent organization and documentation model converging with cataloguing library standards. Once this evaluation is completed it will provide the basis for establishing a preservation plan […] Digitisation will make possible the access to these sources, giving researchers and musicologists the possibility to decode the artistic and political significance of Roberto Gerhard's work in the future. In order to achieve these goals a preservation project in cooperation with the Cambridge University Library should be developed, and financial support should be sought for (García-Karman, 2007, p.8).

The second report (García-Karman, 2008a)[33] provides an overview—in figures and diagrams—of the full archive: 714 items, including 609 magnetic tape reels of different sizes. The evidence provided by the annotations on containers and reels ratify the collection as "a major repository of Gerhard's music" (García-Karman, 2008a, p.5). Furthermore, roughly half of the tapes—from a total estimate of 300–600 hours of recordings—were considered to be materials related to Gerhard's sound compositions.[34] With a view to the preservation of the tapes, attention was drawn to the presence of different track formats and the coexistence of various generations of

---

[33] Both a tentative index of musical works and speech recordings, based on the annotations on the tapes, and a preliminary catalogue of the collection on paper accompanied this second report. The catalogue draft, submitted to the Cambridge University Library 13 October 2008, is superseded by the full catalogue of Gerhard's tapes and digital repository included as supporting documentation in this portfolio (García-Karman, 2014a).

[34] Both estimations proved very close to the figures arrived at after the re-mediation of the tapes (see below).

acetate- and polyester-film based carriers. The uneven state of degradation of the tapes had already been reported in 2007:

> Visual inspection shows that about half of the tapes are in apparent good shape. […] To the eye the most common problems are uneven or loose winds, and occasional deterioration of loose tape headers […] More severe damages are also encountered, evidenced by tape deformation and curly tape surface, suggesting a more advanced state of chemical degradation of some carriers. Furthermore, at least two tapes were affected by moulds (García-Karman, 2007, pp.7–8).

A crucial aspect on which both reports lay emphasis is the value of the collection as "the physical support of the creative work itself" (García-Karman, 2008a, p.5). The second report equates the tapes with "magnetic manuscripts" at different stages of production and formulates the hypothesis that "their recovery would offer an invaluable insight into Gerhard's electroacoustic music and compositional thinking" (García-Karman 2007, p.5). The fact that the study of the tapes could help to shed light on "some unclear aspects of [Gerhard's] electronic catalogue" (García-Karman 2007, p.5) is also underscored.

In October 2008, the Cambridge University Library *Reader's Newsletter* published an editorial on the donation of Gerhard's Archive. The article stated: "He was a pioneer of electronic music, and his music on magnetic tape is of great interest. […] The technical challenges for the preservation of this material will be one which the University Library will have to address with some urgency" ([Andrewes], 2008). The significance of Gerhard's tapes and the matter of their preservation had been raised.[35]

6.2 Roberto Gerhard's Tape Collection: The Electronic Music (García-Karman, 2010)

The aims of (García-Karman, 2010) are to cross-correlate Hugh Davie's catalogue of "electronic music" (Davies, 1981) with the evidence provided by the inventory of

---

[35] This first stage of promising research was followed by the unsuccessful outcome of the author's application for the Edison Visiting Fellowship 2009-2010 of the British Library with a proposal to migrate Gerhard's tapes, followed by various failed attempts by the Cambridge University Library to establish partnership arrangements with both the British Library and the Biblioteca de Catalunya, and ultimately the retirement of the head of the Music Library, Richard Andrewes. The publication of this column, however, drew public attention to the collection and piqued the curiosity of researchers.

Gerhard's tapes (García-Karman, 2008b) and to outline the context in which Gerhard's compositions were produced. A rich apparatus of references, based on an extended literature review and the data collected at Roberto Gerhard's Archive at Cambridge University, support this critical commentary of Davies' list. A further original contribution of this publication is the appreciation of the importance of Gerhard's self-coined term "sound composition".[36] Together with the central place of this concept in Gerhard's musical thought, themes such as the composer's eclectic choice of sound sources and his conceptualisation of the creative process are all hot topics formally introduced here that are elaborated throughout this portfolio (Adkins, Duque and García-Karman, 2012; García-Karman, 2013b; c, 2014d). In this regard, worth noting is the model proposed in the conclusion of this article (Figure 6.1).
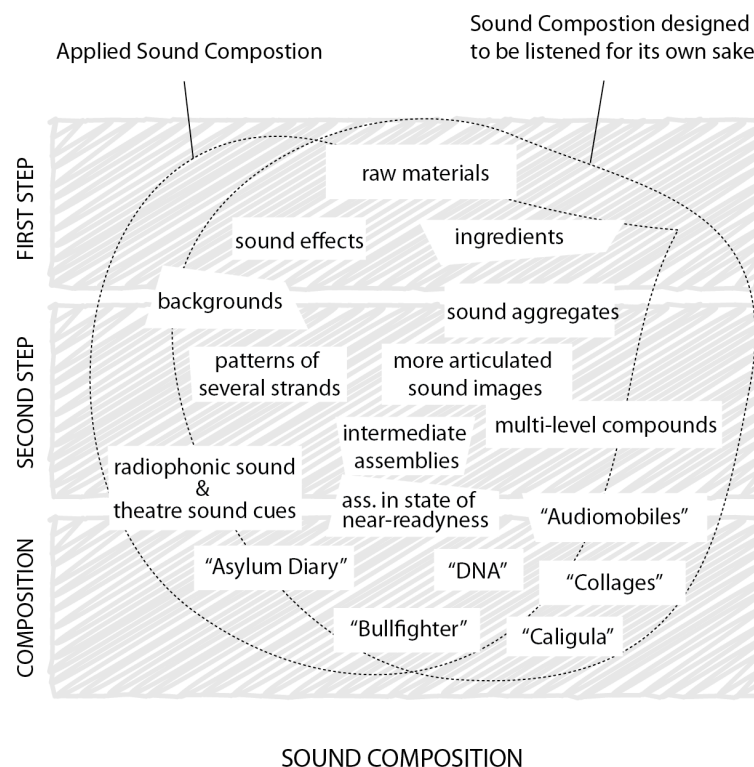
Figure 6.1 Sound composition "word cloud". Source: (García-Karman 2010)

---

[36] This article draws, for the first time, scholarly attention on the term "sound composition"—neither (Adkins, 2010) nor (Duque, 2010) make mention to this concept—, a central notion to Gerhard's approach to the electronic medium that has ever since received sustained attention. In this sense, Meirion Bowen's reformulation of the original title of Gerhard's speech "Concrete and Electronic Sound Composition" (Gerhard, 2000) (Bowen rephrases it as "Concrete Music and Electronic Sound Composition" instead of using Gerhard's original title) is not particularly fortunate. See also (García-Karman, 2013b, pp.319–320).

Figure 6.1 represents the vocabulary that Gerhard used to describe his work in the electronic medium against the binomial subsidiary/autonomous and the stages of composition elucidated in *Sound Observed* (Gerhard 1965 [2000]). Not only does this conceptual map retain its validity after the study of the tapes, but it also provides a useful model for describing prominent methods—pervasive throughout Gerhard's oeuvre—such as the recycling and recombination of materials (García-Karman 2013a; b, 2014b). Some conclusions that can be drawn from (García-Karman 2010) are:

a) The majority of the compositions in the enumeration of electronic works provided by Hugh Davies are represented in the tape collection. On the other hand, given the long period of time elapsed between Gerhard's death (1970) and the deposit of Gerhard's tapes at Cambridge University (1994), the possibility exists that a number of tapes were separated from the collection or went missing.

b) Moreover, given the amount of commercial commissions, it is likely that in a number of cases, the last stages of production were completed in external facilities.[37] Still, Gerhard's tape collection is, without doubt, the central repository of Gerhard's production materials and, thus, a singular testimony of the composer's creative process.

c) In spite of Gerhard's modesty,[38] both the photographs of Gerhard's home studio and the amount of tapes in the collection connected to his sound compositions are eloquent testimony of the composer's commitment to the electronic medium.

d) At this stage, scientific scepticism should be retained on Hugh Davies' claim that Gerhard was the first composer in Britain to experiment with tape manipulation (Davies, 1981), even more so given the widespread use of sound effects in radio and theatre by the 1950s. Subsequent publications in this

---

[37] And thus, a priori, the final versions of Gerhard's commercial works are more likely to be part of institutional archives such as the BBC Sound Archive (see below) and the Shakespeare Memorial Library Stratford-upon-Avon.

[38] As Roger Reynolds puts it: "RG always portrayed his involvements with tape as being very 'inexpert'. Done in his living room (or study) with tape machines." (Reynolds, 2007)

portfolio investigate this statement from different angles presenting Gerhard's sound compositions in relation with their historical and musical context[39] and validating their precociousness and originality.

e) The correspondence between the tapes and the catalogue of Gerhard's sound compositions presented in this article is based on external evidence prior to the digitisation of the tapes. As such, the references provided in later publications based on the investigation of the actual contents of the tapes such as *Roberto Gerhard's BBC Sound Compositions* (García-Karman 2013a), *Sonido y símbolo en "Lament for the Death of a Bullfighter" de Roberto Gerhard* (García-Karman 2013b), and particularly, *Uprooted Sounds* (García-Karman, 2014d) and the Annotated Catalogue of Gerhard's Tape Collection and Digital Repository (García-Karman 2014a), complement and update the results of this article.

6.3 *The Electronic Music of Roberto Gerhard* (Adkins, Duque and García-Karman, 2012)

The Electronic Music of Roberto Gerhard (Adkins, Duque and García-Karman, 2012) was written during the early stages of the re-mediation of Gerhard's tape collection. This article sums up the work carried out by the three co-authors so far (García-Karman, 2008a, 2007, 2010; Duque, 2010; Adkins, 2010), and thus collects a summary of the publications previously discussed as well as some preliminary results of the digital migration of the collection. It also opens up new angles, putting Gerhard into perspective with some of his contemporaries and pondering the impact of the electronic experience on his instrumental music.

6.4 *Roberto Gerhard's BBC Sound Compositions* (García-Karman, 2013b)

Roberto Gerhard's BBC Sound Compositions (García-Karman, 2013b) addresses the highs and lows of the long-lasting relationship between Gerhard and the BBC. This

---

[39] The composer's close acquaintance with the experimental circles of the BBC and his conversance with the most recent developments of the continental avant-garde are discussed in (García-Karman 2013a; b).

chapter examines—on the basis of a comprehensive examination of official records, correspondence, and production materials—the repercussion that this "insider's perspective" (García-Karman, 2013b, p.310) had on Gerhard's adoption of the tape. This publication expands and qualifies previous work dealing with the creation of the BBC Radiophonic Workshop (Hollingum, 2010; Niebur, 2010).[40] In this regard, a particularly important contribution of this chapter is to put into perspective the significance of Gerhard's BBC sound compositions,[41] integrating them—for the first time in a scholarly context—into the narrative of the development of early electronic music in Britain.

Following the main thrust of research in the present portfolio, this chapter brings together Gerhard's files at the BBC Written Archives Centre, Caversham, with the audio documents in the Gerhard tape collection. This line of research seeks to shed light on the circumstances in witch Gerhard's works were produced and the extent of involvement of the BBC in their fabrication. The relatively large amount of written and recorded evidence related to compositions such as, e.g., *Asylum Diary* (1959) and *Lament for the Death of a Bullfighter* (1959) allow for a clear grasp of the scope and nature of these operations. In a number of cases, the study of the tapes make it possible to carry out a reconstruction of the assembly processes at a very high degree of detail. Such is the case of the uncomplicated "sound images" for *Asylum Diary* or the more elaborate assembly of the introduction of *Lament for the Death of a Bullfighter*, both discussed in the closing section of this chapter (García-Karman, 2013b, pp.336–341). In the latter case it is even possible to revisit in detail the editing and mixing operations that presumably took place at the BBC by recreating the broadcasted version of the piece on the basis of the final sketches in the Gerhard collection (see Figure 6.3).

---

[40] A context saddled between the forward-looking work of visionary producers and the reservations towards electronic music of the conservative circles of the BBC (García-Karman, 2013b, pp.310–316, 319–320).

[41] This chapter argues that Gerhard's pre-Radiophonic Workshop productions were a significant landmark in the use of manipulated tape at the BBC (García-Karman, 2013a, p.315) and that compositions like *Lament for the Death of a Bullfighter* numbered "among the most important and innovative works produced at the Radiophonic Workshop in the late 1950s" (García-Karman, 2013b, p.320).

6.4.1 The Interview With Dick Mills

The interview with Gerhard's direct collaborator, Dick Mills, is a singular testimony of Gerhard's undertakings at the Radiophonic Workshop.[42] Mills joined the Workshop following Daphne Oram's resignation in November 1958 (Mills, 2012, pp.20–21), and thus his account covers the entire period of Gerhard's association with the British studio. Besides its significance as first-hand description of the working methods at the BBC, particularly revealing is Mill's narration of his involvement in the premiere and subsequent performances of Gerhard's Symphony No. 3 "Collages". Moreover, the interview is rich in anecdotes that illuminate the personalities of both the composer and his wife.

It should be noted, however, that whilst Mill's period at the BBC coincides with the dates of production of *Asylum Diary* (1958) and *Lament for the Death of a Bullfighter* (1959), his memory concerning those two works is fairly vague and should be interpreted with caution.[43] On the other hand, his memory of the performances of Symphony No. 3 "Collages" is remarkably vivid and consistent with the historical documentation accessed.[44] In this respect, Mills chronicle underscores the importance given by Gerhard to the tape part of Symphony No. 3 "Collages" and brings to light the details of its performance practice.

Also highly relevant is Mills' report of the circumstances surrounding the rescue of the Radiophonic Workshop's sound archive in which he and Mark Ayres were involved:

---

[42] Mills is probably Gerhard's last living personal acquaintance from the Workshop. Delia Derbyshire passed away in 2001, Daphne Oram—with whom Gerhard kept some level of contact (García-Karman, 2013b, p.322)—in 2003, and Desmond Briscoe in 2006. Maddalena Fagandini sadly died in 2012 while this research was in progress.

[43] From the interview it is questionable whether Mills was involved in their production. Prima facie evidence exists that the *Lament* was supervised by Desmond Briscoe (García-Karman, 2013b, p.327) and it appears that Magdalena Fagandini would have assisted Gerhard in *Asylum Diary.*

[44] Of considerable interest is the photograph of the general rehearsal of "Collages" (Mills, 2012, p.8,14) that surfaced in the course of this research, in pursuit of the trail of a Vitavox advertisement. See also the annotations on the sound diffusion score and Gerhard's preparatory sketches for the tape part (García-Karman, 2013a, pp.328–332, 345–346).

Mark set himself up really as a curator of the Radiophonic Workshop, and he heard that all our tapes were going to be thrown away, so he got hold of me and he said, "Look, you are the oldest surviving member of the Workshop, and you've probably got the best memory anyway. Will you come into the Workshop? We will compress physically all the tapes, we will get all the paperwork we can with each tape, and we will combine the tapes" […] So we compressed the whole library."[45]

Intriguingly, in the course of the investigation that I carried out for (García-Karman, 2013b) Mark Ayres denied that the collection had been "compressed" (personal communication 2012). Ayres also kindly provided a list with the tapes available in the Radiophonic Workshop sound archive related to Gerhard's productions (see Table 6.1), which, with the exception of a listening copy of TRW1076 made at my request,[46] are yet to be digitised.[47]

Tape RW	Contents	RW staff mentioned
TRW 122	Gerhard's talk "Sound Observed"	-
TRW 127	Tape part of Collages / Recording of the Symphony	-
TRW 136	Recording of Collages (Promenade Concert 1967)	-
TRW 213	*Lament for the Death of a Bullfighter*	-
TRW 1076	*Asylum Diary*	Maddalena Fagandini
TRW 2027	*Lament for the Death of a Bullfighter*	Desmond Briscoe
TRW 3021	Original and stereo inserts for "Collages"	Dick Mills
TRW 6031	The Anger of Achilles	Delia Derbyshire

Table 6.1 Gerhard's materials in the tape collection of the Radiophonic Workshop.
Source: Mark Ayres.

6.5 Sound and Symbol in Roberto Gerhard's *Lament for the Death of a Bullfighter* (García-Karman, 2013c)

Sound and Symbol in Roberto Gerhard's "Lament for the Death of a Bullfighter" combines the philological study of Gerhard's magnetic tape sketches—sustained by

---

[45] (Mills, 2012, p.17)

[46] This tape contains a complete recording of *Asylum Diary*, which can only be found in fragmentary form in the Gerhard tape collection. See (García-Karman, 2013b, p.324).

[47] The most interesting tape of this list is TRW 2027, conceivably a broadcast-quality copy of Gerhard's *Lament for the Death of a Bullfighter*.

abundant documentary evidence—with the methodological perspective of *poietic* analysis (Nattiez, 1990). The thesis of this article is that, despite the emphasis that the composer set—publicly at least—"on the abstract 'musical' quality of concrete sounds rather than their associative meaning" (Adkins, Duque and García-Karman, 2012, p.22), the dialectic abstract-figurative plays a central role in Gerhard's creative process. This claim takes, thus, position on the ongoing debate (Lendle, 2010; Pérez del Castillo, 2010; Russ, 2013) surrounding the use of figurative elements in Gerhard's music. The threads tied together in this article make it a key output of this research portfolio.

A significant contribution of this publication is to reveal the importance that the dual notion of a musical entity as "sound-structure" and "sound-image" played in Gerhard's process of conception. The results of the analysis show that Gerhard's discourse is remarkably consistent with the solutions adopted in the *Lament*. The extensive use of quotations and figurative elements throughout the piece firmly support the idea that the dialectic abstract-figurative is central to Gerhard's creative process.[48] The following paragraph represents an attempt to put Gerhard's poetical operations in the *Lament* in terms of both the process of conception described by the composer and the observations derived from the analysis:

> At the outset, there is the germ of a musical thought. The utterance of the speech, a certain literary image, the atmosphere in a particular section, the sanguinary rites, the man facing death, or the sharp presence of Lorca, are all emotionally and mythically charged entities that activate the composer's creative imagination. Following, the creator takes up the task of examining these objects mentally, abstracting from them certain distinctive attributes capable of being mapped onto a sound entity with expressive characteristics. Then, a negotiation takes place in which the suitability of the available musical resources to represent these attributes, and the capacity of those resources to take on a functional role and to establish relations with their surrounding context according to musical laws, are evaluated. These semantic properties can be attached to a sound with certain physiognomic characteristics and a determined temporal behaviour, to a choice of instrumentation, a characteristic rhythmic design, the harmonic structure of a chord, the density of a texture, a formal arrangement, and the different allocation of sound-colors and patterning to each section. […] In this way, the composer

---

[48] Plentiful evidence supports the consistent use of such figurative devices throughout Gerhard's work, including self-sufficient compositions such as Symphony No. 3 "Collages" (1960), *Caligula* (1961)*, and *DNA in Reflection* (1963).

builds a web of relations in which the abstract—pure sonic movement of simultaneously coherent musical layers—and the figurative coexist dialectically. "**The truth is that I couldn't be happy without either. I must have them both**,"[49] Gerhard stressed (García-Karman 2013b, p.80).

Granting the rationalistic reduction of this construal, what is compelling (besides the remarkable congruence between the composer's ideas and their manifestation in the *Lament*) is the close resemblance that the above characterisation has with the exegesis of the process of artistic creation offered by (Valéry 1990 [1957]) and (Stevens, 1951a)—two of Gerhard's prime aesthetic reference points. Just as significant is the fact that Gerhard's praise of music as an acoustical, sensorial phenomenon and his scepticism towards the validity in music of the notions of "message", [50] "communication" and "self-expression" (García-Karman, 2013c, p.88) are highly agreeable with the theoretical foundations of Hermann Scherchen's performance aesthetic (Hutchison, 2003, p.21). Both Scherchen's relentless support of modern music—inspired by Schoenberg—and his utopian political convictions had eyes set on the future, and demanded, in Scherchen's view, a selfless dedication and a sense of responsibility. In extolling the acoustical quality of the music, Scherchen was not only propagating Schoenberg's idea of "l'art pour l'art" (1950, p.51) but also expressing a strong reaction to the exploitation of music as political propaganda by fascism (Hutchison, 2003, pp.61–63). The symbolic analysis of the *Lament* delivered in (García-Karman, 2013c) suggests that Gerhard's emphasis on the pure act of listening is coherent with Scherchen's utopian ideals. It pinpoints the existence of aesthetic operations in Gerhard's music that reveal that the composer seems to have relished speculating with the problem of conciliating those visionary ideals with a quiet, yet passionate emotional involvement. In light of this reading, the *Lament* should be considered a pivotal work that yields illuminating insights into Gerhard's nuanced understanding of how art can be, at the same time, both fully autonomous and an intimate form of self-reflection. This unprecedented opportunity to break into

---

[49] Gerhard.9.115, fol. 36, Roberto Gerhard Archive, Cambridge University Library.

[50] "I dislike the word 'message' for the cluster of conflicting overtones it has" Gerhard.7.119, fol. 3, Roberto Gerhard Archive, Cambridge University Library.

Gerhard's intimate sphere[51] would have hardly been possible without being able to study the composer's magnetic tape sketches.

6.6 The Reconstruction and Concert Adaptation of *Lament for the Death of a Bullfighter* (Gerhard and García-Karman, 2012)

The reconstruction / new realisation[52] of *Lament for the Death of a Bullfighter* complements the general introduction to Gerhard's technique (García-Karman, 2013b) and the analysis of this piece (García-Karman, 2013c) commented on above. This experiment was primarily designed as a method to gain insights into the inner workings of the *Lament* and into Gerhard's musical thought but also with the purpose of adapting the radiophonic poem for concert performance. Altogether, the overall aim was to create a tape part without the voice that is virtually indistinguishable from that produced for the BBC radio broadcast in 1960.

---

[51] Exposing his conversance with cutting-edge artistic practices and giving insight into an artistic temperament "well disposed towards technology and experimentation but never losing sight of the figurative and human" (García-Karman 2013b, p.88).

[52] The author adopts those terms aware that the experiment reported here displays a number of unique features that differentiate it from other "reconstructions" or "new realizations" of tape music classics. A musicological reconstruction, in its more common specialized meaning, refers to an incomplete work in which lost or unfinished parts (e.g., at the composer's death) have been pieced together from the rough sketches and/or completed by someone highly familiar with the composer's writing style. In the context of electroacoustic music, the term "reconstruction" has come to bear diverse additional connotations. Its most common usage is to designate the process leading to the staging of historical live-electronic works (Bernardini and Vidolin, 2005; Wetzel, 2006). Explaining his three-stage model for the conservation of this repertoire (analysis, reconstruction and performance), Wetzel, for instance, equates "reconstruction" with "realisation using newer technology" (Wetzel, 2006). On the other hand, the term "realisation" has a long-established usage in EM. Right from its early stages, it was adopted to describe the actual making of music for magnetic tape, a process comparable with "the composer's interpretation of his own instrumental music" (Koenig, 1960). Composer's like Koenig regarded the own realisation as the "authentic version", which would eventually serve as model for later realisations. What we hear when we listen to music for tape is, thus, "only one of many possible realizations" (Straebel, 2009). Acting accordingly, present-day realizations of tape music classics have been carried out by both artists and scholars seeking to explore, fulfil, and expand both authorial intentions and prerogatives (see, e.g., Austin, 2004; Dack, 2004; Baudouin, 2007; Heintz, 2010).

Admittedly, Gerhard's ingredients and Stephen Murray's voice were put together during the course of several sessions in the facilities of the Radiophonic Workshop in December 1959 (García-Karman, 2013b, p.327). Both the evidence found in the Gerhard Tape Collection and the testimony of Dick Mills, suggest that a tape part without the voice was probably never rendered. The usual process to attain the compound tape would have been manually triggering several tapes containing different components and mixing them live, a process that was never achieved as a continuous pass, according to (Mills, 2012). The investigation reported here was able to achieve a complete reconstruction of the final stages of production carried out at the BBC[53] as well as of the audio document history of the intermediate components edited together by Roberto Gerhard in his home studio.

6.6.1 Recreating Gerhard's Manipulations

Aiming at the problem of recreating Gerhard's operations in the studio the focus was set, on the one hand, on identifying the more elaborate specimens in the tape collection. The discovery of components relevant to the piece was a highly empirical, iterative process achieved during lengthy sessions of repeated listening through the entire archive.[54] Along this process, metadata was collected in the Filemaker database. The contents of each audio document were classified according to their complexity (final assemblies, intermediate assemblies, compounds and ingredients) and comments on their properties (with a high keyword content) were entered as text fields in the database (see Appendix 1, section A1.3). Potential candidates were gradually incorporated into a multi-track ProTools session in order to compare them with the rest of selected materials and with the finished piece. Matching the potential candidates with the BBC broadcast of the piece[55]—an operation hampered by the voice of Stephen Murray—also allowed to assign them an approximate position in the session time-line.

---

[53] The magnetic tape sketches of the *Lament* identified in the Gerhard Tape Collection support the idea that heavy editing took place at the BBC (see Figure 6.3).

[54] Many hours of unlabelled components built upon similar combinations of ingredients exist in the Gerhard Tape Collection. For more information on the methodology used by the author to work through Gerhard's magnetic tape sketches see Appendix 1.

[55] The best recording of the finished piece available in the Gerhard Tape Collection, Tape 387, was used as reference for the reconstruction.

The identification of the most elaborate components in the collection and their time alignment posed some difficulties. On the one hand, all components required a certain amount of editing before they would match the way in which they had been integrated into the finished work. Once edited, a further problem was fine-tuning the time alignment of the different layers, due to small speed deviations. Discrepancies that arose in properly fitting the intermediate assemblies together were typically in the range of ±1–2%, likely attributable to the tolerances of Gerhard's equipment and perhaps also to uneven aging of the tapes.[56] Fine-tuning those deviations was achieved by comparing waveforms at the sample level, calculating the duration ratio between Gerhard's ingredients and their occurrence in the finished piece, and effecting the necessary speed adjustments on the original files using SoX (Figure 6.2).[57]

```
sox ingredient1.wav ingredient2.wav speed 1.0124
```

Figure 6.2 Syntax used to change the sound files' speed with SoX. In this example, *ingredient1* is the name of the input file and *ingredient2* the name of the output file sped up by a ratio of 1.0124.[58]

Thereafter, the corrected files were dragged again into ProTools and realigned (at sample-level) with the finished piece. The next step was to adjust the volume envelope of each clip to recreate the mixing operations performed at the BBC. Particularly instrumental in achieving this goal was Gerhard's copy of the dry voice of Stephen Murray,[59] which allowed for direct A/B comparisons with the original version of the piece at all stages of the reconstruction. Re-mixing and fine-tuning the dynamic envelopes of Gerhard's components entailed comparative listening—roughly every second—of both original and reconstructed versions. The ProTools session of

---

[56] The variability in length / duration of digital masters retrieved from analogue tapes is a common phenomenon in many electroacoustic music pieces. In my experience, this variability can be useful. in when tracing audio document history (identifying corresponding to the same or different transfers).

[57] My tool of choice to effect the necessary speed adjustments of each component was SoX (http://sox.sourceforge.net), a command line application considered to provide the best resampling algorithm available at the time of writing.

[58] This ratio corresponds to a 1,24 % increase in speed and to an upward transposition of ca. 21 cents.

[59] The existence in the Gerhard Tape Collection of a dry recording of Stephen Murray's voice without Gerhard's electronic setting (Tape 417) was most important for this listening comparison to succeed.

the final assembly (Figures 6.3 and 6.4) ended up referencing sounds scattered over more than 40 reels. On the whole, the operation of readying the tape part represented several months of artisan craftwork.
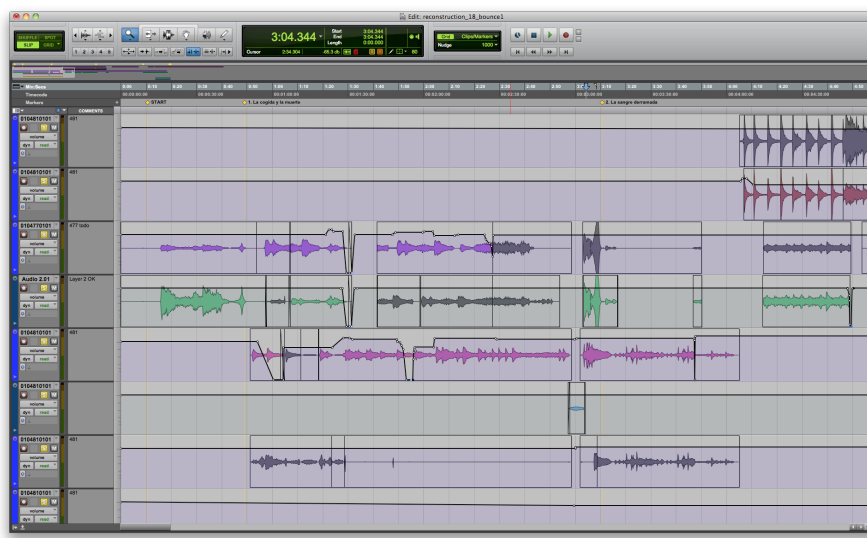
Figure 6.3 ProTools session of the reconstruction of Gerhard's *Lament for the Death of a Bullfighter* (detail).[60]
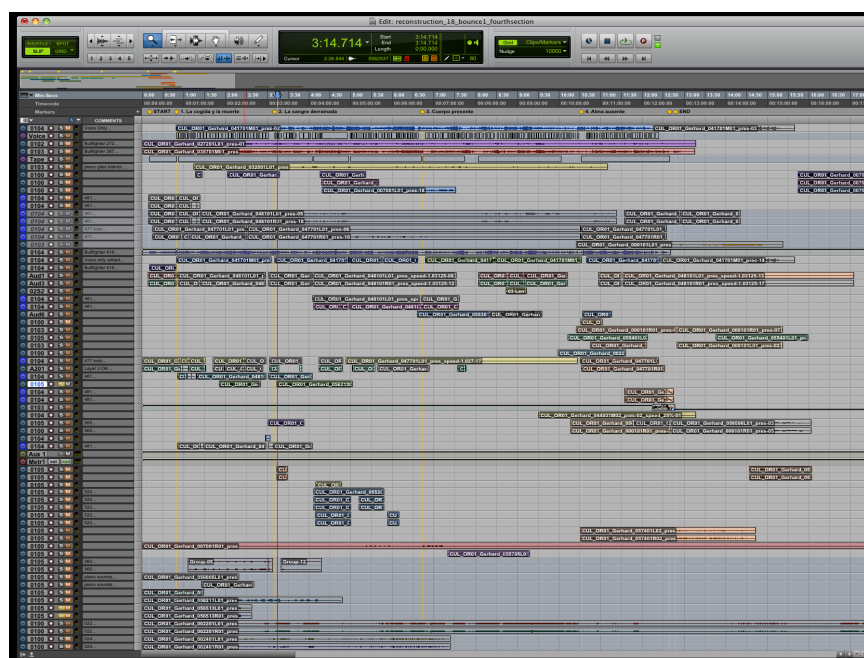
Figure 6.4 ProTools Session of the reconstruction of the tape part of *Lament for the Death of a Bullfighter*.

---

[60] A transcription into musical notation of this assembly can be found in (García-Karman, 2013b, pp.340–41).

Research was also undertaken regarding the way in which Gerhard's simpler components had been put together. Studying the audio document history of the intermediate production steps mostly entailed gradually taking apart Gerhard's assemblies and compounds into simpler pieces (Figure 6.5). That is, during this stage the course of action was, to a great extent, to deconstruct and decompose rather than to reconstruct. Here, the researcher must be prepared to infer intermediate steps corresponding to magnetic tape sketches that are missing.[61]
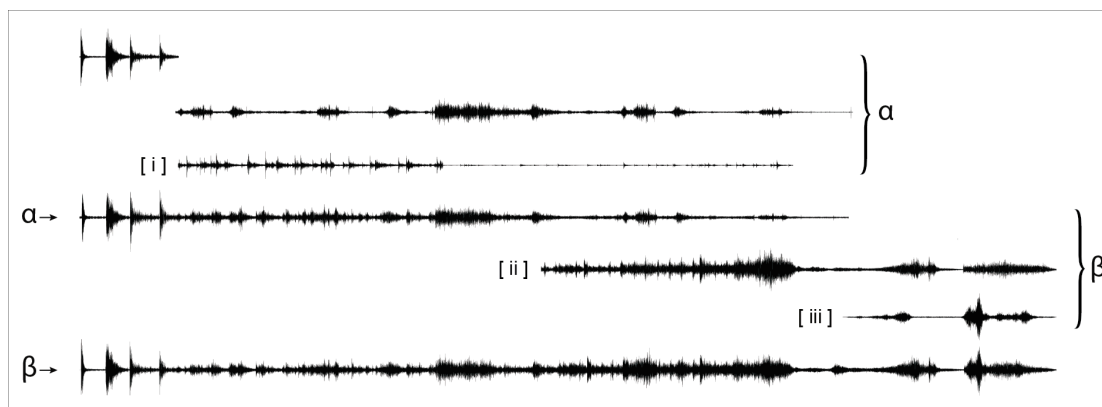
Figure 6.5 *Lament for the Death of a Bullfighter* (fourth section, *Absent Soul*). Components involved in the production of the tape part and reconstruction of the assembly sequence based on Gerhard's magnetic tape sketches: combination of three components to form an intermediate assembly (compound α), finished assembly of the tape part (compound β); Illustration by the author. Source: (García-Karman, 2013c).

On this level, the focus was on attempting to ascertain the origin of Gerhard's ingredients and their deployment. A summary of the methodology used based on listening, collecting descriptive metadata, and comparative study of manipulations and assemblies is provided in Appendix 1. In the end, bringing all stages of the reconstruction together provided an overall perspective of the complete production process.

---

[61] During the production process, audio documents may be, e.g., subjected by the composer to destructive editing, reused in another context, or simply discarded after their operational usefulness was over.

6.6.2 Terminological Considerations

The term "reconstruction" used to refer to the methodological framework described above should be taken in a double sense. Firstly, to refer to the act of bringing together again the composition from its original sources (i.e., as in rebuilding a broken vase from its pieces). This level of analysis interrogates the audio sketches in the Gerhard Tape Collection seeking to gain an understanding of the composer's operations in the studio. The second meaning of "reconstruction" at issue here (to form a picture of a past event by piecing together evidence) shifts the emphasis from the phenomenological to the hermeneutical. This next level of discernment seeks to form a picture of the *poietic* space that oriented the composer's decisions by piecing together "the composers intentions, his creative procedures, his mental schemas, and the result of this collection of strategies" (Nattiez, 1990, p.92). In this sense, the experiment reported here and further elaborated in (García-Karman, 2013c) may be understood as a proper effort at a re-enactment of the process of composition of the *Lament*.

Some of the unique features that distinguish the reconstruction / new realisation of *Lament for the Death of a Bullfighter* (1959) from similar enterprises are:

1) The absence of a proper realisation score that, unlike other tape music classics (such as, e.g., Stockhausen's *Studie II* [1954] and Koenig's *Essay* [1957]), provides instructions that could eventually serve as a model for later realizations.[62]

2) Unlike other tape compositions of that time, a reconstruction of the *Lament* using generic materials, such as electronic oscillator sounds or arbitrary sounds, is not applicable. On the other hand, the Gerhard Tape Collection provides an unusual opportunity to access the historical audio documents originally used by the composer to render the piece.

---

[62] The absence of a realization score is not surprising given Roberto Gerhard's reluctance to disclose his working methods. Evidence attests, however, to the existence of a script of the *Lament* containing manuscript notes taken by Gerhard. Regrettably, this script, described in the Cambridge University Library's internal catalogue with shelf-mark reference Gerhard.13.21, was reported by the library as "lost" in response to the author's inquires during the course of this investigation.

3) The express intent to produce an exact replica of the tape using the composer's original production materials.

4) The coexistence of two aims: a) to explore the reconstruction as a research methodology to understand the mechanisms that govern the composition; and b) to produce a concert performable version of the piece for reciter and tape.

5) The latter goal raises questions of authenticity and intentionality. Unlike open works such as, e.g., Cage's *Williams Mix* (1951–53) and Henri Pousseur's *Scambi* (1957) (which seek the active intervention of a third party by providing a set of rules that invite to reconfigure or complete the composition) no such "openness" is built into Gerhard's *Lament*. However, the concert adaptation of the *Lament* realisation does, in fact, address Gerhard's unfulfilled authorial intention of producing a Spanish realisation of the piece (García-Karman, 2013c, pp.71–72).

6.6.3 The Concert Adaptation

Engaging in a concert realization of the *Lament* necessarily forces attention to the question of the synchronization between voice and tape. After having examined a number of alternative solutions, this challenge was dealt with by using an onscreen teleprompter synchronous with the tape.[63] Concerning the implementation of this performing aid, a word-by-word mapping—dovetailing Stephen Murray's English recitation with Lorca's Spanish text—was codified as a sequence of MIDI events (Figure 6.6). The resulting MIDI sequence was then used to control a Max-MSP / Jitter patch, which generated the text to be read from the screen by the reciter. The first performance bringing together the reconstructed tape and Lorca's *Llanto por Ignacio Sánchez Mejías* took place on the 26 April 2012 in the Auditori of the Conservatori del Liceu, Barcelona, in the context of the II International Roberto Gerhard Conference (Gerhard and García-Karman, 2012).[64]

---

[63] See list of submitted contents, item 9.3.

[64] A video recording of this adaptation is submitted with the present portfolio.
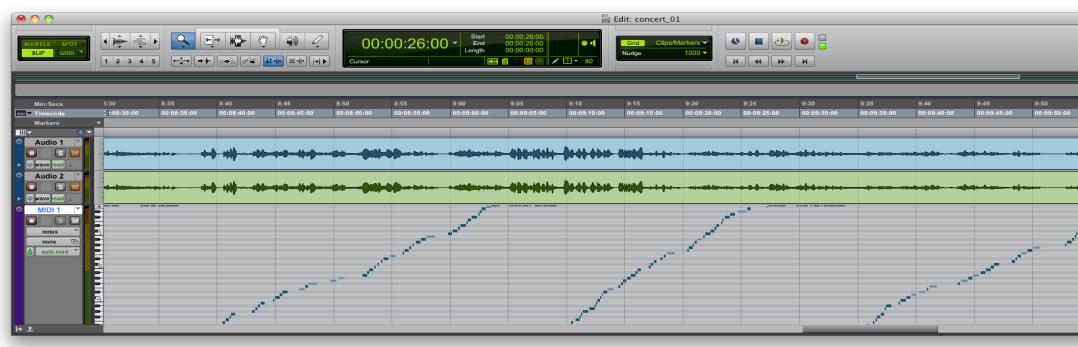
Figure 6.6 ProTools session for the concert performance of *Lament for the Death of a Bullfighter* (detail).

6.7 *Uprooted Sounds: International Electroacoustic Output of Spanish Pioneers in Times of Francoism* (García-Karman, 2014d)

This publication places Gerhard's sound compositions in the context of the electroacoustic output of Spanish composers beyond the country's borders during Francoism. This is the first scholarly effort to collect this little known repertoire and to report it in a cohesive format. The results presented confirm the existence of a substantial body of music composed in studios scattered across Europe and North America. A division into two sociogeographical groups is proposed: composers living in exile (Roberto Gerhard, José Luis de Delás, Enrique Raxach, Gonzalo de Olavide, Ramón Sender) and those who worked in international facilities yet maintaining their primary residence in Spain (Juan Hidalgo, Cristóbal Hallfter, Luis de Pablo, Andrés Lewin-Richter, Eduardo Polonio).

In this broader context, (García-Karman, 2014d) sums up several aspects of the present research and provides an overview of Gerhard's catalogue. Attention is drawn to the disparate treatment of the tape among the works identified by (Davies, 1981) under the banner name of "electronic music". This updated review helps to clarify the scope of Gerhard's sound compositions, which covers the entire spectrum from the merely decorative sound effect to sophisticated arrangements that truly explore the

expressive potential of the medium.[65] Moreover, amendments are proposed to the list of Gerhard's works in (Davies, 1981) that reflect the findings of the empirical study of the Gerhard Tape Collection and the underpinning research carried out by the author for the portfolio. Specific recommendations (see García-Karman, 2014d, pp.3–4) are: 1) to include the *Capriccio in the Manner of Goya* (1959);[66] 2) to remove the BBC radio drama *Caligula* (1961);[67] and 3) to remove the 10 excerpts from *DNA in Reflection*.

This research also underscores the fact that, with the exception of the soundtrack for the film DNA in Reflection (1963),[68] there seems to be no evidence of the completion of further items in the so-called series of "Audiomobiles" (see Davies, 1981; García-Karman, 2010; Adkins, 2010, 2013). The only possible reservation, with which the author agrees beyond objection, is the existence of a work in progress entitled Audiomobile No. 3 "Sculpture" [1963–68?], which is based on earlier draft sketches that Gerhard had initially given the name of *Sculpture I* (1963). Gerhard mentions the latter in his correspondence with Hugh Davies (see Appendix 2) but its completion does not seem to be validated on empirical evidence in the Gerhard Tape Collection.

This publication also proposes the hypothesis that the key to this conundrum is that the idea of composing a series of "audiomobiles" is a belated undertaking. The project can probably be linked to the impetus of an album proposal received from a record label in 1968:

> The correspondence between Gerhard and Hugh Davis reveals that, most likely, the idea of
> grouping together a series of works under the title *Audiomobiles* came about at a later point in

---

[65] Future research should investigate the significance of the tape in works for theatre and television such as, e.g., *The Prisoner* (1954), *All Aboard* (1958), *Coriolanus* (1959), *The Cherry Orchard* (1961) or *Macbeth* (1964).

[66] See below.

[67] Gerhard's music for the BBC adaptation of Albert Camus' *Caligula* does not feature electronic sounds as demonstrated by the recording of the complete play from the BBC sound archives, which can be heard at the British Library. This radio play should not be confused with the homonymous solo tape piece *Caligula* (1962), composed by Gerhard for his students at the University of Michigan, Ann Arbor.

[68] In his correspondence with Hugh Davies (Gerhard to Davies, 27 January 1967, see Appendix 2) Roberto Gerhard reports on ongoing work to make a stereo version of "Audiomobile 2 DNA" although no evidence was found of this stereo edit of the piece in the tape collection.

time, subsequent to their inception. Among his achievements in the electronic medium, in 1963 Gerhard mentioned a work entitled "*Audiomobiles*", clarifying that they were "just a series of illustration-examples for a lecture" (I suppose, as Davies does, that Gerhard, was referring to the *Capriccio in the Manner of Goya* and to the examples taken from *Asylum Diary* that Gerhard used in his speech "Audiomobiles" [BBC, 1959]). Later on, in 1967, Gerhard clarified for Davies that the last musical example of his speech *Sound Observed* (BBC, 1964) was in fact his *Audiomobile 2 "DNA"* (the sound-track of the film *DNA in Reflection* [1963]). Moreover, there is no evidence of a public debut of *Audiomobile No. 3 "Sculpture"* ([?]) in Gerhard's lifetime. Neither does this work appear in Davies' list supervised by Gerhard in 1967 nor are any other documentary references to this work known to exist. On the other hand, the level of sophistication and the variants (at least two) of a project labelled "*Audiomobile No. 3 «Sculpture»*" in the composer's tape collection suggest that it might be a relatively mature work. These variants of *Audiomobile No. 3 "Sculpture"* ([?]) are based to a great extent on a previous composition indeed mentioned in Davies' catalogue, named by Gerhard in 1963 as *Sculpture I* (1963), though there is also no evidence that it was presented publicly. Everything suggests *that Audiomobile No. 3 "Sculpture"* ([?]) is a late revision of *Sculpture I* (1963), a work that Gerhard probably never brought to light. There is also evidence that this revision was conceived to be included, along with other *Audiomobiles*, in an album proposal, never consummated, that Gerhard would have received from a record label in 1968 (García-Karman, 2014d, p.5).[69]

As far as the tape labelled "Audiomobile No. 1" in the Roberto Gerhard Tape Collection is concerned (Tape 361), I refer to my comments about this item in the annotated catalogue supplied as part of this portfolio:

> Although the reel is identified as "Audiomobile 1", audition of the tape gives rise to doubts about the nature of the recording: 1) from audition the tape seems quite likely to be intended to be played back at 7 ips (and not "15 ips" as stated next to the title); and 2) the contents—a concatenation of isolated compounds separated by silences—rather suggest that this tape contains preparatory materials (or, perhaps, illustrations for a speech) and not a finished composition (García-Karman, 2014a, p.75).

As previously stated, however, this tape is unrelated to the *Capriccio in the Manner of Goya* (1959)—a minor but well-documented sound illustration that Gerhard conceived as a corollary to his critical BBC radio-speech "Audiomobiles". Gerhard's *Capriccio* not only epitomizes the composer's interest in breaking away from

---

[69] See also the correspondence between Roberto Gerhard and Hugh Davies filed at Cambridge University Library and British Library (see Appendix 2) and the letter from Gerhard to Geoffrey Bridson, 23.4.1968 (Gerhard 14.51), Cambridge University Library.

classical models but also underscores the composer's wit and sense of humour. The allusion to Goya is examined in (García-Karman 2013b):

> [The *Capriccio*] is a crude and frenzied two-minute sound composition that Gerhard penned to illustrate his BBC talk Audiomobiles (1959). Eloquently, Goya's Caprichos (1793–99) are a series of prints of surprising audacity, both because of their biting satire (abundant in anticlerical and lascivious subjects) of established power-structures and the informal use Goya made of the technique of aquatint to convey violent tones and bold contrasts in a simplified, quick and lively design. That Gerhard took those attributes as a model for his own *Capriccio* is out of question (García-Karman 2013b, p.87).[70]

As revealed by the study of its constituent materials, Gerhard's *Capriccio* is a sonic transgression in which the composer condenses his discrepancy with the dogmas and prejudices of the electronic avant-garde:

> Gerhard's *Capriccio* is also a satire of the (aesthetic) dogmas of its time. A closer look on this "study" reveals that it consists of a delirious rhythmic structure of a piano—used as *objet trouvé*—superimposed to a recording of electronic sound appropriated from a record of musical examples by electronic music pioneer Herbert Eimert played backwards (García-Karman 2013b, p.87).

On the one hand, one can see in Gerhard's *Capriccio* the germ of the idea of a series reminiscent of Goya's own *Capriccios*. That this piece prefigures an alleged plan to compose a series of "audiomobiles" is strengthened by the homonymous title of the

---

[70] Those attributes are in fact cited in the preface of (Goya and Adhémar, 1951), a book of reproductions of Goya's *Caprichos* that was part of the composer's personal library: "Ce recueil d'estampes avait une originalité et une audace vraiment surprenantes; il fit scandale. Scandale, par le sujet: des rêves, des hallucinations, des violentes satires. Scandale par la technique, car l'aquatinte, qu'on croyait réservée à fournir d'agréables planches reproduisant les dessins au lavis français de Boucher ou de ses émules, servait à donner ici des tons violents, des contrastes hardis, un dessin simplifié, rapide e vivant" (Goya and Adhémar 1951, p.VII). In this book, Adhémar goes on to underline the decisive significance of *Los Caprichos* in the development of Francisco de Goya's late style, following the painter's severe illness in the last decade of the 18th century. For the hitherto court painter and designer of colourful tapestries, *Los Caprichos* signalled a key date in the own life and a radical breakaway from classical models. Goya's dramatic turn in style, as stated by Adhémar, was not only a breakthrough in the history of Spanish aquatints but also a milestone in the history of art and of human thought (Goya and Adhémar, 1951, pp.VII–VIII). See also (García-Karman, 2013c, p.87, and 2014d, p.5).

radio-speech and Gerhard's introduction to the piece.[71] The study of Gerhard's tapes further reveals a significant number of production materials of resolutely unfinished character (see Figures A1-18 and A1-19), which are consistent with the "ca. 25 to 30 7" reels of multilevel compounds classified as 'good'" reported by (Davies, 1981, p.35). On the other hand, the fact is that, even in relation to late efforts to systematize his electroacoustic catalogue and in spite of Davies' call in 1967 to list "absolutely everything"[72] for his International Electronic Music Catalogue (Davies, 1968), Gerhard did not mention any other "audiomobiles" other than no. 2. Moreover, that the composer generically applied such appellation to other dimensions of his artistic output (for instance, to refer to *Lament for the Death of a Bullfighter* in 1968[73]) further questions the existence of a mature, well-defined plan to compose an independent series of "abstract works" under this banner name.

The disparate treatment of the tape, the apparent inconsistencies in Davies' list and the fuzzy boundary between casual arrangements of compounds and deliberately edited works, justifies the conservative approach adopted in this investigation and urges to consider individually each item's significance. At the same time, in pursuing to read Gerhard's catalogue as a whole, this portfolio underscores the value of giving due importance to minor as well as to applied works that contribute to a contextualised, more nuanced understanding of the ideas that shape the composer's approach to the electronic medium.

---

[71] As previously mentioned, the omission of Gerhard's *Capriccio* in the account to Davies in 1963 (and elsewhere) is coherent with the assumption that the "example no longer of applied or purely functional sound composition but designed to be listened for its own sake" (see Tape 442) was ultimately but one more of the "*Audiomobiles* [that were] just a series of illustrations-examples for a lecture" (Gerhard, 1963). The capriccio was probably produced at the Radiophonic Workshop with the assistance of Maddalena Fagandini in September 1959 (García-Karman, 2013b, pp.323–324). In the author's opinion, that Gerhard did not consider the *Capriccio* as significant does not diminish the interest of this prank.

[72] Including studies and withdrawn works, see Appendix 2.

[73] Gerhard to Geoffrey Bridson, 23.4.1968 (Gerhard 14.51).

6.8 *Closing the Gap Between Sound and Score in the Performance of Electroacoustic Music* (García-Karman, 2014d)

In his BBC-Speech "Sound Observed" Gerhard touches upon the dependence of composers on their interpreters (Gerhard, 1965, p.188). Gerhard observes that the "gap […] between the original creative process and the indispensable re-creative process" (which lies at the foundation of instrumental music) gets bridged when composing with sounds on tape (allowing composers to work "in as direct a contact with sound as the painter works with paint"). *Closing the Gap Between Sound and Score* (García-Karman, 2013a) literally takes Gerhard's reflection as its point of departure and sets out the basis for the conceptual framework underpinning this research.

This chapter starts by drawing attention to the parallel between the work in the studio and instrumental performance. Examples are provided of early writings by *elektronische Musik* composers that challenge the view that the act of performance was abolished with the advent of electronic music (a commonplace assumption rooted in the thinking of post-Webern serialism).[74] The link between technical and musical craftsmanship is further explored in the context of the acousmatic tradition, where the process of turning the work of the composer into concrete reality takes place in two distinct stages. Firstly, the composer's spontaneous makings and gestures (undertaken in the isolation of the work in the studio and guided by intuition and perception) leading to a fixed sequence of sound events recorded on tape; and secondly, the public performance of the resulting tape through a multi-loudspeaker setup.[75]

In (García-Karman, 2013a), these examples are used to show the heightened awareness of the new proactive role of composers (both in the studio and on stage) in the two communities of practice held responsible for the initial developments in

---

[74] *Elektronische Musik* composers including Karlheinz Stockhausen, Herbert Eimert and Gottfried Michael Koenig embraced the idea that the new medium was at least as conditioned by the instrumental and human circumstances as instrumental performance (García-Karman, 2013a, p.144) or, more plainly, that "the technical realization of electronic music can be compared with the composer's interpretation of his own instrumental music" (Koenig, 1960, p.109).

[75] The additional layer introduced by the live act mediated at a later stage in the concert venue, enriches but does not diminish the interest of the composer's performance in the studio.

electroacoustic music composition. The conditioning exercised by instrumental and human circumstances as well as the tension between conception and practical realization both persisted—even when the "middle man" was abolished. This led composers to posit that "the technical realization of electronic music can be compared with the composer's interpretation of his own instrumental music" (Koenig, 1960, p.109).

Gerhard, in Sound Observed, also considered the repercussion on the composer's decision-making processes that the direct action with sound facilitated by the tape-recorder had. He particularly acknowledged the significance of the shortened distance between mental audition and aural confirmation, which allowed "to take quick decisions in anticipation of events or in reaction to them as they arise"[76] and "stimulates thought as applied to strategy and tactics in new ways" (Gerhard, 1965, pp.188–191). From the present-day scholarly perspective, the beauty of this new form of musicianship—in which composition and performance are linked indissolubly—is that the work with media leaves material traces of the composer's decision-making processes, which can be studied with the tools of the philologist. It is this significant gap in early tape music scholarship that this portfolio as a whole addresses.

A further significant contribution of (García-Karman, 2013a) is to reframe the act of performance in the context of live-electronic music. In this repertoire, the high technical and interpretative demands bring back the role of the instrumentalist as mediator of the score and give rise to new forms of musicianship and creative collaboration. The dilemma of obsolescence, the steady rate of technological improvement, the lack of notation standards or the focus on spatial sound are some of the issues addressed in this essay. The author invites to see these problems in another light considering them as opportunities and challenges that are inherent to the nature of this repertoire. This perspective provides a valuable framework for informing the study of a musical practice that is dominated by the interplay between ideal entities and material realities. On the grounds of its dependence on technical artefacts this

---

[76] Gerhard's description of the technique of composing with tape as a combination of "steered operations and chance operations" (García-Karman, 2013b, p.327) also reflects this close interplay between the ideal conception and technical realization. This statement was made by Gerhard with specific reference to *Lament for the Death of a Bullfighter*.

practice encourages the perception of the work as a space of possibilities that is subject to permanent revision. The impact of technology on the linking and timing of events also suggests that, in the context of electroacoustic music, the process of artistic creation can be conceptualised as a dialectic exchange between composition and performance, which starts in the studio and often seamlessly extends across rehearsals and subsequent performances of a piece.

6.8.1 Rationale for Inclusion of the Concert Performances of *Lament for the Death of a Bullfighter* and *Claustrophilia*

The idea of producing a concert version of the *Lament* has its origin in David Atherton's claim that this composition was "originally written as a radio broadcast but could be performed as a monologue with magnetic tape" (Atherton, 1973, p.118). This claim triggered the author's expectation (see García-Karman, 2010, p.126) of finding a tape part without the voice in the Gerhard Tape Collection, which eventually didn't turn up to reality.[77] Conveniently, the new assembly of the tape using Gerhard's magnetic tape sketches offered a prompt solution to the author's too hasty commitment to present the *Lament* in concert during the 2nd Roberto Gerhard Conference in Barcelona.[78] Moreover, the opportunity to work with a young Sevillian actress encouraged exploring the viability of a modern performance with Lorca's original text.[79] Conclusive evidence was later established about Gerhard's intention to produce a version of the piece using the original Spanish version of *Llanto por Ignacio Sánchez Mejías* (see García-Karman, 2013c).

---

[77] The existence of a tape part without the voice that went missing cannot be ruled out, although with the available evidence a plausible argument can also be made that it never existed.

[78] During the digitization of the tapes, the expectation of discovering the specimen of the *Lament* without the voice brought excitement to each working day. When three months later all the tapes had been digitized without any traces of the treasured tape, it was too late: the author had committed to perform the work, and Mónica Muñoz, a young student of the Conservatori del Liceu in Barcelona had already started learning the poem by heart.

[79] The author would like to thank Mónica Muñoz for her outstanding contribution to the premiere performance of the concert version of the *Lament* that took place on the 26 April 2012 in the Auditori of the Conservatori del Liceu in Barcelona.

Along this process, analytical, practical and creative goals reinforced themselves. The result is an undertaking that combines the rigor of philology's comparative and genealogical approach to the study of audio documents with an experiment in performance practice without any particular pretensions of authenticity. Paradoxically, the reconstruction eventually not only made it possible to bring to life the idea of a live performance of the *Lament* (presumably communicated to Atherton by Gerhard)[80] but also to fulfil the authorial intention of producing a Spanish version of the piece.[81]

The interest of this adaptation may be considered from different perspectives. Firstly, in connection with the significance of providing a new reading of the *Lament* that contemplates Gerhard's unfulfilled intentions. If we accept Atherton's claim, the work carried out in this dissertation to rescue the concert version of the *Lament* brings to light a landmark composition for speaker and tape that enlarges both Gerhard's oeuvre and the repertory of early electroacoustic music. At the same time, in proposing an interpretation of the work that intervenes in its object and changes it, the performance confronts us with the fundamental question of the identity of the *Lament* and the ontological problem of whether the audio text equals the work. This leads to consider the possibility of different realizations of the piece that represent the composer's intentions but also to question the notion of the work as a persistent, immutable object. In terms of reflective meta-analysis, this experience also argues for the benefits of practice-sensitive research and shows a fertile ground for exploring new modes of interaction between the roles of the textual critique and the creative producer.

Another source for the appeal of the concert realization was the ability to explore the musical problems addressed in the *Lament* from a practical perspective. The experience of devising the concert performance had straightforward relevance to assess the standard of craftsmanship and competence attained by the composer working at the tape recorders. Readying the teleprompter, for instance, contributed to a refined understanding of the level of detail of the dovetailing between the voice and

---

[80] Atherton does not give the basis for this claim, but his testimony manages to suggest that Gerhard entertained the idea of a concert version of the piece. No other references supporting Atherton's asseveration are known to the author.

[81] See (García-Karman, 2013c).

the tape parts but also to grasp the difficulties associated with their synchronization in a live context.[82] The intuitive understanding gained from the concert performance moreover provided considerable input into the analysis and interpretation of Gerhard's electronic setting. Contributions range from enhanced aural understanding of the composer's strategies to valuable input received from the audience.

On a more subjective plane, the concert adaptation provided an opportunity to cast fresh light on Gerhard's composition (somewhat obscured in the broadcast version of the piece) and to present the results of the research in an inventive manner. Strategies seeking to illuminate the expressive range of the piece may include taking advantage of the medium-specific possibilities of multi-channel diffusion and to explore new expressive registers of the speech.[83] Last but not least, bringing Lorca's original text and Gerhard's electronic setting together provided the opportunity to present the *Lament* in a new symbolic relationship to its historical and socio-political context (see García-Karman, 2013c).

On its part, *Claustrophilia*, *a page for John Cage* (1966) is an atypical musical action in the style of John Cage. In this "work" Gerhard himself takes the relationship between composition and performance and the problem of the composer's intentionality as subjects of critical reflection. McLuhan's opening quote, "performance is composition" (McLuhan, 1964, p.245), and Gerhard's own reply written below, "rehearsal is a fraud", seem to leave no doubt about the tone of Gerhard's "message". This page may be regarded both as display of affection to his friend John Cage (claustro-philia) and as a playful parody of Cage's indeterminacy theories positing the transformation of the roles of performer and composer.

For the author, the premiere of *Claustrophilia* was a fitting way to commemorate the 100th anniversary of the birth of John Cage coupled with the determination to enjoy turning Gerhard's mischief into reality in the context of a pedagogical concert that

---

[82] Perhaps, the idea of the concert version was abandoned by reason of those difficulties. On the other hand, A. L. Lloyd's quasi-literal translation of Lorca's poem greatly simplified the overall operation to prepare a Spanish version of the piece.

[83] The concert realizations of the *Lament* documented on the video recordings submitted with this portfolio were both performed by female voices and involved sound projection of the mono tape using multiple loudspeaker sources arranged around the audience.

aimed to disseminate the work of both composers. At the same time, the performance was born out of sincere curiosity for what would have happened if John Cage and David Tudor had agreed to Gerhard's bidding to bring this musical action to life. All efforts were made to be respectful with the text of *Claustrophilia*, as if it were a historic-reconstructive performance. On the one hand, by following Gerhard's meticulously detailed instructions, as closely as possible;[84] and on the other, in communion with Cage's spirit, as an action the outcome of which is not foreseen.[85]

The performance documentation of *Claustrophilia* submitted with this portfolio is relevant, firstly, because it represents the premiere of a musical action that involves wireless sets and sound diffusion in a live context (and is, thus, an electroacoustic work to be considered as part of Gerhard's catalogue). A second, and perhaps more important aspect of this extravaganza is its value to enhance our understanding of the expressive scope of a multifaceted and unclassifiable artist. It should be noted that, prior to this research, Gerhard's work in the field of sound composition had been largely disregarded (justly, but almost exclusively, receiving attention as a dodecaphonist with influences from Catalan folklore). *Claustrophilia* helps to better understand Gerhard's complex creative personality and is a vindication of his own views of the work of the composer. Its underlying wit and sense of humour is also key to fully appreciate the scope of Gerhard's work with the tape. At a meta-level, this experience casts new light on some of the topics considered in this portfolio by problematizing the notion of "turning the work of the composer into concrete reality". Firstly, by reformulating the problem of the borders between composition and performance as one of aesthetic choice; secondly, by placing an inquiry into the identity of the work that gives credibility to Gerhard's playful challenge to John Cage; and thirdly, by expressing the view that authenticity and intentionality are problem definitions rather than immutable concepts.

---

[84] One of the historistic elements of this performance was the use of four wireless sets from the collection of Jaume Figueras, a private collector close to Gerhard's Catalan circles (see submitted items 10.2 and 10.3). The author wishes to thank Figueras for his disinterested contribution to this performance.

[85] The author considered the otherwise intimidating scenario of a single dress rehearsal as a feature.

7. Conclusion

The goal of this publication portfolio was to examine the magnetic tape sketches in the Roberto Gerhard Tape Collection and to demonstrate that the analysis and interpretation of this evidence significantly enhances the understanding of the ideas that underpin Gerhard's artistic practice. This goal was achieved by combining experimental, investigative and analytical skills, together with knowledge from the field of textual philology and artistic practice. One area of particular interest was to explore the connection between Gerhard's creative procedures and personal reflections upon his craft. This led to consider the importance given by Gerhard to the dual notion of a musical entity as "sound structure" and "sound image" and the composer's use of extra-musical realities as the basis for musical thoughts. The interpretation of Gerhard's creative strategies in terms of historical and cultural specificities also contributed to understand the way in which Gerhard's music echoes the composer's personal convictions and experiences.

The dictum that "style is the quality of a work and is based on natural conditions, expressing him who produced it" (Schoenberg, 1950, p.47) also appears to be true in the case of Gerhard. Like the man himself, Gerhard's work in the electronic medium is purposefully eclectic and provocative. Compositions including *Capriccio in the Manner of Goya*, *Lament for the Death of a Bullfighter*, *Caligula*, Symphony No. 3 "Collages", *DNA in Reflection*, and *Claustrophilia* describe a system of dialogic responses to major themes that convey a sense of the world rich in shades and reject the authority of dogmas and formalisms of its time. In those pieces Gerhard engages in a conscious and creative exchange with the surrounding world, open to the influence of literature, art, philosophy and science. They portray a maverick composer, who found in technology a medium to unleash his uncensored imagination and to address the paradoxes and contradictions of the rational human being. Gerhard's sound compositions celebrate individuality, the autonomy of the artist and the uniqueness and subjectivity of the musical experience. They cast the vision of an artist with an unmistakable sense of humour, communication and emotional involvement; a composer concerned with playing an active role in society and who sought fulfilment by making his imagination become light in the mind of the others (Stevens, 1951b, p.29).

The study of audio documents conducted in the present research brings new empirical, cultural and aesthetic perspectives that are similarly pivotal to those reported in other emerging subfields of musicology (Cook, 2010). In this dissertation, the study of sound recordings contributes to improve our understanding of the process of coming into being of a musical work. Our questions resemble those posed by research concerned with the study of the poietic process and the composition of literary works (Bushell, 2005): How does the study of compositional material enlarge our understanding of the work? How does it problematize our understanding of what is meant by "the work"? The position adopted here as regards to textual criticism was to explore the process that precedes and follows the moment of publication—without diminishing the importance of the published work. Arguments were provided in favour of the triangulation potential (Landy, 1999) of philology as a discipline that takes in account the human factor and that is relevant to study a corpus of work like Gerhard's, which is essentially dialogic and referential.

It was our endeavour to observe the work of the composer but also to reflect upon the creative process itself. Composing with sounds on tape gives origin to a new production context. It shifts the responsibility of turning the work into concrete reality on the side of the composer, creates a shortened distance between mental audition and aural confirmation, and provides the composer with opportunity to discard. The composer constructs systems, makes experiments, selects materials and arranges them according to his plans; but also goes back over his steps, adjusts decisions and corrects miscalculations, incorporating ideas that arise from the direct contact with the medium. This sustained interaction between ideal entities and material realities transforms the dynamic of the process of creation and affects the composer's decision-making processes.

Our pursuit to understand these principles led to develop a novel methodology to investigate the process of coming-into-being of a musical work: its reconstruction using the composer's sketches. A notable distinction of this approach was the importance given to audition and to the interaction with sound, seeking to experience the composer's materials in a similar fashion as the composer did.[86] In the present

---

[86] This approach, thus, significantly differs form other efforts concerned with the study of production materials (Orio and Zattra, 2007; Grierson, 2013) in that it favours heuristic and intuitive judgement.

research, this methodology was used as a powerful supplement to musical analysis that was able to reveal underlying structures that are not exposed in the finished work. The reconstruction moreover provided a rigorous framework to the comparative study of magnetic tape sketches and to the modelling of the history of the audio documents that may be considered to be a specular equivalent of stemmatology. This dissertation proposes to combine this rigorous approach with the methodological perspective of poetic analysis to model and to interpret the composer's decision-making processes. To the author's knowledge, such effort is reported here for the first time in the literature and represents, both in terms of methodology and scope, a significant contribution to the study of early tape music.

When compared with its central role in the context of present-day media theory discourses (see Zielinski, 2011, pp.214–231), the impact of philology in electroacoustic music studies is still in its infancy. The present investigation calls for a shift in the practice of electroacoustic musicology towards more practical, contextual and rigorous research. The importance given in this portfolio to the study of sources was driven by the desire to contribute to an understanding of the non-trivial interplay between technology and cultural expression; much in the same way that media theorists have focused their epistemic interest on the exact knowledge of the objects that operate between both fields of discourse. Electroacoustic music studies might be able to work within the theoretical framework purveyed by its sister discipline. This would imply to recognize the importance of considering the study of technical artifacts and ideal identities on a par and to acknowledge the indissoluble unity of theory and praxis. This move towards a more holistic approach to the study of electroacoustic music, may be compared with the attack conducted by ethnomusicology on historical musicology for being a discipline concerned with a mystically transcendent interpretation of the phenomenon "music" with little or no practical or social significance. The achievement (or not) of this change of perspective might be held accountable for either challenging or perpetuating the perceived cold and inhuman nature of electroacoustic music and for advancing the social and professional future of this musical practice.

This conclusion finishes with a summary that incorporates the author's recommendations for future research on Gerhard. We hope that future research will

extend the scope of this study by examining central works such as Audiomobile No. 2 "DNA", Symphony No. 3 "Collages" and *Caligula* as well as continuing the study of Gerhard's production materials and works in progress. The significance of applied works, of which insufficient evidence seems to be available at the moment (*The Prisoner*, *All Aboard*, *Coriolanus*, *Macbeth*), may as well be the subject of fruitful study. The promising avenues opened by this research also raise the question of whether the study of magnetic tape sketches and the technique of reconstruction are applicable as a general method for the investigation of electroacoustic music, particularly in the context of early tape music. It is expected that, seeking to understand Gerhard's creative strategies, this perspective will be enriched by knowledge generated from further analytic pathways focusing on serial techniques and other systems employed by the composer in his instrumental music. More could as well be learned on the influence exerted by Gerhard on his British contemporaries as well as on those with whom Gerhard seems to have been actively in contact concerning his work in the electronic medium, including the ONCE collective and Catalan circles. For the sake of completeness of the digital archive, it also seems necessary to develop a plan of action to redo a small set of deficient transfers and to digitise the small group of 3-inch tapes that surfaced after the studio was dismantled in 2012. It should also be advisable to investigate the 78 rpm vinyl records of *King Lear* hosted at the Shakespeare Centre Library and Archive, Stratford-upon-Avon, and particularly the Radiophonic Workshop tapes in the BBC Sound Archive, identified by the author and yet to be digitised. It is also hoped that the annotated catalogue submitted with this portfolio will be available publicly in the near future. Last but not least, the best way to make the digital repository of public access and to provide researchers with the opportunity to explore the recordings in the Gerhard collection should be investigated.

APPENDIX 1

A1.1 Clarification of the Relationship of the PhD to the AHRC Funded Archival Project and Outline of the Candidate's Role Within the Project

The research project "The Electronic Music of Roberto Gerhard" carried out under the auspices of the University of Huddersfield with funding of the Arts and Humanities Research Council (P.I.: Prof. Monty Adkins) proposed three major goals: 1) the digital migration of the Roberto Gerhard Tape Collection; 2) the publication of a collective monograph (Adkins and Russ 2013); and 3) the release of a CD with a selection of Gerhard's sound compositions (Gerhard, 2014).

During the first phase, the author of this PhD supervised all aspects of the production process, both at the conceptual and implementational levels. This encompassed a comprehensive survey of hardware and software solutions (including hardware and software benchmarking) prior the start of the project;[87] the choice of equipment and the planning and set-up of the transfer studio and imaging facilities; the detailed specification of the production workflow; the design of the digital object repository and metadata architectures; and the restructuring of the Filemaker database as well created by the author in 2007–08. The conception of the data collection and sound archival strategies was the sole intellectual work of the author, who was also the main contributor to the project as transfer operator (see Table A1-1). Following the author's plan, two transfer operators (Duque and the author) successfully executed the actual

---

[87] This phase took place at the Experimentalstudio of the SWR in Freiburg in 2011, during the months prior to the commencement of the AHRC project. The author would like to thank this institution for providing the technical facilities necessary to perform the AD converter benchmark tests. For the author's notes taken during this pre-production stage in a private wiki see http://ggkarman.de/preservation/wiki/index.php.

transfer of the tapes in a period of three months, during which time the author was permanently based in Cambridge. Insofar the intellectual merit of the strategies developed and implemented in the migration and cataloguing of this corpus, are not covered elsewhere, this appendix provides a brief overview of this methodological groundwork.

Originator	Transfer operations conducted										
	Tapes	**Takes**	**Files**	**Duration**	**Net Duration[88]**	**Percent[89]**					
García Karman	430	497	960	230 h 16 m 11 s	121 h 53 m 21 s	67,1	59,1	62,9	62,7	60,8
Duque	209	342	564	136 h 10 m 55 s	77 h 32 m 11 s	32,6	40,7	36,9	37,1	38,7
Adkins[90]	2	2	2	0 h 54 m 47 s	0 h 54 m 47 s	0,3	0,2	0,1	0,2	0,5
TOTAL	**641[91]**	**841**	**1526**	**367 h 21 m 53 s**	**200 h 20 m 19 s**	100%				

Table A1-1 Overview of the author's relative contribution to the digital migration project as transfer operator. Source: repository metadata.

The goal of the second phase[92] was the publication of the Gerhard Companion. The author's contribution to this stage was to conduct basic research into Gerhard's tape collection and digital repository leading to the contribution of a book chapter to the Gerhard Companion. During this stage, a sustained effort was made to contextualise the research conducted on Gerhard's tapes, complementing it with an exhaustive

---

[88] This column indicates the net recording time. The number of preservation master files and durations provided in the two previous columns (Files; Duration) correspond to raw data, without taking into account whether they represent mono or split-stereo files.

[89] Thus, depending on criterion, the author's relative contribution to the archival project as transfer operator oscillates around 59–67%.

[90] In addition to being responsible for applying for the AHRC grant, Monty Adkins was in charge of managing the project finances. During the archival project Prof. Adkins acted as primary link for communication with the University of Cambridge and was responsible for taking the photographs of Gerhard's tapes.

[91] This figure is higher than the total number of reels in the collection because a number of tapes were retransferred more than once (see below).

[92] Following the digital migration of Gerhard's tapes the author was co-organizer, together with Carlos Duque and Trevor Walshaw, of the 2nd Roberto Gerhard Conference in Barcelona.

review of primary sources, covering those housed in Cambridge University Library, BBC Written Archives Centre (Caversham) and British Library. This effort resulted in the writing of *Roberto Gerhard's BBC Sound Compositions* (García-Karman, 2013b) submitted with this portfolio. The research into the audio documents was carried out autonomously during the second half of 2012 in the author's private studio in Freiburg, Germany, while the study of the large body of documentary evidence involved regular visits to the UK.

The bulk of the work concerning the CD-release with Gerhard's sound compositions (Gerhard, 2014) was completed throughout the entire year 2013, beyond the end of the AHRC funded period.[93] The author's contribution[94] was to advise on the selection of works and on the identification of the preservation masters in the digital repository. Moreover, the author was responsible for the research concerning the rights of A.L.Lloyd's translation of Lorca's poem[95] and of the negotiation of the publication agreement with Lorca's heirs.[96] Further, the author contributed with two original essays about *Lament for the Death of a Bullfighter* (García-Karman, 2014b) and *Caligula* (García-Karman, 2014c) as liner notes for this CD.[97]

The Annotated Catalogue of the Gerhard Tape Collection and Digital Archive (García-Karman, 2014a) was prepared solely by the author in the one and a half years following the AHRC project, and represents a substantial effort in terms of empirical research and editorial work. It provides full analytic entries (title proper, authorities, performance and broadcast dates, concert venues, etc) describing the contents of each tape and a body of commentary that incorporates the author's research as amended up to May 2014. To this purpose, the information gained through audition of the tapes

---

[93] The author was on contract as Research Assistant of the University of Huddersfield during January to October 2012; that year the author was also affiliated as Research Associate to the Centre for Music and Science of the University of Cambridge.

[94] The editing of the audio recordings that form the basis for the CD took place at the University of Huddersfield under the responsibility of Monty Adkins and Alexander Harker.

[95] The rights of A.L.Lloyd's translation had passed through the hands of several publishers.

[96] The author thanks Manuel Fernández Montesinos and William Peter Kosmas for their permission to publish *Lament for the Death of a Bullfighter* (1959) on CD.

[97] Entitled "*A note on Gerhard's* Lament for the Death of a Bullfighter (1959)" and "*A present for the ONCE Festival*" (see Gerhard, 2014).

and the study of annotations was collated by the author with a wide range of sources, including music manuscripts and published scores; a large part of Gerhard's discography;[98] and a systematic review of BBC-radio broadcast indexes (1941-1970).[99] Significant work was put into metadata standardisation and into the format definition and the adherence of the printed catalogue to international standards (see García-Karman, 2014a). Using its internal scripting capabilities, the FileMaker database was moreover significantly extended by the author in response to changing research needs as well as to parse and export the analytic entries elaborated during this period into XML format.

The author moreover acted as sole researcher and conducted all observations that went into (García-Karman, 2013c, 2014d). The analysis presented in (García-Karman, 2013c) was carried out in continuation of the work initiated with the reconstruction of *Lament for the Death of a Bullfighter* (Gerhard and García-Karman, 2012) and the study of audio documents applied to works such as *Asylum Diary* (1959) and Symphony No. 3 "Collages" (1960) (see García-Karman, 2013b). Emphasis during this stage was placed on the critical study of Gerhard's manipulations including identifying, describing and classifying production materials into families according to their degree of elaboration and similarities in design, investigating the processes by which they had been produced and empirically verifying them in the digital domain. This methodology, exemplarily illustrated in (García-Karman, 2013c), was applied by the author to the study of selected works including *Capriccio in the Manner of Goya* (1959), *Lament for the Death of a Bullfighter* (1959), *Caligula* (1961), and DNA in Reflection (1963).

Furthermore, the revised list of sound compositions that went into (García-Karman, 2014d) is the result of independent work conducted during the period 2008-14 and incorporates recommendations emerging from the author's research that went into the catalogue of Gerhard's tapes. This latter stage of investigation was furthered by the

---

[98] I would like to thank Dr. Till Knipper for sharing his collection of CDs spanning most of Gerhard's discography.

[99] The author processed the BBC archive, program, and speech indexes between 1941-1970 with the aim of identifying Gerhard's broadcasts. Those indexes are available on microfilm at BBC Written Archives Centre.

study of sources housed in a number of different archives[100] and through interviews independently carried out by the author. During this period the author was also committed with the dissemination of the knowledge contribution of the research though a number of academic conferences.[101]

This PhD is a follow-up study to a Master's Thesis (García-Karman, 2004) carried out at the Universidad Complutense de Madrid, 2003-2004. The bulk of this PhD, and the research underpinning it, were completed over the period 2007–2014. Table A1-2 summarizes the time frame, process and background research indicating the milestones addressed during each stage of the dissertation process.

---

[100] Including Cambridge University Library, British Library, BBC Written Archives Centre, Biblioteca de Catalunya, British Film Institute, Institut d'Estudis Vallencs, New York Public Library and Northwestern University Music Library.

[101] During the period 2012-14 the author presented the following conference papers as sole and main author: **1)** *Playing to be Gerhard*. Paper presented at the II International Roberto Gerhard Conference, Higher Conservatory Liceu, Barcelona (Spain), April 24, 2012; **2)** *The Restoration Project of Roberto Gerhard's Tape Collection*. Paper presented at the Conference of the International Association for Recorded Sound (IASA), New Delhi (India), October 9, 2012. **3)** *Uprooted Sounds*. *International Electroacoustic Output of Spanish Pioneers in Times of Francoism*. Paper presented at the International Conference "Sound Spaces", JIEM 2013, Universidad Autónoma, Madrid (Spain), March 12, 2013. **4)** *The Reconstruction of Early Tape Music Based on Magnetic Tape Sketches*. Paper presented at the EMSAR Electronic Music Symposium, Anglia Ruskin University, Cambridge (UK), May 11, 2013; **5)** *The well-tempered Tapesichordist*. *On the Art of Domestic Sound Composition in the Cradle of the DNA revolution*. Paper presented at the Fourth International Symposium on Music/Sonic Art, MUSA 2013, "Practices and Theories," Staatliche Hochschule für Musik, Karlsruhe (Germany), May 26, 2013. **6)** *In search of Lost Time*. Paper presented at the Postgraduate Workshop "Media Archeology and Technological Debris," Goldsmiths, University of London, London (UK), June 21, 2013; **7)** *Gerhard's 'Caligula' and the ONCE Group*. Paper presented at the III International Roberto Gerhard Conference, Universidad de Alcalá, Madrid (Spain), July 6, 2013; **8)** *Towards a New Philology*. Paper presented at the Toronto Electroacoustic Symposium (TES), Toronto (Canada), August 18, 2013; **9)** *'Music Against the Grain.' Exploring Dissent as an Aesthetic Category in the Electroacoustic Output of Spanish Expatriate Pioneers*. Paper presented at the International Conference "Protest Music in the 20th Century," Centro Opera Omnia Luigi Bocherini, Lucca (Italy), November 17, 2013.

Data collection: Inventory and documentation (2007–08)
• Organization of the collection • Programming of the database • Completion of the inventory • Research reports and first catalogue submitted to the CUL (García-Karman, 2007, 2008a; b)
Preliminary research (2009-10)
• Codicological study of the tapes • Editing of the database • Research into Gerhard's archive • Application for the Edison Fellowship • 1st Roberto Gerhard Conference (Huddersfield, 2010) • Publication of (García-Karman, 2010) • HIPs of Cristobal Halffter's works
Project planning (2011)
• Review of sound preservation literature • Transfer studio design, market survey and benchmark tests • Metadata and digital object repository structure design • Optimization of the database • Writing of (García-Karman, 2013a)
Remediation of the collection (2012)
• Setup of transfer facilities at Cambridge University • Digital migration of the tape collection (January-March 2012) • Reconstruction of *Lament for the Death of a Bullfighter* • 2nd Roberto Gerhard Conference (Barcelona, April 2012) • Performances of *Lament* and *Claustrophilia* • Publication of (Adkins, Duque and García-Karman, 2012)
Follow-up research (2013–15)
• Extension and reprogramming of the database • Empirical study of the audio documents • Musicological investigation • Dissemination and performance • 3rd Roberto Gerhard Conference (Madrid, July 2013) • Publication of (García-Karman, 2013a; b; c, 2014d, 2015) and Gerhard's CD • Annotated catalogue of the Gerhard Tape Collection (García-Karman, 2014a) • Production of the commentary

Table A1-2 Research schedule of this dissertation

A1.2 Overview of the Strategies Adopted in the Migration of the Gerhard Tape Collection

A1.2.1 Project Planning

A growing body of literature exists dealing with preservation standards and best practices (Reilly, 1996; Bereijo, 2004; Bigourdan et al., 2006; Library of Congress, 2006; Pohlmann, 2006; Casey and Gordon, 2007; Copeland, 2008; Hess, 2008; IASA, 2009; Library of Congress, 2010; Fleischhauer, 2010; Bogus et al., 2012; Nelson-Strauss et al., 2012; Bressan, 2013).[102] The emphasis placed on the item-level appraisal and documentation of the collection prior to transfer,[103] the effort to adhere to audiovisual conservation practices and safety guidelines, or the systematic metadata and repository policies adopted in this research can be attributed to a great extent to the guidance provided by previous studies. Withal, a perusal of this literature reveals that relatively little attention had been explicitly devoted to the specific conservative needs of manipulated tape collections at the time of setting up the project (see Cossettini, 2009; Berdux, 2010; Berdux, Füßl and Wallaszkovits, 2011; Davis and Patterson, 2012; Haßler and Lambrecht, 2012). The complexity involved in the migration of the Gerhard Tape Collection is further evidenced by its considerable scale and antiquity (over 600, 50+-year-old tapes), the abundance of tape manipulations and production materials (> 50%) and the problems resulting from the composer's independence (i.e., poor maintenance and misuse of equipment). Specific objectives in designing the preservation project were to make the contents of the physical collection (heritage of sound and associated documentation) accessible for research, while retaining the most accurate (optimal tracking, sound quality) and meaningful representation of its original structure and significant properties as well as minimizing damage and alteration of historical evidence. Table A1-3 provides a

---

[102] Online resources could also be cited including the Interpares (http://www.interpares.org) and Prestospace (http://www.prestospace.org) projects, the mailing list of the Association for Recorded Sound Collections (http://www.arsc-audio.org/arsclist.html) and Richard Hess' Tape Restoration Resources website (http://www.richardhess.com/tape/).

[103] Guideline recommendations reinforced the importance of documenting the collection previous to attempting to play back Gerhard's tapes.

summary of the correspondence between the physical collection and digital repository.

Physical collection	Digital repository
455 boxes with one reel	612 Pro Tools sessions
28 multi-reel items with 156 reels	1526 preservation master files
128 empty containers	367 h. 21 min. 53 sec.
1 loose bit of tape	3912 digital images

Table A1-3 Overview in figures of Gerhard's Tape Collection (*left*) and digital repository (*right*). As amended up to May 2013. Source: Compiled by author.

A1.2.2 Transfer Studio

A temporary, purposely-designed studio was set up for the remediation project and dismantled after the transfer of the collection was completed (Figure A1-1). This studio was built around two transfer stations each consisting of a Studer tape deck (3, 9), a high-end analogue-to-digital Mytec ADC 96 converter,[104] and a MacMini computer running ProTools 10 (4, 7). In order to prepare the tapes prior to transfer the provision of a further playback deck and a tape-splicing station (1, 2) was also made. A monitoring solution (6), based on an RME Fireface 400 audio interface and Wavelab 7, was utilized to calibrate the tape decks and to perform real-time quality control measurements at different points in the audio signal path during transfer. Headphones were used for reference monitoring. Metadata was collected using two laptops (5, 8) connected to a Filemaker Pro 7 database remotely served by an off-site MacMini workstation. Lastly, various queues, designed to optimize the workflow throughout the production process, were created on shelves and trolleys (10).

---

[104] More details about the converters considered can be found in

<http://www.ggkarman.de/preservation/wiki/index.php/Analog_to_digital_converters> and

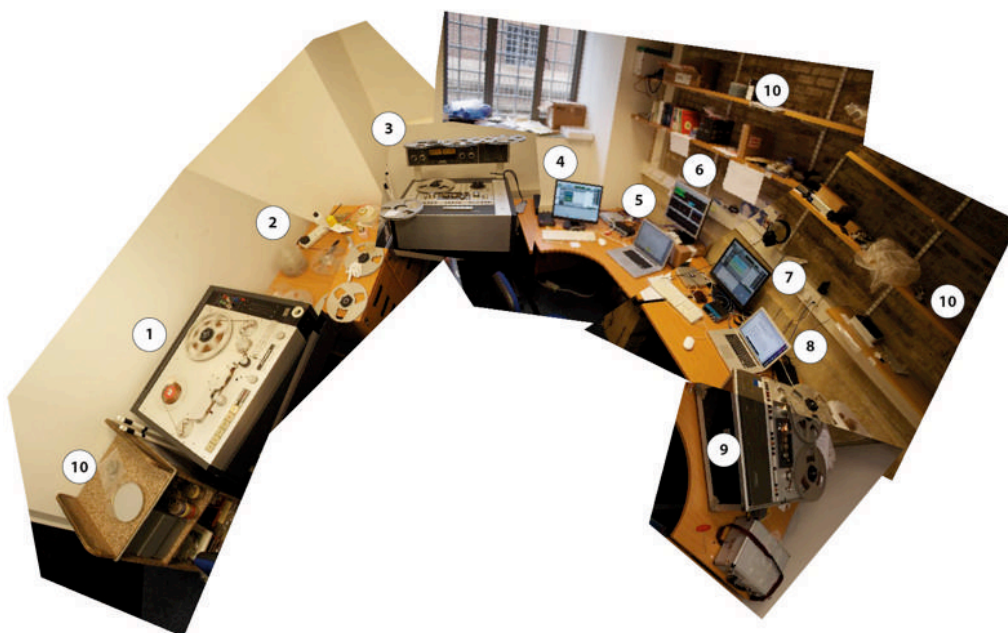<http://www.ggkarman.de/preservation/wiki/index.php/Converter_comparison>

Figure A1-1 Panoramic view of the transfer studio set-up at Cambridge University Library for the digital migration of the Gerhard Tape Collection. Source: the author.

A1.2.3 Metadata

This section describes the metadata schema adopted for the documentation of Gerhard's tape collection and digital repository.[105] All the metadata corresponding to both collections is stored in a single database (Figure A1-2).
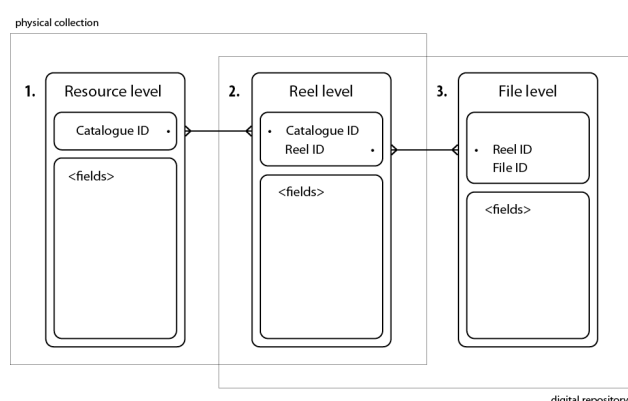

Figure A1-2 The metadata of Gehrard's tape collection and digital repository is placed into three related tables.

---

[105] As a preparatory stage for the remediation project, containers and reels were examined in contrast with the metadata collected by the author during the inventory of the tapes in 2007-08. In addition to this verification of quality and completeness, during this stage the original data was redistributed between the two levels of description concerned with the physical resource (*resource* and *reel* levels). The author wishes to acknowledge the dedication of Carlos Duque during this stage.

Metadata corresponding to the physical collection is organized into two different levels of description. The first of those levels (Figure A1-2, level 1) is concerned with the external description of the *resource* as a whole (e.g., an empty container, a reel with tape, a multi-reel spike, etc.).[106] The data corresponding to this first level is collected in a table that includes fields specific to the container (description, dimensions, transcript of annotations, contents), foreing objects, number of reels etc (Figure A1-3). The second level is attached to the single *reel* as a unit (Figure A1-2, level 2). The data in this second table includes the description of the external aspect of the reel (brand, reel diameter, basefilm), carrier condition, etc as well as the information collected upon transfer of the tape (technical metadata, first impression of the contents, etc) (see also Figure A1-4). In the database, a one-to-many relationship between each resource and (none, one, or more than one) reels is created through the *Catalogue ID* field (Figure A1-2). The purpose of this relational model and of providing a metadata structure that supports the representation of composite objects (e.g. a tin with two tapes inside) is to preserve the integrity of the physical collection in the digital domain and to enable matching misplaced containers and reels a posteriori.

In the digital domain, a ProTools preservation master session exists for each open reel tape in the Gerhard Tape Collection (García-Karman, 2014a, p.6). (Thus, at the reel level, a biunivocal correspondence exists between physical and digital object.) Each of those sessions, named directly after the *Reel ID*, may, in turn, contain any number of preservation master files corresponding to one or possibly various transfers of that reel (see García-Karman, 2014a, pp.4–5). In the database, this correspondence between the single reel and (none, one, or more than one)[107] preservation master files is reflected by creating a one-to-many relationship between the reel level and the file level using the *Reel ID* field (Figure A1-2).

---

[106] Gerhard's sound archive is treated as a single collection of heterogeneous documents. Physical entities such as box lids, tape reels and foreign objects, exist in the Gerhard Tape Collection both as elementary objects and as part of freestanding composite objects. The first hierarchical level of the metadata repository (the resource level) is designed to fit each of those elementary / composite resources in an individual cataloguing record.

[107] The absence of preservation masters (i.e., "none") corresponds to the case of a reel with no tape.

Figure A1-3 Filemaker database (resource level): (1) Catalogue ID and date of record creation / last edit ; (2) description of the external aspect of the resource, including annotations on containers and foreing objects; (3) reels associated with the resource; (4) thumbnail preview of resource; (5) quality control.

Figure A1-4 Filemaker database (reel level): (1) *Catalogue ID*, *Reel ID* and date of creation / last edit; (2) description of the external aspect of the reel and carrier condition; (3) technical metadata corresponding to tape transfer; (4) comments related to tape contents; (5) associated preservation master files; and (6) quality control.

Lastly, each record in the third table (Figure A1-2, level 3) represents a single preservation master file (see also Figure A1-5). This third table—subordinate to the reel level—contains all the metadata corresponding to the preservation master files produced during the migration of the tapes (Figure A1-5). For each file the fields collected include: *Reel ID*, *File ID*, file format (BWF, 96 KHz, 24 bit),[108] file name and duration, originator, transfer deck, headblock serial number, and transfer speed. A digest of the technical metadata corresponding to each file in the digital repository is included in the annotated catalogue that accompanies this portfolio (García-Karman, 2014a).
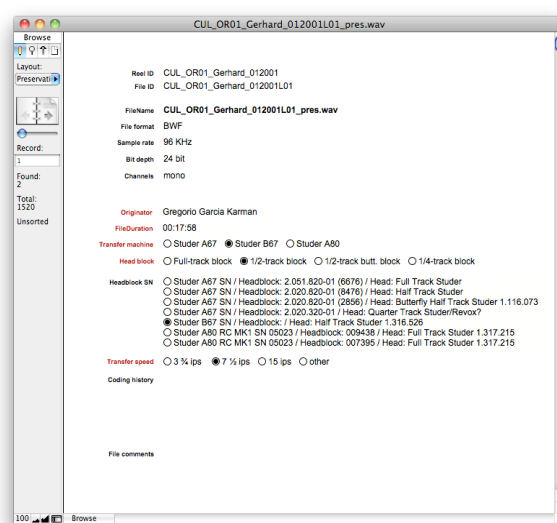

Figure A1-5 Filemaker database (preservation master file level): metadata corresponding to one mono digital audio file in the digital repository.

In all, the digital repository and the metadata scheme were designed: 1) to respond in an expressive manner to the complex structure of the physical collection (a large, heterogenenous collection of objects); 2) with a view to study the tapes both as physical objects and as a carriers of information (accounting for the dual nature of the tape as sound carrier and creative medium); and 3) to account for the expectation (confirmed by experimental evidence) that selectively performing multiple transfers

---

[108] Following current audio-visual preservation practices the collection was digitized using BWF (Broadcast Wave Format) mono 96 KHz / 24 bit files. A possible argument that could be raised in favour of using higher sample rates (e.g., 192 KHz) is the prospect of studying the frequency of the applied bias signal (53 KHz in the case of a Ferrograph series 4 tape recorder, for example) to assist in determining the original recording speed and in the analysis of Gerhard's manipulations.

can be exploited to analyze and interpret Gerhard's manipulations and assemblies (i.e., by using different speeds and headblock geometries) and often be useful to retrieve better quality recordings (i.e., by optimizing azimuth adjustments).

A1.2.4 Digital Imaging

Series of photographs documenting each physical resource in the collection were taken using an imaging station with a dedicated computer.[109] The systematic photographic documentation of the tape collection (Figure A1-6) proved to be a useful complement to the annotation transcripts documented in the File Maker database, providing valuable support for the follow-up study and for elaborating the catalogue of Gerhard's tapes.
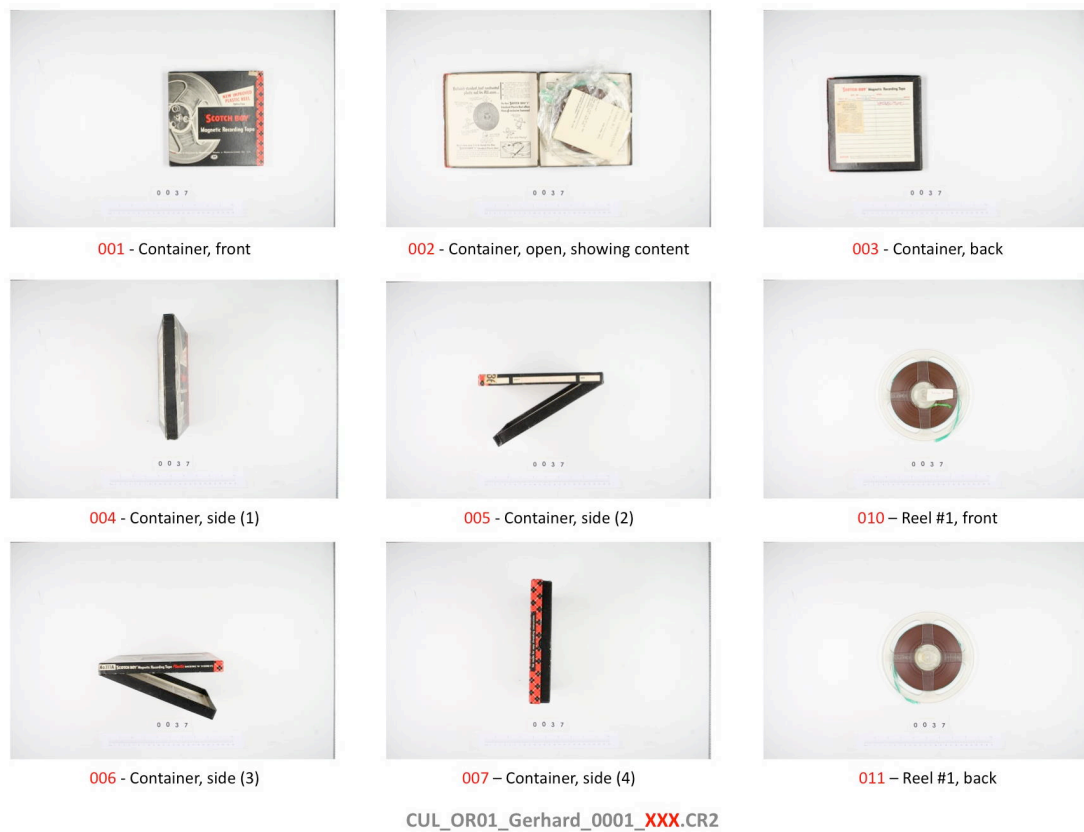

Figure A1-6 Digital image collection and file naming patterns.

67

A1.2.5 Preparation of the tapes

Prior to digitisation each spool was prepared slow-winding the tape onto a professional metal 10.5" NAB spool using a Studer A80 deck fitted with an editing dial for variable speed control. Immediate goals of this procedure were to re-tension the tape pack prior to transfer as well as to avoid tape splices coming loose during fast wind operation. Moreover, winding the tape at controlled speed also provided a valuable opportunity to examine the composer's annotations on the tape itself.[110] During this process, dry splices were repaired and extra head and tail leader was added in order to minimize the strain on the original carriers on start-stop operation (IASA 2009, p.51). A further measure of adherence to recommended practices was the transfer of the tapes using NAB professional supply and take-up reels—rather than Gerhard's often-deteriorated consumer *cine* spindles. Following transfer, tapes were wound again onto their original spools for short-term archival until a long-term preservation plan for the physical collection could be implemented by the CUL.[111]

A1.2.6 Digital transfer

Once the studio was installed, a step-by-step breakdown of the production workflow was set down in writing by the author to guide the operators through the digitisation process. A summary of the sequence of events involved in the preparation and digital transfer of Gerhard's tapes is shown in Figure A1-7. The complete collection was

---

[110] Although I was aware of the benefits of the pioneer techniques used in the study of Stockhausen's of *Gesang der Jünglinge* at the WDR (see above), time and budget constraints—aggravated by the difficulties caused by a batch of tapes affected by moulds—rendered this approach impractical. This shortcoming was partly circumvented by documenting tape splices and annotations on leader tape in both the form of metadata and setting markers in the preservation master sessions.

[111] A long-term preservation assessment of Gerhard's tape collection was beyond the scope of this project. Efforts were however made to create a heightened sensibility on the part of the Cambridge University Library and to communicate the urge to stabilize the physical collection. Besides refreshing the collection, during the course of the digitisation project loose reels were put into archival boxes. Prior to digitisation the cleaning of ca. 100 tapes affected by moulds was turned over by the CUL to a third-party specialist (Harwell Document Restoration Services, www.hdrs.co.uk).

transferred at constant gain,[112] thus preservation master files provide a consistent representation of the signal-strength of the analogue original.

The flow chart in Figure A1-7 illustrates the effort to create a systematic framework that defines preservation action, but also the complexity of variables in play (even before considering the skill of the transfer engineer, the amount of hours spent listening, or the fragility of the analogue machines). The experience of the transfer of Gerhard's tapes strengthens the view that, especially when it comes to manipulated tape collections, the transfer process is an "interpretative operation in which the restorer who makes a conservation copy becomes, with his decisions, an active part of the history of the sound document" (Cossettini, 2009, p.103). Those decisions affect not only the quality of the recording but also play a decisive role in guiding its subsequent interpretation.
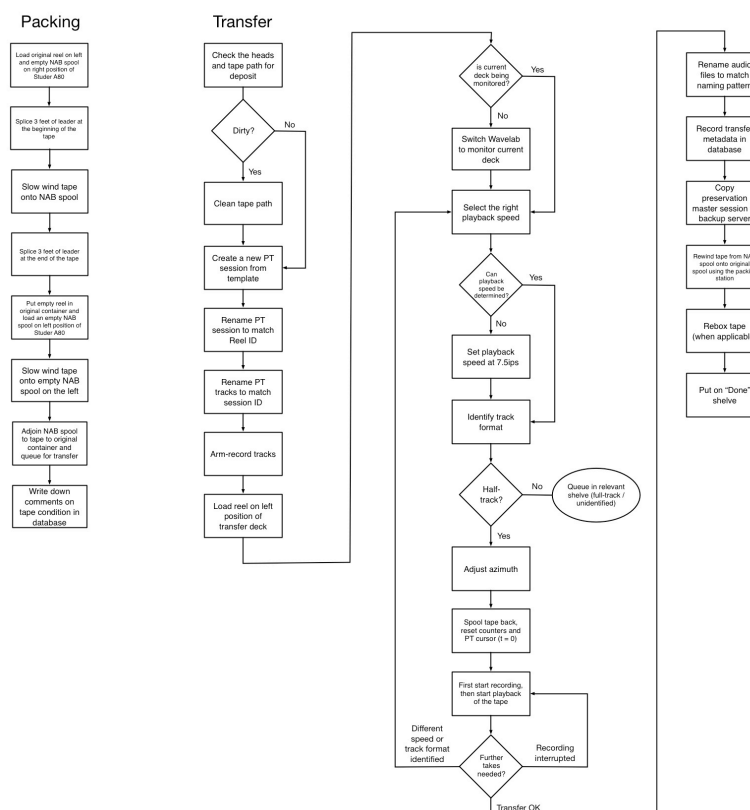

Figure A1-7 Simplified flow chart representing the packing and transfer workflows.

---

[112] For the digitization, the front stereo potentiometer of both Mytec ADC 96 converters was disabled using the internal input gain jumpers ("Fixed Gain" setting) and the gains of both units were matched using the internal trimpots.

A1.2.6.1 Azimuth

Azimuth adjustment on a per tape basis (Casey and Gordon 2007, p.24) proved to be a key strategy to cope with Gerhard's tapes.[113] This is hardly surprising, since the collection had been gathered over a time span of three decades and mostly recorded at a 1950s home-studio presumably lacking regular professional maintenance. During transfer, tape-head alignment was determined by measuring the phase relationship of left and right channels on an XY-display (Figure A1-8) and—given the rare availability of test tones—monitoring the high frequency content of the program material.[114]

As regards to azimuth adjustment, special consideration deserves the discernment between professional recordings made in external facilities (or even single-take recordings from Gerhard's studio) and Gerhard's assemblies. By definition, assemblies are obtained by splicing together multiple individual tape pieces on a single reel, possibly comprising different tape types recorded at different points in time using different tape recorders (see García-Karman, 2010). From a technical perspective, the (theoretical but highly impractical) prospect of adjusting the alignment of each portion of tape poses a tricky predicament. That Gerhard opted for a fixed alignment in overdubbing his own assemblies is common sense and also consistent with the observations made by the author during the transfer of the tapes. Gerhard's lack of concern about tape azimuth adjustment suggests that he was just being practical or, simply, that such subtleties were beyond his discernment.[115] The compromise approach adopted by the author in this research was to align the playback

---

[113] Looking at the practicalities, reference should be made to issues concerning the durability of the adjustment mechanisms during three months of continuous transfers (particularly the wear of screw and substrate threads). Given the cultural value of Gerhard's tapes and the benefits in terms of audio quality, the results seem to justify the inconvenience of having had to swap damaged headblocks on two occasions.

[114] The skill and discernment of the transfer operator play, of course, a significant role in making the correct judgements and have a crucial effect on the sound quality of the resulting digital objects.

[115] Arguments can be made in both directions. Withal, we can have no assurance that variations in sound colour resulting from head-tape misalignment may have influenced Gerhard's creative decisions. The case could also be made that the final stages of production were often completed in professional facilities, where alignment issues could be rectified.

head to the first portion of tape, while remaining aware of the effect of this decision on the rest of the assembly. In a second-pass review for quality control, selected tapes and assemblies considered to be of particular relevance were retransferred. This time, seeking a better head-to-tape alignment represented in some cases aiming at an overall compromise between the different sections.
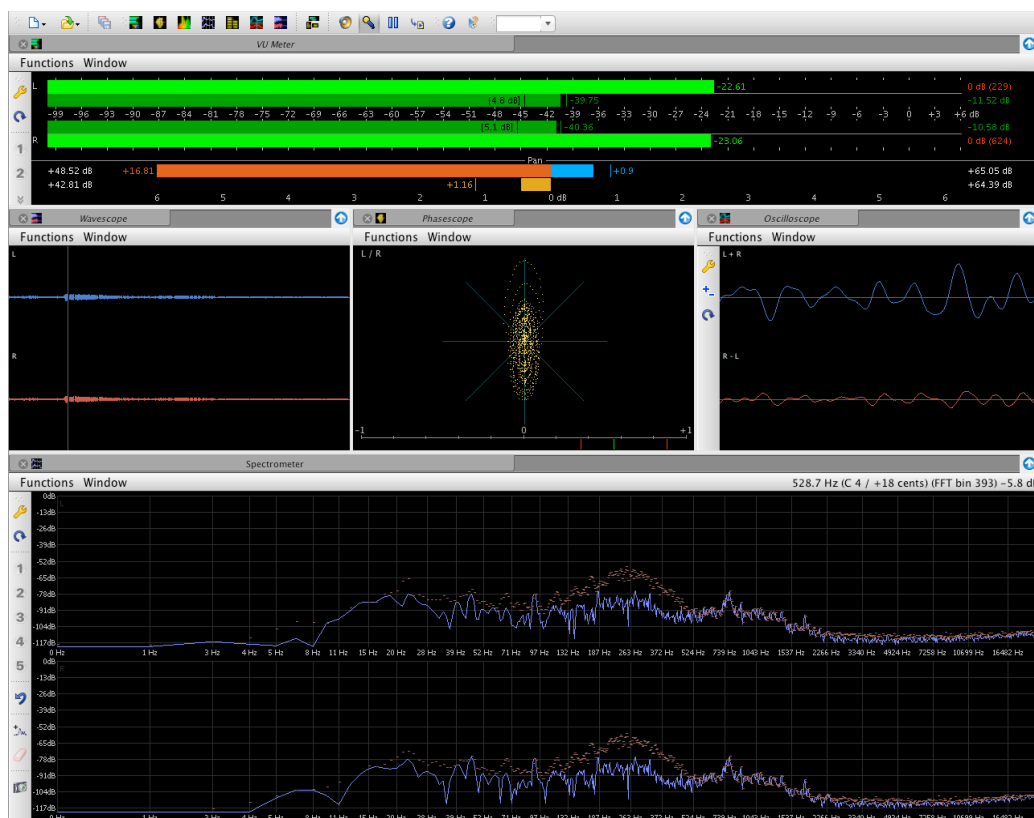

Figure A1-8 Wavelab 7 workspace used to monitor the signal path during the digital migration of Gerhard's tapes (VU and pan meters, oscilloscope, phasescope and spectrometer).

A1.2.6.2 Tape speed

The audio documents in the Gerhard collection often contain programme material recorded at different speeds on a single tape.[116] Worthy of consideration is the wide-

---

[116] For example, in double-sided tapes where each side was recorded at a different speed; in collections of ingredients and compounds consisting of pieces of tape recorded at different speeds spliced together; and even in single takes in which the speed was changed on the fly during the recording (a regular procedure when a radio programme would not fit on the tape). The author's rough estimate is that as

scale reuse and recycling of production materials that happen differently—at varying speeds and in forward and reversed direction—in different contexts.[117] Determining the transfer speed and direction of such manipulations is a non-trivial task. Even if more educated guessing was encouraged as the transfer process developed, often "correct" speeds could only be determined on careful analysis of the programme material in the digital domain, subsequent to transfer. Accordingly, selected tapes were retransferred at different speeds and, whenever unclear, a nominal speed of 7 ½ ips was favoured.[118] For obvious reasons, the use of the ProTools 10 transport capabilities for real-time playback of the digital files at different speeds and in both directions[119] was particularly instrumental for the subsequent analysis of Gerhard's manipulations and assemblies.
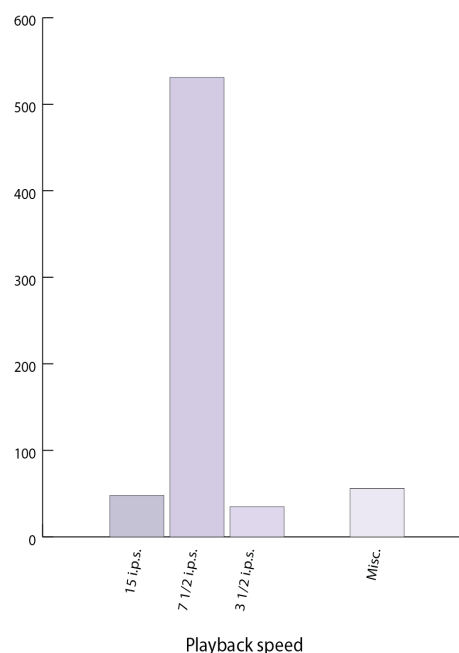

Figure A1-9 Playback speed from audition (categories are non exclusive). As amended up to May 2013. Source: the author.

A1.2.6.3 Track format and playback modes

The issue of the coexistence of different track geometries (full-track / half-track) and playback modes (mono / stereo) was raised both at the documentation stage (García-Karman, 2008a) and during the study of Gerhard's equipment (García-Karman,

---

much as 20 per cent of the tapes contain programme material recorded at multiple speeds or whose speed is ambiguous.

[117] It is this permutation potential that presumably inspired Gerhard to coin the term "audiomobile" (García-Karman, 2013b, p.339).

[118] The hypothesis that 7.5 ips is the prevailing speed in the collection (see García-Karman, 2008a) was confirmed with the transfer of the tapes.

[119] Using the so-called "Shuttle Lock Classic Mode", which allows to shuttle forward or backwards at specific speeds using the numeric keypad.

2010). To address this complex scenario, the transfer studio was equipped with three tape decks fitted with full-track, half-track, butterfly and quarter-track headblocks (Table A1-4).[120] Prior to playback, a number of techniques were applied to identify the track geometry of each tape.[121] Further, the use of a Sigma Hi-Chemical MV 95 magnetic field viewer[122] was particularly helpful in resolving a number of unclear cases.

TAPE DECK	HEADBLOCK(S)[123]				SPEED					APPLICATION		
	FT	HT	HTb	QT	3.75ips	7.5ips	15ips	30ips	Variable[124]	Transfer	Packing	ADC Benchmarking
Studer B67	-	X	-	-	-	X	X	X	-	X	-	-
Studer A67	X	-	X	X[125]	X	X	X	-	-	X	-	-
Studer A80 #1	X	-	-	-	-	X	X	X	X	-	X[126]	-
Studer A80 #2	X	X[127]	-	-	-	X	X	X	X	X	X	-
Studer A810	-	X	-	-	-	X	X	X	-	-	-	X[128]

Table A1-4 Tape decks / headblocks involved in the digital migration of Gerhard's tapes (see García-Karman, 2014a).

[120] For further details on track configurations see (IASA, 2009, pp.52–56).

[121] Such as auditory evaluation of the signal from the tape and real-time monitoring with the Wavelab software (using the level meters and the phase scope to detect the amplitude and phase relationship between the left and right channels), as well as observing the effect of gently displacing the tape vertically out of the playback head.

[122] http://www.sigma-hc.co.jp/english/magnet_viewer.html

[123] Full-track (FT), half-track (HT), half-track "butterfly" (HTb), and quarter-track (QT) headblocks were used to transfer the tapes.

[124] Decks fitted with an editing dial for variable speed control.

[125] Before buying the magnetic field viewer, a Revox quarter-track headblock was used to explore the surface of the tapes exhibiting anomalous track configurations.

[126] A Studer A80 machine with a faulty audio circuit was used for packing the tapes.

[127] This second Studer A80 was initially fitted with a half-track headblock that was later substituted by a full-track headblock.

[128] A Studer A810 machine was used for converter benchmarking during the preparatory stages in Freiburg.

The initial strategy consisted of sorting the tapes into queues (see Figure A1-7) according to their track configuration.[129] This approach was eventually dropped in favour of prioritising the transfer of the Gerhard's manipulations using half-track headblocks.[130] The author took this decision after observing a representative number of deviations from expected patterns (i.e., full-track mono, half-track mono and half-track stereo). The most significant are:

- different portions of tape with dissimilar track geometries spliced together on a single reel. This was identified as the most likely scenario in the case of intermediate and final assemblies (Figure A1-10);
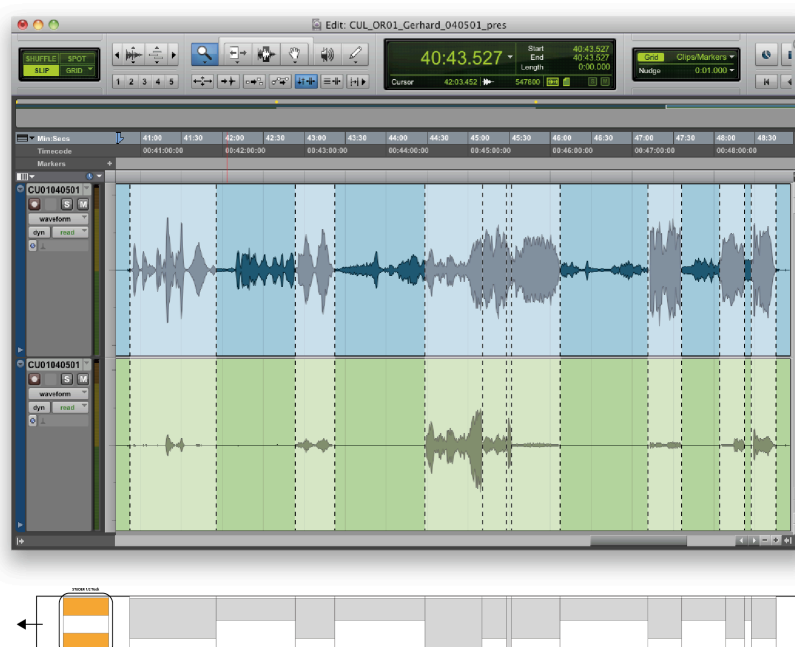

Figure A1-10 Coexistence of different track geometries in the final assembly of Audiomobile No. 2 "DNA" (CUL_OR01_Gerhard_040501)

---

[129] Thus avoiding having one machine permanently fitted with a full-track head-block waiting until a full-track tape would emerge (one out of three were full-track tapes).

[130] This decision was taken roughly halfway thought the digitisation project. The initial approach was to attempt to sort the tapes according to their track format, and to digitize each tape using the corresponding headblock. The number of tapes using different track layouts spliced together on a single reel and the evidence of anomalous traces (see below) resulted in the decision to scrap this idea in favour of digitizing Gerhard's manipulations using a half-track headblock. The decision was taken on the basis that a better assessment could be made a posteriori through the visual inspection of the digital waveform and, if necessary, developing the tapes using a magnetic tape viewer. On a second pass, full-track tapes were retransferred using a full-track headblock.

- full-track mono (and half-track stereo) tapes on top of which half-track mono material had been recorded a posteriori onto a certain section, mostly attributable to a routine recycling of redundant tapes (Figure A1-11);
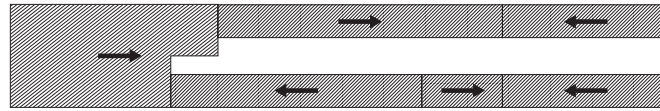

Figure A1-11 Coexistence of different track layouts in a reused tape

- tapes in which both tracks containing different program material were recorded in the same direction (Figure A1-12). Although sparingly, Gerhard used twin-track recording as a primitive but effective method of overlaying sounds;
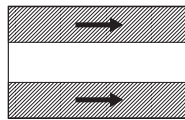

Figure A1-12 Roberto Gerhard took advantage of twin-track recording.

- a significant number of anomalous tapes exhibiting a magnetic trace occupying approximately two-thirds of the tape-width, presumably recorded with a vertically-misaligned full-track headblock (Figure A1-13).[131]
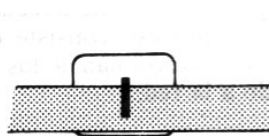

Figure A1-13 A vertically-misaligned full-track head (Ruiz Vassallo, 1991, p.179)

---

[131] This technical problem with one of Gerhard's recording decks has highest incidence across manipulations and assemblies. It is unclear whether or not the composer might have taken advantage of this condition at some point.

The cases presented above stress the need for a detailed understanding of the technical and interpretational issues arising from the coexistence of different track geometries in the Gerhard collection (Figure A1-14). This process begins with the study of Gerhard's technical facilities and passes through the awareness of the limitations of the corpus of data made available by the digital repository. A key ingredient in this process is the discernment of the problems posed by the non bi-univocal correspondence between the digital objects and the magnetic traces on the tapes. A meaningful interpretation of the digital repository must thus rely on a coordinated analysis of the digital

Figure A1-14 Track formats (categories are non exclusive). As amended up to May 2013. Source: the author.

objects, the associated technical metadata (see García-Karman, 2014a), and the effect of mismatching track formats and headblock geometries (see Figures A1-15 and A1-16). Understanding this is crucial for a critical evaluation of Gerhard's manipulations and assemblies. In falling to do so, deviations from standard traces and artefacts induced by the remediation process can easily lead to issues ranging from altering the balance between the parts of an assembly to delusions regarding the discovery of "new compositions". The interest in dealing with the issue of track geometries is therefore not only justified by its relevance at the preservation stage but also for its applications to the comparative study of audio documents. In turn, technical decisions must be tailored to the needs of textual research and to offer insight into the history of the audio documents. This transdisciplinary dialogue provides the researcher with the necessary tools for moving towards the interpretation of Gerhard's manipulations and assemblies.
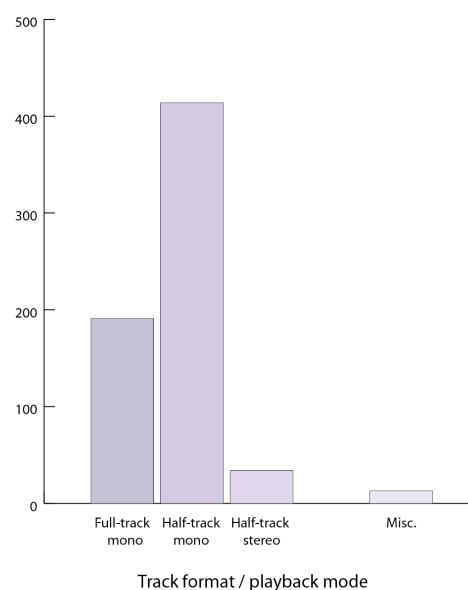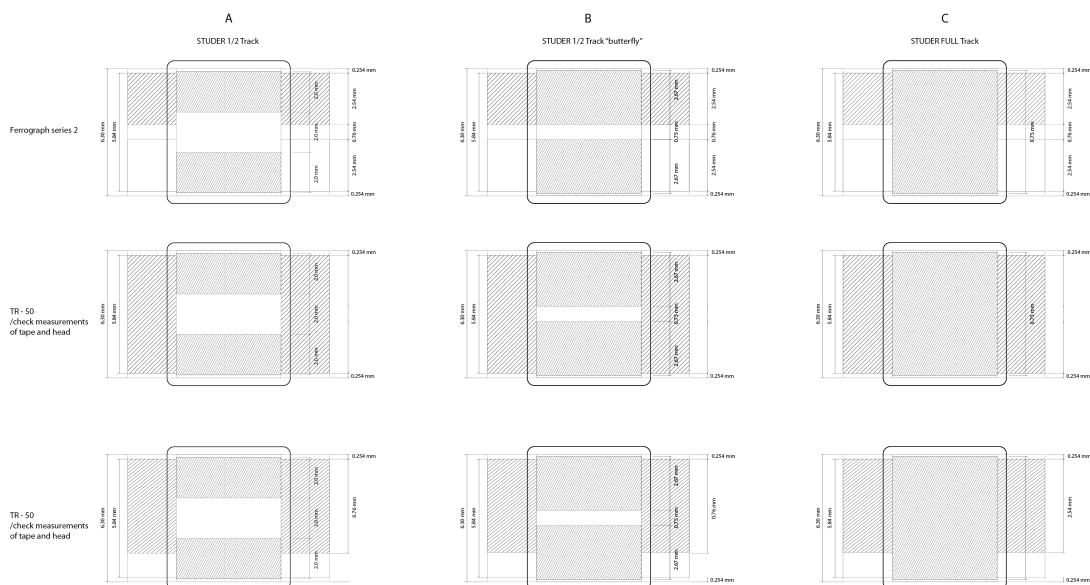
Figure A1-15 Illustration demonstrating the relationship between different headblock geometries and magnetic traces found in the Gerhard collection. Source: the author.

IEC 94-1 (pre 1985) Full Track

(CUL_OR01_Gerhard_023301)

IEC Home Stereo (pre 1985)

(CUL_OR01_Gerhard_021101)

IEC-1 Stereo (pre 1985)

(CUL_OR01_Gerhard_016701)
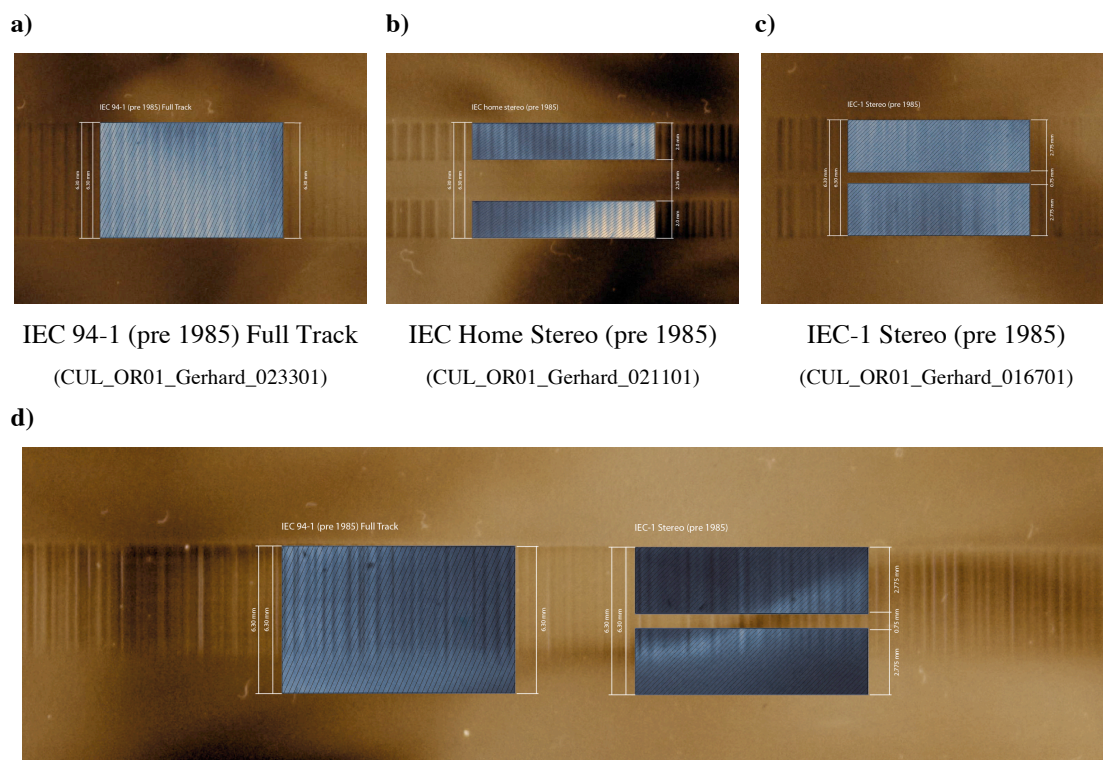
Magnetic trace occupying two-thirds of the tape width, probably caused by a vertically-misaligned full-track head. (CUL_OR01_Gerhard_031501)

Figure A1-16 A technical and conceptual challenge in the re-mediation of the tapes was the coexistence of different track formats and playback modes. Source: the author

A1.3 The Study of Roberto Gerhard's Tape Manipulations

Identifying the different stages of composition was a highly empirical process. It involved many hours of listening through the tape collection at different speeds and in both directions—very much like Gerhard himself did. Manipulations were categorized according to their level of completeness and the Filemaker database was gradually populated with descriptive comments (e.g., sound sources involved, degree of elaboration, potentially related works, cross-references to documentary sources, etc). Along this process, the database was extended to meet the needs of research, paying special attention to workflow speed and to efficient navigation through the digital repository.[132]

Figure A1-17. Frontend of the Filemaker database (detail of the *Reel Content* window). Comments correspond to a tape that contains composition sketches of varying degrees of elaboration (*from audition*).

---

[132] This process was greatly facilitated by the systematic use of unique identifiers across the database and the digital repository.

Figure A1-18. Tape contents from audition (categories are not exclusive). As amended up to May 2013. Source: compiled by author.
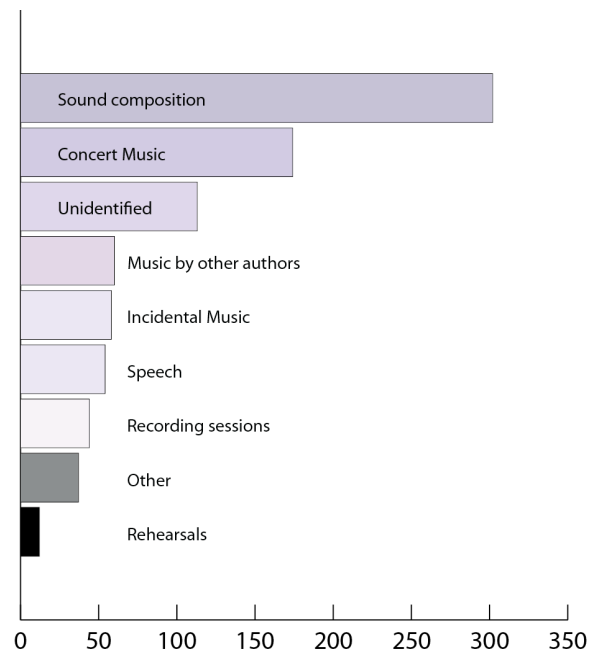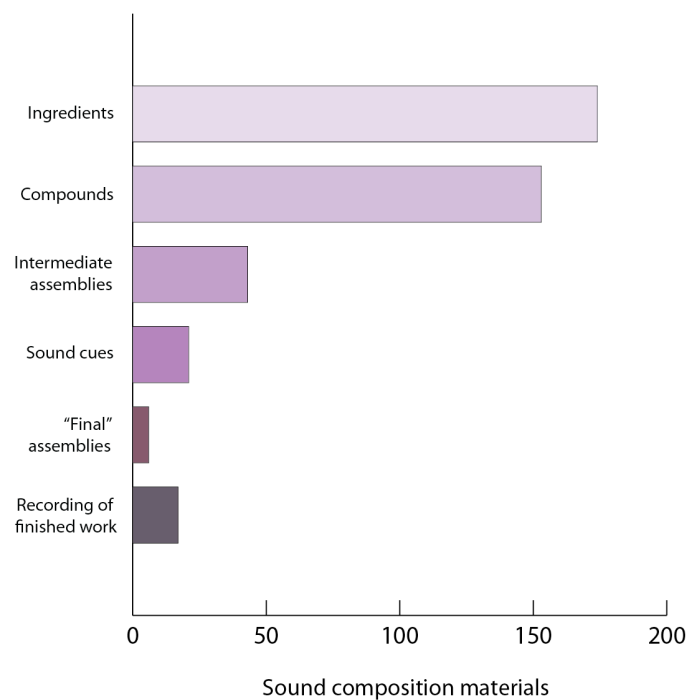

Source: GGK, May 2013

Figure A1-19. Gerhard's tape manipulations classified according to their degree of elaboration (*from audition*). As amended up to May 2013. Source: the author.

79

Figure A1-19 shows the distribution of sound composition materials classified according to the different stages of elaboration described by Gerhard. Noteworthy is the large amount of ingredients, often organized by Gerhard as sound catalogues. These include a considerable proportion of instrumental manipulations derived from both purposely-made recordings[133] or borrowed from recordings of Gerhard's own instrumental works. Together with the (sparse) annotations on containers, reels and tape leaders, a range of sources were used to support the interpretation of the recordings including Gerhard's notebooks and correspondence, as well as documentation related to the productions available at the BBC.

The methodology used for the study of Gerhard's magnetic tape sketches was mainly based on repeated listening, developing auditory memory, collecting descriptive data, and wading through trial-and-error until success was achieved. This study was approached at three different levels of abstraction, roughly corresponding to the three stages of composition described by Gerhard (see García-Karman, 2010):

- Firstly, by characterizing the composer's selection criteria for the choice of source materials and pre-existing recordings. In order to identify the recordings held in the tape collection (which include a large number of radio broadcasts), a review of BBC radio indexes and concert programmes from that period was conducted to identify the origin of Gerhard's ingredients.[134]

- Secondly, through comparative study of consecutive steps of elaboration of Gerhard's components. This stage sought to break down the composer's workings at the tape recorders into elementary tasks in order to better understand the repertoire of tape manipulation techniques and production processes employed by the composer (altering playback speed and direction, tape loops, sound layering, re-recording, assembly etc).

---

[133] Poldi Gerhard, the composer's wife, was a competent accordionist capable of operating the tape recorders. Roberto and Poldi often worked together when it came to producing electronic-like accordion effects and homemade sounds with all kinds of found objects.

[134] Drawing on available evidence that suggested that Gerhard borrowed sound material from *musique concrète* and *elektronische Musik* compositions of the time. This is how, e.g., the recording of Henri Pousseur's *Scambi* (1958) was identified (see García-Karman, 2013c).

- Thirdly, studying the relationships among the entities identified in the previous step. Here, the focus moved from the operative level to the study of Gerhard's compositional strategies. The research seeks to understand the genesis of musical structures and to contribute analytical perspectives. The connection between formal aspects and musical thoughts is explored through the prism of Gerhard's conceptualisation of the creative process.

This groundwork was throughout framed by methodological struggles including: 1) the vast amount of recordings corresponding to all stages of production; 2) the need to listen to the audio documents at different speeds and in both directions; 3) technical issues concerning the recycling of redundant tapes and non-standard track formats; 4) the difficulty to assign materials to a single work given Gerhard's generalized practice of borrowing and recycling; and 5) the possibility that materials corresponding to intermediate steps could be missing.

<div align="right">APPENDIX 2</div>

A2.1 Correspondence between Roberto Gerhard and Hugh Davies

[Gerhard to Davies, 1963 (Typescript, British Library, Hugh Davies' Papers)]

Feb. 12.1963

Dear Mr. Davies

Many thanks for your letter of Jan, 20.[135] The electronic music I have so far written—or rather, the pieces I have composed in that medium (since writing is no longer part of the direct and entirely empirical process of sound-composition)—include, apart from "Collages"; "Audiomobiles", "Lament for the Death of a Bullfighter", "Sculpture I", and "Caligula". The first is just a series of illustration-examples for a lecture. "Lament" is a setting of background for the recitation of Lorca's poem. "Sculpture I" is entirely based on sounds obtained from the small-scale model of a brass sculpture (abstract) by the young architect John Youngman. "Caligula" originated form a few sounds devised for the broadcast production (Bakewell) of Camus' play, but was later developed as a totally independent piece.

As incidental music I have used tape-composition exclusively in "Asylum Diary" (BBC, Third) and for the Stratford production (Peter Hall) of "Coriolanus". I have also used it together or in alternation with instrumental music in Gogol's "The Overcoat" and Chekov's "Cherry Orchard".

The score of "Collages" will, I hope, be available in print one day, in the mean time both orchestras material and sound-tape can be hired from Mills. I'm afraid none of my work in the medium so far qualifies for entry in the British Institute's of R.S. Discography, since it is not on sale or hire to the general public.

You ask me how do I keep "up to date"? If – as I suppose – the question here is "how is a process of renewal, or self-renewal sustained", I am afraid I don't know the answer. I would say, the process is a natural one and, probably because of it, the less scrutinized the more naturally it works. No, I am not truly well acquainted with the production of the avant-garde. I don't like a great deal of what I know, but I would be prepared to take some trouble – If that

---

[135] The letter referenced here (Davies to Gerhard, 20 January 1963) could neither be found among Gerhard's correspondence at the Cambridge University Library nor in Davies' Papers at the British Library.

were necessary – to defend this young generation's right to do what they do. The only thing I feel I have in common with it is a very general, new concept of music as <u>non-language</u>. This affects the physical quality of music, its structural nature, <u>not</u> communication. There, as far as communication is concerned, I part company with the avant-garde, since I am for it.

I hope this answers to some extent some of your questions – do not hesitate to ask more, if you can wait for replies, since I am, alas, a negligent letter-writer.

Yours sincerely

Roberto Gerhard

[Davies to Gerhard, 16 December 1966 (Typescript, British Library, Hugh Davies' Papers, RPM / 3012) / (CUL, Gerhard 14.331)]

Dear Mr. Gerhard,

Nearly four years ago you very kindly answered my request for informations [sic] on your electronic compositions.

Now, as you will see from the enclosed letter, I am preparing a complete international documentation on tape music for the branch of the French Radio which is directed by Pierre Schaeffer.

I am also enclosing a list of your electronic works that I have assembled: could you please correct and complete it, and return it to me as soon as possible.

Please indicate where each work was produced, according to my three divisions (unless of course you have worked in yet another studio), particularly if any of the works at the Radiophonic Workshop should be <u>also</u> listed under your private studio.

I would be interested to know which piece (7'55") you played at the end of your second talk "Sound Observed" in 1965. And in which year did you give your talk "Audiomobiles"?

Yours sincerely

Hugh Davies

[Typescript on headed paper of the Office de Radiodiffusion-Télévision Française (ORTF) amended to the previous letter]

Dear Sir,

The Groupe de Recherches Musicales of the O.R.T.F in Paris, is preparing a new, more complete and up-to-date edition of the documentation on tape music that was published in

1962 as the "Répertoire International des Musiques Expérimentales". This work will be coordinated by Hugh Davies, and will be either published commercially, or duplicated, and available [sic] to interested persons on request: if the latter, in February 1967.

In order to unify the final presentation of details, and to speed up the completion of the documentation, we are sending you a list together with this letter which contains all information we have on compositions produced in your studio, in more or less the form in which the final document will be published.

In this new edition it is hoped to include all compositions for magnetic tape ever composed (electronic music, musique concrète, etc.), up to the end of 1966. [...] we ask you to list absolutely everything! This includes works performed but later withdrawn, experimental studies – particularly by well known, sometimes unexpected composers – that have not been released, and so on.[136]

[...]

Gerhard to Davies, 27 January 1967 (typescript / ms. letter, British Library, Hugh Davies' Papers, RPM / 1512) / (CUL, Gerhard.14.105)

Dear Mr. Davies,

My apologies for the delay in replying to your letter of Dec 16, due to exceptional pressure of work.

Your list is a pretty good piece of research—you say that I gave you the information, most unusual, I know I'm not that thorough—there is only one doubtful item "The unexpected country" of whose paternity I am not certain (you know what paternity is) and two minor items missing, namely commercial Animated Cartoon films, "ALL ABOARD" (Bowater) and "YOUR SKIN" (Unilever).

Everything is produced in my own private permanent studio except for the final assembly (montage) of the ingredients that went into the examples for "ASYLUM DIARY" and the contributions for "THE ANGER OF ACHILLES", these were planned and discussed (in a few instances I intervened actively) with Deliah Darbisher [sic] of the BBC Radiophonic Workshop who executed them.

---

[136] In the copy of this letter housed at Cambridge University Library a handwritten remark written by Gerhard is inserted at this point: "'All Abord' [sic] commercial animated cartoon film (Bowater); 'Your Skin' commercial animated cartoon film (Unilever)".

The last example in my talk "Sound Observed" was "AUDIOMOBILE 2 DNA" (duration ca 9'); I am making a stereophonic version of the same (with David Scott[137] of BBC London Transcription Service, Kensington House) which will be performed at the Tuesday Invitation Concert, BBC Concert Hall, on Febr. 14 (and Broadcast in Stereo on the Third).

I enclose the amended list.

Yours sincerely

Roberto Gerhard

Davies to Gerhard, 1967 (typescript, British Library, Hugh Davies' Papers, RPM / 3439)

Dear Mr. Gerhard,

Thank you so much for your letter and list.

I have now remade your list, incorporating all your notes and it really looks good! Unfortunately, because of the form in which I am presenting my survey, the durations column now looks rather bare, with so many not given: could you please give some duration each time there is a question mark; the simplest—and completely adequate—method is to give an approximate duration, an estimate which you can make very quickly, perhaps ten minutes for the complete list. I have underlined in blue a couple of other points which are not quite yet clear, a few dates, and whether Collages is available on hire from Mills, for anyone who is interested in putting on a performance (it is still the most substantial electronic work produced in England so far!). I presume that only the one piece exists in stereo as indicated in the final column.

Asylum Diary, *Lament*, *Collages* and *The Anger of Achilles* all appear in the official list of the Radiophonic Workshop, so that I have indicated a distribution of works between the two studios. I can add a note to say that the final stages only were at the BBC, the bulk of the work being done in your own studio.

---

[137] It is unclear whether the single letter from David Scott to Gerhard available in Cambridge University Library refers—on the basis of the date on this letter (over one year later)—to the stereophonic version of Audiomobile No. 2 "DNA": "Thank you for sending the tape and your letter. I have done what you asked me to do and hope very much it is to your liking. If when you hear it you would like anything to be altered, please let me know and I shall be only too pleased to do it for you. I have, as you suggested, lifted the general level considerably and have tried to make the movements fit the different sections. With kind regards to yourself and to your wife. Yours. David Scott." (David Scott to Roberto Gerhard, 26 April 1968, Gerhard.15.1.78, Cambridge University Library)

I would be most grateful of you could add these few details to my list and return it as soon as possible.

Yours very sincerely

Hugh Davies

Gerhard to Davies, [April? 1967] (manuscript letter, British Library, Hugh Davies' papers, RPM / 1822)

Apologies for the delay—in one fell swoop I was put out of action for the best part of Febr. & March—acute bronchitis.

I have added accurate durations where possible—approximate, otherwise. Your original duration of *DNA* was correct, I seem to remember. Since they seem to be working in association with you I am sending a Xerox copy of the list to the New York Electronic Music Review.

"Collages" will be given a stereophonic very slightly modified new version, for the forthcoming performance in August at the Proms.

Many thanks, once again.

Yours sincerely,

Roberto Gerhard

[p.s.] Since you ask for everything, I might mention an accumulation of work in a state of near-readiness, I mean ready for com-po-si-tion; namely ca. 25 to 30 7" reels of multilevel compounds classified as good.

OFFICE DE RADIODIFFUSION-TÉLÉVISION FRANÇAISE

CAMBRIDGE Roberto Gerhard (Spain—England, 1896)

14 Madingley Rd. Cambridge

f.e.p. = full evening performance

The Prisoner (chamber ensemble and tape)	theatre	1954	f.e.?p.	1 track
King Lear (chamber ensemble and tape)	theatre	1955	f.e.?p	1 "
A Leak in the Universe (chamber ensemble and tape)	radio	1955	ca 10'	1 "
The Strange Country	radio	1957	28'30"	1 "
Pericles (chamber ensemble and tape)	theatre	1958	f.e.?p.	1 "
All Aboard	film	1958	ca 5'?	1 "
Your Skin	film	1958	ca 5'?	1 "
Asylum Diary (+ BBC)	radio	1959	75'	1 "
Coriolanus	theatre	1959	f.e.?p.	1 "
Lament on the Death of a Bullfighter (+ BBC)	radio	1959	12'58"?	1 "
Collages for orchestra and tape (+ BBC)	concert	1960	ca 19'	1 "
The Overcoat (chamber ensemble and tape)	radio	1961	ca 15'	1 "
Caligula (chamber ensemble and tape)	radio	1961	ca 15'	1 "
Caligula (based on the above)	concert	1961	ca 6'	1 "
The Cherry Orchard (chamber ensemble and tape)	theatre	1961	f.e.p.	1 "
Macbeth (chamber ensemble and tape)	theatre	1962	f.e.?p	1 "
Sculpture I (based on sounds from a sculpture)	concert	1963	4'18"	1 "
DNA in Reflection	film	1963	8'57"	1 "
Excerpts from "DNA in Reflection"	disc	1963	5'12"	1 "
Audiomobile 2 DNA	concert	1963 ?	8'57"	2 "
The Anger of Achilles (orchestra and tape) (+ BBC)	radio	1963	110'	1 "
Macbeth ( ) (excerpts for a TV anthology)	TV	1964	ca 3'.	1 "
Sculpture II	concert	?	?	1 "
Sculpture III	concert	?	?	1 "
Sculpture IV	concert	?	?	1 "
Sculpture V	concert	?	?	1 "

→ B.B.C Music Library

* Southern Library 706

} as yet unedited.

Figure A2-1. List of works with manipulated tape compiled by Hugh Davies with handwritten remarks by Roberto Gerhard, [April?] 1967.[138]

[Davies to Desmond Briscoe (Typescript, British Library, Hugh Davies' papers, RPM / 3459)]

Dear Mr. Briscoe,

thank you for the various lists received a few weeks ago. I have three small points:

[…]

> 2) Gerhard has indicated the four pieces in the BBC list under his own studio, which is fair enough, if he prepared the material there (also mentioning that the final version was made at the Workshop): I will therefore indicate that these pieces were produced in both studios. You may query the designation of this equipment as studio, but he

---

[138] (Gerhard, 1967)

has produced some 25 pieces there since 1954, which makes an impressive looking list.

[…]

I have discovered all the other missing details (such as birthdates), except for Gerhard's *Lament for the Death of a Bullfighter*—do you not have a tape in your archive? One other thing just occurs to me: which pieces (signature tunes, I think) are "pop", as I want to indicate this in an appendix? *Delia's Choice* is, I think, and of course *Dr. Who*, and the two little Parlophone disc pieces (*Time Beat*, *Waltz in Orbit*); what about *Family Car*, *Chronik der Tag*, *Famous Gossips* and *Suives la Piste*?

[…]

Best wishes,

Hugh Davies

ERRATA LIST

Publication / Page / Footnote	Original text	Corrected text
1 / 130	"Sound Composition Designed To Be Listened For It's Own Sake"	"Sound Composition Designed To Be Listened For Its Own Sake"
3 / 307	"… *Cristóbal Colón* (1941) and *El día de la raza* (1942), and two literary features by Salvador de Madariaga …"	"… *Cristóbal Colón* (1941) and *El día de la raza* (1942), two literary features by Salvador de Madariaga …"
3 / 327 / 84	"Ibid."	"Roberto Gerhard, "[Draft for the Introductory Speech to the Lament for the Death of a Bullfighter]" (BBC, 1959), 3, Roberto Gerhard Files, BBC Written Archives Caversham."
4 / 81	"… cuyo origen es en realidad acústico ($III_{b1'}$ y III_{b1}), infunden …"	"… cuyo origen es en realidad acústico (III_{b2} y II_{a2}), infunden …"
1a / 1	"… in the context of my master thesis …"	"… in the context of my master's thesis …"
1a / 1	"… it was no until later that closer work …"	"… it was not until later that closer work …"
1a / 5	"… Sir Collin Davies …"	"… Sir Colin Davies …"

LIST OF REFERENCES

Adkins, M., 2010. Audiomobiles, Sculptures and Conundrums. In: *Proceedings of 1st International Roberto Gerhard Conference*. Huddersfield: University of Huddersfield, pp.98–103.

Adkins, M., 2013. In Search of a 'Third Way'. In: M. Adkins and M. Russ, eds., *The Roberto Gerhard Companion*. Aldershot (England): Ashgate, pp.257–283.

Adkins, M., Duque, C. and García-Karman, G., 2012. The Electronic Music of Roberto Gerhard. In: *Proceedings of the International Computer Music Conference 2012*. ICMC. Ljubljana.

Adkins, M. and Russ, M. eds., 2013. *The Roberto Gerhard Companion*.

[Andrewes. R.], 2008. Donation of the Roberto Gerhard Archive. *Cambridge University Library*. *Reader's Newsletter*. *Number 40*, Oct., p.3.

Andrews, T.L. and Macé, C., 2012. Trees of Texts – Models and methods for an updated theory of medieval text stemmatology. [online] Digital Humanities. University of Hamburg. Available at: <http://www.dh2012.uni-hamburg.de/conference/programme/abstracts/trees-of-texts-models-and-methods-for-an-updated-theory-of-medieval-text-stemmatology.1.html> [Accessed 1 Jan. 2014].

A Page for John Cage. 2014. [Film] Directed by G. García Karman. Available at: <http://info.ggkarman.de//node/160> [Accessed 1 May 2014].

Atherton, D. ed., 1973. *Schoenberg-Gerhard Series*. *The complete instrumental and chamber music of Arnold Schoenberg and Roberto Gerhard*. London: Sinfonietta Productions.

Austin, L., 2004. John Cage's 'Williams Mix' (1951-3). The restoration and new realisations of and variations on the first octophonic, surround-sound tape composition. *A Handbook to Twentieth-Century Musical Sketches*, pp.189–214.

Baudouin, O., 2007. A reconstruction of 'Stria'. *Computer Music Journal*, (3), pp.23–81.

Baudouin, O., 2008. Stria by John Chowning. Last Improvements. [online] EMS08. Paris: EMS. Available at: <http://www.ems-network.org/ems08/papers/baudouin.pdf> [Accessed 1 May 2013].

Berdux, S., 2010. Oskar-Sala-Fonds am Deutschen Museum. Available at: <http://oscar-sala.de/oskar-sala-fonds/nachlass/archivgut/> [Accessed 1 May 2014].

Berdux, S., Füßl, W. and Wallaszkovits, N., 2011. Audio goes Video. Ein Projekt zur Digitalisierung von Tonbändern aus dem Nachlass von Orcar Sala. *Archivar*, 64(1), pp.66–72.

Bereijo, A., 2004. The conservation and preservation of film and magnetic materials (2): magnetic materials. *Library Review*, 53(7), pp.372–378.

Bernardini, N. and Vidolin, A., 2005. Sustainable live electro-acoustic music. In: *Sound synthesis, representations and environments*. Sound and Music Computing Conference. Salerno.

Bigourdan, J.-L., Reilly, J.M., Santoro, K. and Salesin, G., 2006. *The Preservation of Magnetic Tape Collections: A Perspective*. [online] Rochester, New York: Image Permanence Institute, Rochester Institute of Technology. Available at: <https://www.imagepermanenceinstitute.org/webfm_send/303> [Accessed 5 Jan. 2007].

Bogus, I., Blood, G., Dale, R.L., Leech, R. and Mathews, D., 2012. *Minimum Digitization Capture Recommendations (Draft)*.

Brech, M., 1994. *Analyse elektroakustischer Musik mit Hilfe von Sonagrammen*. Frankfurt am Main; New York: P. Lang.

Brech, M., 2013. Zwischen Kunst und Wissenschaft. *Neue. Z. Musik Neue Zeitschrift fur Musik*, 174(2), pp.17–19.

Bressan, F., 2013. *The preservation of sound archives: A computer science based approach to quality control*. PhD Thesis. Universita degli Studi di Verona.

Bushell, S., 2005. Intention Revisited: Towards an Anglo-American 'Genetic Criticism'. *Text*, 17, pp.55–91.

Casey, M. and Gordon, B., 2007. *Sound directions. Best practices for audio preservation*. [Bloomington]; [Cambridge]: Indiana University, Harvard University.

Cook, N., 2010. The Ghost in the Machine: Towards a Musicology of Recordings. *Musicae Scientiae*, 14(2), pp.3–21.

Copeland, P., , 2008. *Manual of analogue sound restoration techniques*. [online] Available at: <http://books.google.com/books?id=E_xBAQAAIAAJ>.

Cossettini, L., 2009. Le registrazioni audio dell'Archivio Luigi Nono di Venezia: linee per la conservazione e la critica dei documenti sonori. *Musica / Tecnologia*, (III), pp.99–112.

Dack, J., 2004. *Notes on the Realization of Scambi*. Available at: <http://www.scambi.mdx.ac.uk/Documents/Notes%20on%20the%20Realization%20of%20Scambi.pdf> [Accessed 20 Nov. 2013].

Davies, H., 1968. *Répertoire International des Musiques Electroacoustiques*. Paris, France; Trumansburg, New York: Groupe de Recherches Musicales de l'O.R.T.F ; Independent Electronic Music Center.

Davies, H., 1981. The Electronic Music. *Tempo*, (139), pp.35–38.

Davis, E. and Patterson, N., 2012. Preserving the Recordings of the Composers Forum: A Case Study. 43rd IASA Annual Conference. Delhi.

Dewey, J., 1935. *Art as Experience*. New York: Penguin Putnam.

Duque, C., 2010. Gerhard's electronic music: a pioneer in constant evolution. In: *Proceedings of 1st International Roberto Gerhard Conference*. Huddersfield: University of Huddersfield, pp.87–97.

Erbe, M., 2009. *Klänge schreiben: die Transkriptionsproblematik elektroakustischer Musik*. Wien: Verlag der Apfel.

Estanyol, M., 1996. El Fondo de Manuscritos no Musicales de Roberto Gerhard. *Boletín de AEDOM*, 3(1), Jun., pp.20–31.

Fleischhauer, C., 2010. Format Considerations in Audio-Visual Preservation Reformatting. *Information Standards Quarterly*, 22(2), pp.34–40.

Friedl, R., 2012. Was ist ein Fehler? Xenaquis' 'La légende d'Eer': Versuch einer kritischen Edition elektroakustischer Musik. *MusikTexte*, (135), Nov., pp.33–39.

García-Karman, G., 2004. *Fundamentos para un acercamiento analítico al repertorio de la música electroacústica*. Master's Thesis. Universidad Complutense.

García-Karman, G., 2005. *Arqueología de la música electrónica en vivo*.

García-Karman, G., 2006. Una propuesta para la restauración de 'Planto por las víctimas de la violencia' de Cristóbal Halffter. In: *Actas del Primer Congreso Internacional de Música y Tecnología Contemporáneas*. Congreso Internacional de Música y Tecnologías Contemporáneas. Seville: University of Sevilla.

García-Karman, G., 2007. *Roberto Gerhard's Sound Archive at the Cambridge University Library*. [online] Cambridge: Cambridge University Library. Available at: <http://info.ggkarman.de/node/48> [Accessed 1 Sep. 2013].

García-Karman, G., 2008a. *Roberto Gerhard's Tape Collection*. [online] Cambridge: Cambridge University Library. Available at: <http://info.ggkarman.de/node/49> [Accessed 1 Sep. 2013].

García-Karman, G., 2008b. *Roberto Gerhard Tape Collection*. *Preliminary Index*. [Inventory of Gerhard's tapes compiled by the author] Cambridge University Library, Cambridge.

García Karman, G., 2009. *Application for the Edison Visiting Fellowship of the British Library, 2009–2010*.

García-Karman, G., 2010. Roberto Gerhard's Tape Collection: The electronic Music. In: *Proceedings of 1st International Roberto Gerhard Conference*. Huddersfield: University of Huddersfield, pp.107–122.

García-Karman, G., 2013a. Closing the Gap Between Sound and Score in the Performance of Electroacoustic Music. In: C. Coessens, P. de Assis and W. Brooks, eds., *Sound and Score*. Leuven University Press.

García-Karman, G., 2013b. Roberto Gerhard's BBC Sound Compositions. In: M. Adkins and M. Russ, eds., *The Roberto Gerhard Companion*. Aldershot (England): Ashgate, pp.307–347.

García-Karman, G., 2013c. Sonido y Símbolo en 'Lament for the Death of a Bullfighter' de Roberto Gerhard. *Quodlibet: Revista de Especialización Musical*, (54), pp.53–92.

García-Karman, G., 2014a. *Annotated Catalogue of the Roberto Gerhard Tape Collection and Digital Repository*.

García-Karman, G., 2014b. A Note on Gerhard's Lament for the Death of a Bullfighter (1959). Sub Rosa.

García-Karman, G., 2014c. A Present for the ONCE Festival. Sub Rosa.

García-Karman, G., 2014d. Uprooted Sounds: International Electroacoustic Output of Spanish Pioneers in Times of Francoism. In: *JIEM*. Espacios Sonoros. Madrid: Universidad Autónoma de Madrid.

García-Karman, G., 2015. Cristóbal Halffter: Homo Electricus. In: *Cristóbal Halffter: Homo Electricus*. Milan: Stradivarius, pp.5–14.

García-Karman, G., Orquesta de la Comunidad de Madrid and Encinar, J.R., 2010. *Homenaje Cristóbal Halffter*. Teatros del Canal, Madrid.

García-Karman, G., Orquesta de la Comunidad de Madrid and Encinar, J.R., 2015. *Cristóbal Halffter: Homo Electricus*. Times Future. [Compact Disc] Milan: Stradivarius.

Gerhard, R., 1963. *Letter from Roberto Gerhard to Hugh Davies, 12 February 1963*.

Gerhard, R., 1965. Sound Observed. In: M. Bowen, ed., *Gerhard on music. Selected writings*. Aldershot [Hants, England]; Burlington [Vt.]: Ashgate, pp.187–195.

Gerhard, R., 1967. *Letter from Roberto Gerhard to Hugh Davies*.

Gerhard, R., 2000. Concrete Music and Electronic Sound Composition (1959). In: M. Bowen, ed., *Gerhard on Music: Selected Writings*. Aldershot [England]: Ashgate.

Gerhard, R., 2014. *Electronic explorations from his studio + The BBC Radiophonic Workshop*. Early electronic series. [Compact Disc] Sub Rosa.

Gerhard, R., n.d. *Notebook Gerhard.9.115*. Cambridge University Library, Roberto Gerhard Archive.

Gerhard, R. and García-Karman, G., 2012. *Lament for the Death of a Bullfighter*. [Concert performance].

Goya, F. de and Adhémar, J., 1951. *Les caprices de Goya*. Paris: Fernand Hazan.

Grierson, M., 2013. The Daphne Oram collection: A Case Study in Electronic and Noise Music Information Retrieval. EMSAR 2013 Symposium. Anglia Ruskin University, Cambridge.

Haßler, M. and Lambrecht, J., 2012. New paths of digitalisation and archiving presented by the example of Karlheinz Stockhausens 'Gesang der Jünglinge'. [online] 27th Tonmeistertagung. Cologne. Available at: <http://www.tonmeister.de/index.php?p=tonmeistertagung/2012/congress/d5>.

Heintz, J., 2010. Re-Generating Stockhausen's 'Studie II' in Csound. [online] Linux Audio Conference. Utrecht, the Netherlands. Available at: <http://lac.linuxaudio.org/2010/papers/34.pdf>.

Hess, R.L., 2008. Tape Degradation Factors and Challenges in Predicting Tape Life. *ARSC Journal*, 39(2), pp.240–274.

Hollingum, R., 2010. Between Two Worlds – Experimentalism in Radio Drama. [online] Available at: <http://northampton.academia.edu/RichardHollingum/Papers/520164/Between_Two_worlds_Val_Gielguld_BBC_Drama_Sound_and_Experimentalism> [Accessed 12 Aug. 2012].

Hutchison, D.C., 2003. *Performance, Technology, and Politics: Hermann Scherchen's Aesthetics of Modern Music*. PhD Dissertation. The Florida State University. School of Music.

IASA, 2005. *IASA-TC 03*. *The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy*. [online] [Canberra]: International Association of Sound and Audiovisual Archives. Available at: <http://www.iasa-web.org/sites/default/files/downloads/publications/TC03_English.pdf> [Accessed 9 Aug. 2014].

IASA, 2009. *IASA-TC 04*. *Guidelines on the Production and Preservation of Digital Audio Objects: Standards, Recommended Practices, and strategies*. 2nd ed. Aarhus, Denmark: IASA.

Koenig, G.M., 1960. *Essay, composition for electronic sounds, 1957. Score and instructions for realization*. Wien: Universal Edition.

Landy, L., 1999. Reviewing the Musicology of Electroacoustic Music: a plea for greater triangulation. *Organised Sound*, 4(1), pp.61–70.

Lendle, G., 2010. Double Reality in Roberto Gerhard's Don Quixote. In: *Proceedings of 1st International Roberto Gerhard Conference*. Huddersfield: University of Huddersfield, pp.63–70.

Library of Congress, 2006. *Capturing Analog Sound for Digital Preservation.* [online] Washington DC: Council on Library and Information Resources and Library of Congress. Available at: <http://www.clir.org/pubs/reports/pub137/pub137.pdf> [Accessed 1 Jan. 2012].

Library of Congress, 2010. *Audio-Visual Prototyping Project. Typical Elements for Use in a Statement of Work for the Digital Conversion of Sound Recordings and Related Documents*. Available at: <http://www.loc.gov/rr/mopic/avprot/audioSOW.html> [Accessed 1 Jan. 2011].

Licata, T., 2002. *Electroacoustic Music: Analytical Perspectives*. Westport, Conn.: Greenwood Press.

McLuhan, M., 1964. *Understanding Media. The Extensions of Man*. 2nd ed. New York: New American Library;

Miliano, M. ed., 1999. *The IASA Cataloguing Rules. A manual for the description of sound recordings and related audiovisual media*. [online] Stockholm: IASA. Available at: <http://www.iasa-web.org/cataloguing-rules>.

Mills, D., 2012. *'What a smashing bloke he was!', Dick Mills, Royal Festival Hall, London, interview by author*. 16 May.

Nattiez, J.J., 1990. *Music and Discourse. Toward a Semiology of Music*. Princeton, N.J.: Princeton University Press.

Nelson-Strauss, B., Gevinson, A., Brylawski, S., Loughney, P., Council on Library and Information Resources, National Recording Preservation Board (U.S.) and Library of Congress, 2012. *The Library of Congress National Recording Preservation Plan*. [online] Available at: <http://purl.fdlp.gov/GPO/gpo37398>.

Niebur, L., 2010. *Special Sound: The creation and legacy of the BBC Radiophonic Workshop*. New York: Oxford University Press.

Orio, N. and Zattra, L., 2007. Audio matching for the philological analysis of electroacoustic music. In: *Proceedings of the International Computer Music Conference*. [online] ICMC. Ann Arbour, MI: MPublishing, University of Michigan Library, pp.157–164. Available at: <http://hdl.handle.net/2027/spo.bbp2372.2007.035>.

Pérez del Castillo, B., 2010. I am in tune with Camus'. Roberto Gerhard and Camus: A synergy against totalitarianism. In: *Proceedings of 1st International Roberto Gerhard Conference*. Huddersfield: University of Huddersfield, pp.21–34.

Pohlmann, K.C., 2006. *Measurement and Evaluation of Analog-to-Digital Converters Used in the Long-Term Preservation of Audio Recordings*. [online] Available at: <http://www.loc.gov/rr/record/nrpb/pdf/Pohlmann.pdf> [Accessed 29 Jun. 2014].

Reilly, J.M., 1996. *IPI Storage Guide for Acetate Film*. Available at: <https://www.imagepermanenceinstitute.org/webfm_send/299> [Accessed 1 Jun. 2008].

Reynolds, R., 2007. *'Roberto Gerhard', email to the author, dated 13-11-2007*.

Roy, S., 2003. *L'analyse des musiques électroacoustiques: modèles et propositions*. Paris: L'Harmattan.

Ruiz Vassallo, F., 1991. *Alta fidelidad*. 3rd ed. Barcelona: Ediciones CEAC.

Ruschkowski, A., 1997. *Die Analyse elektroakustischer Musik - eine Herausforderung an die Musikwissenschaft? wissenschaftliches Kolloquium im Rahmen der 4. Werkstatt Elektroakustischer Musik vom 26. bis 28. April 1991 in Berlin*. Saarbrücken: Pfau.

Russ, M., 2013. Music as Autobiography. In: M. Adkins and M. Russ, eds., *The Roberto Gerhard Companion*. pp.132–152.

Schaeffer, P., 1966. *Traité des objets musicaux*. Paris: Éditions du Seuil.

Schoenberg, A., 1950. *Style and idea*. New York: Philosophical Library.

Smalley, D., 1997. Spectromorphology: explaining sound-shapes. *Organised Sound*, 2(02), pp.107–126.

Stevens, W., 1951a. Effects of Analogy. In: *The Necessary Angel. Essays on reality and the imagination*. New York: Vintage Books, pp.107–130.

Stevens, W., 1951b. The Noble Rider and the Sound of Words. In: *The Necessary Angel. Essays on reality and the imagination*. New York: Vintage Books, pp.3–36.

Straebel, V., 2009. The Project for Magnetic Tape (1952/53): Challenging the Idea of a Critical edition of Historic Music for Recording Media. Joint Conference of the International Association of Music Libraries and the International Musicological Society, 'Music: Notation and Sound'. Amsterdam.

Teruggi, D., 2006. *'Re: Electroacoustic Initiative 4', email to the author dated 4-9-2006*.

Ungeheuer, E., 2013. Künstlerische Forschung: Ein Programm? *Neue Zeitschrift fur Musik*, 174(2), pp.20–25.

Valéry, P., 1990. *Teoría poética y estética*. Translated by C. Santos. Madrid: Visor.

Wetzel, D.B., 2006. A model for the conservation of interactive electroacoustic repertoire: analysis, reconstruction, and performance in the face of technological obsolescence. *Organised Sound*, 11(3), pp.273–284.

Zattra, L., 2006. The Identity of the Work: Agents and processes of electroacoustic music. *Organised Sound*, 11(2), pp.113–118.

Zattra, L., 2007. The Assembling of Stria by John Chowning: A Philological Investigation. *Computer Music Journal*, 31(3), pp.38–64.

Zattra, L., 2008. Sources and philological problems in the study of Computer Music. In: T. Böhme-Mehner, K. Mehner and M. Wolf, eds., *Elektroakustische Musik: Technologie, Ästhetik und Theorie als Herausforderung an die Musikwissenschaft*. Essen: Die Blaue Eule, pp.109–118.

Zielinski, S., 2011. *[...nach dem medien]*. Berlin: Merve Verlag.

(30803 Words)