CHAPTER 5.
Film Sound in Theory, Preservation, and Presentation

5.1 A Biaxial Model

The aim of this dissertation is to find, define, and conceptualize film sound in preservation and presentation. The core questions of the research concern the nature of film sound: what is film sound? How can it be conceptually defined? What does it consist of? What are its core dimensions? In order to formulate an answer to these questions, I explored in chapters one and two the value of recorded sound for individual and collective memory. In chapters three and four I described practices of film sound preservation (the sound-on-disc systems) and film sound presentation (the activity of the EYE Film Institute Netherlands). This last chapter aims at resuming the main considerations and findings of this research, and combining them in a coherent model.

In this chapter, I first use the analysis of the case studies examined in this dissertation to develop a model for the definition and conceptualization of film sound, showing how film sound preservation and presentation practices bring to the fore the core characteristics of film sound. This discussion serves to demonstrate how a study of preservation and presentation practices can contribute a much needed definition of film sound to the field of film theory in general. Then, I will discuss how the proposed theoretical model can promote the reformulation and interpretation of film sound preservation and presentation theories and practices. Although based on real practices, it is a theoretical model. In fact, this model aims to provide some key concepts to understanding and interpreting the decisions and choices related to preservation and presentation practices, however it does not explicitly suggest or describe new solutions, methodologies, or procedures.

As the case studies demonstrated, preservation and presentation practices highlight a number of crucial aspects and dimensions that contribute to the definition of
the nature of film sound. The preservation of early sound systems focused on the importance of taking into consideration not just the material carrier, but also the technological devices and the human actor’s techniques, which I defined as the film dispositif. On the other hand, the presentation practices adopted by the Filmmuseum-EYE demonstrated how the devices, the dispositifs, and the spaces necessary for presentation can be used in an experimental way to create cinematic events and experiences.

In order to describe the nature of film sound, I interpret the dimensions that have emerged from my analysis of film sound presentation and preservation practices – carrier, device, dispositif, text, physical space, and institutional context – using three key concepts: trace, material form, and performance. These key concepts are borrowed from different film and media theories, as well as the fields of film preservation and fine art conservation. The notion of trace, discussed in chapter two and further elaborated here, is derived from media theories, in particular from theories developed by Thomas Elsaesser, Friedrich Kittler, and Maurizio Ferraris. The concept of material form is taken from art historian and restorer Cesare Brandi and applied to film sound and film preservation. With the help of more recent film preservation theories, such as the ones developed by film scholars and historians Giovanna Fossati, Vinzenz Hediger, and Barbara Flückiger, I formulated certain considerations regarding the conceptual, material, and performative nature of film, as well as reflections on the different histories of film, such as those of a film’s production, reception, material object, and performance. According to Hediger, consideration of film’s material and performance histories is an example of how film archival theory can contribute to film theory:

A theory of archival practices […] redefines film as an art form in terms of a historical object with a material history, but also with a performance history. The film’s material and performance histories are without doubt crucial to the film object as defined by the archivist, but they are not accounted for in current and classical approaches to film theory.246

The contribution of this dissertation to previous theories is twofold. First, the theoretical model that I propose originates from and is centered on film sound, a

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component that in the conceptualizations of film, even from an archival perspective, is still largely neglected or treated selectively, focusing mainly on the soundtrack or the musical accompaniment. Second, my intent is to discuss the key notions as interrelated concepts in an integrated model. Instead of simply making distinctions between different concepts, such as between the material object and the conceptual object, the textual and the performative dimensions, the material form and the audiovisual trace, I attempt to outline their interconnections.

These links between different concepts emerged from examination of the selected case studies. In the analysis of early sound systems I described possible relations between material object, dispositif, text, and exhibition. The EYE case highlighted some connections between the performance, the space, and the institutional context. In this chapter I intend to further investigate these interconnections, and integrate them in a united model that can effectively illustrate the dynamic nature of film sound as an object of preservation and presentation. The dynamic nature of film sound can be described considering all the different dimensions that were identified in the introduction and over the course of this research: the material, technological, human, institutional, experiential and memorial dimensions.

In order to describe the integration and interrelation of these different concepts in the context of film preservation and presentation, I use a double axis Cartesian system. In this double axis model, the x-axis is related to the dimensions of space and experience and to the notions of film sound as material form and performance. The y-axis refers to the dimensions of time and memory, and to the concept of film sound as trace. This double axis can be considered as representing the field of action of film heritage institutions: film preservation acts mainly on the y-axis, while film presentation acts on the x-axis.

The theoretical elaboration of this chapter is concentrated primarily on film sound, yet in the final sections the discussion will be extended to film in general, as it is composed of both image and sound. The separation of image and sound can be useful for analytical purposes, but it should be kept in mind that film as a cultural form comprises both images and sounds as its main constituents. Beginning with the underrepresentation of film sound in film theory as argued in the introduction of this research, I asserted the specificity of film sound with respect to the predominant dimension of the image, and I sustained the need to investigate the nature of film sound. As previously stated in chapter three, from the start film has been conceived as a
medium that comprises moving images (a representation of live events) and sound (performed live or recorded on carriers, either separate or together with the image). The image and sound components together create film as a cultural form; thus the cinematic experience is based on a combination of visual and auditory perception. Sound and image can exist on separate carriers, as in early sound systems, but only when they are displayed together can film be fully experienced as a form of culture.

As I will argue in this chapter, even if image and sound are treated separately during preservation, with different tools and by different operators, they have to be considered as a united body. Some observations made about film sound and its preservation and presentation can be effectively translated to film in general. Moreover, reflection on film sound can emphasize some features of film that are not considered in image-centric film theories, such as the importance of the space and performance dimensions of a cinematic event. Thus the key concepts that define film sound (material form, trace, and performance) will be used in the final section of this chapter to interpret the preservation and presentation of film intended as a united body composed by image and sound.

5.2 Film Sound as Trace

4.014 The gramophone record, the musical thought, the score, the waves of sound, all stand to one another in that pictorial internal relation, which holds between language and the world. To all of them the logical structure is common.
— Ludwig Wittgenstein

In this section I take into account film sound preservation practices, in order to highlight some features and elements that contribute to the theoretical definition of film sound. Film sound preservation and restoration deals with the dimension of trace, as I defined it in the second chapter, in its two meanings: first, the physical trace intended as the form of inscription of aural information on a carrier, namely how the sound signal is recorded on the material carriers and how the sound information is transmitted to the

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future through the trace inscription, and second, the *mnemic trace*, which is the trace that film leaves in individual and cultural memory through its reception.

The *physical trace* represents the entity that should be preserved in order to ensure the transmission of cinematic information for future access. Thus, *film sound preservation* concerns the storage, copying, migration, and restoration of the film sound *physical trace*. Storage involves maintaining the appropriate space and climatic conditions for film sound carriers, including masters or preservation copies (e.g. sound negatives, sound positives, magnetic tapes, or digital carriers). These elements can be copied in order to ensure the transmission of the information for future access. The copying process can be completed in the same media domain, as in the case of making a film sound negative from a film sound positive. When the media carrier or format changes, there is a migration process: this is the case when a film sound magnetic tape is first digitized and then recorded on a film positive copy. The most common migration activity as of present is digitization. In this phase, it is important to apply the right filters required of the original production and playback devices.

*Film sound restoration* implies, at present, digitizing the sound information of the *physical trace* and elaborating of the sound signal in the digital domain. The film sound carrier, like an archaeological artifact, presents signs incurred by the passage of time, due to the decomposition of the carrier, but also caused by the devices that produced and played it. As Altman observes “Recorded sound thus always carries some record of the recording process, superimposed on the sound event itself.” Altman recognizes the value of these marks as a source for film sound history and analysis:

> [T]he variables introduced by sound’s material heterogeneity, along with the system constituted to record it, lie at the very heart of film sound. Though they may constitute distortions for the sound engineer, the marks of the sound narratives and the recording process that appear as part of any sound record constitute the very text of the sound analyst, the fundamental signs of the sound semiotician, the basic facts of the sound historian.  

I would add that these marks have an important value also for the preservationist and restorer. The marks in film sound caused by the device and the recording process

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249 Ibid., 30.
assume the form of noise, intended as unwanted sound.

Film sound as *physical trace* is determined in fact not only by the recorded signal, but also by the unwanted noises, which I divided into the following types: the *noises inherent to the carrier* (e.g. pops and crackles), the *noises inherent to the device* (e.g. hiss, hum), the *noises derived from the dispositif* (e.g. noise occurring during film exhibition originating from the playback device or the human actor, as for instance the clicks caused by cuts in the film copy), and the *noises caused by the passage of time* (derived from the physical decay of the carrier).

As I have argued in chapter three in analyzing the *Tonbilder* case, film sound restoration deals primarily with the treatment of noise. The key issue in film sound restoration is which noises belong to the film sound and which do not. Those belonging to film sound deserve to be preserved, while those that do not can be erased or attenuated. This discernment implies the presence of a human actor, the film preservationist, restorer, or operator, who decides according to a judgment of value. The judgment on which noises should be preserved, attenuated, or eliminated reveals a particular conception of the nature of film sound. If for instance the preservationist decides to cancel out all noises, the ones inherent to the carrier and the device as well as the ones caused by the passage of time, the film sound is conceived as only the text composed by music, dialogue, and effects. If, instead, the preservationist decides to maintain the noises inherent to the carrier and device, these dimensions are recognized as part of film sound. When the noises produced during film exhibition (as a click caused by a cut) and incurred by the passage of time are also preserved, film sound is considered as an historical object; the marks and signs left on the object by time and use testify to its history and are acknowledged as part of the nature of film sound.

Therefore, in preservation work it is important to be aware of film tradition, which refers to how films have come to presently exist in collections (*physical trace*) and how they have come to impact individual and collective memory through exhibition and reception (*mnemic trace*). I consider film tradition as being composed of an internal history, which regards film as a material object, and an external history, which relates to film presentation. This distinction relates to Hediger’s consideration of three forms of temporalities: “Film […] in the terms of a theory of archive practice, is both a material and temporal object, where the temporality is actually threefold: The temporality of the material object, the temporality of the film’s performance and the temporality of the
The temporality of the material object refers to what I define as internal history, while the history of film performance recalls external history. I will now discuss internal history, which can be related to the dimension of the material object; then I will describe external history, referring to the concept of occurrence.

Internal history concerns film sound as physical trace, and it depends on the material object, the physical carrier: over time, some alterations and decay can affect the materiality of the carrier and the recording trace, as for instance the appearance of physical or chemical decomposition of the film stock or the presence of dust and mold. These alterations can modify the recorded signal to different degrees and compromise the ability of the carrier to be played. Understanding the internal history of film sound carriers is fundamental to preservation and restoration activities: it helps to distinguish between the noises and marks inherent to the devices and carriers and the ones that occurred through use and aging of the carrier.

External history refers to the history of film sound exhibition and presentation as well as public reception and also relates to how the film trace entered individual and collective memory. Thus external history is related to film sound as mnemic trace. As pointed out in the Tonbilder case, the knowledge of the history of a film’s exhibition is a crucial element in the preservation process. This information provides insights into understanding a film’s reception by the public and how it was exhibited, and, thus, how it inscribed itself as a trace in cultural memory. Moreover, this information can also assist with locating other copies of the film in the frame of reconstruction.

Reflection on the musical accompaniments of early “silent” films offers another method to comprehending a film’s external history. The history of film exhibition can be interpreted with the help of musicology. Cinema shares what Stephen Davies calls, in reference to music, “multi-instantiability,” that is, the possibility to be performed in multiple moments. In the domain of cinema, I define the different moments of exhibition as occurrences. I recall here the idea of textual occurrences (occorrenze testuali) applied to film by Simone Venturini, referring to “the object and the modality of material, semiotic and aesthetic perception of the final product, that is, the pragmatic

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affirmation, the actualization of the text in collaboration with the public in the moment of the theatrical presentation.”

The external history, interpreted as a succession of occurrences, can be simplified as follows: a movie usually has a first distribution (occurrence A), the moment that inaugurates its public entrance into the social domain. After that initial moment, a film can be screened a number of times (occurrences X, Y, Z) in the following years. The life span of a film can cover more than a century, as demonstrated by the present-day screenings of early movies, for instance at dedicated festivals like *Le Giornate del Cinema Muto* festival in Pordenone, the *San Francisco Silent Film Festival*, or the Filmmusuem-EYE’s *Biennale*. Notably, the projection of films produced as early as the end of 19th century is made possible by the characteristics of the material object and the *dispostif*. The history of the exhibition occurrences depends on the preservation of the material object and the *dispostif* set up.

The history of film exhibition and presentation (occurrences A→Z) is not just a chronology of events; it helps shape the identity of film sound as a cultural object and historic document. Through this history the film leaves traces in individual and cultural memory. The understanding of how film sound becomes a *mnemic trace* and how it enters individual and cultural memory provides useful information in the frame of preservation.

Understanding the transformation of film sound into a *mnemic trace* can be understood with support from some concepts elaborated by Cesare Brandi. Theorizing fine art restoration, Brandi explores the dimension of time in a work of art and its relation with the subject, and distinguishes three types of time. First there is the duration, the time in which a work of art is produced by the artist. Then there is the interval between the end of the creative process and the moment of reception. Finally, there is the instant “when the work of art strikes consciousness like a bolt of lightning.”

If we translate this consideration on temporality from works of art to film sound, we can recognize these three temporalities in film sound as well: the duration of production (which involves human intervention as well as technological devices); the

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interval between production and reception (which is the moment when film sound becomes a historical trace, but also when time leaves its traces on the film object), the moments of reception (what I have previously named occurrences A, X, Y, Z). I would add to these three a fourth temporality: the mnemic temporality, which comprises the time when film sound, after being experienced by the audience through its occurrences, enters the individual and cultural memory, becoming a *mnemic trace*.

These forms of temporality permeate the film carrier leaving traces; at the same time, the object itself becomes a trace entering the individual and cultural memory. Film sound, as well as film image, is not static but very dynamic: film changes continuously depending on temporalities, movements, and forces by which it is touched and penetrated. A similar consideration is made by art historian Georges Didi-Huberman in relation to the movements of the image in the domain of visual arts:

> An image, each image, is the result of movements tentatively deposited or crystallized in its interior. These movements pass through the image completely, each with its own trajectory – historical, anthropological, psychological – which leaves from afar and goes on beyond the image. These movements compel us to think of the image as an energetic and dynamic moment, yet specific in its structure.\(^{254}\)

The conceptualization of *film sound as trace* allows for the description of its inherently dynamic nature, much better than a static model of film sound based on only the textual dimension would. The film carrier can thus be considered as a base for the inscription of *physical traces*, which change over time because of different factors. The different traces and marks on a film can be interpreted as signs of different histories. Flückiger observes that film as a material object is the product of several histories: the history of its production, the history of its processing, and the history of its projection. She argues that:

> Most often, these histories collapse into an individual film object, even when we consider anything else than the original camera negative. These histories have overlapping traces,

they interfere with and mask each other. When we acquire such a filmic object at a certain time, a broad knowledge is necessary to identify the different strands of influences present in it.²⁵⁵

The knowledge of the internal and external histories of film sound, i.e. the histories of the physical trace and the mnemonic trace constitute a fundamental activity in preservation work.

This section focused on how the analysis of film sound preservation practices, described in the case studies, brings forth the theoretical consideration of film sound as physical and mnemonic trace, as well as the related internal and external film histories. Similarly, in the next section, I use film sound presentation practices to elaborate the theoretical concept of film sound as performance.

5.3 Film Sound as Performance

[...] I insist that the film text be read in the architectural context of its reception rather than as an autonomous aesthetic product.
— Anne Friedberg²⁵⁶

Film sound presentation is the activity aimed at presenting the sound of archival films in theatres to contemporary audiences. Film sound presentation does not only involve live musical accompaniment for early films, but also the presentation of films that have a recorded soundtrack. Since sound is made by waves that are diffused in a specific space, it cannot be reduced to a physical object, the sound trace recorded on a carrier: the specific characteristics of the exhibition space, as well as the playback and amplification systems influence the way the sound waves reach our ears and thus should be included in this analysis. The cinematic soundscape, which I defined in chapter four as the sound perceived and experienced by the audience in a particular screening situation, is determined by how the sound trace resonates in a specific space thanks to a specific dispositif as well as by the sound coming from the public.

In light of these considerations, film sound presentation accentuates the variable elements of the cinematic spectacle. As Rick Altman observes,

> the sound system plays the record of the story of an event. At every point in the chain, new variables enter, new elements of uncertainty. Sound heads, amplifiers, leads, loudspeakers, and theater acoustics all force new auditory data on the audience, just as the recording process in itself had earlier introduced an implicit viewpoint.\(^{257}\)

The *dispositif* and the acoustic space of reception determine the variables that change the *cinematic soundscape*. Because of these variables, the same film copy screened in two different theatres, by two different projectionists, through two different devices, yields two different film sound events. With this in mind, it is now necessary to understand how the cinematic situation influences film sound. In this regard, I refer to the analysis of the presentation activity of the Filmmuseum-EYE carried out in chapter four.

In the analysis of the Filmmuseum-EYE case I stressed the importance of the physical space and the institutional context, which is defined by the activities and decisions of the people working in the institution, as curators and programmers. In examination of the case study I underlined the influence of different aspects of the institutional context in film presentation: the limitations of the presentation space in the Vondelpark venue, the decision to hire a music programmer to curate the films’ live musical accompaniment, the recovery of marginal cinematography and orphans works, the experimentation on the sound of “silent” films. All these institutional factors contribute to define film sound presentation. Moreover, the physical space is also taken into account as a contributing factor in presentation. In the new building, film sound is displayed differently according to the type of space: the four cinemas, the exhibition area, the Panorama, the Pods, the Arena, and the internet. The decision of where a particular film should be programmed also requires the consideration of the spatial characteristics of the different theatres.

These considerations bring me to add another dimension to film sound, in addition to the trace: the *performance*. The performative nature of film sound emerges in film presentation. Film presentation intended as a cinematic event, is characterized by the following elements: the film *physical trace* recorded on the carrier, the technological

device and human actor (i.e. the _dipositif_) that allow the film to be displayed, the audience, the space, and the institutional context.

The performance element is particularly relevant if we consider early cinema presentation. In the _Tonbilder_ case, I used the term _performance_ to describe historical exhibitions, where the ability of the projectionist was fundamental to ensure the synchronization of image and sound. The performative aspect of film presentation relates in fact to the interaction between human and technological actors. Film presentation in early cinema can be considered a _performance_: each screening was a unique event, depending on an exhibitor’s choices in the accompaniment, live music, programs, theatrical décor, and stage attractions. Film historian Leonardo Quaresima notices that early film’s text does not coincide with the film object: it is made up of the film object and the spectacle in which the film is included.

If in early cinema the _cinematic soundscape_ was mainly composed of sounds produced in the physical space of the auditorium by musicians and the audience, after the introduction of synchronized sound, the _cinematic soundscape_ came to coincide with the recorded soundtrack. As a result of sound-on-film standardization, the performative nature of film sound and film presentation became less visible and perceptible to the public, for the musicians and performers that used to accompany the screenings disappeared from the stage. Hediger observes that:

> With the introduction of sound the film screenings become the performance, and the producer produces not only the pre-text for the performance, but the substance of the performance itself, that is the film print with its soundtrack which henceforth occupies the key place in the theatrical performance, unencumbered by other elements.

The importance of the performance dimension of exhibition is further discussed by Hediger, who refers to the concept of performance in music philosophy to clarify the relationship between text and performance in film. In music, the performance depends on a text, the musical score, as well as on the work of the musicians that interpret the text. Similarly, in film exhibition there is a text, the film work, which serves as a score

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258 See the section “Film sound before the conversion: live performance” in Leo Enticknap, _Moving Image Technology: From Zoetrope to Digital_, 102-104.


in film exhibition: “the relationship between work and performance is essential and thus can help to conceptualize the film object regardless of whether the performance aspect is an obvious constituent of the film-as-work, as in the case of early cinema or film installations, or not, as in the case of mainstream feature films.”

Hediger’s observations on the role of performance can be further elaborated considering film sound in particular. As I have noted in the analysis of the case studies, film sound reveals the performance aspects of film presentation: this is very clear for live music or sound performances, as in the case of early cinema exhibition. The performance aspects are also present when the film sound is recorded as a trace on a carrier: the cinematic soundscape of that film will be different for each screening and audience. The analysis of film sound presentation in the new EYE building demonstrated that the diverse spatial configurations of the four theatres have an influence on film reception, in that they activate different auditory modes. Using the concepts of source of sound, object sound, and bodily felt sound as auditory modes, I described how film sound was perceived in different ways in the four cinemas, but also in other spaces of the new building.

The analysis of film sound presentation highlighted the importance of the following elements for the definition of cinematic soundscape: the acoustic signal recorded on the carrier, the playback and amplification devices, the physical configuration of the space and its acoustics, the institutional context. These elements contribute to define how film sound is perceived and experienced by the public. Film sound presentation can thus be productively interpreted in terms of performance for two reasons. First, the concept of performance stresses the singularity and non-reproducibility of the cinematic event, which depends on the variables of the dispositif, the space, and the institutional context. Second, the concept of performance also highlights the importance of the interrelation between human and technological actors in film presentation.

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261 Ibid., 53.
5.4 Film Sound as Material Form

Material: “If memory and perception were the Material of things? The thought gives us the idea of a completely new form of reality: it is composed of perception and memory together.”
— Friedrich Nietzsche

Form: “And every thing, as long as it lasts, carries with it the pain of its form, the pain of being like that and of not being able to be any different […] We are very superficial, you and I. We don’t delve deeply into the joke, which is more profound and rooted, my dear friends. And it consists of this: the being acts necessarily through forms, the appearances he creates for himself, to which we give the value of reality. A value that changes, naturally, according to how the being appears to us, in that form, in that act.”
— Luigi Pirandello

In the previous sections I defined the nature of film sound using the concepts of trace and performance. The material, technological, and human dimensions of film sound still requires further investigation, which will be carried out in this section with the help of the concept of material form. Other core dimensions of film sound, specifically the carrier, dispositif, and text, the importance of which was argued in the analysis of preservation and presentation practices, can be described from a coherent perspective by using the concept of material form.

My intent in employing the concept of material form is to bring together these two aspects (matter and form) in the definition of film sound. I take this concept from Cesare Brandi’s theory of restoration regarding a work of art. The coexistence and interconnection of material and form in cultural and artistic objects is one of the fundamental assumptions in many aesthetic theories. What is notable about Brandi’s theory is that he considers the issue of material and form in a work of art from a preservation and restoration perspective and not just from a theoretical, historical, or


263 My translation from the original: “E ogni cosa, finché dura, porta con sé la pena della sua forma, la pena d’esser così e di non poter più essere altrimenti. […] Siamo molto superficiali, io e voi. Non andiamo ben addentro allo scherzo, che è più profondo e radicale, cari miei. E consiste in questo; che l’essere agisce necessariamente per forme, che sono le apparenze ch’esso si crea, e a cui diamo valore di realtà. Un valore che cangia, naturalmente, secondo l’essere in quella forma e in quell’atto ci appare.” Luigi Pirandello, Uno, nessuno e centomila (Milano: Oscar Mondadori, 1972), 88 [originally published in 1926].
aesthetic point of view. This perspective can add significant elements to the pure theoretical, historical, or aesthetic approaches. In particular, the preservation perspective highlights the interconnections between the material, human, technological and social dimensions of film sound, while other approaches consider them separately.

Brandi’s work has already been referenced in the first theories on film restoration made by Italian film preservationists and historians during the 1990s. These professionals and scholars applied Brandi’s principles by considering film restoration as a work of art. Here, instead, my intent is to use Brandi’s concept of material form to define film sound in theoretical terms. Therefore, I expand the application of Brandi’s concepts to the issue of film sound, which was not discussed in the 1990s because film restoration at that time was centered on early “silent” films. I also read Brandi’s writings in light of new developments within film preservation theory, which are less-focused on the restoration of a single film as a work of art and more engaged in issues of mass digitization, broad access, and open archive.

According to Brandi, the experience of a work of art depends on the dialectic between form and material: the form (forma) is the image, while the material (materia) is the epiphany (epifania) of the image. The form is manifested through the material, the physical medium. In other words, the form represents the way in which the work of art’s materiality is perceived and interpreted by the human subject.

Brandi considers the form and the material as both equally important in the perception and transmission of a work of art. Moreover, in a work of art, there is no definite separation between material and form, but a close interconnection: the material—the physical means through which the image manifests itself—is coextensive to the form:

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265 Brandi recognizes two kinds of errors in giving priority to the form or to the material: “The error is concealed in the view – dear to the positivism of Semper and Taine – that material generates or determines style. This sophistry stems from paying insufficient attention to the distinction between structure and appearance, and from assimilating the material, as the vehicle of the image, into the image itself. In effect, the appearance taken on by material in a work of art is being considered as a function of the structure. At the opposite extreme, the role of the material in the image may be neglected (as occurs in formal aesthetic theory). This arises when material’s importance as structure is not recognized. Thus the same result is reached: the assimilation of the material’s appearance into form, dissolving the material’s structural aspect.” Cesare Brandi, Theory of Restoration, 52.
But the physical medium to which the transmission of the image is entrusted does not merely accompany it; on the contrary, the medium and the image coexist. It is not a question of material on the one hand and image on the other. Nonetheless, despite the material’s coexistence with image, it is not completely subsumed within the image. Some of the physical structure will be acting as supports for the parts that are actually transmitting the message, though the reasons these are needed and the image’s maintenance are closely linked. Examples would be the foundations of a building, the panel or canvas of a painting, and so on.266

If we apply Brandi’s theory to cinema, the form is the image and the material is the film carrier. However, if the form is the image, where does the sound fit in? Even though Brandi focuses only on visual arts, he does not forget the dimension of sound; in the following passage, he recounts the importance of materiality, intended as “the physicality that is needed for the image to arrive at one’s consciousness,”267 also in the sound dimension, referring in particular to sound in poetry and music:

This physicality may be minimal, yet it is always there, even when it virtually disappears. For example, the objection could be made that a poem, if read silently, only with the eyes, needs no physical vehicle, in that writing is merely a conventional tool for indicating certain sounds. In theory, one could even create a poem with a series of symbols, knowing only what they mean but not how they are pronounced. This is a mere quibble. Not knowing the sound that corresponds to the symbol does not imply that the sound is unnecessary to the substance of the poetic image. The image would be as diminished in its figurativeness as the famous compositions of ancient paintings for which there is no image, only a description. The need for sound exists, and even if the sound is not supplied, it lives in the totality if the language’s image, which every speaker possesses fully, and gradually activates internally.268

Brandi concludes that there is a physical materiality in music, and that this materiality influences the form that music takes during a performance.

And so, time still goes by, even for such works of art as poetry, that seem more immune to it. Here, too, time has the same effect as it does on a painting’s colours, or on the hues

266 Ibid., 49.
267 Ibid., 62.
268 Ibid.
of marble. Music is equally affected, for ancient instruments have been so greatly modified – for tone as well as pitch – that nothing is more approximate than the way Bach sounds on a present-day church organ, or even Corelli and Paganini on a violin of their period, fitted with metal strings.269

This last consideration establishes a possible link between music and film sound preservation. The material form of music changes over time according to the type of instruments used, the musicians’ performance, and their techniques. In other words, the same music score assumes a different material form depending on these factors, but also on the configuration of the space. Similarly, the same film sound trace played by different projectionists, in different spaces, and through different devices, results in different film sound forms.

Film sound as material form is defined by the interrelation of the following three factors: the sound carrier as a material object in its different forms (optical, magnetic, digital, vinyl, and others); the sound dispositif, which refers to the recording, postproduction, and playback technologies and to the techniques adopted by the operator; and the sound text as conceptual object, which consists of the music score, dialogue, and effects.

The three dimensions of film sound as material form are interconnected and dependent on one another. This relationship means that a specific sound carrier (e.g. optical soundtrack) requires a specific device to be read (e.g. a sound head in the projector and an amplification system) and a specific technique (e.g. the Academy filter) to be adopted by the human actor (the projectionist). All of these elements influence the material form of film sound, how film sound is presented to the listener’s ears and how it is experienced by the audience in a particular cinematic event.

The analysis of the Tonbilder case study in chapter three is helpful for conceptualizing film sound as a material form. The description of Tonbilder films, which I made from the perspective of preservation, was based on three dimensions. First, I considered the dimension of the carrier: the peculiarity of these movies is the distinction between the image carrier, the 35 mm film stock, and the sound carrier, the shellac discs. I then described the dispositif, which refers to the relationship between human actors and technological devices in production and reception. The conception of dispositif not just as an apparatus but as the interrelation between a human actor and

269 Ibid., 63.
technological devices derives from the analysis of this case, in particular from the consideration of the importance of the projectionist’s performance for synchronization during screenings. In this frame, I interpreted Messter’s repeated technological improvements as continuous re-adjustment of the interrelation between human and technological actors. During production, the camera and gramophone devices were used by the technical and creative crew in different ways in order to create the synchronization of sound and image. During exhibition, the technological devices included a 35 mm projector that was linked to a gramophone and the related amplification system. The human actor, the projectionist, and the techniques that he or she adopted during projection played an important role in the resulting synchronization of the films. The third factor is the film’s textual dimension, namely, short comic scenes and musical numbers. In the description of this case, I underlined how much these three dimensions are interconnected not only in terms of production and reception, but also for preservation purposes.

All these dimensions put together define the material form of film sound. The carrier relates to the material dimension of film sound, which is how the sound trace and signal is recorded. The dispositif refers to the human and technological dimensions, which is how the sound trace is played back by the reading and amplification devices and through the work of the projectionist. The textual dimensions concern the content and meaning assigned to film sound through reception.

If one of the aims of film preservation is to preserve film sound as integrally as possible, all these dimensions should be taken into account. These dimensions are therefore crucially important for the work of film preservation and presentation. The carrier guarantees the survival of the recording trace in the future, and therefore has to be preserved. The dispositif is necessary to display the film to the public; moreover, the knowledge of the historical dispositif gives information on how to preserve and present archival films properly. The integrity of the text favors the reception and understanding of the film by the contemporary public.

These considerations regarding the preservation of the Tonbilder films prompt me to identify the elements of film sound as material form, but at the same time reveal that these elements do not only pertain to film sound but also describe film as a whole. Film sound can be separated from the image for analytical purposes, but on a theoretical level it should be considered together with the image, as a whole body. The consideration of film sound as an independent entity risks a promotion of the hegemony of the sound
instead of the hegemony of the image. The cinematic experience contradicts a rigid separation of the two: the reception of film always includes visual and sound perceptions together. In consideration of this, film theory and film preservation should consider image and sound together. A valuable definition of film sound, therefore, takes into account the image as well. For this reason, then, I now move from the definition of film sound as material form to a more general definition of film as material form, which includes the image and accommodates the specific nature of film sound.

Film as material form can also be separated into our three dimensions: the film carrier, the film dispositif, and the film text. In the definition of the dimensions of material form, I was inspired by Barbara Flückiger’s suggestion that “we should make a distinction between the film as a text (i.e. as a conceptual object), the film as a token (i.e. as a material object), and the film as a performative instance in projection.”

The first dimension regards the film carriers, the material objects that convey the cinematic information. In the analogue domain, the materiality of the carrier concerns the physical, chemical, and mechanical characteristics of the physical base: the filmstrip. The structural elements of the film carrier include the film format (8 mm, super 8 mm, 9.5 mm; 16 mm; 17.5 mm; 35 mm; 70 mm), perforation type (KS, BH, etc.), edge codes, aspect ratio (1.37:1; 1.66:1; 1.85:1, 2.20:1, 2.40:1), film base (nitrate, acetate, polyester), film emulsion (black-and-white, color, negative, positive, reversal, dupe), sound carriers (optical, magnetic, digital), and sound type (variable density, variable area, optical mono, optical stereo, Dolby A, Dolby SR, Dolby Digital SR.D, DTS, SDDS). In the digital domain, the structure refers to the carrier that stores digital cinematic information and also to the format and encoding characteristics of the digital files that contain the audiovisual information.

From a preservation perspective, it is advantageous to enrich the dimension of film carriers with the notion of “film body,” as defined by Barbara Flückiger. With the term “film body” I refer to the film in its entirety, as the entity composed of the different carriers that store different parts of information related to an individual film title. In the case of the Tonbilder films, for instance, the cinematic information is stored on two material objects: a 35 mm film for the image and a shellac disc for the sound.

270 Barbara Flückiger, “Material Properties of Historical Film in the Digital Age.”
271 For a definition of the technical terminology, see Paul Read and Mark-Paul Meyer, Restoration of Motion Picture Film.
272 The notion of a film’s body is discussed by Barbara Flückiger, “Material Properties of Historical Film in the Digital Age.”
Different carriers exist and are played as single entities, but the film in its entirety, as a whole body, is complete only when all the carriers containing different parts of the cinematic information related to a title are gathered together. This observation also refers to the recording of a film on multiple film rolls: if a roll is lost, the other rolls can still be screened, but the film as a body is incomplete.

The second dimension relates to the film dispositif, which refers not only to the technological devices (technological actors) used to produce and display the film but also the technicians (human actors) and the techniques adopted in employing the machines and devices. In this sense, film is considered as the product of a specific industrial and technological system: some particular technologies enable the media object to be produced and distributed for release as well as to be transferred to a different media format for future access. The film dispositif depends on the interrelation of technological devices and human actors: the technological devices exist also when not in use, but it is only when the machines are triggered by a human actor in a certain spatial and temporal context that the dispositif dimension is set in motion. The techniques used by the human actors influence the resulting projection. Through the dispositif, the film gains its appearance and is experienced by the audience. Without the dispositif, the film remains a potential form imprisoned in its body.

The third dimension, the film text, refers to a film’s content and meaning as it is perceived, experienced, and interpreted by human subjects. This dimension concerns what Brandi calls form, which is the image as perceived by a person viewing a work of art, and is related to the spectator’s perception, conceptualization, and interpretation.

After describing the distinctions between these three dimensions, the carrier, the dispositif, and the text, I would now like to once again highlight their interconnections. These three dimensions of film as material form are in fact interrelated (“coextensive” in Brandi’s terms): the material identity of film is defined by the interrelationship of these three factors. Therefore, the material form is not a stable object, since it changes

273 A definition of the distinction between film technologies and techniques is given by Simone Venturini: technology is “the entirety of apparatuses and elements of the applied technological research at disposal during film production,” while techniques are “the modes and processes of technical and cultural production of the film, where production should be intended in the etymological sense: to extract, reveal, give meaning to, that is, to produce a complete and coherent audiovisual text.” My translation from the original: “a) le tecnologie, nel nostro caso e limitatamente al sonoro, il complesso di attrezzature ed elementi della ricerca tecnologica applicata a disposizione del gruppo produttore durante il periodo di genesi del film; b) le tecniche, i modi e i processi di produzione tecnica e culturale del film, dove produzione è da intendersi in senso etimologico: estrarre, rivelare, dare senso, ovvero produrre un testo audiovisivo compiuto e coerente.” Simone Venturini, “Tecnologie, tecniche, testi. Problematiche teoriche e metodologiche di restauro del film sonoro italiano dei primi anni Trenta,” 52.
continuously as different subjects experience the film in all its dimensions (carrier, dispositif and text) in different places and times and through different media.

The material form and the trace represent two aspects of the nature of film sound in particular, and of film in general. Film (sound) as material form is related to the form that the material object takes when displayed in a specific dispositif and in a specific space; it represents how film (sound) is experienced by the audience in a particular cinematic occurrence. Film (sound) as trace concerns the passage of film (sound) throughout the dimensions of time, history, and memory, and refers to the internal history of the physical trace and the external history of the mnemonic trace, how film enters individual and cultural memory. The film material object that is closed in the archive or forgotten in a cellar can be considered a trace that is subject to time. Film reveals its material form when it is experienced and perceived by an audience in a specific cinematic event, which can be defined as performance. Whereas film (sound) as material form regards the cinematic experience, film (sound) as trace is linked to film’s cultural memory.

There is a symbiotic relation between material form and trace: the material form influences the historical trajectory of the trace and vice versa. The Tonbilder case demonstrates this relationship: the material form of the Tonbilder films, which is characterized by the separation of the image and sound carriers, influenced the tradition of Tonbilder traces, which refer to the internal history of the films (how time affected the physical trace recorded on carriers) as well as the external history (considering that the presentation of Tonbilder films stopped when the material form could not be displayed in theatres because of a change in projection devices). Similarly, the internal and external histories of Tonbilder films as traces impacted the material form: for instance, the damage to the film and discs that occurred through time or use modifies to a certain extent how the film was perceived by the public during a specific cinematic event. For instance, the splices made by the projectionists during the exhibition of Tonbilder films caused the loss of frames: this compromised the synchronization of the image and sound for future screenings, and thus also the audience’s reception.

Evidence of this relation between material form and trace can be found also in the EYE case study. Experimentation in film preservation and presentation influenced the tradition and history of film traces. For instance, the experimentation with the sound of the silent films Zeemansvrouwen and Beyond the Rocks changed those films at the level of the material form, how the films were experienced by the audience in the screening
of the restored versions. But those screenings became part of the external history of the films, so the experimentation also changed the film as trace, how the films entered individual and cultural memory and how they will be transmitted to the future.

In the next section I will interpret film preservation and presentation in the frame of this symbiotic relation between film as material form and film as trace, between the space of the experience and the time of memory.

5.5 Preservation and Presentation of Film Sound:
Between Experience and Memory

Experience is indeed a matter of tradition, in collective existence as well as private life. It is the product less of facts firmly anchored in memory [Erinnerung] than of accumulated and frequently unconscious data that flow together in memory [Gedächtnis].
— Walter Benjamin

In the previous sections, I outlined a definition of film sound as trace, performance, and material form originating from the observations on film sound preservation and presentation practices described in the case studies, which highlighted the material, technological, human, institutional, social, and cultural dimension of film sound. The concepts of material form, trace, and performance, elaborated from the practices, can be constructively applied to film preservation and presentation theorization. Thus, in this last section I widen the discourse from film sound to film in general, intended as a body composed of images and sounds, and from film sound to film preservation and presentation in general, conceived as the work of film heritage institutions. This work can be interpreted using the concepts of trace, material form, and performance, as I suggested in the beginning of this chapter. The work of film heritage institutions acts in a double axis, where film sound as material form and performance refers to the space and experience axis, while film sound as trace relates to the time and memory axis.

Film preservation theories deal primarily with the question: how can film heritage be preserved, restored, and presented? The varied answers to this question highlight

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different approaches to film preservation. I use the concepts from the theoretical model that I previously described to individuate different approaches with regard to film restoration.

The first approach concerns the restoration of “film as original text,” which is the film as originally produced and distributed and what can be defined as *Urfilmtext*. The idea of trying to recover the original text often entails the attempted elimination of the traces of time, negating the history of the material object. With regard to this approach, Paolo Cherchi Usai references the “model image,” which lacks a history:

> The main aim of each project of preservation of the moving image is therefore, *strictu sensu*, an impossible attempt to stabilise a thing that is inherently subject to endless mutation and irreversible destruction. Trying to impose a reversal of this process (a goal incoherent in itself, as no reconstruction of the moving image can be accomplished without trying to imagine what the Model Image looked like, thus separating it still further from a previous character which itself is unknown to the preservationist) is tantamount to a denial that the moving image has a history.

Another approach is aimed at the restoration of “film as occurrence,” which implies preserving a particular version of the film; for example, the version screened during the first public projection or the one licensed by the director. A third approach regards the restoration of “film as material object, as physical copy, as carrier,” which involves restoring the physical copy without adding materials from other copies. All of these approaches are focused only on one aspect and risk neglecting the other elements that define film as material form and trace, and cinema as event and occurrence. It is therefore productive to elaborate on the definition of film preservation to include the different elements of the model that I have described.

Film preservation work primarily addresses film as material object and its material characteristics. Film preservation work regards the dimension of time: it acts in the present, on material objects of the past, with the goal of transmitting the film trace and form to the future. This work deals with the continuous passage and transition of

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275 A first classification of approaches to film preservation is made by Fossati, who individuates four frameworks: “film as original,” “film as art,” “film as dispositif,” and “film as state of the art.” Giovanna Fossati, *From Grain to Pixel*, 158.

276 Urtext is used to indicate the original text in human sciences. It is formed by adding the prefix Ur, used in German language to indicate the origin or the primordial state of something, to the word “text.”

film forms through different dimensions of time, and aims at preserving the traces of time, possibly avoiding the eradication of time from audiovisual traces and vice versa.

Observations made regarding film sound can help clarify how to add the notion of trace to film preservation theory. As discussed in the second section of this chapter, film sound preservation and restoration can be considered as a practice that acts in the field of noise: noise, intended as unwanted sound, is the gray area where time and other factors change the materiality of film sound. I distinguished between the noises inherent to the carrier and the device, which were already present when the film was first exhibited, and the noises caused by the dispositif and by the passage of time.

These considerations can be applied to film preservation and restoration in general, including also the image component. The film object, like an archaeological artifact, displays marks left by different temporal occurrences. If noise can be a trace of time in the sound dimension, other types of time marks pertain to the visual dimension (e.g. dust, scratches, color fading). Preservation practices can be interpreted as a process of identification and discernment between the marks and signs inherent to the technological device, the ones inherent to the carrier, the ones caused during film exhibition, and ones generated by the passage of time. The marks caused during film exhibition by the dispositif are signs left by the devices that played the film (e.g. the scratches and tears provoked by the projection device) and by the human actor who handled it (e.g. cuts and splices in the copy, punch holes to sign the reel change, written annotations). The marks caused by the passage of time include the modifications due to physical and chemical processes of decomposition of the carrier. Dust, humidity, heat, fungi, bacteria, and other agents can affect the physical carrier as well as the image and sound traces recorded on it. The discernment between these different marks can be useful for arriving at and justifying the decisions regarding which marks should to be preserved and which should be erased.

Along this line of reasoning, film can be interpreted as having a field of variability (the elements of the film form that change over time) and a field of invariability (the elements that persist). The presence of variable and invariable elements is underlined by film historian Alberto Farassino:

In the film text as a whole, there are components created to last and ensure transmissibility (namely, film carriers, in different stages: negative, positive, lavender, etc.) and then there are other components that are renewable but always different, and are
made to maybe wear down during a single projection. [...] Cinema is the medium of continuous retexualization: each screening of a film establishes, even because of small variations, a new text for the next projection.  

This consideration suggests that film as material object is reproducible, but cinema as spectacle is not. The field of invariables is linked to the notion of film as a material carrier capable of preserving recorded information, while the field of variables pertains to the dimensions of cinema as an event and involves the dispositif, the space, and the institutional context.

Nevertheless, this demarcation is nuanced, since there are some variables that affect the material object, such as the marks caused by the passage of time and the decay of the physical copy. There are also invariables in the film exhibition context that involve the technological standards established over time (e.g. the film projection speed of 24 frames per second as well as film sound standards, such as the Academy Curve or the Dolby noise reduction filters). This last consideration in particular influences film preservation: even if the material objects, the carriers of cinematic information, are preserved in the best way possible from aging and decomposition so that the invariable characteristics of the film are safeguarded, the material form of the film will necessarily change when it is presented. This is because the dispositifs through which the carriers are displayed change over time, as well as the space and the institutional context of presentation. Along these lines, Fossati observes that the continuous evolution of the dispositif makes presentation of archival films a re-interpretation:

Film archival practice is traditionally intended as the practice that preserves, restores, and presents film heritage so that it is true to the original, both as a historical and aesthetical artifact. However, no matter how true to the original a film archivist tries to be, the restoration and presentation of film heritage always implies a re-contextualization. Indeed, a film made and projected in another era has not only been presented through a different technological apparatus, but has also been experienced by an audience with a very different relation to the medium. In other words, the whole film dispositif changes

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278 My translation from the original: “Nel testo filmico globalmente inteso esistono delle componenti pensate per durare e assicurare la trasmissibilità (sono appunto i supporti, nei loro vari stadi: negativo, positivo, lavender, ecc.) ed esistono poi altre componenti rinnovabili ma sempre diverse, fatte per esaurirsi nel corso di una proiezione. [...] Il cinema è il medium della continua ritestualizzazione, ogni proiezione di un film stabilisce, anche solo per piccolissime varianti, un nuovo testo per la proiezione successiva.” Alberto Farassino, “Un cinema corrotto,” in Il restauro cinematografico: Principi, teorie, metodi, 69.
with time and any (re)presentation of archival films is by necessity a re-interpretation.\textsuperscript{279}

In order to be presented and experienced in the present and future, \textit{film as material form} is subject to a continuous process of migration (the adaptation of the material object to the presentational \textit{dispositifs}) and re-contextualization (the presentation of film in a particular space and context of exhibition).

Following these considerations, \textit{film preservation and presentation can be described as the work aimed at the preservation of the audiovisual trace through managing the variables and invariables involved in the processes of migration and re-contextualization}. In other words, preservation and presentation decisions are aimed at mediating the temporal dimensions by dealing with the fact that part of the material form survives over time, and part of it only emerges in the \textit{performance}.

As I have noted in the analysis of the \textit{Tonbilder} preservation project, when \textit{film as material form} is subjected to migration, some elements of the material form change, others disappear, and the rest remain. The choices made in preservation work are often determined by what elements should be preserved and what elements will consequently change in the process. In the \textit{Tonbilder} case, for instance, it was decided that the loose synchrony between image and sound was a characteristic of the material form that should be maintained in the reconstruction: attempting to obtain a perfect sync would have hidden a trace of the separation of the image and sound carriers as well as a trace of the exhibition practice in which synchronization was obtained through the projectionist’s performance. This decision demonstrates an approach to film preservation that is not only focused on the material carrier, but also takes into account other dimensions, such as the \textit{dispositif}, the space, and the \textit{performance}.

These dimensions can and should be considered not only in film preservation activity, but also in film presentation, as I have explained in chapter four through analysis of the presentation activity of the EYE Film Institute Netherlands. I observed that the form of sound in auditory perception and experience depends on the playback and amplification system (\textit{dispositif}) as well as on the configuration of the space (diffusion and reverberation of sound waves) and the institutional context (the activities and decisions of the people working in the institution).

\textsuperscript{279} Giovanna Fossati, “Filmmaking, Film archiving and New Participatory Platforms,” 178.
These observations led me to the formulation of a possible answer to the initial question of this section, regarding what and how can film be preserved, restored, and presented through the work of film heritage institutions. Film preservation work can be aimed at preserving, restoring, and presenting film as audiovisual trace and film as material form in all of its dimensions (the film carrier, the film dispositif, and the film text). The work of film heritage institutions can preserve film as material form and audiovisual trace, but also the experience of the former and the memory of the latter. The intent of this work can be described as the attempt to set up the space (context) and preserve the time (different temporalities) of film.

Film heritage institutions act on this double axis. The x-axis, which represents the dimension of space and experience, is related to the concept of film as material form and performance. The y-axis, corresponding to the dimension of time and memory, refers to the concept of film as audiovisual trace. In particular, the preservation activity regards the y-axis, being aimed at the storage and tradition of the audiovisual trace for future access. The presentation activity involves the x-axis, cinema as event, meaning the transmission of the material form to the public.

This double axis model can also be interpreted using as metaphor Elsaesser’s conception of the Mystic Writing Pad model, which was described in chapter two as based on two levels: the storage and the transmission of information. The x-axis, defined by film material form and experience, can be interpreted as similar to the transmission level. The y-axis, characterized by film trace and memory, recalls the storage function of the Mystic Writing Pad model. The double axis model is constructed by the relation between the tradition of the audiovisual trace and the transmission of the material form.

The double axis model illustrates the relationship between preservation and presentation: preservation and presentation are two interconnected and symbiotic activities. This interconnection has been highlighted on many occasions throughout this research. In theoretical terms, preservation is a precondition for presentation, while presentation is the main justification for preservation. In more practical terms, the decisions undertaken when preserving a film not only influence the outcomes of presentation, but they are also influenced in turn by the presentation setting. Along these lines, Cherchi Usai argues for an integrated approach in preservation and presentation:
the way you present a moving image is dependent on the way you preserve it, and it is dependent, in turn, on the way you decide to acquire a given work. I think one of the imperatives of our profession now is to demonstrate, in a persuasive manner, the importance of an integrated approach to archiving and curating, which incorporates the acquisition process, the preservation process and the presentation process.²⁸⁰

Throughout my research, I have discussed not only the interconnections between preservation and presentation, but also the interrelation between the different concepts and dimensions that I used to define film sound. In chapter three I investigated the relation between the dimensions of the carrier, dispositif, and text, in film sound preservation practices. In chapter four I described the relation between dispositif, space, and institutional context in film sound presentation practices. These relations are summarized in this chapter through the elaboration of three concepts to define film sound: trace, material from, and performance. These concepts are considered in an integrated biaxial model that can be used for the analysis of film sound, as well as for the interpretation of film preservation and presentation.

Taking the different elements of the model into account does not mean that all of them have the same importance: in preservation practices, the decisions undertaken often tend to privilege one aspect of the model (e.g. the material object, the dispositif, the presentation setting, or the original text). An example of the implications of recognizing different elements in the model can be found in the treatment of noise in film sound restoration practices. The consideration of the different dimensions of film sound permits the identification of noises inherent to the carrier and the device, and the noises derived from the dispositif and caused by the passage of time. This discernment can help in deciding which noises are to be preserved, attenuated, or erased. By including all these different dimensions, the model can serve as a tool in the decision making process, and also in the interpretation of this decision after the fact.

The decision making process is also influenced by the institutional context of film preservation and presentation. As I have observed in the introduction, preservation and presentation are not just practical activities, but social activities of interpretation that involve public actors (film heritage institutions, laboratories, manufacturers of film and film equipment), human actors (film archivists, restorers and preservationists, curators,

lab technicians), and technological actors (the technological devices and equipment). The practices and choices depend on the institutional context, and on the interaction of the individual, social and technological actors involved in film preservation.

Additionally, film heritage institutions are involved in a larger network that includes social actors that are involved in film production (e.g. filmmakers, film production companies), distribution (e.g. film distribution companies, rights holders), preservation (e.g. film heritage institutions, film and digital laboratories), and reception (e.g. audiences and users). Film preservation and presentation deal with all these different contexts. For instance, when discussing noise, I underlined that film archivists and preservationists should also take into account the social phenomena surrounding them, such as the soundstalgia phenomena or the use of noise in sound art practices, in order to integrate their actions in the social sphere. In other words, the practice of preservation is a social activity of interpretation that depends both on the actors involved and the context in which it is performed.

Being part of the work of film heritage institutions, film sound preservation and presentation is affected by all the different elements and dimensions that emerged in the theoretical model of this final chapter. The consideration of the key concepts of this model (material form, audiovisual trace, performance), both in film theory and preservation practices, can help in the acknowledgment and valorization of the different dimensions of film sound, that I traced in the introduction: the material, technological, human, institutional, experiential and memorial dimensions.