
Roberto Gerhard's tape collection: the electronic music

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ABSTRACT

Roberto Gerhard was one of the first composers to set up a studio in the United Kingdom and to have started incorporating magnetic tape sounds in his music. However, the full significance of his electronic production, over 20 compositions including music for theatre and film, sound compositions for radio drama, radiophonic poetry, mixed works for instruments and tape, sounding sculptures, or even a live-electronic performance in the style of John Cage - is yet to be brought into context. Gerhard was suspicious of the sophistication of the emerging schools represented by Paris and Cologne, and levelled sharp criticism at the musical output of those centres defending a model based in home-made production and critical listening. A willingly ambiguous approach to sound composition, influenced by his early engagement in the composition for stage and radio plays, together with a strong position of aesthetic and technological independence lay at the heart of the singularity of his electronic production.

1. GERHARD'S STUDIO

According to the International Electronic Music Catalogue (1968) compiled by Hugh Davies [1], the first informal activities in Gerhard's private permanent studio would have been initiated in 1954, whereas the official foundation of the "Home Office" can be dated 1958, most likely coinciding with the composer's change of address to 14 Madingley Road, Cambridge on October 1st 1958 [2]. Joaquim Homs, who visited Cambridge in September 1959, provides a first-hand impression of the studio one year after the Gerhard's moving to Madingley Road: "The study was ample and, at the back, near the window that lead to the garden, there was a grand piano. [...] By now Gerhard had constructed an electronic laboratory [...] with the aid of the Radiophonic Workshop, and it was full of tape-loops of concrete music" [3].

A series of undated black and white portraits of Gerhard at his workplace [4], perhaps coetaneous to Homs' visit, present varied perspectives of four open-reel tape recorders, together with numerous reels on shelves and an unusual image of hundreds of tape splices fixed on hooks to the lid of the grand piano.

A closer look (see Figure 1) [5] supplies further information about the recording equipment found there: two EMI TR50 [6] mono recorders, an early Vortexion WVA [7] mono recorder and a Ferrograph Series 66 [8] mono recorder. The production dates of the Series 66 and the fact that all of the pictures were taken in Madingley Road [9] would corroborate that they should not be dated earlier than 1958 [10]. At a later point of time, Gerhard incorporated a new Ferrograph Series 4 [11] mono recorder and a five-channel mixer [12] [13]. It would not have been uncommon to find a similar set of open-reel tape recorders in the facilities of the BBC [14], and whereas Gerhard was eager to underline the modesty of what he called a "shoe-string equipment in electronics" [15] the fact is that the "Home Office" would be better characterised as a semi-professional operation using the best affordable equipment at the time [16].



Figure 1: Roberto Gerhard in his studio

During the 1950s and 1960s [17], Gerhard gathered a significant magnetic tape collection in his studio, corresponding to a major repository of historical sound recordings of his own work in which all areas of his compositional activity are represented. Following Gerhard's death in 1970, Poldi Gerhard continued to play back the recordings, helping to identify their contents with her own annotations and comments. After her own death in February 1994 [18], the studio was dismantled [19] and the tapes were deposited at the Cambridge University Library with the rest of Gerhard's archive [20]. In 2008 the inventory of the tape collection took place [21], and later that year, Gerhard's archive was donated to the Cambridge University Library [22].

2. SOUND COMPOSITION

About 50% of the tapes are directly related to Gerhard's sound compositions [23]. For those works, the magnetic tape collection is the primary source of sound documents. Excluding one remarkable exception [24] most of this work remains unpublished, and in a number of cases is not available from other sources. The tapes contain all different stages of production, from ingredients to multi level compounds and sound compositions [25].

[...] we all have got to start in the same way: by building up a repertoire of sounds which are stored on tape. [...] The sounds selected may either be appropriate in their original form to the sound-picture one has in mind or else require further treatment before being used. Most of my stored sounds are of instrumental origin, recorded on tape through microphone. The next step -what I called my second stage - is directed towards a certain transformation of that original sound, ideally towards a metamorphosis of the sound which origins are blurred, and a far-reaching change of identity might be achieved. [Gerhard 9.116 f26-27v. Cambridge University Library.]

The first stage of sound composition is to gather a repertoire of raw materials on tape. This task is well illustrated in ff. 1-10 of the sound score [26] for *King Lear* (1955), which contain detailed instructions for recording a catalogue of instrumental sounds using different dynamics and modes of attack [27]. In the studio, a microphone was available for making recordings of piano effects -

there are more sounds in the piano than one would think [28] - or smaller percussion instruments. But materials were by no means limited to instrumental sources. Production notes reveal the regular use of daily objects for making sounds (packing paper, paper tissue, combs, ashtray), as well a wide range of incidental noises (birds, dogs, axe strokes, cracking tree, thunder, wind, rain and storm, whipping gusts, crowds, chatter, laughter, screams), which could be "home made" [29] or taken from the everyday environment.

There are a number of interesting anecdotes describing the unorthodox procedures Gerhard employed for obtaining such source materials for his compositions [30]. Dick Mills, an associate of the Radiophonic Workshop [31], describes the recording sessions, in which Poldi Gerhard was fond of participating too, as [32]:

Roberto had a rather difficult problem to overcome when attempting to record his basic sounds, as he lived on a busy trunk road in Cambridgeshire and the only quiet period was around 3.30 in the morning. One can imagine the scene as Roberto twanged and banged and bonked metallic objects as his wife Poldi acted as recording engineer. Both of them were in their sixties at that time. [Briscoe 1983: 38-40]

Aside from self-made sound sources, Gerhard would also resort to commercial sound catalogues or to outsourcing the recordings to a professional facility when a wider palette of instrumental sounds was needed [33]. The multiplicity of sources from which sounds could be obtained include Joaquim Homs for recordings of castanets which were required for the tape part of *Symphony no. 3, 'Collages'* [34], an Australian friend bringing "recordings of fishes" [35] or even recycling fragments of recordings of his own instrumental works. Neither did his preference for sounds of acoustic origin [36] rule out the occasional use of synthetic sounds, such as white noise or electronic oscillators [37].

The sounds described were recorded on countless tape splices hanging down from the side of Gerhard's grand piano [38], or wound on the smaller 3" reels inserted on spikes [39]. Keywords in capital letters (a convention Gerhard used in his notebooks to refer to the ingredients) are sketched on the flanges of the reels to identify their contents.

In *Sound Observed* [40], Gerhard proposes listening to these sounds for their own sake, "divested of all extraneous associations". It is the relation of sounds with other sounds that interests the composer, allowing him to classify them "by groups and into families that have common characteristics". Sounds, which by means of "suitable operations", can be made to resemble less and less the original from which they developed, eventually adopting the character of other families. Grouping, transforming and combining the recorded ingredients represent what Gerhard called "the second stage" of his production process.

Gerhard was well aware of the techniques of electronic music on the continent: transposition, looping and layering of sounds, cutting and splicing to create rhythms or dynamic envelopes, feedback, filters and ring modulators, were thoroughly described in a special number of the technical magazine of the Nordwestdeutschen Rundfunk devoted to the Cologne Studio for Electronic Music [41], part of the composer's book collection along with other seminal texts of the early days of electronic music [42]. While always suspicious of studios operated by sound technicians, Gerhard, on occasion regretted his lack of more sophisticated devices, envelope controllers and modulators [43]. It is not surprising that one of his favourite resources was the use of transposition.

| Take | Play | Effect | Sounds |
|---------------------------------|---------------------------------------|---------------------------|---|
| 7" [44] | 15" | one octave higher | Maracas, Timpani, White noise |
| 15" | 7" | one octave lower | Maracas |
| 15" | 7" & 3 ³ / ₄ " | one & two octaves lower | Cymbals, Timpani, Crumpling papers, White noise |
| 3 ³ / ₄ " | 7" & 15" | one & two octaves higher | Crumpling papers |
| 7" | 15" & 3 ³ / ₄ " | one octave higher & lower | Crumpling papers, Wind |

Table 1. Tape-speed combinations found in *King Lear's* sound score.

In case variable speed playback would be needed, the transfer could be organised in an external facility, making possible operations like the mixing of three disks on three turntables at different speeds and applying simultaneous glissandi to the recordings [45]. Gerhard used capital letters to identify sound patterns that resulted from the combination of sources. This step involved mixing of sources at fixed or variable loudness [46] to obtain more articulated sound images, and successively, patterns of several strands up to multilevel compounds ready for composition:

Necessito aquests dos sons per a la sinfonia, com a elements d'una estructura de percussio de fustes sonores a 12 pistes. M'interessa fixar les altitudes relatives en combinació amb dos tipus de 'claves' sud-americans en un grup de 4. Les castanyoles greus haurien d'esser d'un so més baix que el parell de claves de talla gran. Les castanyoles agudes, d'una altitud entre els parells de claves o be més agudes que els claves aguts. [Gerhard.14.192]

3. WORKS FOR THEATRE

In the 1950s Gerhard became actively involved in the production of incidental effects for theatre and radio plays - a group of works mainly representing what he called "applied or purely functional sound-composition". During the late 1940s the use of 78rpm sound-effect lacquer discs taken from specialist libraries and played back in rugged Panatropé turntable units, had already become prevalent in British theatres [47]: the infrastructure for the use of "canned music" arrived at the Shakespeare Memorial Theatre as early as 1946 [48]. Its stage would welcome the great majority of plays which are counted in Gerhard's electronic output: *King Lear* (1955), *Pericles*, *Prince of Tyre* (1958), *Coriolanus* (1959), *The Cherry Orchard* (1961) and *Macbeth* (1962) [48]. Despite the little information available on *The Prisoner* (1954), it is considered this play deserves a special place in Gerhard's catalogue of works, considered by some authors the first British score to involve tape [50].

The Prisoner [51] (1954)

The only non-Stratford play in which Gerhard got involved was Bridget Boland's *The Prisoner* for The Globe Theatre. The idea of the composition was an initiative of Gerhard, who after attending a performance of the play, decided to approach the author of the text with a proposal for writing music to the production [52]. A single SCOTCH box with the title of *The Prisoner* on its spine and containing a 5 ³/₄ reel 75% full of polyester tape in seemingly good condition is one of the few testimonies [53] of Gerhard's enterprise, and if its contents were confirmed, a valuable recording of the play unavailable from other sources.

King Lear [54] (1955)

The six items of the collection related to this work include recordings of background noise cues as well as an early recording dated May 1955, which add to the wealth of materials already available for one of Gerhard's best known productions [55]. The sound score of this play is an invaluable source for the understanding Gerhard's approach to applied sound composition: playing with incidental sounds which describe physical happenings, and turning them into elaborate sound-images of dramatic eloquence [56].

Pericles [57] (1958)

The fact that Gerhard was given the responsibility for all the recordings of Tony Richardson's *Pericles* [58] is also reflected in the amount of related items found in the collection. We can find both instrumental takes and sound effects used as materials for preparing the sound cues. For example, Gerhard satisfied Richardson's demand of using "ancient and exotic instruments" with takes of "TIPLE, ZUMARA, SYRINGA, PHARAOH PIPES, ETC." and "VARIOUS PERCUSSION" [59], contributed respectively by James MacGillivray and Gilbert Cobbett [60]. Thunder and crowd effects [61], three small reels just labelled "PERICLES" and one tape with five cues [62] add up to the list of tapes related to the production. Additionally, annotations on one or two tapes suggest that they contain recordings of the 1958 staging [63], not yet known to be available in other archives [64]. The question is whether these recordings will be able to provide a different impression than Gerhard's rather unambitious sound score [65] of the 1965 BBC radio play of the same title [66].

Coriolanus [67] (1959)

Gerhard contributed to this play with twenty-nine pan cues, one for every transition between scenes, and the sound effects demanded by the text for which he made use of his own resources [68]. A single 4" reel with tape in a plastic bag with the paper inscription "CORIOLANUS PATTERNS", and the title "CORIOLANUS II" found on the spine of an 18x18 cm. cardboard box (eventually reused for a recording of *Libra* and *Gemini*) are the references to this work found in the examined annotations.

The Cherry Orchard [69] (1961)

Gerhard contributed the soundtrack [70] for Saint Denise's version of Chekhov's play [71]. In his production notes [72] he collected hundreds of ingredients for background and incidental sounds, including instrumental, every day sounds and other effects (piano strings, piano gliss, guitar, maracas, castanets; birds, dogs, wind, axe strokes, cracking tree, Poldi felling tree, tremendous shout of Roberto, ashtray; radio white noise; Nonet, sculpt, negro song) assembled in intriguing patterns (bubble + Nonet + drops; deer + Zürich + timps + shriek; howling montage...). Seven items refer to this work.

Macbeth (1962)

This is the last play presented at Stratford for which Gerhard composed incidental music. Two of the novelties introduced in the score are the doubling of the orchestral parts by pan cues "adding musique concrète effects" as well as the use of electronically distorted voices [Cholij 1995: 42]. The legend "MACBETH – SOUNDS" on the spine of an 18 x 18 cm Irish cardboard box, which also appears on the 7" BASF reel inside, could correspond to some of those [73]. No recordings of the play have been reported to be in other archives, and unfortunately no candidates could be identified in the collection either.

4. WORKS FOR RADIO

In over thirty years of collaboration with the BBC [74], Gerhard was involved in more than twenty incidental scores for the radio [75]. He had already composed music for a number of radio plays - *The Adventures of Don Quixote* (1940), *Cristóbal Colón* (1943), *Conquistador* (1953), *L'Etranger* [76] (1954) – prior to *A leak in the Universe* (1955).

A leak in the Universe [77] (1955) (c. 10')

The first play included in Davies' catalogue is a BBC production of a play by I. A. Richards, a fantasy about a "magician's encounter with real magic" [78]. "Purely incidental music" should be set in between the various scenes, with the exception of a whistle "to run behind the recorded voices speaking through the medium in a trance" [79]. According to the score, the instrumentation chosen by the composer was viola, percussion, piano and accordion, with magnetic tape [80].

The Unexpected Country [1957] (28')

This was a BBC radio production of the play by Olwen Mymark [81]. Despite the existence of production notes in one of his notebooks [82], Gerhard questions the “paternity” of this work in one of his letters with Davies [83]. No tapes related to this work were found in the collection.

Asylum Diary [84] (1959) (75')

This is a radio play based on the story written by Christine Lavant and broadcast by the BBC in November 1959, representing the first collaboration between Gerhard and the Radiophonic Workshop [85]. Some of the preparatory materials were used as examples for a paper entitled *Concrete and Electronic Sound Composition* presented at the Joint congress of the International Association of Music Libraries and the Galpin Society celebrated in Cambridge in 1959 [86]. In those examples, Gerhard stressed the expressive qualities of the electronic medium - such as the use of a background sounds to underline the poetic range of words, or a more articulate sound-image to suggest “morbid apprehension and panic”- and formulated the theory that electronic sounds are “better suited for the fantastic than traditional music” [87]. The available tapes include some of the ingredients and sound patterns, and presumably a recording of the complete play [88], which has been reported to be unavailable in the BBC archives [89].

Lament for the Death of a Bullfighter [90] (1959) (12'58")

This is a musical setting of the reading of Lorca's poem entitled *Llanto por Ignacio Sánchez Mejías*, for speaker and tape. Originally commissioned for a radio broadcast [91] the piece can also be performed as a monologue with electronics (speaker + tape) [92]. The work was broadcast at the end of the Gerhard's two-part BBC programme entitled *Sound Observed* [93] on 28th January and 3rd February 1965. Gerhard, attracted by the potential of structural innovation offered by the electronic medium, derived the composition of the tape part from the recitation of the poem, subordinating it to the verbalization of the four cantos [94], the length of the lines, the breath pauses and vocal loudness, in such way that the audibility of the poem itself would never be endangered. The electronic ingredients were treated as strands of a multithreaded sound-fabric on which sound manipulations were applied to contribute the required effect of dramatic expression [95]. As in the case of his previous work, Gerhard relied on the assistance of the Radiophonic Workshop [96]. Items in the collection include the recordings of the original voices in Spanish and English [97], and evidence of the existence of an electronics-only tape without the voice of Stephen Murray [98], for the live performance of the work.

The Overcoat [99] (1961) (15')

This is a BBC radio production of Gogol's play (scored for Vln, Guit, Acc, Barit, Cor. barit and magnetic tape). The single dubious item in the archive corresponds to a tape where the word GOGOL is crossed out.

Caligula [100] (1961) (15')

This work comprises incidental music for chamber ensemble and tape, for the BBC radio production of Camus' play. Six of the seven items in the collection related to this work are labeled with the words “Assembly Caligula” identified with numerals “3”, “4”, “7”, “8”, “9”, “10” giving the order of the tapes in the final assembly [101].

The Anger of Achilles [102] (1963/4) (59')

This is an *Epic* for radio in three parts [103] by Robert Graves, from his translation of Homer's Iliad with music of Roberto Gerhard and special effects made by the BBC Radiophonic Workshop. The work was awarded the Prix Italia in 1965 [104]. The score for orchestra, soloists, choir and magnetic tape [105], including sung parts for the actors, is divided into 45 main cues [106]. Instrumental cues Q9, Q10, Q11, Q16, Q28a, Q29a receive the observation “+ radiophonics”, whereas the electronic arpeggio used in Q9 as background for the appearance of Achilles' mother Thetis, stands as single “radiophonics only” cue. The synthesizer cue for Agamenon's dream, a low frequency drone, the treatment of the word “vanished” with a short echo, and the use of sound effects [107] and reverberation chambers to establish locale, enhance an overall sophisticated production. Gerhard planned this work in collaboration with Delia Derbyshire of the Radiophonic

Workshop, who executed most of the radiophonic contributions [108]. There are only two related items in the collection, including one copy of the complete radio feature [109].

5. WORKS FOR FILM AND TV

In *Music and Film* (1931) [110], barely three years after the 'marriage' between film and sound [111], Roberto Gerhard anticipated the significance the soundtrack would have in his work more than 20 years later:

Adding 'noises' to music, on the other hand opens doors to a distinctive cine-phonetic genre [...] we should accept that there is all the immense repertoire of acoustic impressions of an 'extra-musical' order that attack our ears all the time, and constitutes an almost unexplored territory, untested as to its aesthetic value to the musician. [Gerhard 1930]

The composer contributed music for a number of films and TV features including the score for Lindsey Anderson's *This Sporting Life* [112] (1963) and two BBC television features: *You know what people are* [113] (1955), and *The Count of Montecristo* [114] (1964), and a sample piece for *Secret People* (1951?). However, according to Davies' catalogue, Gerhard only contributed sound scores to three of them: *All Aboard* (1958), *Your Skin* (1958) and *Macbeth* (1964).

All Aboard [115] (1958) and *Your Skin* [116] (1958).

In 1958, Gerhard completed two short "commercial Animated Cartoon Films" [117], for the opening of the Bowater House [118] and the cosmetic concern Unilever. A copy of those works (only music) at 15ips produced by World Wide Pictures Limited [119] is part of Gerhard's collection of tapes. The references to *All Aboard* represent the majority of those items, including a number of ingredients (lyrical birds, nagging wife, car-horn...). The score of *Your Skin* (accordion, guitar, percussion and tape) contains both instrumental and effect cues, and includes annotations for changing the playback speed of the instrumental parts: "slower", "speed up twice", "instrumental section to be speeded up" [120].

Macbeth (1964)

Another score called *Macbeth* (1964), a commission for 3 minutes of background music for two scenes, to be overlaid with speech for a BBC T.V. production entitled "Shakespeare and Music" - "excerpts from the earlier theatre score, for a BBC T.V. anthology" [121] - realised using just instrumental sounds: percussion and piano [122].

6. CONCERT MUSIC

Besides the *Symphony no. 3, 'Collages'* (1960), and *Caligula* (1961), a number of other works in Gerhard's catalogue of sound compositions presented here under other headings were intended to be used in concert: *Lament for the Death of a Bullfighter* [123] (1959) *Audiomobile no. 2 'DNA'* (1963), "Sound variations by Roberto Gerhard on a Musical Construction by J. Youngman" (1963). In addition to those works, also worthy of mention is the existence of a further "electronic" composition for concert, which does not rely on magnetic media: *Claustrophilia* (1966) a page to John Cage for eight harps (or as many multiples of 4 as available) and 4 backstage radio sets, tuned to different wavelengths, monitors backstage and loudspeakers [124].

Collages [125] (1960) (20')

The *Symphony no. 3, 'Collages'* (1960), for electronic tape and orchestra [126], written during August-December 1960, and premiered at the Royal Festival Hall, London, 1961 (BBC Orchestra conducted by Rudolf Schwarz) is probably Gerhard's most ambitious electronic work. Around 40 items related to this work are in the archive [127]. They comprise rehearsals and recordings of different performances, as well as various sources and mixes of the electronic tape, including the tape cues to be used for the concert. This is how Desmond Briscoe describes the collaboration with the Radiophonic Workshop for this work:

The years... most ambitious collaboration was with anglicised Spanish composer Roberto Gerhard, which culminated in Dick Mills [128] supporting live performances of Gerhard's work at both the Royal Albert Hall and also the Royal Festival Hall under the baton of Rudolf Schwarz. [...] Gerhard brought the basic sound material to the Workshop where it was mixed and prepared and made ready for playing with the orchestral parts. As Dick was familiar with it, it was decided that he should perform with the orchestra. [Briscoe 1983: 39]

A stereo version of the tape of *Collages* was prepared [129] for the performance of the *Symphony no. 3, 'Collages'* at the Promenade Concerts, 22 August 1967, conducted by Frederik Prausnitz.

Caligula (1961) (6')

Based on the play of the same name, this is an independent concert piece, which was performed in the USA in 1962 and 1963.

Audiomobiles and *Sculptures* [130]

There are marked divergences in the way these two titles are treated in the catalogues of different authors. While [Davies 1981] presents them as two discreet works (*Sculpture 1* and *Audiomobile 2*), other authors have frequently registered two different series of sound compositions (*Audiomobiles* and *Sculptures*).

"[...] here is one example no longer of applied or purely functional sound-composition, but designed to be listened to for its own sake. It is out of a series which I call "Audiomobiles". This one is a Capriccio in the manner of Goya." [Gerhard 1961: 37]

According to this quotation, the idea of a series of *Audiomobiles* as autonomous works already existed in 1959, but Davies, argues that the relation between this early series of *Audiomobiles* and the soundtrack for the 1963 film *DNA in reflection* is ambiguous [131] and considers the *Capriccio* as an example [132].

The work *Audiomobile no. 2 'DNA'* itself does not seem to be a source of quarrel. It reached some popularity Gerhard's lifetime, both as the soundtrack of the film *DNA in Reflection* [133] (1963) (of which a copy of the 35 mm film is part of the collection), as well as an independent concert work. The work is entirely the result of the manipulation of natural sounds. A stereo version of *Audiomobile no. 2 'DNA'* was produced and broadcast in 1967 [134]. Copies of this work are also available at the British Library Sound Archive [135].

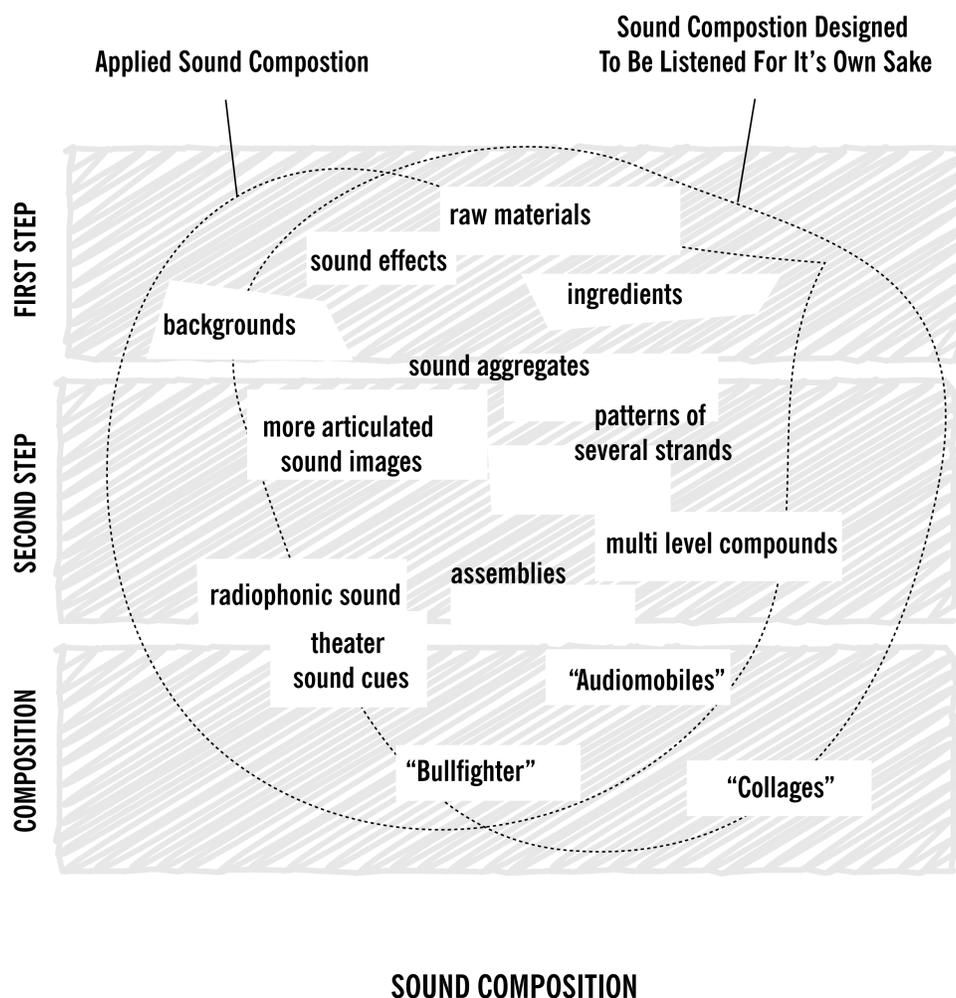
| | Audiomobile | Audiomobile Nr.1 | Audiomobile Nr. 2 | Audiomobile Nr. 3 | DNA | Sculpture | Illustrations of a talk |
|-------|-------------|------------------|-------------------|-------------------|-----|-----------|-------------------------|
| TAPE# | | | | | | | |
| 13 | | | | | | x | |
| 15 | | | | | | x | |
| 16 | | | | | | x | |
| 45 | | | x | | x | | |
| 48 | | | x | | x | | |
| 49 | | | | | | x | |
| 56 | | | | | x | | |
| 77 | x | | | | | | x |
| 116 | | | | | x | | x |
| 186 | | | | | x | | |
| 187 | | | | | x | | |
| 231 | | | | x | | x | |
| 235 | | x | | | | x | |
| 239 | | | | x | | x | |
| 269 | | | | | x | | |
| 271 | | | | x | | x | |
| 291 | | | | | | x | |
| 361 | | x | | | | x | |
| 405 | | | x | | | | |
| 437 | | | | | | x | |
| 532 | | | | | | x | |
| 540 | | | | | | x | |
| 542 | | | | | | x | |
| 543 | | | | | | x | |
| 544 | | | | | | x | |

Table 2: *Audiomobiles* and *Sculptures* in Gerhard's Tape Collection

Interestingly, three tapes in the collection refer to an *Audiomobile no. 3*, always in combination with the word 'Sculpture' and unambiguously labelled "*Audiomobile 3 "Sculpture" 15"ps. full track-stereo*" [136]. Three more refer to an *Audiomobile no. 1 'Sculpture'* [137]. Is no. 3 a better version of no. 1, or are those two audiomobiles different works? [138] What is clear is that in the tape collection, "sculptures" and "audiomobiles" are tangled together. What is the relation to the

two “*Sculptures*” with the “Sound variations by Roberto Gerhard on a Musical Construction by J. Youngman” [139], also known in the literature as *Sculpture 1* [140] (1963)?

7. CONCLUSIONS



8. REFERENCES

- [1] Davies' compendium of Gerhard's electronic music [Davies 1981] serves as departure for this article.
- [2] Some early tapes were addressed to 5 Adams Road where Gerhard lived between until 1958 but I have not been able to examine any related documentation to this period. See for example, [Tape.01.1-130, Tape 01.1.038].
- [3] [Homs 2000: 60-61].
- [4] Envelope 1. Prints F1 & B946 + Negs. Roberto Gerhard Collection. Cambridge University Library.
- [5] The identification of the machines and their description has been possible thanks to the kind collaboration of Mr. Georg West.
- [6] A very robust machine employed in many professional studios in the early days of tape music. It was advertised by EMI as being “Used by the experts in the world's leading recording and broadcasting organizations. A transportable high fidelity tape recorder designed for professional use”. It recorded full-track format (i.e. recording only in one direction), was capable of tape speeds of 15 ips and 7.5 ips (a model with 7.5 ips and 3 ¾ ips was also available), and provided separate microphone and line inputs. The take-up reel rotated clockwise, resulting in a tape wound with the oxide coating facing out

- rather than inwards, in order to reduce print-through. Few other machines employed this method. It was introduced in 1951.
- [7] Mono recorder with Wearite (Ferrograph) deck. There were full and half-track versions. The WVA model had two heads (no off-tape monitoring). Ca 1951-1952.
- [8] The Ferrograph series 66 chassis model is a mono half-track recorder with two selectable speeds (15 / 7.5 isp or 7.5 ips / 3.75 ips), based on the standard Ferrograph series 3-deck mechanism. It did not include a power output stage, so it had to be connected to an external amplifier. Aimed at Hi-Fi enthusiasts, it was designed to be incorporated into a cabinet alongside the Hi-Fi system: an amplifier, turntable and radio tuner. First introduced in 1957.
- [9] Personal Communication with Richard Andrewes.
- [10] Meirion Bowen estimated this picture to be taken “ca. 1955” [Bowen 2000: 156 bis (no. 7)]
- [11] Ferrograph Series 4, mono, half-track with two selectable speeds (15 / 7.5 isp or 7.5 ips / 3.75 ips). Introduced in 1959 as a successor of Series 3. The main changes were a more ergonomically designed control knob and a new head cover design.
- [12] Probably a Vortexion valve mixer, from which many versions from 3 to 10-12 ways were produced.
- [13] On this occasion portrayed in a series of colour shoots shown in the B.B.C. film *The Explorer* [Gavin, 1971]
- [14] See [Biscoe 1983: 20] for a pre-Radiophonic Workshop photograph of Daphne Oram working with Ferrograph Series 2 tape recorders at the BBC.
- [15] “I have always been working with a shoe-string equipment in electronics. It comprises: one microphone, five tape recorders, a track mixer of five channels.” [Cholij 1996: 30]
- [16] The Ferrograph Series 4 and the Vortexion WVA were advertised for £81 gns. (£86 gns. the high speed model) and £93.13.s.0d. respectively (retail prices of 1960). The EMI TR50, would cost around three times the former [West 2010]
- [17] It also features a number of recordings dated after 1970, later incorporated to the collection by Poldi.
- [18] Estanyol 1996: 21
- [19] The 'Home Office' was reported to have been in a similar state shown by the photographs taken in the late 1950s. Rosemary Summers with the help of David Drew cleaned up Gerhard’s studio putting the tapes in boxes and the exposed tapes in plastic bags. Unfortunately, the tape recorders were not conserved. [Summers, Rosemary. Personal Communication. 17th Oct 2008].
- [20] Cambridge University Library, Roberto Gerhard Archive
- [21] The tape collection was sorted and documented during two visits to the Library in December 2007 and February 2008. A research report submitted to the Music Department of the University Library provides the details of the work [García-Karman, 2007]
- [22] Andrewes, Richard: "Donation of the Roberto Gerhard archive". Cambridge University Library Readers' Newsletter. Number 40, October 2008. At the time of writing, the collection is in process of being transferred to the Pendelbury Library.
- [23] For a detailed description of the contents of the collection see Roberto Gerhard’s Tape Collection [Karman 2008]
- [24] The *Third Symphony “Collages”*, of which at least three commercial recordings are currently available. HMV ASD 2427, 1967 Montaigne Auvidis MO 782103, 1997 Chandos Records 1013104, 1997
- [25] Using Gerhard’s own terminology.
- [26] Gerhard.7.102, ff. 1-10
- [27] Maracas, cymbals, xylophone, turkish cymbal, tam-tam, piano, chromatic timpani, bass drum, gong, mbira. [Gerhard.7.102]
- [28] [Gerhard 1959, 36]. For example, the tape labelled “Roberto working on piano strings for incidental music” [Tape.01-1.055] would be a document of those experiments, with similar recordings to those described in King Lear’s sound score (low piano strings: pluck, rub with wire brushes, comb, roll with timpani sticks). [Gerhard.7.102].
- [29] For example, the labelling “Rain and storm home produced by Roberto” [Tape.01-1.391]
- [30] “I remember visiting Roberto in Cambridge, talking about the score, and even assisting him in throwing various objects down the stairs, in an effort to product the right kind of abstract sounds which he felt he needed.” [Anderson, 1981]. Another anecdote on Gerhard’s imaginative and unorthodox methods of self-production see Briscoe 1983: 39.
- [31] With whom Roberto collaborated for the production of *Collages* [Briscoe 1983: 39]
- [32] Interestingly, a number of annotations found on the tapes like “P & R Experimenting with accordion and Piano” [Tape.01-1.230] or “Sunday (rainy) afternoon, Roberto and P. making samples for incidental music” [Tape.01-1.260] also contribute to the idea of Poldi’s frequent participation in the recording and production of sounds. Further references pointing to such involvement are: “Poldi’s voice as ingredient for nagging wife for Bowater Film” [Tape.01-1.433] “Poldi on felling tree” or “Birds Poldi” [Tape.01-1.433]

- [33] This was the case in Stratford's play *Pericles* (1958): [Tape.01-1.254] credits "Studio Black, Queens Way" for the recording of a set of percussion and exotic instruments.
- [34] "Tinc un prec que t'agrairia d'allò més, si tens tamps, que em poguessis complaure am la possible urgència: em podries fer un troç de cinta magnetofònica enregistrant el so de dos parells de 'castañuelas', l'un el més agut possible i l'altre el més baix possible." *Letter from Gerhard to Joaquim Homs, 27th June 1959*. [Gerhard.14.192]
- [35] "[...] a friend of ours brought home from Australia a recording of fishes. And I told Roberto about it. And he said, bring me that recording, get me that recording. Borrow it. So I did. And he put it into a rythmical skeleton." According to Poldi Gerhard in [Gavin 1971]
- [36] "The microphone captures the living spark of the natural acoustic source; sound is thus taken fully-fashioned with its intrinsic harmonic structure, its attack, its main characteristics of body and decay and also with the noise-content inseparable from all of it, all complete. Personally I feel that this, as it were, naturally animated material is preferable to the synthetic electronic sound, built up from sine-tone with it's lifeless signal quality." [Gerhard 1959: 34] (Concrete music and electronic sound composition)
- [37] 2 FREQUENCY OSCILLATORS at lowest possible frequency, ½ tone or less apart. [Gerhard.7.102]
- [38] I did not examine any loose splices in case they would break during the sorting of the tapes.
- [39] Were not catalogued
- [40] This is what Gerhard called his theory of change of family through sound mutation. [*Sound Observed*].
- [41] "Sonderheft über Elektronische Musik" Technische Hausmitteilungen des Nordwestdeutschen Rundfunks. Jahrgang 6 Nr.1-2 (1954).
- [42] À la recherche d'une musique concrète. E. Du Seuil (1952) Gravesaner Blätter Perspectives of New Music Vol 1, No 1 (1962) Stockhausen, K: *The concept of unity in electronic Music* in Babbit, Milton: "Twelve-Tone Rythmic Structure and the Electronic medium"
- [43] [Cholij 1995, p 30]
- [44] Gerhard always wrote 7" instead of 7" ½ in his sound score [Gerhard.7.102].
- [45] Ibid. f 9r
- [46] Ibid. f 4v
- [47] Hence the name 'pan cues' stage managers used to give to the sound cues. *My Fair Lady*, transferred from Broadway to the Theatre Royal in 1957, stands as a reference for the introduction magnetic tape for this purpose. Stanton, Sarah and Banham, Martin: "The Cambridge Paperback Guide to Theatre". Cambridge University Press, Cambridge 1996. (p. 347)
- [48] Gerhard's music for Stratford's Shakespeare Productions has been treated in detail in Cholij, Irena: "Roberto Gerhard's Music for Stratford Shakespeare Productions 1947-1962 and its context". Unpublished MA dissertation, University of Birmingham 1995. About the controversy with the Musicians see Cholij, op. cit., pp. 7-9.
- [49] All of the theater plays in [Davies 1981] catalogue are represented in the tape collection. On the other hand, apart from the annotations on an empty box which could have contained a recording of the panatropes of *Cymbeline* (1949) [Tape 01.1-140], I did not identify any tapes corresponding to *Romeo and Juliet* (1947), *The Taming of the Shrew* (1953/54) or *A Midsummer Night's Dream* (1954), none of which are counted among his electronic works.
- [50] [Davies 1968 & 1981]. The use of manipulated tape was already noted in [Drew 1956].
- [51] [Tape.01.1-248] I have provided the list of tapes related to each of the compositions as a footnote to the title. In this case I only found a single tape that makes reference to *The Prisoner*.
- [52] [Gerhard.14.41, Gerhard.14.54]
- [53] Together with a transcription of the theatre programme which credits Gerhard for the music of a performance dated 3 May 1954. *Theatre collections: Programme collection. Templemann Library. University of Kent at Canterbury*. <http://library.kent.ac.uk/library/special/Programmes/PRG1954.HTM> (Last retrieved 14.04.2010).
- [54] [Tape.01.1-44, Tape.01.1-45, Tape.01.1-97, Tape.01.1-130, Tape.01.1-135 and Tape.01.1-491].
- [55] Thanks to [Cholij 1996] and the wide range of available sources: The instrumental parts as well as the sound score, at the Cambridge University Library; and the sound cues, cue sheets and a complete recording of the play, as part of the collection of the Shakespeare Centre Library.
- [56] "Sound becomes less real than ever: Lear is Mad"
- [57] [Tape.01.1-83, Tape.01.1-113, Tape.01.1-137, Tape.01.1-181, Tape.01.1-182, Tape.01.1-265, Tape.01.1-254, Tape.01.1-400, Tape.01.1-274, Tape.01.1-275, Tape.01.1-276].
- [58] See [Cholij 1995: 34-36] for a thorough description of the correspondence.
- [59] See [Tape.01.1-254]
- [60] Cobbet was a drummer involved in a number of theatrical productions of Stratford between 1956 and 1966. <http://theatricalia.com/person/2mq/gilbert-cobbett> (Last retrieved 24.04.2010)

- [61] “SR 5866 PERICLES THUNDER FX” [Tape.01.1-400] “CROWDS (GRUNDIG)” [Tape.01.1-254] may have been used for the “storm effects and ‘mush’” [Cholij 1995: 35].
- [62] “1) TARSUS 2 / 2) BROTHEL / 3) REVIVAL A / 4) TARSUS 1 / 5) REVIVAL B” [Tape.01.1-265]
- [63] According to the annotations [Tape.01.1-113] would probably be the best candidate. No other recordings of this play have been reported.
- [64] No other recordings of the performance have been reported in Stratford, the British Library or the BBC archives.
- [65] At least this was my impression when I listened to the recording of the radio play available at the National Sound Archive 1965.08.30 - T8638/01 NSA. which is not listed in Davies’ catalogue. The catalogue only includes electronic compositions up to 1964 but would be based on correspondence between Davies and Gerhard up to 1967. It seems difficult to imagine that anyone in 1965 would consider the use of sound effects here as *musique concrète*.
- [66] This second *Macbeth* was directed by Raymond Raykes, with whom Gerhard had worked for *The Anger of Achilles* in 1964.
- [67] [Tape.01.1-76, Tape.01.1-510].
- [68] The cues at the Shakespeare Centre Library are incomplete. [Cholij 1995: 38-41].
- [69] [Tape.01.1-22, Tape.01.1-142, Tape.01.1-323, Tape.01.1-359, Tape.01.1-488, Tape.01.1-489, Tape.01.1-509].
- [70] The musical arrangements were made by Brian Priestman [Cholij 1996: 28].
- [71] Michael Elliot’s TV adaptation of the original theater play has been recently released on DVD.
- [72] [Gerhard 9.101, ff 1-10]
- [73] Knocking, thunder (2x), ravens (2x) and bagpipe music. [Cholij 1995: 42]
- [74] Dating back from before his exile, until the end of his life.
- [75] [Atherton 1973] identified twenty-two works under this category.
- [76] Albert Camus’ play is the first of the works for the radio referenced in the tape collection, including some “bits of incidental music, 3 ½ speed L’Etranger” [Tape.01-1.382], and a “talk on L’Etranger” by Camus himself [Tape.01-1.382].
- [77] Poldi identified a part of the radio play in [Tape.01.1-310]
- [78] *A Leak in the Universe* http://www.tudormagic.com/articles/a_leak_in_the_universe.htm (Accessed 21-3-2008).
- [79] Instructions found in a letter from Geoffry Bridson (Assistant Head of features of the BBC) dated 3 August 1955. [Gerhard.15.123]
- [80] [Gerhard.3.35] “chamber ensemble and manipulated tape” [Drew 1956]
- [81] [GOM: 264]
- [82] [Gerhard 10.108, f 6v.]
- [83] Letter from Gerhard to Davies dated 27 January 1967 [Gerhard.14.105]
- [84] [Tape.01.1-11, Tape.01.1-20, Tape.01.1-227, Tape.01.1-292, Tape.01.1-357]
- [85] According to Gerhard this was the only work, together with *The Anger of Achilles* (1964), where the final montage was not made at his private studio. *Op. cit.* [Gerhard.14.105]
- [86] The paper was originally printed in [Gerhard 1959: 36-37] and reprinted in [GOM] lacking the examples.
- [87] [Gerhard 1959, p36].
- [88] [Tape.01.1-227] a selection of works compiled by Sasha Moorsom, including *Asylum Diary*.
- [89] “[...] bei der BBC hat sich kein Band der Sendung erhalten.” Hartung, Harald: “Es ist gut, verrückt zu sein unter Verrückten.” *Frankfurter Allgemeine Zeitung*, 04.12.2001
- [90] [Tape.01.1-28, Tape.01.1-120, Tape.01.1-127, Tape.01.1-128, Tape.01.1-183, Tape.01.1-195, Tape.01.1-224, Tape.01.1-227, Tape.01.1-238, Tape.01.1-267, Tape.01.1-272, Tape.01.1-307, Tape.01.1-385, Tape.01.1-386, Tape.01.1-387, Tape.01.1-416, Tape.01.1-417, Tape.01.1-418, Tape.01.1-419, Tape.01.1-460, Tape.01.1-508]
- [91] First performance: 1960, Stephen Murray + Tape (Speaker).
- [92] [Atherton 1973]
- [93] Related materials to this relevant document describing Gerhard’s ideas on sound composition are [Tape.01.1-315, Tape.01.1-316, Tape.01.1-317, Tape.01.1-318, Tape.01.1-319]. *Sound Observed* is available for listening at the British Library National Sound Archive [NP739W, NP740R]. A transcription is available in [GOM 185-195].
- [94] Each of them is treated “somewhat different and uniformly, both in sound colour and patterning” [GOM, 185-186]
- [95] *Talk given on the B.B.C. on the 22 January 1960.* [GOM, 185-186] For Davies, this is Gerhard’s first significant step away from incidental music. [Davies 1981: 37]
- [96] [Davies 1981] [Briscoe 1983: 39]
- [97] [Tape.01.1-183, Tape.01.1-417]
- [98] [Tape.01.1-238] “Bullfighter. Lorca - Gerhard. Electronics only.” Unfortunately the container is empty.

- [99] [Tape.01.1-006]
- [100] [Tape.01.1-3, Tape.01.1-13, Tape.01.1-14, Tape.01.1-15, Tape.01.1-46, Tape.01.1-103, Tape.01.1-289]
- [101] Eventually corresponding with cue numbers in the score.
- [102] [Tape.01.1-61, Tape.01.1-194]
- [103] The three parts were broadcast weekly on the 17th, 24th and 31st of May 1964
- [104] “RAI prize for literary or dramatic programmes with or without music” (international category). *Programmi Vincitori (1960-1969)*.
http://www.prixitalia.rai.it/pastedition/nuovo/old_2_2.htm (Retrieved 12.08.2009)
- [105] [Gerhard 3.43]
- [106] Each cue has a title and may be in turn divided into subcues, representing a fair number of bits to be assembled.
- [107] Sea waves, wind, flames, swords brandishing.
- [108] “the contributions for ‘THE ANGER OF ACHILLES’ [...] were planned and discussed, in a few instances I intervened actively, with Deliah Darbisher [sic] of the B.B.C. Radiophonic Workshop who executed them.” letter from Gerhard to Davies, 27.01.1967
- [109] Also one of the few incidental works conserved in the BBC archives [catalogue numbers #838860, #838861 and #838862], a recording of the work is also accessible through the British Library sound Archive.
- [110] [Gerhard 1931] appeared in [GOM, p 80] The text exhibits astonishing similarities with a similar text on the possibilities that the film soundtrack opened to contemporary music of Chávez, Carlos *Hacia una Nueva Música* (1932).
- [111] [Chion 1994: XIII]
- [112] This score originally included a “concrete music” soundtrack for the title sequence [Anderson 1981].
- [113] [Tape.01.1-42] (empty box)
- [114] [Tape.01.1-21, Tape.01.1-041]
- [115] [Tape.01.1-45, Tape.01.1-81, Tape.01.1-230, Tape.01.1-232, Tape.01.1-287, Tape.01.1-288, Tape.01.1-289, Tape.01.1-290, Tape.01.1-355]
- [116] [Tape.01.1-81]
- [117] Letter from Gerhard to Davies Jan.27.1967 [CUL-CO 14.105]
- [118] Copies of the films are not contained in the archive at the CUL
- [119] “Sorry for the delay - Peter Gilpin. With the compliments of World Wide Pictures Limited. Music Only. Your Skin - All Abroad. 34 Cursitor Street, London E.C. 4. HOL 4683. 15" p.s”. [Tape.01.1-81]
- [120] [Gerhard.6.4]
- [121] [Davies 1981: 38]
- [122] [Cholij 1995: 44].
- [123] [Tape.01.1-28, Tape.01.1-120, Tape.01.1-127, Tape.01.1-128, Tape.01.1-183, Tape.01.1-195, Tape.01.1-224, Tape.01.1-227, Tape.01.1-238, Tape.01.1-267, Tape.01.1-272, Tape.01.1-307, Tape.01.1-385, Tape.01.1-386, Tape.01.1-387, Tape.01.1-416, Tape.01.1-417, Tape.01.1-418, Tape.01.1-419, Tape.01.1-460, Tape.01.1-508]
- [124] The score of this work is available at the Cambridge University Library [Gerhard.14.62]
- [125] [Tape.01.1-4, Tape.01.1-5, Tape.01.1-6, Tape.01.1-7, Tape.01.1-8, Tape.01.1-9, Tape.01.1-10, Tape.01.1-12, Tape.01.1-51, Tape.01.1-66, Tape.01.1-79, Tape.01.1-121, Tape.01.1-123, Tape.01.1-124, Tape.01.1-126, Tape.01.1-131, Tape.01.1-132, Tape.01.1-158, Tape.01.1-159, Tape.01.1-160, Tape.01.1-161, Tape.01.1-162, Tape.01.1-163, Tape.01.1-210, Tape.01.1-235, Tape.01.1-238, Tape.01.1-299, Tape.01.1-300, *Tape.01.1-301*, Tape.01.1-302, *Tape.01.1-303*, Tape.01.1-304, Tape.01.1-305, Tape.01.1-358, Tape.01.1-380, Tape.01.1-381, Tape.01.1-406, Tape.01.1-407, Tape.01.1-466, Tape.01.1-467]
- [126] In this order in the original EMI pressing.
- [127] Forty tapes in the collection are linked to this work.
- [128] Recording engineer who joined in 1958 the Radiophonic Workshop as technical assistant, six months after it started [Briscoe 1983: 75]
- [129] See [Gerhard.15.1.74]
- [130] cf. below in relation to the dates of composition and relevant tapes
- [131] “did it incorporate the second of the original audiomobiles, or was the original set considered as No. 1?” [Davies 1981: 36]
- [132] The film was produced by Hans Boye and Anand Sarabhai
- [133] “An experiment in the visual presentation of molecular models. Production company: Molecular Biology Laboratory. Medical Research Council, Cambridge.” *BFI National Archive* <http://ftvdb.bfi.org.uk/sift/title/4980> Last retrieved 12.04.2010
- [134] “I am making a stereophonic version of the same [AUDIOMOBILE 2 DNA] (with David Scott of B.B.C. London Transcription Service, Kensington House) which will be performed at the Tuesday

- Invitation Concert, B.B.C. Concert Hall on Febr.14 (and broadcast in stereo on the Third).” Letter from Gerhard to Davies, 27th January 1967 [Gerhard.14.105].
- [135] M1111R BD 1: *Audiomobile No.2*/Gerhard - BBC recording broadcast Third Programme February 21st 1967 // 1CDR0006375 BD3 NSA: *Audiomobile No.2*/Gerhard - Recorded from transmission by Michael Gerzon // M973W BD 1: *Lament for the Death of a Bullfighter* / Gerhard.
- [136] [Tape.01.1-271] Which is even more interesting because 15” would presumably be the speed chosen for a master tape and Gerhard did not seem to adopt Stereo until the late 1960s.
- [137] The title *Audiomobile 1. 15” Sculpture*. Full track is found on a 5 ¾ cardboard box [Tape.01.1-235] and a 5 ¾ reel in plastic bag, “*Audiomobile 1 (Sculpture)* Full track” [Tape.01.1-361]
- [138] One of the latter annotations has been crossed out, while one of the former tapes is labelled “Version II. *Audiomobile nr. 3 ‘Sculpture’*” [Tape.01.1-231]
- [139] [Tape.01.1-532]. A typewritten label branded with a seal of the University of Cambridge School of Architecture
- [140] All catalogues identify those two works giving it a duration of 4’18”. However, actually none of the examined tapes of the collection make explicit reference to a work called *Sculpture nr. 1*. A further packet of tapes composed of five 8 x 8 cm. boxes [Tape.01.1-540, Tape.01.1-541, Tape.01.1-542, Tape.01.1-543, Tape.01.1-544] containing six 3” reels seem to be components for the assembly of some of those *Sculptures*.

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