The Electroacoustic Music Archives at the Fondazione Giorgio Cini: A Review of the Camillo Togni, Fausto Romitelli and Giacomo Manzoni Collections

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In the past the highly technological, multilayered, and collaborative nature of the art of sound organised using analogue or digital technology (sonic art or sound-based art, particularly as practised in electroacoustic music),[1] has put musicological analysis and most traditional methodologies of philology, oriented towards reconstructing the 'truth' of a unified original text in crisis. The creative process in electroacoustic music inevitably produces a vast number of sources, depending on the machines and instruments (each with its own 'language' and technical functioning), the performers (musical assistants, computer music designers, musicians) and, of course, the composer himself. However, the community of scholars has thoroughly investigated these issues in recent decades, unravelling them and profoundly innovating the methods of studying and analyzing music, thus providing numerous publications and research projects aimed at studying and preserving the heterogeneous documentation produced during the creation and performance of this music.[2] One of the most interesting approaches reconstructs *la fabrique des travaux*, the composition 'workshop', that is to say the physical, technical and mental environment of the composition.[3]

This paper considers the author's experience conducting research within

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Camillo Togni's archive (Fondo Camillo Togni, henceforth FCT) at the Fondazione Giorgio Cini for an article on Togni's *Recitativo Elettronico* (1961), and exploring electroacoustic music sources held at the archive specifically related to the collections of Fausto Romitelli (FFR) and Giacomo Manzoni (FGM). It reflects on the physical nature (source) and the content (text) of these objects, focussing on two issues that arise from their study: the first concerns the question of what these sources can tell us about the creative process of the composers, about their 'workshop'; the second question relates to the acquisition and maintenance of some of these sources (particularly the computers and their content), and the questions that can derive for musicological research.

The three case studies presented here provide excellent examples of the heterogeneity within the domain of electroacoustic music. These collections, some of which have been recently acquired, contain sources that can be classified according to their medium: paper, audio, video or digital.[4] On the other hand, according to the source contents, they can be classified in a chronological manner from the first sketches of a musical work to the final version; and their description and analysis can help clarify the various phases of creation, change, erasure, rewriting, and interpretation. In the following sections I will consider the various issues by focussing on Togni's paper materials, on Romitelli's computer items, and on Manzoni's hard-disk.

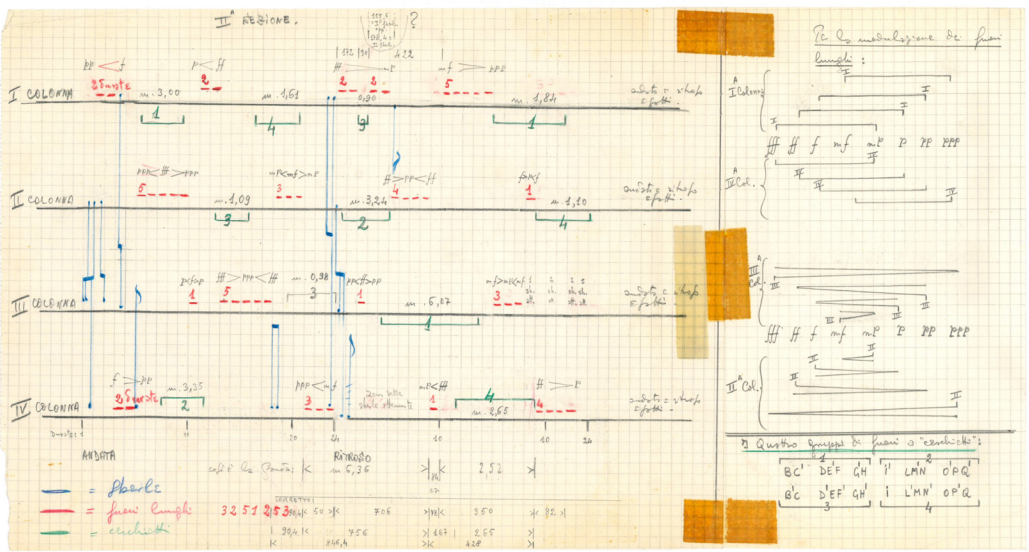
CAMILLO TOGNI AND HIS ONLY ELECTRONIC MUSIC PIECE, *RECITATIVO*

Judging by the state it arrived in when it was acquired, the collection of Camillo Togni reveals the history of a composer with an organized workflow and archival awareness. Togni composed a single composition for electronic music (acousmatic, and using only oscillators), entitled *Recitativo*, realized in 1961 at the Studio di Fonologia della RAI (SdF) in Milan. As for his other pieces, the preparatory materials are contained in systematic containers, in this case a brown cardboard holder, numbered 24, closed by a push button bearing two white adhesive labels, on the front and on the spine, with the following writing (almost certainly written by Togni himself): 'CAMILLO TOGNI / RECITATIVO / PEZZO ELETTRONICO / 1961'. The folder contains various sources that, even from a first glance, reveal the serial techniques he used in this piece – typical of his compositional approach – shown in the manuscripts, and other materials (particularly two books) that he used to learn about the physics of sound and psychoacoustics. To familiarize himself with the latest experimentations in

electronic sound emerging across the globe, Togni most likely read Abraham A. Moles', *Les Musiques expérimentales* (1960). Another even more interesting book, which Camillo Togni enclosed in the same box, is a typewritten tome by Pietro Righini entitled *Acustica Musicale* (ca. 1960). Among other books by Righini, this volume was a cornerstone publication in Italy during the early electronic music era for those learning the new sound world. Since it was written at RAI during the same period Togni worked at the SdF, it is most likely that someone donated it to him so that he could learn the basics of acoustic, psychoacoustics and timbre.[5] In the sample owned by Togni, we find the composer made annotations with his very precise and neat handwriting (for example, some pencil comments on the margins of pages explaining mathematical fractions, in the chapters dedicated to the evolution of musical intervals and scales), occasionally underlining with a ruler in graphite or blue-red pencil.

Among the handwritten sources contained in this folder the most interesting by far is a light brown cardboard folder with a handwritten title in black marker 'Appunti per pezzo elettronico (1961) [Notes for electronic piece (1961)]', containing 137 handwritten pages with numbers and schemes, some on loose square sheets, others on light tissue paper, other loose pages torn from a notepad, with the bulk of the material belonging to a notebook with pages that have square gridlines printed on them (FIGURE 1). I will dedicate the following paragraphs to reflections that have been made possible from a general description of these objects.

FIGURE 1. Sketch for *Recitativo*. Fondazione Giorgio Cini (Venezia), Fondo Camillo Togni.



All these paper sheets evidently served his serial management of pitches (sinusoidal sounds that he produced with oscillators) and their calculation (the choice of a 'chromatic scale' of 7 pitches not belonging to the traditional tempered scale, transpositions, ratios between the pitches). The resulting row series and the structure of each section resulting from the combination of these row series combined to create the macro-form of the piece which derived from the sheets. The sheets from the squared notebook preserve a sort of 'chronological' order, fundamental in the study of the creative process of *Recitativo*, from the early sketches, to the final choice of pitches, structure and overall form of the piece. Upon opening this folder, the main problem that emerges is the fact that many of these sheets are loose (having likely been detached from the glued spine of the notebook during the composition phase), and others have been attached to the notepad. The dispersal of these loose sheets was probably due to the notebook being continuously leafed through, or sheets being inserted into the notebook during the compositional process. Hence, this presents a challenge for the future archival and preservation of these objects, which must be kept in the same exact order. Moreover, some sheets, on light tissue paper, are very thin, almost transparent. Due to the delicate nature of these 137 handwritten pages (it must be noted that a couple of the sheets contained in the folder are already torn: the creative process, and the writing of these sheets, denotes an intense and feverish work), their digitization would be desirable both to avoid ruining, wrinkling and tearing them, thus safeguarding them over time, and to avoid changing the order of the sheets.

The light brown cardboard folder also contains two texts presenting the piece, in which Togni explains the choice behind the 'chromatic scale'. One is typewritten and clearly dates back to the period when he composed the piece, while the other was written in 1991 on a sheet from a hotel in Fiesole. This leads us to another aspect related to the tidy organization of the FCT collection, and this main brown folder closed by a push button in particular. Togni collected not only the preparatory materials in this folder, but also materials related to the re-performance of the piece in June 1991, in the Chiesa del Carmine (Carmine Church) in Brescia. *Recitativo* was used for a performance of 'Brescia *Passion*' (*Un'antica 'Passio' bresciana*, from texts of the fourteenth century), with scenery and sculptures by Franca Ghitti, directed by Giorgio Rosa (who also made the sound design effects). These materials in this folder include: the program booklet of the *Passion*, press releases and newspaper articles, the official invitation to the concert, his *curriculum vitae* (which he evidently sent to the press or used in the concert program), and a square sheet (15x15 cm) dated 10 June 1991 on which he jotted telephone numbers and a scheme for the spatialization of the piece.

The brief description of the contents of this box allows us to surmise that the composer took care to gather the materials pertaining to one specific work in the same place; this inclination for cataloguing also provides a useful window on his specific ways of working, composing, preserving and archiving his own works. The sources related to this piece require more in-depth research, including an investigation on the role of the technician Marino Zuccheri (who assisted composers at the Studio di Fonologia). Source analysis could demonstrate that the composer worked autonomously, or that the technician helped him in the preparation of the materials, at least the electronic ones. A comparison of these sources with the ones held at the Centro Studi e Ricerche NoMus in Milan (Marino Zuccheri Collection) would be essential.[6]

FAUSTO ROMITELLI'S COMPUTER

Fausto Romitelli's personal archive was donated to the Foundation by his family in 2016.[7] In addition to his musical manuscripts, the family also donated his personal computer, which is an object to study in its own right. In fact, the computer, as an object and a medium, offers many more dizzying questions than other electroacoustic music sources (magnetic tapes, vinyls, compact digital disks, or external memories), for the reason that it is both an instrument for composition and a medium. It is used for creation, production, reproduction, and storage.

Romitelli's computer provides an opportunity to present some issues scholars must consider when studying computers as a source and a text (or series of texts), such as the dating of the machine and its files, their organization, or what the content taken as a whole can tell us. These are questions that researchers pose to clarify the composer's atelier, but at the same time the computer, as a non-static instrument, may present problems that inhibit musicological research. As a material object Romitelli's computer reveals historical/biographical details. It is a Macintosh Classic personal computer designed, manufactured and sold by Apple Computer in 1991. Romitelli kept the computer purchase invoice, which is now preserved in the FFR. It is very likely, in the current state of research, that this was the computer he bought when he began to study new technologies at the Cursus d'Informatique Musicale at IRCAM in Paris, and that he used afterwards up until his death.

When the computer arrived at the archive in 2016, the IT system manager turned on the computer and saved an exact copy of its contents on a hard disk including several screenshots. Musicologists Alessandro Olto and Francisco Rocca conducted the first recognition of these materials and made paper printouts of

some of the documents: the first large printout was titled *Fondo Fausto Romitelli: Patchwork Files + Codice Lisp* and contains PatchWork patches and Lisp codes; the second is titled *Fausto Romitelli: Documentation of new Patchwork Modules* and contains Patchwork modules with a short description.[8] It must be also noted that switching on and saving the contents of the computer took place in one single session shortly after the computer's acquisition within the FFR. When one accesses the archives today only the corresponding paper printouts of the contents are made available. Instead, researchers interested in the aspects of computer organization and storage, would need to access and study the computer while is running. Unfortunately, this is a quite delicate process, due to the fact that outdated computers and software often malfunction or cannot run with operating systems that are no longer supported.

From the conclusions I was able to draw by studying the printed documentation, Romitelli's computer contains some standard system folders (system folder, games, RagTime Disk, Word 5.00) and a folder titled 'Fausto3', which is one single folder, where all of his documents and work were stored, with uneven organization. The same irregular display characterized the paper material within the FFR, which may reveal the frenetic activity of a young composer. However, after a deeper analysis, this apparent haphazardness seems to correspond to his compositional strategy: he did not organize the computer documents by musical pieces or by effects. In fact, the computer 'tools' he used (particularly the Patchwork patches he developed with the help of computer music designer Laurent Pottier) formed an 'orchestra' of instruments and effects that he built over time and used in various pieces as part of his approach to the Computer Assisted Composition during the 1990s.[9]

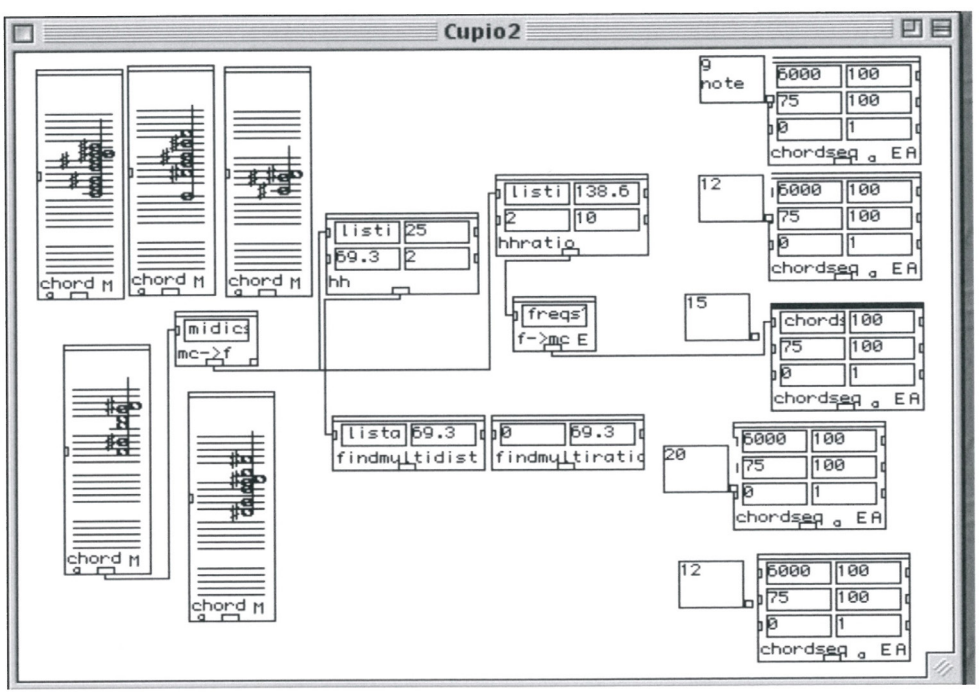
Future research on Romitelli's 'workshop' should also consider his collaboration with the computer music designer Laurent Pottier at IRCAM.[10] Questions that may arise could be how this collaboration started and developed, on the basis of what needs were these Patchwork modules and Lisp codes created, what is the genesis of these codes/files, if there were/are other files, if other computer materials are kept at IRCAM or in Pottier's private archive, and if he used other computers during his life.

If we now look at the texts rooted within the computer, we notice that the PatchWork patches and modules and the Lisp codes related to them, even taken as a whole, are by far the most interesting for the study of Romitelli's compositional process. The complete list of files is also printed in screenshots, in order of file extension and then in alphabetical order. The first aspect worthy of our attention, which is by far the most evident, is the dating of the files. Dates range from 6 April 1993 to May 1996; with 5 files dated 13 July 2001. Further analysis could reflect

on the dates, the creation of the files, their final modifications, the compositional period when he worked on them, the musical pieces related to them, etc. However, some files are dated 27 August 1956. This obviously is surprising, but it can be explained by a dating error caused by a problem with the lithium battery of the computer (when the battery fails, most MacIntosh computers reset to the birthdate of one of the designers, 27 August 1956).

Just to give an example of the philological issues associated with digital sources of this type, one Patchwork object called 'ProfBadTri' (manifestly related to the cycle *Professor Bad Trip*, 1998–2000) is dated 1956, which prevents us from knowing precisely when and how Romitelli worked on it, at least from the printouts. Other interesting questions arise from the patch files entitled: 'blood', 'cupio1', 'cupio2' or 'domeniche'. They are clearly related to the works *Blood on the Floor, Painting 1986* (2000), *Cupio Dissolvi* (1996), and *Domeniche alla periferia dell'impero* (1996–2000) respectively (patches 'blood-add[alfa].sott' and 'blood-dd[alfa].sott.pw' are also dated 1956, as are 'cupio1', 'cupio2', 'cupio3', 'cupio5'). Other patches and Lisp codes' titles are more obscure, or are parts of effects and transformations used across different pieces: 'deform', 'densifier', 'destroy', 'distcordfond'.

FIGURE 2. Patch 'Cupio 2'. Fondazione Giorgio Cini (Venezia), Fondo Fausto Romitelli.



The usefulness of studying Romitelli's computer as an object, a storage facility and a writing and composition tool, is exemplified by the series of patches named 'cupio'. Let's consider for example 'cupio2' (FIGURE 2). 'Cupio2' uses several modules, among them Findmultidist connected with the module 'Esempio 1' (p. 3/14 of the printout *Fausto Romitelli: Documentation of new Patchwork Modules*: 'the module finds the coefficients of distortion of a list of chords spectra [LISTA] for a fundamental [FOD]') which in turn refers to 'Esempio 1' among the patches and Lisp codes in *Fondo Fausto Romitelli: Patchwork Files + Codice Lisp*; the module HHratio[11] is connected to 'esempio 2bis'; the module Findmultiratio is listed on page 6/14, and is also related to 'esempio 2bis' and so on. Moreover, 'Esempio 1' in the *Patchwork Files + Codice Lisp* is dated 8 July 1994, 'esempio 2bis' is dated 19 March 1994. If we consider the dates indicated on the computer screenshots to be plausible and correct, this would lead us to assume that it took several years to create a work, which was first performed on 14 Februar 1997 (Paris, with the ensemble L'Itinéraire).

Future comparisons between patches, modules and codes – including a chronological reconstruction of their usage – could shed light on the evolution of Romitelli's compositional approach. Laurent Pottier is an important witness in this sense, because he assisted Romitelli during the composition of *EnTrance* in 1995, a work for which there is a clear re-use of some computer materials previously created for *Natura morta* (partial data have been studied by Eric Maestri and Alessandro Olto).[12]

Romitelli's computer also contains several text files with different versions of his *curriculum vitae*, lists of concerts (years 1995, 1996–1999, 2000, 2001), files titled 'lettera [letter]' and so on. The large majority of these files are dated 1956, others 1993 and 1996, and a file 'progetto ircam new' is dated 19 June 2001. It seems that the computer does not contain files of electronic correspondence (e-mails), although apparently he preferred to make others receive and read them for him.[13] As is well known, Romitelli liked paper and writing on it and this biographical and personality trait must be taken into consideration when analyzing his production.

GIACOMO MANZONI

Giacomo Manzoni's production is still little explored, particularly the works with electronics or which are performed with the use of live electronics techniques, and the works where he had started to use digital music notation software.[14] The collection FGM at the Fondazione Giorgio Cini contains the musical manuscripts

of the works he composed between 1956 and 2014 and it is well organized with work dossiers. Giacomo Manzoni also donated hard-disks that mirror his computer hard drives up to 2013. Given that this is a collection of a living and active composer, this is not a definitive archive. There is certainly the possibility that the composer might wish to change the materials, or add new archival material from 2014 onwards, thus changing the identity of the FGM collection.

As in Romitelli's case, Manzoni's computer (in this case the hard-disk) will be the object of my considerations in this section, particularly in respect of the composer's compositional techniques with the music notation software Sibelius, which he started to use around 1992, and issues related to subsequent versions of the software versions. It is interesting to note how Sibelius, and some of its functions, have become tools to aid in composition.[15] Manzoni uses Sibelius both for the writing of the intermediate or final scores of the piece, as well as for his sketches. In some cases, he uses some Sibelius functions, such as the Transpose function. The transposition is a procedure that Manzoni always used, even before, on paper, for the reuse-transformation of pitch materials. Although this compositional strategy does not depend on the software, it is surely facilitated by the software. Consequently, it follows that an automatic function offered by the software has made it easier to employ a traditional compositional technique, thus improving the creative process of the composer who takes advantage of the possibilities of the machine.

Manzoni's computer includes folders divided by work, and within each work, we find separations between various phases of the work, revisions, etc., revealing a well-managed organization. Most of the files were generated with Sibelius. The problem with these files is that they were made with an older version of Sibelius, and present challenging reading problems when opened with a present version of the software. Thus, although they may be opened, certain musical passages, notations, etc. are interpreted differently with new versions of the software (for instance, recent versions of Sibelius offer the function to avoid overlapping symbols, and this function can intervene also in Manzoni's files, presenting clear difficulties in interpretation readability). A research project aimed at studying these files should recover the correct version of the software to enable an accurate representation of their contents. Moreover, as was the case with Romitelli's computer, there may be also problems with the dating of the files. The hard-disk shows the creation date (e.g. 25 September 2013) which most likely represents the date he made the copy of the file. Instead, the last modification dates embedded in each of the files should be studied, since those should be closer to the real file creation date (for example 2010 in one file).

Each folder contains pdf files (complete scores or separate parts of the

orchestra), Sibelius files (sometimes processing of the music notation such as transpositions), and, sometimes but not always, Word files or saved emails (for example for *Sei canti dal Kokin Shū* for soprano and live electronics, 2007). This organization system is the same as the one he used within his dossiers before the use of computers. Although research on these materials has yet to begin, all folders apparently pertain to musical works from the 2000s. However, since Manzoni also donated additional paper materials related to these works, any research project must work with both computer and paper media. Again, as Manzoni being a living and active composer, we should remember that this is a temporary 'snapshot' of his computer at the time when the materials were first delivered in 2013.

Regarding Manzoni's use of electronic instruments, another series of interesting sources in the FGM is related to his use of electronic keyboards and the electronic acousmatic backgrounds. The publishing house Ricordi has released CDs with the 'backing tracks' to be distributed with the scores and there are the works with live electronics or the acousmatic pieces (e.g. *Musiche per l'*Oreste *di Vittorio Alfieri* for magnetic tape, 1993), for which the FGM holds also material sources, that allow the creative process to be reconstructed. For instance, the electronic part of *Sei canti dal Kokin Shū* (for soprano and live electronics, for electronic processors and midi keyboard, 2007) was realized at the CCMIX in Romainville (Paris) with the assistance of Stefan Tiedje, where MAX patches are used to operate the electronic keyboard (e-mail contained in the hard-disk). All these materials require in-depth study, and different types of sources (audio, paper, video, digital) need to be placed in context with one another if the ultimate goal is to reconstruct the creative process of Manzoni's pieces.

CONCLUSION

As evidenced at the beginning of this paper, electronic music sources are varied, both according to the physical typology of the support, and due to the nature of the texts contained therein (digital, verbal, schemes, algorithms…). In this article I have investigated some scarcely explored electroacoustic music sources held at the Fondazione Giorgio Cini pertaining to three collections: FCT, FFR and FGM. A preliminary analysis of their descriptions allows us to trace, even at an early stage of research, a multi-layered discourse that touches various disciplines: from philology, source criticism and genetic criticism, to the study of the creative process (the creative *atelier*); from biographical analysis and its link with musical composition, to a critical cultural-theory discourse that through the sources helps to place the composer, his/her activity and the technology used in an historical,

geographical, scientific and cultural context; up to the exploration of the agents and processes involved in the act of composition – and the traces that are produced during the act – in light of the actor-network theory. This investigatory research also led me to identify some issues, not only specifically related to the case studies (such as the problematic dating of some sources), but also related generally to the organization of these materials and the need to preserve them. For example, the digitization (scanning) or photocopying of Camillo Togni's paper material would permit the vital preservation of these fragile materials so that researchers can consult them, at least initially, in their digital form without needing to handle them directly. Moreover, in the management of such documents, digitisation (when deemed necessary), and the cataloguing by means of contextual metadata, are important factors that may further improve the accessibility to the collections.

Finally, combining the study of material evidence with the testimony of the human agents involved in the process of composition (particularly the musical assistants/computer music designers, and the performers) would shed light on the creative network and help us to further comprehend any additional meaning to be found within the sources, by illuminating the circumstances under which they were produced. These interviews of contemporary artists or collaborators, whether they are part of an ethnographic survey, an oral history project, or another context (journals, TV, Internet), are necessary for the reconstruction of the electroacoustic music framework whose essential characteristics come often from oral tradition (the transmission of composition techniques, technological practice, shortcuts and tricks, and collaboration between the often numerous contributors to the creation process). These oral sources are invaluable to elaborate and preserve the finer (and frequently private) details of the creation process. The collective memory of the protagonists conveys knowledge that other media cannot reveal. Naturally, compared to the material fixity of other sources, these have a high degree of intrinsic instability. However, the oral document acquires a right of citizenship in the study of electroacoustic music, one of the reasons being quite simply that we are studying active professionals who can thus contribute to our knowledge of the process of creation by recounting their memories. As a result, the work of exegetes of electroacoustic music is positioned at the crossroads of musicological and socio-ethnographic expertise.

Notes

1 I refer to the definition of sound-based art given by Leigh Landy in 'But Is It (Also) Music?', in: *The Routledge Companion to Sounding Art*, ed. by Marcel Cobussen, Vincent Meelberg, and Barry Truax, New York: Routledge, 2017: 'both note-based and sound-based works' (p. 17) that were created 'over the last century catalyzing an ongoing need for a broader definition of music' (p. 19). Landy's article addresses the important issue of terminology (sonic art, sounding art, sound-based art, sound art, electroacoustic music, electronic music, etc.), also in relation to the historical development of this broad technology based musical practice. In this article, I will use the term *electroacoustic music* as an umbrella term that evokes the one presented twenty years ago by Simon Emmerson and Denis Smalley in *The New Grove Dictionary of Music and Musicians*, London: Macmillan Publishers Limited, 2001 (1980[1]): '[m]usic in which electronic technology, now primarily computer-based, is used to access, generate, explore and configure sound materials, and in which loudspeakers are the prime medium of transmission' (quoted in Landy, 'But Is It (Also) Music?', p. 19). Historically we consider the period to start with musique concrète in 1948 and elektronische Musik in 1950, with computer music starting in 1957.

2 Among the latest publications devoted to the issues of archiving and preservation see the issue of *Array. The Journal of the ICMA*, 2020 (special issue: *Archiving*) (https://doi.org/10.25370/array.v2020), and Miriam Akkerman article in this issue of *Archival Notes*. Among the first publications that address the necessity of a revision in the philological discipline see Angela Ida De Benedictis, 'Le nuove testualità musicali', in: *La filologia musicale. Istituzioni, storia, strumenti critici*, a cura di Maria Caraci Vela, Lucca: LIM, 2009, 2 vols., II, pp. 71–116, and Laura Zattra, 'The Assembling of *Stria* by John Chowning: A Philological Investigation', *Computer Music Journal*, XXXI/3, Fall 2007 (special issue: *The Reconstruction of Stria*), pp. 38–64, and the very recent Michael Clarke, Peter Manning, and Frédéric Dufeu, *Inside Computer Music*, Oxford: Oxford University Press, 2020.

3 *Circuit. Musiques Contemporaines*, XVIII/1, 2008 (special issue: *La fabrique des œuvres*, éd. par Nicolas Donin et Jacques Theureau).

4 I have discussed the taxonomy of the sources and texts of electroacoustic music in Laura Zattra, 'Génétiques de la computer music', in: *Genèses Musicales*, éd. par Nicolas Donin, Almuth Grésillon et Jean-Louis Lebrave, Paris: Presses universitaires de Paris Sorbonne, 2015, pp. 213–238, and in the book *Studiare la Computer Music. Definizioni, analisi, fonti,* Padova: edizioni libreriauniversitaria.it, 2011.

5 Abraham A. Moles, *Les Musiques expérimentales*, traduction de Daniel Charles, Paris–Zurich–Bruxelles: Éditions du Cercle d'Art Contemporain, 1960; Pietro Righini, *Acustica Musicale*, RAI editions RADIOTELEVISIONE ITALIANA, not dated, probable year 1960, 136 typewritten pages only on the front, with also images of sonograms on photographic paper, glued on some pages.

6 In recent years I have been exploring the topic of collaboration between the composer and the musical assistant in electroacoustic music from an approach that combines source criticism with oral history, e.g. in Laura Zattra, 'Collaborative Creation in Electroacoustic Music Practices and Self-Awareness in the Work of Musical Assistants Marino Zuccheri, Alvise Vidolin, and Carl Faia', in: *Sound Work: Composition as Critical Technical Practice*, ed. by Jonathan Impett, Leuven: Leuven University Press–Orpheus Institute, forthcoming, pp. 261–278; 'Symmetrical Collaborations. Jonathan Harvey and his computer music designers', *Nuove Musiche*, 4, 2018 (special issue: *Jonathan Harvey*, a cura di Candida Felici e Stefano Lombardi Vallauri), pp. 29–57. The practice and identity of the computer music designer have been presented in Laura Zattra and Nicolas Donin, 'A questionnaire-based investigation of the skills and roles of

Computer Music Designers', *Musicae Scientiae*, XX/3, September 2016 (special issue: *Traking the creative process in music*), pp. 436–456.

7 Romitelli's electroacoustic production has been the subject of several publications. Among the articles and works recently published, see Alessandro Olto, 'Between spectrum and musical discourse. Computer Assisted Composition and new musical thoughts in *EnTrance* by Fausto Romitelli', in: *Sounds, Voices and Codes from the Twentieth Century*, ed. by Luca Cossettini and Angelo Orcalli, Udine: Mirage, 2017, pp. 419–452; Pascal Decroupet, 'Le son kaléidoscopé: La révélation audible du son incurvé dans *Professor Bad Trip Lesson I* de Fausto Romitelli', *Dissonance*, 143, 2018, pp. 15–23; Alessandro Olto, *ENTRANCE. Spettralismo e composizione assistita all'elaboratore in Fausto Romitelli*, Doctoral Dissertation in Historical, Artistic and Audiovisual Studies, University of Udine, 2017, 247 pp.; Ingrid Pustijanac, 'Spectral Morphology and Space in Fausto Romitelli's *Natura morta con fiamme*', *Archival Notes. Sources and Research from the Institute of Music*, 3, 2018, pp. 119–135. Available: http://onlinepublishing.cini.it/index.php/arno/article/view/105; Nicholas Moroz, 'Hacking the Hallucinatory: Investigating Fausto Romitelli's Compositional Process through Sketch Studies of *Professor Bad Trip: Lesson I*', *Archival Notes. Sources and Research from the Institute of Music*, 5, 2020, pp. 59–84. Available: http://onlinepublishing.cini.it/index.php/arno/article/view/171/292; Luca Guidarini, 'Modelli strumentali, computazionali e transtestuali nell'ultima produzione di Fausto Romitell. Parte prima: casi di studio', *D.A.T - divulgazioneaudiotestuale*, V/9, ottobre 2021, pp. 23–103.

8 Alessandro Olto studied Patchwork and Lisp codes for the analysis of *EnTrance* realized by Romitelli at Ircam in Paris in 1995 with the assistance of Computer Music Designer Laurent Pottier (see Olto, *ENTRANCE*).

9 Patchwork and Open Music are software that were developed at Ircam in Paris during the 1990s. Patchwork is a visual programming system, which allows the graphic manipulation of objects. It provides a graphical interface for the Common Lisp (and CLOS) language on which it is based. OpenMusic is a highly visual environment for the composer for the Macintosh computer. It is intended as a superset of PatchWork, and adds new features making it a second generation Ircam compositional software. See Gérard Assayag, Camilo Rueda, Mikael Laurson, Carlos Agon, and Olivier Delerue, 'Computer-Assisted Composition at IRCAM: From PatchWork to OpenMusic', *Computer Music Journal*, XXIII/3, 1999, pp. 59–72. Available: http://www.jstor.org/stable/3681240.

10 Laurent Pottier, 'Exemple d'utilisation des outils de CAO pour la synthèse sonore *EnTrance* de Fausto Romitelli pour soprano, ensemble et dispositif électronique', in: *Actes de Journées d'Informatique Musicale*, Lyon: Grame, 1997, pp. 22–29.

11 The module HHratio 'creates a list of FM spectra whose partials correspond to the frequencies [LISTI]. The module calculates all the FM spectra of index [INDEX] for the carrying [PORT], modulated by a ratio that, starting from a ratio [RATIO], is lowered of 0.5 until [ratio < .1], but a FM spectrum is edited only if the given frequencies [LISTI] belong to the FM spectrum itself. The tolerated approximation between given frequencies and partials is half-tone' (*Fondo Fausto Romitelli: Patchwork Files + Codice Lisp*, p. 4/14. FFR).

12 Olto, 'Between Spectrum and Musical Discourse'.

13 Personal communication with Francisco Rocca.

14 See Giacomo Albert, 'Some Remarks about Serialism in *Atomtod* by Giacomo Manzoni', *Archival Notes. Sources and Research from the Institute of Music*, 2, 2017, pp. 105–127.

15 I thank Francisco Rocca again for the opportunity to have a fruitful discussion on the use of Sibelius by Manzoni, which I will present in the following paragraphs.