Film sound in preservation and presentation
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CHAPTER 1.
Recorded Sound Souvenirs

1.1 Film Sound Souvenirs

This chapter investigates the socio-cultural value of audiovisual heritage. Before addressing the key object of this research, film sound in preservation and presentation, it is necessary to ask: why is it important to preserve film sound in the first place? This question, far from being just spurious or rhetorical, is fundamental not only to this research, but also, and more generally, to work involving the preservation of audiovisual heritage.

While trying to articulate a simple, essential and effective answer to this question, I remembered the words of a female voice saying: “Lost at the end of the world on my island, Sal, in the company of my dogs strutting around, I remember that January in Tokyo, or rather I remember the images I filmed in Tokyo in January. They have now put themselves in place of my memory, they are my memory. I wonder how people who do not film, take photos, or record tapes, remember, how humankind used to go about remembering. I know: it wrote the Bible. The new Bible will be an eternal magnetic tape of a time that will have to reread itself constantly just to know it existed.”

However, I could not remember which images accompanied this voice: the temple dedicated to cats in the suburbs of Tokyo, or the look in the camera of the women in Guinea Bissau, or maybe the protest against the Narita airport in the 1960s. What I could clearly remember was the calmness of the voice of that woman reading the letters of Sandor Krasna, the alter ego of Chris Marker, at the end of Sans Soleil (1982): “I remember that January in Tokyo, or rather I remember the images I filmed in Tokyo in

44 Chris Marker, Sans Soleil [DVD], New York: Criterion, 2007. English translation from the original French: “Perdu au bout du monde, sur mon île de Sal, en compagnie de mes chiens tout faraunds, je me souviens de ce mois de janvier à Tokyo, ou plutôt je me souviens des images que j’ai filmées au mois de janvier à Tokyo. Elles se sont substituées maintenant à ma mémoire, elles sont ma mémoire. Je me demande comment se souviennent les gens qui ne filment pas, qui ne photographient pas, qui ne magnétoscopent pas, comment faisait l’humanité pour se souvenir... Je sais, elle écrivait la Bible. La nouvelle Bible, ce sera l’éternelle bande magnétique d’un Temps qui devra sans cesse se relire pour seulement savoir qu’il a existé.”
January. They have now put themselves in place of my memory, they are my memory.” These words alone offer a simple and essential explanation of the necessity of preserving audiovisual heritage, which lies in the need to preserve our memories. These words seem to suggest that our memories are not only mediated, but also shaped, if not created, by the use of recording media to the extent that the recorded images and sounds themselves become our memories. The survival of recorded images and sounds, thus, has become a method of guaranteeing the persistence of our individual as well as collective memories. By recording our memories, audiovisual documents contribute to the construction of our individual as well as collective identities, since the way we perceive and express our identity is strongly influenced by the narrative of our past.45

Furthermore, two levels of memorial mediation are at play here. Firstly, Chris Marker’s memories about Tokyo are mediated by the images he filmed while in the city, and secondly, my memory of the film Sans Soleil is mediated by the female voice reading Krasna-Marker’s letters. This voice has become part of my personal film sound souvenirs. In defining the concept of film sound souvenirs, I refer to the idea of sound souvenirs as outlined by Raymond Murray Schafer:46 to clarify the concept of “soundmark,” a sound characterizing a particular community, Schafer remembered some “soundmarks” from his own memory, such as “the brilliant slam of the doors of the old carriages of the Paris Métro, followed by a sharp click,” or “the virtuoso drumming of the Austrian bureaucrats with their long-handled rubber stamps.”47 He concludes: “The world is full of uncounterfeiting and uncounterfeitable sound souvenirs such as these, indelible for the aurally sensitive tourist, and always in need of protection against replacement by duds from multinational factories.”48

Even if Schafer does not go deeper in defining the concept of sound souvenirs, he recognizes the value of sounds to our individual and collective memory. Sound indeed has a particular value for our memories, which can also be grasped by comparing sound memories to visual memories, as Carolyn Birdsall does by exploring the concept of “earwitnessing” and the role of sound in personal and social contexts of remembering:

In juxtaposition to visual memories, it is important to establish that sound (as echo) tends

45 On this subject see among others José van Dijck, Mediated Memories in the Digital Age (Stanford, CA: Stanford University Press, 2007).
47 Ibid., 240.
48 Ibid.
towards an indexical, rather than an iconographic relationship to remembering. Rather than fixing a determined linear narrative or image, sounds can be drawn upon to prompt certain moods or feelings. These echoed sound memories can be actively used for memory recall or can unexpectedly – and sometimes unintentionally – evoke the context and feelings associated with a past era. 

Among all the natural and artificial sounds that constitute the sonic environments in which we live, this research focuses on recorded sounds. Recorded sounds assume a particular value for our daily experience, individual and cultural memory. The form of recorded sound that primarily affects our memories and the construction of our identities is recorded music: we have personal memories related to particular tunes and songs, and we often use music to talk about ourselves, our moods and our past.

Recorded music came to be part of our daily experience due to the mobilization of music listening, which started with portable record players, portable radios, walkmans and stereo headphones in the 1980s. In present day most digital portable devices that we always carry with us in our everyday life, such as mobile phones and personal computers, have a music player function: this gave us the possibility to always potentially be immersed in a personal music environment.

The need and desire to have our favorite music close at hand is perceived as so urgent and important that it can be extended after death: the Swedish company Pause has recently marketed a coffin, the CataCombo Sound System, that has a built-in hi-fi system that plays music for the deceased. The sounds and music can be chosen by the deceased’s relatives online using a Spotify-based system. The marketability of such a product is based on a supposed desire to enjoy music and songs once we pass away, as if sound souvenirs are considered to be a necessary accompaniment to be taken with us to the grave similar to an ancient burial ritual. Although exceptional, this example suggests recorded sounds are socially considered to be a key element for the definition and survival of people’s memories and identities in contemporary times.

Recorded sounds are important not only for our individual memory and personal narrations, but also for collective memory. From the first appearance of the first sound

51 Spotify is a music streaming service system that allows access to a library of, at the time of writing, approximately 20 millions songs.
recording media, the phonograph and the gramophone, the scientific community has also used recorded sounds for documentary purposes; for example, anthropologists and ethnomusicologists used these devices to document exotic languages and music. In Germany, the Königlich Preußische Phonographische Kommission, a scientific committee headed by Carl Stumpf, was established to study and document foreign languages by recording the colonial soldiers imprisoned in German war camps during the First World War. Within this scientific and military context, the recordings were used for two aims: first, for the analysis and study of the languages, and second, in order to build an archive of voices of the populations. This collection, named Stimmen der Völker, consisted of recordings of around 250 different languages; the shellac discs of these recordings were collected and stored in the Berliner Lautarchiv.52

The value of this collection with regard to collective memory can be read on two levels. On one hand, the collection has historical and documentary value with respect to colonial cultures, since it comprises the first sound recordings of many African, Indian and Asian languages. On the other hand, the value of this collection extends to European and German culture, since the discs testify to the practice and attitude of the scientists and how they approached and studied colonial cultures. An example of this attitude can be found in the words of Erich von Hornbostel, the Austrian ethnomusicologist working with Carl Stumpf: “it is possible to fix the chaos of exotic music assailing European ears by first interpolating a phonograph, which is able to record this chaos in real time and then replay it in slow motion.”53 As this example shows, the values and meaning for collective memory attached to sound recordings are different according to the culture that plays, hears and interprets them.

Another important example of the value of recorded sound for collective memory, this time in the light of historiographical research, can be found in the documentation of the International Military Tribunal (IMT) at Nuremberg, which was the process organized to hold leaders of the Nazi’s political and military apparatuses accountable for their actions during World War II. The whole process was recorded in two forms: as written transcripts (the official documentation of the proceedings with legal status) and as audio recordings (on tapes and discs). Audio recording was a new procedure in court rooms at this time, and it was decided that recordings would help facilitate the

52 For more information, see http://publicus.culture.hu-berlin.de/lautarchiv/bestaende.htm, accessed April 2013.
53 Erich von Hornbostel, cited in Friedrich Kittler, Gramophone, Film, Typewriter, 4.
functionality of the trial, since it was the first international criminal tribunal to involve people speaking four different languages (English, German, French, Russian). The audio recordings were used during the trial to compare the transcripts and verify if the translations were accurate. After the process, it was decided that these recordings were to be kept even though the proceedings were published in forty-two written volumes in order to make them accessible to a wider public.54

This example poses some questions: why was it necessary to preserve the audio recordings, since the testimonies given during the trial were transcribed and published? In other words, what do the audio recordings add to the transcripts? An answer to these questions is given by Anne van Es, who investigated the specific value of the audio recordings compared to the transcripts in order to demonstrate that the audio recordings have an added value and should therefore be preserved, digitized and made accessible to the public. According to Van Es, the audio recordings convey some aspects of the liveness of the event: the performance, emotions and attitude of the protagonists of the trial, the intonation of voices, the moments of silence, the response of the audience present in the court, the emotional reactions as laughs or cries.55 All of these aspects, which give interesting information on how testimonies were given and experienced, are lost in the transcripts. Van Es believes that “preserving the sound recordings of the IMT proceedings is to preserve the liveness of the trial, an experience of being physically present at the proceedings with its expressed nuances of meaning.”56 The sound recordings give access to the live performance aspects of the trial, which are lost in the transcripts. The example of the Nuremberg Trials maintains the idea that recorded sounds have a specific value for collective memory, which is different from other forms of recording events (writings, photos, films): different media records convey different aspects of an event. Therefore it is important to preserve the diverse records in order to preserve memory of the event in all of its facets.

The previous two examples show the use and value of sound recordings as documents for research in fields such as historiography, musicology, ethnography, and their role in the construction of collective memory narrations. It should be considered that, even if the discs of the Stimmen der Völker collection and the recordings of the

54 Trial of the Major War Criminals before the International Military Tribunal 42 vols. International Military Tribunal (Nuremberg 1947-1949) - the ‘Blue Series’ /IMT.
56 Ibid., 60.
Nuremberg Trials are stored in public archives, they are consulted by a relatively limited number of people, mainly researchers, because of their specific nature and content. However, the process of reassigning memorial value to the sound recordings regards the majority of people if we broaden the discourse from unique archival documents to commercial music or other popular audio recordings.

The pervasive use of audio technologies in everyday life, which has exponentially increased in the last fifty years, has had a central role in universalizing the importance of recorded sound for individual and collective memory. The relation between audio technologies and cultural practices of remembering has been recently examined in the publication *Sound Souvenirs: Audio Technologies, Memory and Cultural Practices*, edited by historian Karin Bijsterveld and media scholar José van Dijck. The definition of audio technologies as “artefacts that enable people to listen to the sounds of the past” highlights their function of prompting memories: “Technologies, especially certain audio technologies, have become an intrinsic part of our acts of remembrance, of individual and collective processes of remembering.” In this publication, many social phenomena regarding the use of domestic or portable audio technologies in everyday life are analyzed: radios, record players, tape and cassette recorders, hi-fi stereos and walkmans, and the more -recent digital players and mobile phones.

If the majority of academic studies that investigate the relationship between recorded sounds and memory concern music, songs, radio and home recordings, this dissertation focuses on a less-considered type of recorded sound: film sound. Like other types of recorded sounds, film sound contributes to our personal and collective memories, but in a very specific way, since film sound is consistently associated with moving images. I return here to the question that began this section: why is it important to safeguard film sound and its related memories? In the following paragraphs I elaborate a possible answer to this question on the basis of the considerations made so far concerning the value of sound for individual and collective memory and narratives.

Let me consider the extreme: what happens if the sound of a film is irreparably damaged or lost? It is possible to simulate this situation by watching a movie with the sound on mute, recalling Chion’s *cut out the sound* experiment: it is not just the comprehension of dialogue that is missed, but the film as a whole is fatally lost.

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58 Ibid., 15. Cultural practices are defined here as “the ways in which people are used to doing things and commonly attribute meanings to these routines.” Ibid., 16.
impact of this loss on collective memory is perhaps even more evident if we consider documentary film footage: how would the collective memory have been affected if the sound of Hitler or Mussolini’s filmed public discourses were lost and only the images survived? As demonstrated in the case of the Nuremberg Trials, even if the text of these discourses had survived, the collective meanings and memories attached to the discourses would have been very different if the images were not accompanied by the corresponding recorded voices, capturing their emotional impact as well as the rhetorical influence of mass media technologies. The reading, understanding, and narration of that period are widely influenced by the sounds of those public discourses.\textsuperscript{59}

The importance of audio technologies, including loudspeakers and radio, in the propagation of 1920s’ and 1930s’ European dictatorships has been recognized from an early period. Hitler himself wrote in 1938: “Without motor vehicles, without airplanes and without loudspeakers we would have not conquered Germany!”\textsuperscript{60} With regard to this, Schafer observes that:

> We know that the territorial expansion of post-industrial sounds complemented the imperialistic ambitions of the Western nations. The loudspeaker was also invented by an imperialist, for it responded to the desire to dominate others with one’s own sound. As the cry broadcasts distress, the loudspeaker communicates anxiety.\textsuperscript{61}

The sound component of a film, be it narrative or documentary, thus plays a decisive role together with the image in defining a viewer’s cinematic experience and memory of the film. Hence, it is important to preserve the sound together with the image.

Film sound can be considered as one of the many different soundscapes that we experience in our everyday life, recalling this notion as formulated by Schafer: “the soundscape is any acoustic field of study. We may speak of a musical composition as a soundscape, or a radio program as a soundscape or an acoustic environment as a soundscape.”\textsuperscript{62} What differentiates film sound from environmental soundscapes, which

\textsuperscript{59} The soundscape of the Nazi Germany period is analyzed in Carolyn J. Birdshall, Nazi Soundscapes: Sound, Technology and Urban Space in Germany, 1933-1945 (Amsterdam: Amsterdam University Press, 2012).

\textsuperscript{60} The original words of Hitler were: “Ohne Kraftwagen, ohne Flugzeug und ohne Lautsprecher hätten wir Deutschland nicht erobert.” Adolf Hitler, Manual of the German Radio, 1938-39.

\textsuperscript{61} Raymond Murray Schafer, The Soundscape, 91.

\textsuperscript{62} Ibid., 7.
refer to the sound of the events happening in a specific environment, is that film sound is a *soundscape* recreated by human and technological means. Firstly, film sound is not a record of the sound of reality but a record of how human beings interpreted and recreated the sound of reality through technological media. Second, film sound is a record of how humans associate these sounds with a recreated *visualscape*, the moving images. The recreated *soundscape* together with the recreated *visualscape* shape the way we experience and remember films, and become part of our personal and collective memory in the form of audiovisual heritage. Since both the *visualscape* and the *soundscape* shape the form that film takes in our perception, experience, and memory, they both need to be preserved as part of our film heritage.

### 1.2 Soundstalgia

After tracing the significance of recorded sounds, and more particularly of film sound, for individual and cultural memory, this section considers the importance of recorded sound in our everyday experience, and how it currently affects everyday life. In the frame of research on film sound preservation and presentation, it is productive to understand how images and sounds recorded in the past become part of contemporary experience and memory on an individual and collective level.

Looking at contemporary cultural and social practices, it is striking to notice how many of these practices are related to audiovisual heritage. The nostalgic recovery of cultural products of the past has been part of modern culture, but present time seems to be particularly touched by the revival of audiovisual content of the recent past. As relevant contemporary tendencies, these phenomena of nostalgia can be productively analyzed with regard to the processes of the memorial valorization of cultural products.

Simon Reynolds, who made a recollection of nostalgia practices in contemporary sound cultures, provides an incisive interpretation of these phenomena. Reynolds maintains that the first ten years of the twenty-first century can be nominated as *re*-decade, since the cultural domain was dominated by *revivals*, *reissues*, *remakes*, *reenactments* and *recycling*. Reynolds includes all these phenomena in what he calls

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“retromania,” which comprises phenomena that revive cultural products of the “immediate past,” of “living memory.”

We’ve become victims of our ever-increasing capacity to store, organise, instantly access, and share vast amounts of cultural data. Not only has there never before been a society so obsessed with the cultural artifacts of its immediate past, but there has never before been a society that is able to access the immediate past so easily and so copiously.

“Retromania” is made possible by the wide availability of these products in the market, but also by the possibility to freely and instantly access archived documentations (photographs, video, music recordings, images) of these products on the Internet. The old recording media and the new digital media create the conditions for “retromania,” making accessible the cultural products of the past and other related materials. Reynolds observes that “[a]udio recordings and other types of documentation (photographic, video) not only provide retro with its raw materials, they also create the sensibility, based as it is on obsessive repeat-play of particular artifacts and focused listening that zooms in on minute stylistic details.” The old and new media not only make the content of the products accessible, they also create new ways of experiencing these products.

Reflecting on the “retromania” phenomena, what I find most interesting in the frame of this research is that they not only concern the content of the cultural products (a song, an image, a text), but also the technologies and the material carriers of these contents. In other words, recording media are not just the means of existence for these phenomena, but they themselves can become the object of these practices.

Within music culture, for instance, listeners not only enjoy the songs of the 1960s and 1970s, but they are also interested in the playback technologies, such as record players and hi-fi stereos, as well as the material carriers, such as vinyl records and audiocassettes. It seems that the way through which individual and cultural memory recalls the audiovisual media of the past is closely related to their material carriers and

64 “Earlier eras had their own obsessions with antiquity, of course, from the Renaissance's veneration of Roman and Greek classicism to the Gothic movement's invocations of the medieval. But there has never been a society in human history so obsessed with the cultural artifacts of its own immediate past. That is what distinguishes retro from antiquarianism or history: the fascination for fashions, fads, sounds and stars that occurred within living memory.” Ibid., XIII.
65 Ibid., XXI.
66 Ibid., XXXV.
their recording and playback devices: vinyl discs, audio cassettes, record players, tape players, and hi-fi stereos become objects of nostalgic value, and as such, they re-enter the commercial market and acquire new economic value.

In recent years, the market for vinyl records had increased remarkably, despite - or maybe because of - the music industry crisis. Vinyl discs survived the advent of magnetic tape, CDs and digital files. The market for vinyl discs was first renewed in the late 1990s thanks to collectors and professional DJs, and then in the early 2000s because of a more general public of music listeners. Washinton Post journalist Caitlin Dewey observes that “[a]ccording to a new industry report, vinyl record sales in 2012 hit their highest point since 1997.”  

Interestingly, the re-evaluation of analog technologies happened during the same decades of global diffusion of digital recording and playback formats and devices. Dewey observes that “the real reason for the digital-age popularity of such a distinctly analog item might lie right there, in that weird conceptual divide between ‘real’ things and the less tangible, more transient virtual ones.”  

A corresponding interpretation of this phenomenon is given in the report “The Revival of Vinyl: Back to Black” in The Economist: “Now that almost every track is available free on music-streaming services like Spotify or on a pirate website, music fans need something else to boast about. That limited-edition 12-inch in translucent blue vinyl will do nicely.”

Similarly to vinyl, the audiocassette is also returning to the commercial music market. If the return of vinyl can be justified in terms of quality because of its high-quality rendition, this is not the case of the audiocassette, since its sound quality is low compared to that of the CD. Elisa Bray, in the article “Fast Forward: and Press Play Again – Cassettes are Back” in The Independent, explains this recurrence as follows:

So what is the reason for bands and record labels putting out music on cassette? For a start there’s the nostalgia attached to a cassette – the romantic, rose-tinted memories of creating mixtapes for friends and lovers, and of recording favourite radio shows. […] But for many super-fans, the cassette has become a novelty collector's item for treasuring on the shelf, and it often comes with a download code. As with as the surge in vinyl sales

68 Ibid.
over recent years, many music fans want more than just a digital download: they want their music to be tangible, with all its artwork intact. [...] It is also the sound quality of a cassette that has musicians releasing songs on the old format – featuring hissing that can add to the atmosphere of the music.\textsuperscript{70}

The recovery and recirculation of old carriers and playback devices is just one aspect of phenomena related to what can be defined, recalling Reynolds, as \textit{retrostalgia}. Another aspect of these phenomena is the simulation of old analogue technologies in the digital domain; this occurrence can be read by analyzing which characteristics of old technologies are simulated and accentuated through digital means in order to revive analogue media.

I am referring in particular to mobile applications that enable analog characteristics to be added to digital images, thus creating a retro looking photo that recalls that appearance of photographs taken with older cameras that use film stock. One of these applications, probably the most used at the time of writing, is \textit{Instagram}, which adds “aging” filters to digital photos, making them appear as though they were taken with an analogue camera. \textit{Instagram} imitates some characteristics of analogue photography, such as the squared format of the Polaroid or Kodak Instamatic photos, and the look of old photos with different filters that change the values of hue and contrast for reproducing the saturated look of color film stocks of the 1960s and 1970s. Some filters add a kind of interference that alters the definition of the image, in order to simulate the grain of film stock. Other filters allow users to add a border with letters, recalling the letters printed on film stock: this detail indicates that the old style photography is simulated reproducing characteristics of the material carrier and the physicality of the film stock. The changes carried out by these aging filters are so essential and invasive that an antibody has already been developed: for example, \textit{Normalize it} is an application that cancels the \textit{Instagram} filters and returns the photo to its “normal” state.

The success of \textit{Instagram} and similar applications in recent years has been remarkable worldwide, enabling this kind of retro style photography to enter the common perception and experience of mobile photography, especially since photographs taken with a mobile phone are increasingly posted on social networking

spaces. It is interesting to note that the retro analog style has become a prevalent style for mobile and sharing photography, even though the most active users in these fields, the digital born generations, have likely never used an analog camera. This suggests that *retrostalgia* does not only appeal to individual memory, involving people who actually have experience with older media, but also exists in the field of cultural memory and experience.

There are similar “retro” mobile applications for videos, like the *8 mm Vintage Camera* or the *Super 8*. These applications make digital videos look like 8 mm film and simulate the look of home movies with aging filters. In the videos, the materiality of the film carrier is recalled with different tricks: many dots, dust and scratches are added as in a dirty stock; the colors are saturated and the light is flickering; the film grain is recreated through video noise; the frame bar jumps once in a while, simulating the projection, and the perforation is also visible. A piece of video can also be added by the application in the beginning or at the end, imitating the appearance of film stock leaders with their recognizable symbols and writing. It is interesting to note that these applications alter only the image, but not the sound recording: the sound does not have a filter that simulates, for instance, the noises of the Super 8 magnetic soundtrack or at least the noise of the projector during the screening. A discord therefore exists between the old and dirty looking image and the clear and clean sound recording. This disharmony can create an alienating effect in people who are used to associating 8 mm camera projections with the noise of the projector or with the magnetic soundtrack.

All of these applications for photos or videos can be related to the *retrostalgia* phenomena, and in particular, to what can be termed *imagestalgia*, which refers to the tendency to recover or recreate the appearance of images from the past. Similarly, it is possible to identify *soundstalgia* as the tendency to recover or recreate sounds of the past. The renewed market of vinyl discs is an example of a *soundstalgic* phenomenon that focuses on the buying and collecting of vinyl discs.

These examples of *imagestalgia* and *soundstalgia* demonstrate how audiovisual heritage is continuously evoked, simulated, and recreated in present recording and playback practices. It seems that the key unifying way to evoke old audiovisual forms is by recreating the signs or marks of the technological devices and material carriers of the past. For images, this means recreating the marks of film stock (visible frame and perforation, edge codes, grain, color properties, dust and scratches) and of the projection device (jumping border line, flickering). For sounds, it means recreating the marks of
the carriers (crackle of a record, hum of a tape, click of a CD) and playback devices (the noise of the vinyl needle, the sound of a CD player loading). The noises created by the carriers and the devices seem to be easily recognized as the best indicators of old images and sounds in individual and cultural memory practices: they recall the past in a more-direct way than the text or the conceptual content of cultural products.

1.3 Noise and High Fidelity

The description of the contemporary social phenomena of soundstalgia calls into question the concept of noise, which is identified as related to technological devices and material carriers. In this section, I will further investigate the concept of noise for two reasons. First, as noted in the previous section, noise seems to mark and symbolize the images and sounds of our mediated memories, and therefore concerns the field of individual and cultural memory of audiovisual heritage. Secondly, as will be further discussed in the following chapters of this dissertation, the notion of noise is a key concept in the preservation of film sound, since the work of preserving film sound deals primarily with the dimension of noise.

I begin this investigation on noise by defining the term: what is noise and how does it differentiate from sound? In order to clarify this central point of the dissertation, I recall the definition given by film restorers Paul Read and Mark-Paul Meyer, who defines sound in physical terms:

Just like light, sounds comprise part of a much broader family of waves ranging from the vibrations caused by earthquakes, frequencies even much lower than one cycle per hour, up to ultrasound. The longitudinal waves which are perceptible to human ear are defined as being sound waves. Longitudinal waves are vibrations of matter (involving stages of compression and rarefaction) which indicate the absorption and transmission of kinetic energy transferred by any type of impact. The total amount of energy in movement, the surface area covered, and the type of vibrating movement involved (depending on the material and its shape) determine the properties of these waves. When the waves strike and penetrate different mediums, their properties vary and change through the process of reflection, refraction or diffraction. […] A longitudinal wave of any type is characterized by its frequency or period, which measure the length of one cycle, by its amplitude or
height of the wave front, and by its intensity. [...] Sounds may be of several frequencies said to be in harmony (musical notes), or not in harmony (described as noise!) with one another.\textsuperscript{71}

The last mention of noise as a sound “not in harmony” reveals the difficulty to define noise in physical terms: harmony, in fact, is a socially constructed concept, as indicated by the differences between the Western, Indian, Asian, or African music harmonic practices.

My investigation of the concept of noise starts with the consideration of acoustic noise, which can be defined as an unwanted or unexpected sound. This statement implies a subject, the listener, who perceives a sound as unwanted, sudden, annoying, irritating, or painful. Acoustic noise is then subjective. Bijsterveld, who studied noise on a cultural level, affirms that

[...] the perception of sound is now considered to be highly subjective. Psychologists argue that whether individuals are annoyed by a specific sound is not only dependent on the characteristics of that sound, such as its loudness, frequency, or periodicity; equally relevant are one’s physiological sound sensitivity and compulsivity, as well as the social context and perceived control.\textsuperscript{72}

On the same line, Hillel Schwartz notices that “[b]y its very definition, noise is an issue less of tone or decibel than of social temperament, class background, and cultural desire, all historically [and culturally, Ed.] conditioned.”\textsuperscript{73} The definition of noise is not only subjective, but also culturally and socially constructed: what is considered noise today is different from what was considered noise ten, twenty or fifty years ago.

The cultural and social conception of noise in modern societies primarily involves mechanical noises, which from the nineteenth century came along with industrialization, mechanization, and urbanization. The invasion of mechanical noises caused the spread of what Schafer calls “low-fidelity soundscapes,” which are highly noisy places, such as city streets or industrial environments:

\textsuperscript{71} Paul Read and Mark-Paul Meyer, \textit{Restoration of Motion Picture Film}, 9.
\textsuperscript{72} Karin Bijsterveld, \textit{Mechanical Sound}, 10.
The hi-fi soundscape is one in which discrete sounds can be heard clearly because of the low ambient noise level. The country is generally more hi-fi than the city; night more than day; ancient times more than modern. […] In a lo-fi soundscape individual acoustic signals are obscured in an overdense population of sounds. The pellucid sound – a footstep in the snow, a church bell across the valley or an animal scurrying in the brush – is masked broad-band noise.\textsuperscript{74}

What really defines “low-fidelity soundscapes” is the presence of mechanical sounds made by technological machines and devices (cars, tram, trains, airplanes, radios, televisions, telephones, industrial machines and so on).

Studying public problems linked to noise, Bijsterveld observes that “[m]any columnists emphasize the omnipresent sounds of today’s technology: the whirring of the video tape, the hiss of the television standing by, the hum of the refrigerator, the buzz of the electricity gauge, the click of the heating pipe, and the roar of the fan.”\textsuperscript{75} Along the same lines, music editor Rob Young echoes the predominance of sounds from mechanical devices:

Crackles, pops, pocks, combustions, gurgles, buzzes, amplitude tautening, power spikes, voltage differentials, colliding pressure fronts, patterings, jump-slices, fax connections, silent interjections, hums, murmurs, switchbacks, clunks, granulations, fragmentations, splinterings, roars and rushes have overwhelmed the soundscape.\textsuperscript{76}

Contemporary soundscapes are characterized by the omnipresence of noises generated by mechanical, electric, and digital devices. Among all these noises, the ones produced by recording media devices are especially relevant in the frame of this dissertation.

Regarding the noise of recording devices, a first distinction can be made between the noise made by the devices during their functioning and the noise embedded in the devices. To define the latter typology, I recall the information theory, according to which noise is an unwanted signal (random unwanted data) or disturbance that interferes with the operation of a mechanical device or system. In this sense, noise is “irrelevant or meaningless bits or words occurring along with desired information (as in

\textsuperscript{74} Raymond Murray Schafer, \textit{The Soundscape}, 43.
\textsuperscript{75} Ibid., 5.
\textsuperscript{76} Rob Young, “Worship the glitch,” \textit{The Wire} 190/191 (1999): 52.
a computer output)” as defined in the dictionary. In this frame, noise can be considered as anything extraneous to the message, as the background of information, or the backdrop to communication: it fills in the silences, and also disrupts the message. The signal-to-noise ratio indicates the corresponding relation between wanted signal and unwanted background noise, and therefore the level of comprehensible meaning of the message. In the case of audiovisual media, the noise of the technological device (signal noise) can refer to both the image and the sound. Visual noise can be the grain of the film emulsion or the “snow” in an analog video image, which is a random dot pattern of static. Audio noise can refer to the residual low level sounds, like hisses and hums, which can be heard while there is no signal in the recording. Audio noise can also indicate the broadband noise of radio receptions existing within the space between two radio stations.

Early sound recording devices, such as cylinder phonographs and gramophones, produced high-signal noise levels. In fact, the first sound recordings are perceived as very noisy and disturbing by current listeners, as can be experienced by listening to the oldest recovered recordings, like the Phonoautograms made by Édouard-Léon Scott de Martineville in 1860, the recordings made by Thomas Edison on a phonograph tinfoil in 1878, or the voice of Alexander Graham Bell recorded on cylinder wax in 1885. In these recordings, the noises and crackles overwhelm the sound signal, which is almost incomprehensible to a contemporary listener’s ear. Therefore, early inventors and developers of sound recording technologies aimed to increasingly reduce noise and improve the sound signal.

As these technologies became part of the music industry, the need to reduce the noise inherent to the device and improve the signal-to-noise ratio became much more pressing in the name of sound fidelity. Sound studies scholar Jonathan Sterne, who describes the social genesis of sound fidelity, notices that:

Sound fidelity was, ultimately, about faith and investment in these configurations of practices, people and technologies. It posited the technology to reproduce sound as a vanishing mediator. […] They had to be convinced of the general equivalence of the live

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and the reproduced. Even when the sounds of sound-reproduction technologies were explicitly discussed, it was with an eye toward finding new ways for the medium to erase itself.\textsuperscript{81}

The recording industry embraced what I would define as the \textit{ideology of sound fidelity} and the \textit{transparency of the medium}: the development of sound recording media followed the path of a progressive reduction of noise inherent to the recording and playback devices, and higher fidelity became a major selling point of new technologies. For instance, a 1929 advertisement for Lee De Forest’s \textit{Audion}, an electronic amplifying tube that served as the first amplifying radio receiver, declares “No hum, No buzz, No crackle!” (fig.1). Hum, buzz and crackle are the kind of noises inherent to the devices that the industry was trying to reduce in the development of new products. Technological development was driven by the assumption that there are some dirty or cracked sounds that prevent a clean sound from being perceived. Therefore the industry’s objective was to reduce the cracked sound as much as possible in order to come closer – have more \textit{fidelity} – to an ideal sound cleaned of the noises of the device. This assumption implicitly maintains that noises and dirty cracked sounds are objective factors, while instead their nature is subjective as well as culturally and socially constructed.

When sound films became popular in the late 1920s, the film industry adopted the ideology of high fidelity from the music recording industry and developed technologies to reduce noise in the recording of film sound. Dolby Labs, one of the main companies that manufactured film sound equipment, started making filters for audio noise reduction:

Upon investigation, Dolby found that many of the limitations in optical sound stemmed directly from its significantly high background noise. To filter this noise, the high-frequency response of theatre playback systems was deliberately curtailed. [... ] To make matters worse, to increase dialogue intelligibility over such systems, sound mixers were recording soundtracks with so much high-frequency pre-emphasis that high distortion resulted.\textsuperscript{82}

To reduce the “high background noise” and increase the signal quality, Dolby developed analogue and digital formats for film sound (Dolby Stereo, Dolby Surround, Dolby Digital) as well as standards for film theatre and home theatre acoustics, thus becoming a leading company in the field over the last fifty years.

As illustrated by the example of Dolby, the industry involved in the development of audiovisual recording technologies aimed to reduce the noises inherent to the device and to improve the signal-to-noise ratio as much as possible. Noise greatly affects the supposed transparency of the medium, since it is a perceivable mark of the ongoing mediation and therefore has to be eliminated. As Mary Ann Doane observes,

In the language of technicians, the term noise often refers to an interference generated by the apparatus itself, and from that point of view the idea of ‘storing noise’ suggests that the sharpness of the distinction between what is ‘out there’ to be recorded and what is traced by the machine is lost.83

The industry’s battle against noise was supported by the ideology of high fidelity in the name of a supposed transparency of the medium. In reality, this battle is manufactured: the ideology of high fidelity and the continuous overcoming of technological limits in order to have the most faithful reproduction of reality are often used as a trigger for regularly introducing new products and innovative technologies into the commercial market. In this frame the concept of noise is revealed once again to be socially constructed.

As shown in this section, noise can be considered as the counterpart of sound. Therefore the investigation of noise is productive for understanding and defining the nature of film sound: the definition of film sound is inherently linked to the domain of noise. Noise is also a key concept in the perspective of film preservation: noise can be conceptually considered as the grey zone where time and other factors change the materiality of film sound. In this regard, two types of noises have emerged in this section and will be used later in the research for analyzing preservation practices: the noises inherent to the technological device and the noises inherent to the recording carrier. These two types of noise were progressively attenuated by the audiovisual industry, in the name of high fidelity. Sound recordings of the past are characterized by noises inherent to the technological device and to the recording carrier, hence these

83 Mary Anne Doane, The Emergence of Cinematic Time, 65.
noises in particular are to be taken under consideration in film sound preservation and presentation. It should be noted that noise documents and evokes the past from which the film and its sound originate, and therefore can be considered as a component of film sound that should be preserved. As will be argued in the following chapters, film sound preservation and presentation often entail finding the right balance between reducing and keeping noise. Noise can therefore be considered as the field of action of film sound preservation, which can also be defined as the activity that deals with the marks and signs of the past audiovisual heritage.

1.4 Cracked Sounds

Since the sound recording industry was largely driven by the ideology of cleaned sound and high fidelity, artistic practices began to question this paradigm working on the notion of noise. A brief analysis of some artistic practices that experiment with the dimension of noise and how it can be created will help in a further understanding of what noise is and, ultimately, what sound is.

Noise entered the domain of Western music in the beginning of the twentieth century, becoming a component of classical music, experimental music as musique concrète, and pop music. Already during the interwar period, avant-garde music exalted noises and the sounds of mechanical machines. Italian Futurist Luigi Russolo, author of 1913 manifesto The Art of Noises, called for the use of modern technologies and mechanical sounds in artistic practice: “For many years Beethoven and Wagner shook our nerves and hearts. Now we are satiated and we find more enjoyment in the combination of the noises of the trams, backfiring motors, carriages and bawling crowds than in rehearsing, for example, the ‘Eroica’ or the ‘Pastoral.’”

Among all the different noises that can be used in artistic practices, what interests me in the frame of this dissertation is the artistic work on the noises inherent to sound technological devices and recording carriers. These types of noises are important with regard to film preservation, as stated in the previous section. The artistic work on the materiality of these carriers and devices offer very productive ideas that can be applied to film sound preservation and presentation. This is especially true because the artists

involved in these practices, like archivists and preservationists, are concerned with the materiality of the carrier and the devices. Moreover, the artistic work aimed at manipulating the materiality of recording carriers and playback devices, in some cases up to the point of breaking and destruction, can be interpreted as similar to the damaging effects of time and other factors on media carriers, those same effects that preservationists aim to limit. For these two reasons, I focus in this section on some practices and works that give an idea of the possible modifications of material carriers and devices.

Since the 1980s, some sound art practices have reflected on the notion of noise, in particular the noise inherent to technological devices and material carriers. These artistic practices created sounds through manipulating, cracking, breaking, or destructing sound recording carriers and playback devices. This type of activity is also referred to as “cracked media practices” because it works on the notion of “the crack” as a physical break in the surface of an object or a point of rupture or interruption. Scholar Caleb Kelly, who analyzes the crack as a creative process in experimental sound and media arts, provides the following definition of cracked media:

‘Cracked media’ are tools of media playback expanded beyond their original function as simple playback device for prerecorded sound or image. ‘The crack’ is a point of rupture or a place of chance occurrence, where unique events take place that are ripe for exploitation toward new creative possibilities. […] the crack takes a variety of forms […] from gentle coaxing of faint crackle on the surface of a vinyl record to the total destruction of the playback tools. The practice utilizes cracks inherent in the media themselves – we can not play a vinyl record without causing some damage to the surface of the disc – and lead to a creative practice that drives playback tools into territory where undesired elements of media become the focus of the practice.85

The modifications and manipulations of the turntable is one of the first examples of cracked media practices: the playback device is used in unconventional ways, including playing the records at the wrong speed or backwards, making the turning mechanism of the platter wind down, or putting other objects than a disc on the platter. In Cartridge Music (1960), John Cage removed the needle from the turntable and replaced it with other objects: “pipe cleaners, wires, feathers, slinkies, matches,

toothpicks, nails, twigs, cocktail parasols, and miniature American flags."\textsuperscript{86} Milan Knížák extended the manipulations from the device to the material carriers, the vinyl discs; for instance in \textit{Destroyed Music} (1963-1979), he composed a vinyl disc by gluing and taping together four parts of different vinyl discs. Knížák describes the process of manipulating vinyl discs:

By playing them over (which destroyed the needle and often record players too) an entirely new music was created. Unexpected, nerve-racking, aggressive. Compositions lasting a second or almost infinitely long (as then the needle got stuck in a deep groove and played the same phrase over and over again). I developed this system further. I began sticking tapes over records, painting over them, burning them, cutting them up and gluing parts of different records back together, etc. to achieve the widest possible variety of sounds. A glued joint created a rhythmic element separating contrasting melodic phrases.\textsuperscript{87}

Christian Marclay carried out similar work on vinyl records and turntables in the 1980s and 1990s, and his performances stressed qualities of liveness and improvisation. During these performances, he played multiple turntables at the same time, using scratched and ruined records, or played the phonograph as a guitar (\textit{Phonoguitar}, 1982).

This type of artistic practice concerns turntables and vinyl records, stereos and audiocassettes, CDs and CD players, as well as other types of recorded media and devices. In the installation entitled \textit{The Edison Effect} (1989-1993), Paul DeMarinis played with different technological devices (mechanical, electronic and digital) and recording carriers, making them clash together in unusual ways. For instance, DeMarinis used the laser of a CD player to play a vinyl record. There is also an Edison phonograph that plays a cylinder record, highlighting the noise inherent to the device and the carrier.

In cracked media practices, noise is a key concept since it represents sounds produced by modifying the recording carriers and the technological devices, whose materiality is often pushed to the edge of breaking. Kelley summarizes the various forms of noise in cracked media as follows:

\textsuperscript{86} Ibid., 114.
\textsuperscript{87} Ibid., 142.
[...] noise fills the audio output of cracked media: cracked lines, lost data, static and hiss, broken signals, chaotic production, earth hum, piercing tones, and digital glitch. All these sounds are made up of what we call noise, and many of the approaches taken toward the crack and break seem to fit into the numerous definitions of noise.\footnote{Ibid., 61.}

The noise of cracked media practices can be inherent to the materiality of the technological device, of the recording carrier or of both.

Artistic work with cracked media involves both the subjective perception of noise by the public and the conceptual definition of noise in the frame of the music industry. Christian Marclay describes the decision to use the noises inherent to the device and carrier in these terms:

I realized that when I listened to a record, there were all these unwanted sounds, clicks and pops, because of the deterioration of the record, the surface noise, scratches. Instead of rejecting these residuals sounds, I’ve tried to use them, bringing them to the foreground to make people aware they are listening to a recording and not live music.\footnote{Marclay interviewed by Gross, reported in Caleb Kelly, \textit{Cracked Media}, 171.}

In order to increase audience awareness of these kinds of noises, Marclay released \textit{Record Without a Cover} in 1986. It was sold in record stores without a jacket or a sleeve so that each copy would accumulate scratches, dust, and fingerprints from being handled by customers. The artist explains:

With \textit{Record Without a Cover} you can’t ignore the medium. You can’t ignore that you are listening to a recording. There is confusion between what is intentionally recorded and what is damage to the surface of the disc. There’s a push-and-pull between the reality and the illusion. You have to stay alert.\footnote{Christian Marclay, “A Conversation between Christian Marclay and Michael Snow, New York, June 4, 2000,” \textit{Christian Marclay: Cinema}, exhibition held Dec. 9 – Feb 4, 2001, Oakville Galleries.}

As Marclay suggests, the work on the noises of the device and carrier reflect critically on the myth of high fidelity and clean sound reproduction. Crack or break practices emphasize those noises (cracks, hums, hisses) that are contrasted by the recording industry: if the industry wants to erase the noise of the devices, cracked media artistic practices reveal them, questioning the myth of high fidelity and clean sound reproduction.
supported by the industry. Cracked media practices and their work on noise can be interpreted as a critique of recording technologies, questioning the paradigm of the transparency and cleanliness of the technological device and the ideology of high fidelity while at the same time disputing the production system of the music industry. The crackling can be considered as a mark that emphasizes the noise of the technological devices used for the production and playback of recorded material, and therefore also as a mark of older technologies.

A more critical attitude towards the ideology of high fidelity is present not only in experimental music, but also in commercial music. In the aforementioned article on the return of music cassettes, Elisa Bray reported the thoughts of the musician M Ward on recording practices, who recently released an album on cassette as well as vinyl and CD:

> The idea that a ‘perfect recording’ should be absent of all extraneous noise is a myth of the digital age we are living in. Vinyl has a scratch to it and cassette has a certain hiss to it that I love. Making *Volume 3* available on cassette is definitely an experiment, but if we can inspire a few listeners to dig out their cassette players instead of listening to music on YouTube or whatever tiny computer speakers they are growing accustomed to then I'm happy.  

Aside from the return of physical carriers such as vinyl and audiocassettes, another form of *soundstalgia* can be detected in the recreation or evocation of the noises of recording carriers in contemporary music production. A way to recall these noises is for instance to add a filter that simulates the noise of vinyl being played on a record player. An example is Lauryn Hill’s song *The Miseducation of Lauryn Hill*, which was produced in the digital domain yet sounds as though it was played on a record player: it starts with the sound of a needle put onto the record, a crackling noise is then heard, and another noise simulates the jump on a groove that also recurs in loop during the song. A final example of this *soundstalgia* attitude is provided by Quentin Tarantino, who also chose to keep the noises, cracks and pops in the sound of his latest film *Django Unchained* (2012). In the liner notes of the soundtrack CD Tarantino states (fig. 2):

> A note about the condition of the older recordings I am using on this soundtrack – A lot

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91 Elisa Bray, “Fast Forward: and Press Play Again – Cassettes are Back.”
of these came from my personal vinyl collection. Instead of having the record companies give me new digitally cleaned up versions of these recordings from the 60’s and 70’s, I wanted to use the vinyl I’ve been listening to for years – complete with all the pops and cracks. I even kept the sound of the needle being put down on the record. Basically because I wanted people’s experience to be the same as mine when they hear the sound for the first time.

In conclusion, the last section investigated the concepts of noise and cracked media in the frame of artistic practices. The audiovisual technology industry followed the push to reduce the noise inherent to the technological devices and the recording carriers, while artistic practices brought out these kinds of noises by questioning the transparency of the media. Between these two poles, what is the position of the audience and users? A possible answer can be found in Kelly’s words:

Even though it [our much played favorite vinyl record] has come to be filled with the noises inherent in the media – its many ticks and pops and haze of ingrained dust - we forgive vinyl media for this flaw and even hear these noises with a sense of nostalgia, as they are marks created from listening to the record and remind us of times in the past when we played the music.⁹²

The users not only accept the noises embedded in the playback device or the cracked noises of the recording carrier caused by use over time, but they seem to remember the media precisely for its noises. They recognize in these noises the sounds of their past experiences, and therefore these noises acquire a sort of emotional value, which is present in the phenomena of retrostalgia (imagestalgia and soundstalgia) described in the previous section. The evoked past can be real, as in the case of the adult generation who bought vinyl records in their youth, but can also be imagined, as in the case of the digital-born generation that displays soundstalgia towards vinyl without having ever used a record player.

Soundstalgia is closely related to the idea of technological obsolescence and commercial innovation: new technologies are regularly released in the market by the media industry, which used the motivation of improvement in quality in high fidelity, thus making older technologies obsolete as well as more difficult to produce, distribute

⁹² Caleb Kelly, *Cracked Media*, 72.
and use. The old devices become rare and acquire a time patina (marked by noises and cracked elements) that can become an added value to the media and contribute to the phenomena of retrostalgia. Older technologies acquire a retro status and become first vintage, then cool and finally become profitable by re-entering the market and generating a market of memories. Obsolescence and its time marks (noises of the technological devices and the material carriers) are planned and programmed by the industry, exalted by artistic practices, and reclaimed by audiences who also make user-generated content through practices of retrostalgia.

The discussion of these subjects is productive and necessary, since film preservation and presentation are connected to these social and artistic practices. Currently, the habitual confrontation with audiovisual heritage is not a matter that concerns only archivists and professionals in the field, but also involves a broader range of audiences and users. Professionals in the field of preservation should understand these phenomena and take them into consideration in order to integrate their actions in the social sphere.

For instance, the comprehension of the phenomena of retrostalgia can be considered in defining the strategies of audiovisual heritage presentation and preservation. On the one hand, these retrostalgia phenomena set the stage for many possibilities for revitalizing archival material. On the other hand, the copious presence of audiovisual material outside film heritage institutions (mainly on the Internet) should incite the desire to give the audience and users something more than simple access to the material, as for instance a set of contextual information for better understanding the film, or a cinematic experience faithful to the film historicity. Similarly, understanding what noise means in social practices and how it can be conceived as noise that is inherent to technological devices and recording carriers can be useful in the work of preserving and restoring audiovisual heritage. These social and cultural issues represent a premise for further investigation, which in the following chapters will focus on the true object of this research: film sound in film preservation and presentation.