

A Symphony of Noises: Revisiting Oskar Sala's 'Geräuschmontage' for Alfred Hitchcock's 'The Birds' (1963)

Julin Lee

Ludwig-Maximilians-Universität München, Germany

Julin.Lee@campus.lmu.de

Date received: 10-10-2019

Date of acceptance: 30-11-2019

KEY WORDS: FILM MUSIC | SOUND DESIGN | SOUND STUDIES | MATERIAL CULTURE STUDIES | ORGANOLGY

ABSTRACT

The soundtrack of Alfred Hitchcock's *The Birds* (1963) is particularly remarkable, not only because of the absence of a conventional orchestral underscore, but also because the terrifying sounds of the aberrant birds were actually synthesized by Oskar Sala using the *mixturtrautonium*, an electronic musical instrument of his own design. This paper explores the extent to which these electronically synthesized bird sounds go beyond their diegetic placement as sound effects and take on the dramaturgical roles usually ascribed to non-diegetic film music. The more liberal definition of music as "organized sound", in use since the 20th century; Sala's musical background and that of the instrument; and the idiomatic use of electronic musical instruments in films to represent unusual phenomena are all considered. Drawing on the results of a detailed study of the film and referring to material produced by Oskar Sala housed at the Deutsches Museum Archives in Munich, this paper aims to explain how the bird sounds achieved their dramatic effect, and also to shed light on how Sala "composed" this soundtrack consisting of bird sounds. The examination of the film's soundtrack has shown that Sala's organization and use of bird sounds are akin to that of more conventional and tonal sonic material in Hollywood films. Firstly, the montage of bird sounds

accompanying the title sequence has a formal structure which resembles a classical Hollywood film overture, and takes on several expositional roles conventionally assigned to a film's opening musical passage. Furthermore, the gull cries adopt the function of a leitmotif, while the stylized bird sounds perform emotive functions usually ascribed to film music. In addition, the hostile birds are characterized by electronically synthesized bird sounds – a representation which can be understood within the broader context of mankind's ambivalence towards machines and technological progress in general. The consideration of the musical provenance and materiality of these bird sounds affords us a moment of reflection on the sound effect-music divide in film as well as on the perceived aesthetic values of sounds in the noise-music continuum.

The research for this article was facilitated by the funding provided by the Leibniz Association as part of the 'Materiality of Musical Instruments' project at the Deutsches Museum, Munich.

Introduction

“We certainly would be doing an injustice to *The Birds* if we failed to mention the soundtrack. There’s no music, of course, but the bird sounds are worked out like a real musical score” (Truffaut, 1967, p. 223). In this quote from his interview with Alfred Hitchcock, the film director François Truffaut was referring to the array of bird cries and the flutter of wings which constitute the extraordinary soundtrack of Hitchcock’s 1963 film *The Birds*. The film follows the young socialite, Melanie Daniels, who travels to Bodega Bay in pursuit of her love interest: Mitch Brenner. There, she and the locals are mysteriously plagued by a series of unexplained and violent bird attacks, from which Melanie and the Brenner family narrowly escape.

Truffaut touched on two particularly interesting aspects of the film’s soundtrack. Firstly, he pointed out that *The Birds* has no film music in the conventional sense of a non-diegetic, orchestral underscore. This omission is perhaps rather surprising considering Hitchcock’s highly successful collaboration with Bernard Herrmann, who composed the iconic score for *Psycho* (1960) – his latest film prior to *The Birds* – and *Vertigo* (1958) before that. Secondly, Truffaut suggested that the bird sounds seem to have been employed in place of a musical score. This point is worth investigating in greater detail given the musical provenance of the bird sounds: the screeching of gulls, crows and sparrows along with the sounds of their flapping wings did not come from actual birds but were instead synthesized by the musician Oskar Sala using the *mixturtrautonium*, an electronic musical instrument which he himself developed. Owing to the absence of a conventional orchestral underscore, this paper aims to investigate the relevance of Truffaut’s comment, asking: to what extent do the bird sounds go beyond their diegetic placement as sound effects and take on the dramaturgical roles usually ascribed to non-diegetic film music? Besides aiming to explain how the bird sounds achieve their dramatic effect, this paper also tries to shed light on how Oskar Sala “composed” the soundtrack of bird sounds, with reference to two of Sala’s extant manuscripts and digitized tapes housed at the Deutsches Museum Archives in Munich.

Bird sounds as film music?

By the start of the 20th century, traditional conceptions of what could be regarded as music began to dissolve. Visionaries such as Ferruccio Busoni stressed the need for new musical instruments, which would free music from the twelve-tone tempered scale and the limiting concepts of consonance and dissonance (1911). In 1913, Luigi Russolo published his radical manifesto *The Art of Noises*, in which he advocated the creation of music using eve-

ryday sounds, including noise. He implored “futurist composers” to “enlarge and enrich the field of sound” including substituting “the limited variety of timbres that the orchestra produces today” with “the infinite variety of timbres in noises, reproduced with appropriate mechanisms” (Russolo, 1986, p. 28). Along these lines, Russolo envisioned a “futurist orchestra” comprised of “6 families of noises” (Russolo, 1986, p. 28) which included mechanically produced animal sounds. The point was not to merely imitate sounds in everyday life, but to combine different timbres and rhythms afforded by such an orchestra in order to achieve “the most complex and novel emotions of sounds” (Russolo, 1986, p. 29). As early as the 1920s, the composer Edgar Varèse preferred to call his music “organized sound” and referred to himself as “a worker in rhythms, frequencies, and intensities” (Varèse & Chou, 1966, p. 18). Highlighting the relevance of timbre as an essential component of form, he sought to “make music with any sound and all sounds” (Varèse & Chou, 1966, p. 18). In a lecture delivered in 1937, John Cage proclaimed that “the use of noise to make music will continue and increase until we reach a music produced through the aid of electrical instruments”, which he believed would “make available for musical purposes any and all sounds that can be heard” (Cage, 1961, pp. 3-4). Cage believed that such instruments would enable composers to fully control a sound’s physical parameters: its overtone structure, frequency, amplitude and duration, and also give composers unprecedented access to a vast field of sound for both musical and extra-musical purposes, including film (Cage, 1961). Given the more liberal understanding of music from the 20th century onwards, the bird sounds in *The Birds* would qualify as music. Philip Brophy (1999) has compared the collage-like combination of bird sounds to the treatment of recorded sounds in compositional practices of *musique concrète* as developed by Pierre Schaeffer in Paris in the 1940s. Meanwhile, Richard Allen (2017) has pointed out that since the bird sounds were synthesized electronically, Sala’s composition methods were more closely related to that of the electronic music tradition of the 1950s based in Cologne. As “functional music”, film music is admittedly always subject to the film narrative. Its compositional principles and goals thus differ from those of avant-garde music. Nevertheless, according to the aesthetic perspectives of the 20th century, the bird sounds synthesized on the *mixturtrautonium* do indeed count as musical material. Furthermore, Oskar Sala was a classically trained musician. A trained pianist and organist, he studied composition at the Berlin Academy of Music under Paul Hindemith, who introduced him to the inventor Friedrich Trautwein. In the Radio Research Section housed at the Academy, Sala assisted Trautwein in the development of the *trautonium*, which was conceived as a new electronic musical instrument. Following the instrument’s successful debut at the Berlin *Festival for New Music* in 1930, Sala toured extensively as a *trautonium* virtuoso during his career, which spanned the Weimar Republic, the Third Reich and post-World War II Germany. He successfully developed the instrument further to create the *mixturtrautonium* in 1952, which he used to produce over 300 soundtracks for film and television in his studio in the Charlottenburg district of Berlin. He found his niche in under-

scoring and providing sound effects for numerous cultural features and industrial films. Particularly noteworthy achievements include his work for the industrial film *Stahl, Thema mit Variationen* (1960) by Hugo Niebeling, which was awarded the Grand Prix at the *Industrial Film Festival* in Rouen in 1961; and the short film *A fleur d'eau* (1962) by Alexander Seiler and Rob Gnant which won one of the two Grand Prix awarded to short films in Cannes in 1963. The avian sounds in *The Birds* – which remains Sala's most famous work internationally – therefore have a markedly musical provenance.

Due to their unusual timbre, electronic musical instruments were often employed in Hollywood science fiction films, psychological dramas and horror films in conjunction with unusual phenomena. Before the advent of commercial modular synthesizers, film music composers such as Bernard Herrmann and Miklós Rózsa used early electronic musical instruments such as the theremin to create effects in specific situations: signalling the presence of aliens in *The Day the Earth Stood Still* (1951) and underscoring the amnesia of the protagonist in *Spellbound* (1945), for example. Considering that *The Birds* deals with birds that behave in an unnatural manner, it is fitting that the bird sounds were electronically synthesized. The first film to feature a fully electronic score was Fred McLeod Wilcox's *Forbidden Planet* (1956). Louis and Bebe Barrons' ground-breaking score was a departure from conventional film scoring traditions not only because it featured novel sounds generated by its creators' own circuits based on cybernetic theory, but also because it blurred the boundaries between diegetic and non-diegetic sound. The Barrons' soundtrack is thus an important precursor to that of *The Birds*: the bird sounds assume the roles commonly taken up by an orchestral underscore, which is conspicuously absent in this film.

At first glance, the bird sounds appear to merely serve as the acoustic complement to the visual action on the screen. However, taking the aforementioned points together – organized sound as music, Oskar Sala's musical background and that of the *mixturtrautonium*, and the idiomatic use of electronically generated sounds in film involving strange phenomena – could the bird sounds have been treated as extra-diegetic musical material? Could the bird sounds serve as a “musical score” of sorts, as suggested by Truffaut? Perhaps rather more provocatively, are the bird sounds film music?

Methods and archival sources

If we consider these points together, and following on from Truffaut's comment about the film's soundtrack, there appears to be a case for studying the musicality of the bird sounds in order to gain a better understanding of how this unconventional soundtrack works. Given the various approaches to designating the general functions of music in film, this paper will utilize David Neumeyer and James Buhler's concise tripartite classification of music's function in film as narrative (or temporal), emotive and referential, bearing in mind that these functions frequently overlap (Neumeyer & Buhler, 2009). Music facilitates the audience's structural understanding of a film's narrative by various means: different musical

styles may be used to distinguish one scene from another and a continuous musical passage may also be used as a transitional link between two scenes. Additionally, a recurring musical motif “invites the viewer/listener to make associations between temporally disparate segments” (Neumeyer & Buhler, 2009, p. 42), which contribute to the film’s structural unity and narrative continuity. Furthermore, film music may draw on cultural codes to evoke a particular geographic, historical or socio-cultural context. Likewise, music may be used to characterize a character even before the character’s actual appearance or action on screen (Gorbman, 1987). Besides setting the overall mood of the film, music is also capable of instantly evoking or intensifying emotion – a capacity which Neumeyer and Buhler identified as “one of music’s most powerful roles” in film (2009, p. 43). While the film score examples Neumeyer and Buhler refer to in their article mainly consist of tonal music, the film music functions they have outlined can be extended to the avian sounds in *The Birds*, which are arguably ontologically no different from musical tones. Instead of relying on culturally established codes based on melody and harmony, the bird sounds can draw on others based on pitch, rhythm and, most significantly, timbre to evoke an emotional response. The following analysis will serve to examine how the distinctly identifiable bird sounds are equally adept in carrying out the narrative, emotive and referential roles usually ascribed to an orchestral underscore.

While Sala also produced several other diegetic sound effects for *The Birds*, this paper will focus primarily on the bird sounds, which form the majority of the electronically synthesized sounds on the soundtrack. Hence, the title sequence will be investigated first, as it contains one of the longest sustained usages of bird sounds in the film and may serve as a preliminary indication of how the bird sounds are treated as musical material. Next, the potential of the gull cries to serve as a leitmotif will be examined. Subsequently, the emotive potential of the stylized bird sounds and the consequent blurring of diegetic boundaries will be addressed. The paper will end with some thoughts on the materiality of the bird sounds and how acknowledging their electronic origins may enrich the understanding of the film’s narrative. With respect to the degree to which the bird sounds are embedded in the film narrative, they will be analysed in light of the film as a whole and not as autonomous musical pieces. Additionally, two of Sala’s extant manuscripts, the *Protokollheft* and the *Tonbandaufbau* (both ca. 1962) held at the Deutsches Museum Archives in Munich and which have not been included in any publication on *The Birds* to date, were referred to in an attempt to better understand Sala’s approach to composing with these bird sounds. These manuscripts revealed Sala’s organization of discrete sonic materials in relation to each other and to the film’s visual events, besides providing the key to identifying the diversity of finely differentiated bird sounds employed.

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Introduction

Analysis. An overture of avian sounds

Instead of the orchestral flourish that often heralds the start of a Hollywood film, the audience is confronted with an overture of a different kind: a medley of bird cries, which anticipate the sonic landscape to come. Although the film “overture” has not been strictly defined, it can be understood as a “distinct, self-contained, introductory musical entity” (Melvin, 2016, p. 404), which adopts formal, stylistic and functional characteristics of the symphonic overtures in opera and musical theatre. The orchestral film overture is closely associated with classical Hollywood cinema, in which it was used to denote a film’s genre, set the general mood, introduce musical themes and signal the start of the film story (Gorbman, 1987). According to Neumeier and Buhler, the main title music of many American drama films is characterized by the following formulaic structure: “(1) dramatic flourish (sometimes with a clear melody but often not) for the main title itself; (2) break to a lyrical theme; (3) return to a dramatic flourish as the titles finish; and (4) a transition – music usually goes out under the first effect or sound of speech” (2009, p. 48).

On the premise that the electronically generated bird sounds can serve as material for music composition, parallels between the formal structure of the opening montage of bird sounds and that of a classical Hollywood film overture can be detected.

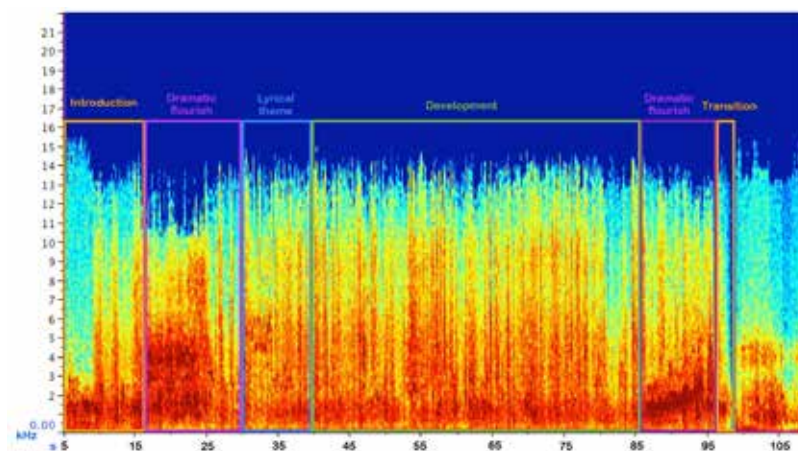


Figure 1: An annotated spectrogram<> of the title sequence showing the formal breakdown of the montage of bird sounds. The horizontal axis represents time and the vertical axis represents the frequency of the sounds. The relative amplitude is represented by the colours: the intensity of the sound increases from blue to yellow, orange, red and, ultimately, dark red.

In the introduction, the first sounds heard are gull cries followed by the fluttering of wings and cawing of crows. The volume and intensity then increases towards the dramatic flourish as Alfred Hitchcock is given credit on screen. This intense section is followed by a contrasting softer, “lyrical” section, which features the chirping of two lovebirds, visually rep-

resented in Figure 2 by the undulating frequency, associated with the romantically linked couple in the film: Melanie and Mitch.

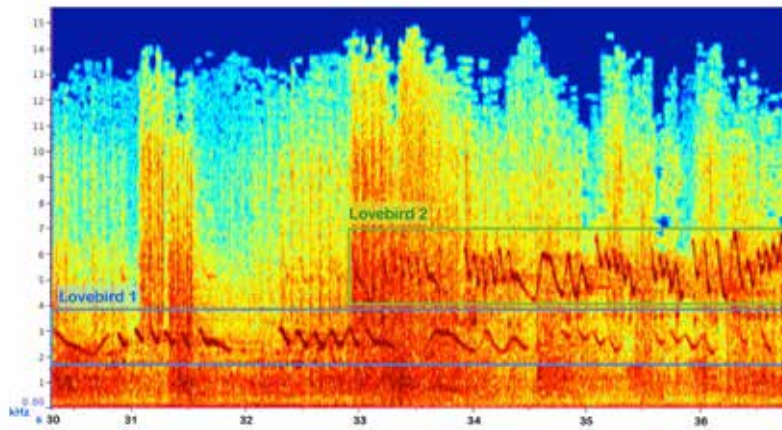


Figure 2: Detailed spectrogram of the lyrical section, in particular featuring the chirping of the two lovebirds.

This lilting bird song is then followed by a mix of bird shrieks which anticipate the attack sequences of the sparrows, crows and gulls. This section, which is comprised of both old and new bird sounds, corresponds to the “development” section of the sonata form typical of overtures in opera (de la Motte-Haber & Emons, 1980). The sonic intensity rises once again at the end of the overture and peaks at the return of the dramatic flourish before the picture fades to black and transitions to the first scene of the film.

Thus, instead of orchestral music presenting musical themes, this montage in the title sequence introduces the cries and wing sounds of all the bird types that feature in this film. The montage of bird sounds, which include persistent gull cries, the solo crow caws, the shrill sounds of the sparrow swarm and the twitter of the lovebirds offers a concise summary of the various bird types and their sounds in the film. Corresponding to the role of overtures as musical summaries of an ensuing opera, this opening montage also functions as an acoustic resume of important narrative events in the film, which are invariably linked to disparate bird species. Therefore, despite its unusual sonic material, the montage of bird sounds can be regarded as an overture of sorts. The title sequence thus provides the first indication that subsequent bird sounds may be organized in a manner close to the tradition of classical Hollywood film music scoring.

Besides establishing the soundscape featuring various bird species, this “overture of bird sounds” is also capable of setting the general mood of the film from the outset, despite not being able to draw on established cultural codes with respect to melody and harmony. Nonetheless, the montage utilizes other musical parameters such as rhythm, pitch, dynamics and especially timbre to evoke an increasingly tense atmosphere, reflecting the escalation in intensity of the bird attacks as the film progresses. At the very beginning, the distant cries of a flock of gulls create a calm atmosphere, reminiscent of a normal situation by the

coast, where gulls are expected. In contrast, the irregular tempo of wing beats accompanying the dark silhouettes of crows flying erratically across the screen adds an element of restlessness and agitation. Although a single crow may not be particularly threatening, being surrounded by a swarm of crows as sonically and visually depicted in the introduction of the overture is by any standards disturbing and unsettling. The loudness and pitch of the bird cries then rise to discomfoting levels at the first dramatic flourish. In the development section, the bird cries become increasingly shrill, mirroring the narrative development in the film, in which the birds become increasingly violent.

It can also be argued that the absence of tonal music in the title sequence also influences the establishment of the film's mood. Without recognizable tunes or other musical (tonal) signifiers of emotion, the audience is deprived of established points of reference and orientation. Additionally, fear is not abstracted in a codified tonal system, but instead directly linked to the bird sounds, making its effect more visceral. Hence, the tense atmosphere is evoked not *in spite* of but rather *because* of the absence of conventional film music as well as the use of the dramatically effective bird sounds.

The gull cries as a leitmotif

The gull cries prove to be a significant acoustic signal which reappears again and again throughout the entire film. Notably, they are also the very first and last bird sounds in the entire film. By framing the film in this manner, the gull cries contribute to the symmetry and unity of the film, which are notably structural roles usually taken up by film music. Their distinct sound and frequent recurrence also enable them to take on the function of leitmotif. A leitmotif can generally be understood as a "concise, recurring musical statement associated with a non-musical object or idea" (Link, 2009, p. 180). Although a leitmotif is in itself arbitrary, it gains its meaning and association with a character, place, emotion or event through the context in which it first appears in a film (Green, 2010; Larsen, 2007). Moreover, it is able to acquire additional meanings through the contexts of its subsequent appearances, through its interaction with other musical motifs and other filmic elements as well as through the transformation of specific features of the leitmotif itself (Gorbman, 1987). Leitmotifs are commonplace in classical Hollywood film scores as they are "extremely economical: having absorbed the diegetic associations of its first occurrence, [the motif's] very repetition can subsequently recall that filmic context" (Gorbman, 1987, pp. 26-27).

In the opening scene, the audience learns to associate the gull cries with something amiss: it would seem unusual for gulls to hover over San Francisco city, as they usually hover over water. Because of this exposition, even though no gulls are seen there is a sense of foreboding each time gull cries are heard as Melanie arrives at the docks at Bodega Bay. It is only after she drops the two lovebirds off at the Brenner's house and leaves that the gulls are seen forming a barrier between Melanie in the boat and Mitch on land, the intensity of their

cries visibly greater than before. This culminates in the first bird-attack on Melanie by a single gull shortly before she arrives on shore. As such, the gull cries subsequently serve as an acoustic warning before an attack occurs.<?>

The gull cries reappear when Melanie brazenly convinces Annie, Mitch's ex-lover, to let her stay the night in her spare room. In this sequence, the gull cries are noticeably louder and their timbre is sharper. Next, the gull cries are heard softly in the background as Melanie arrives at the Brenner's for dinner at Mitch's invitation, despite his mother Lydia's subtle disapproval. Although the evening passes uneventfully, Lydia privately makes Mitch aware of Melanie's scandalous reputation. Undeterred, Mitch sees Melanie off and catches the disconcerting sight of a host of birds assembled on the power lines outside the house. Nonetheless, nothing happens until Melanie reaches Annie's house and decides there and then to attend the birthday party for Mitch's sister, Cathy. When Melanie and Annie investigate the cause of the thud against the door, they discover a dead gull. The bird-attack anticipated by the prior gull cries eventually takes place during Cathy's birthday party, at which all three women are present. Given the unusual bird activity coincides with Melanie's interaction with Mitch and the women in Mitch's life, the attack of the birds has often been read as a metaphor for the conflict between the women competing for Mitch's affections (Horwitz, 1986; Allen, 2002). Since musical themes and motifs are conventionally associated with certain characters, events or themes, the gull cries can be said to be an ominous acoustic embodiment of the conflict between the women. This is therefore an instance in which the bird sounds take on another role usually assigned to non-diegetic film music.

Stylized bird sounds and their emotive potential

Regarding the sound in *The Birds*, Hitchcock commented: "We were really experimenting there by taking real sounds and then stylizing them so that we derived more drama from them than we normally would [...] Until now we've worked with natural sounds, but now, thanks to electronic sound, I'm not only going to indicate the sound we want but also the style and nature of each sound" (Truffaut, p. 224). Sala shared Hitchcock's approach to film sound and stated that in his work he did not generally aim to imitate natural sounds but rather to "acoustically illustrate a subject matter" (Sala, 1955, pp. 99-100). According to Sala, a natural sound should be produced electronically according to the desired pitch, rhythm and dynamics, so that it can be "musically overlaid in a scene" (1955, p. 100). Sala revealed that generating non-realistic bird shrieks for the attack on the Brenner's house yielded far more satisfactory dramatic results than imitating real bird sounds and that, to his surprise, they were still identifiable as sounds coming from birds, despite their stylization (1993, p. 88).

The stylization of sound effects has been a common practice in Hollywood sound films

since the 1930s, when the limitations of sound recording and reproduction technologies resulted in the failure to create the desired dramatic effect: “the dull thud of hooves on the ground did not communicate the sense of urgency that [the filmmakers] wanted in their “horse chase” scenes [...] Even if they could have been properly recorded, the actual sounds for galloping, shooting, punching, stabbing, and so on were simply not theatrical enough for the filmmakers’ needs” (Wierzbicki, 2016, p. 154). Although the stylized, more dramatic sounds reproduced by Foley artists often sound unnatural, audiences have been conditioned over years of film-watching experience not only to accept these stylized sounds as realistic, but to expect them, as they are perceived as sounding more realistic and convincing than real sounds (Wierzbicki, 2016).

In *The Birds*, Sala exerted creative freedom not only in synthesizing the timbre of various bird sounds – giving them a voice that is more shrill and aggressive-sounding than routinely expected from ordinary gulls, crows and sparrows – but also in how they are employed in relation to the spatial setting in which they appear. In certain scenes, the electronically synthesized bird sounds deviate significantly from how they would be expected to sound in the filmic reality.

For example, in the scene in which Melanie and Mitch discover Annie’s dead body, the cawing sounds of the crows perched on the fence are deeper in pitch, distorted and have markedly more echo than would be realistically expected in the scene. The discrepancy between the sound heard and the physical dimensions of the setting suggests a change in perspective into the subjective world of the character. This deviation could be a reflection of Melanie’s trauma, as she has just experienced the attack of crows on the school children and also the terrifying attack of the gulls in the town centre. Echo and trauma are closely related. The physical phenomenon of an echo – the belated return of an original sound – reflects how trauma following a shocking experience persistently re-emerges in a fragmentary, distorted manner in individuals suffering from post-traumatic stress disorder (PTSD) (Greenberg, 1998).

In another scene, the sound of wings flapping lures Melanie to the attic, where she is almost killed by the attacking birds. Once again, there is a discrepancy between the sound’s characteristics and the physical conditions of the scene. Firstly, the sound is disembodied – no birds are visible. Eventually, dozens of birds are revealed in the attic, waiting to ambush Melanie. However, the clarity and volume of the sound suggests that it is not completely diegetically anchored in the scene. Again, the audience is hearing through Melanie’s perspective: due to her ordeal with the birds, her trauma-infused fear makes the flapping sound louder and clearer than expected, or it is plausible that she may be simply imagining the sound. In this respect, this bird sound goes beyond its diegetic placement as a sound effect accompanying a physical bird on screen and instead functions as a manifestation of Melanie’s fear. This example shows us that the bird sounds can also play the roles usually ascribed to music to express the internal state of a character and signify emotion.

Sala's electronically synthesized bird sounds occupy the entire spectrum from diegetic sound effects to non-diegetic "sound affects", which Wierzbicki has referred to as a sound which possesses the potential to elicit an emotional response comparable to non-diegetic film music (Wierzbicki, 2016, p. 156). In the absence of an orchestral underscore, Sala's use of bird sounds throughout the film has demonstrated that they are capable of carrying out dramaturgical functions independently of their visual counterparts, and they ultimately blur the line between diegesis and non-diegesis. Recalling the Barrons' fully electronic score for *Forbidden Planet*, in which there was no clear distinction between non-diegetic electronic music and the diegetic sound effects of the spacecraft and ambient sounds on the planet Altair IV, it becomes evident that the boundaries between diegetic sound effects and non-diegetic film music are fluid. It is then pertinent to pose the question that if the "electronic tonalities" of *Forbidden Planet* are now considered film music, why not the electronically synthesized bird sounds of *The Birds*?

Materiality of the electronic bird sounds

It can be said that the bird sounds were not made to draw attention to their electronic nature. Allen has argued that "while Hitchcock's use of electronic sound is certainly experimental in the sense that it is pushing the boundaries of how sound is used and conceived in cinema, it is mistaken to think that Hitchcock used the electronic sound in *The Birds* primarily because it was electronic" (Allen, 2017, p. 114). The question that can be asked, however, is what does it mean to have electronically synthesized bird sounds and not recorded sounds of real birds? Could the mechanical origins of the synthesized sounds hold meaning for the film's narrative?

The "material turn" in the humanities has shown that significant insights can be gained when the materials and not only the form of an object is taken into consideration (Lehmann, 2015). In the field of visual arts, Ann-Sophie Lehmann has argued that materials have been institutionally neglected in theory of art discussions due to the dominance of the hylomorphic paradigm despite materials' "decisive role in determining the meanings and effects of visual artefacts" (2015, pp. 21-22). She has highlighted the importance of considering the role of materials and techniques in generating meaning (Lehmann, 2015). In the field of music, the "material turn" is manifested in studies of the relationship between technology and music creation, performance and reception, especially in light of the great changes brought about by electronic musical instruments and audio devices from the 20th century onwards (Weium & Boon, 2013). With respect to *The Birds*, the significance of using the *mixturtrautonium* can be explored not only in terms of sound aesthetics but also considering the discourse surrounding electronic musical instruments. Following Lehmann's recommendation, the material – that is, electronic sound versus natural sounds – can be more closely examined with the aim of better understanding how the type of sound is linked to characterization. Firstly, it is important to note that all bird

sounds except those in the pet shop were electronically synthesized by Sala. This is evidenced by Hitchcock's written instructions for the scene^{<?>} and supported by Sala's manuscripts, which, despite the scene's length, does not include sketches for the pet shop sequence. The corroboration between these two sources is important in order to understand the dichotomy between natural and electronic sounds and their use in the film. The natural sounds represent order and security: in the pet shop, the birds are caged up and the humans are in control. As the film progresses, the order is reversed: the humans are driven into "cages" – houses, cars and telephone booths – by the birds, who have the upper hand. Since the pet shop is the only scene in which the natural order is upheld (humans over birds), it is thus fitting that all other scenes in which the birds pose a threat to humans are furnished with electronic bird sounds. If the electronic bird sounds were merely regarded as an easy solution to the problem of recording and synchronizing actual bird sounds to the picture, the characterization of the birds as normal/abnormal through the dichotomy between natural and electronic sound would be overlooked.

In fact, the non-organic origins of these bird sounds reflects the mechanicality of the birds as portrayed in the short story *The Birds* by Daphne du Maurier (2004), first published in 1952 and which inspired Hitchcock's film in terms of its basic premise and its war analogy. In the short story, the birds are likened to warplanes, which fly in formation and coordinate themselves before an attack: "[the gulls] were spreading out in formation across the sky (...) it was as though they waited upon some signal. As though some decision had yet to be given" (Du Maurier, 2004, p. 17). Furthermore, the birds attack in a manner analogous to Kamikaze bombers: "the silly, senseless thud of the suicide birds, the death-and-glory boys, who flew into the bedroom, smashing their heads against the walls" (Du Maurier, 2004, p. 31). The parallels between the bird attacks and mechanized warfare can also be evidenced in the attack on the protagonist's house: "Nat listened to the tearing sound of splintering wood, and wondered how many million years of memory were stored in those little brains, behind the stabbing beaks, the piercing eyes, now giving them this instinct to destroy mankind with all the deft precision of machines" (Du Maurier, 2004, p. 38). In Hitchcock's film, the war analogy is most evident in the climactic attack on the Brenner's house, which is highly reminiscent of air strikes during the Second World War: the shrieks of the approaching birds resemble the wail of sirens, the sound of wings flapping resemble the sound of propellers, and the invasion of the first gull, shattering the window, sounds like a bomb explosion. In view of the parallels between the bird attacks and mechanical warfare, it is fitting that the birds, these "killing machines" are given sounds originating from a machine, the mixturtrautonium, and not recorded from real birds.

The representation of the hostile birds as machine-like in the film and even more so in the short story can be understood within the larger context of ambivalence towards techno-

logical progress, especially with the invention of machines with the potential to replace human labour (Marx, 1994; Sennett, 2008). This ambivalence was also prevalent in the attitudes towards musical automata, especially with the advent of the player piano at the turn of the twentieth century. While certain composers welcomed the possibility of overcoming the limitations of human performers, some musicians felt threatened by the prospect of being totally replaced by machines, as such automata would hypothetically be able to execute music beyond the capabilities of humans. Those who were keen on maintaining the status quo asserted that music is an intrinsically human activity, and that only humans have the sensibilities required to genuinely make music, and not merely copy or reproduce it (Pinch & Bijsterveld, 2003).

The reception of electronic musical instruments was also simultaneously characterized by excitement surrounding the possibilities these new instruments afforded in terms of expanding the sonic material for making music on the one hand, and the fear that acoustic instruments may be rendered obsolete due to the timbre-mimicking capabilities of electronic instruments on the other. This ambivalence persisted with the advent of magnetic tapes, which had the potential to replace entire orchestras. Fear that the status quo would be disrupted was noticeable even in the realm of Hollywood film music production. With specific reference to *The Birds*, the mixturtrautonium had indeed replaced film music performed by an orchestra with electronically synthesized sounds. Thus, in *The Birds* the threat of the machines towards humans permeates both the level of the narrative and the meta-level of the soundtrack. This extra reference, which complements the film narrative, would be lost if the electronic, mechanical origin of the bird sounds were not acknowledged.

Concluding remarks

Sala's work for *The Birds* is particularly noteworthy in various respects: the uniqueness of the soundtrack's timbre as well as the masterful synchronization of sound to image were remarkable achievements during the pre-synthesizer era. Equipped with the mixturtrautonium at the heart of his personal studio in Berlin, Sala single-handedly created bird sounds which were not only thoroughly convincing, but also highly effective dramatically, fulfilling structural, emotive and referential roles commonly taken up by film music. Instead of attempting to mimic the sounds of real birds and merely fulfilling the requirement for sound to accompany the visuals on screen, Sala approached the production of the soundtrack as a creative process akin to that of film music composition.

Since the release of *The Birds*, soundtrack production for Hollywood films has changed significantly. With the advent of the Dolby noise-reduction system and the Dolby stereo system, which were invented in the 1960s, how sound is handled in films has changed dramatically. These significant developments enabled sound to be recorded and reproduced more clearly, resulting in more attention being given to a film's sound design, especially

following Walter Murch's landmark achievement for Francis Ford Coppola's *Apocalypse Now* (1979). Inspired by how recorded sound material was handled in *musique concrète*, Murch demonstrated the creative possibilities of approaching sound musically in the film soundtrack. Regarding the close relationship between sound effects and music, Murch has said: "Sometimes a sound effect can be almost pure music. It doesn't declare itself openly as music because it is not melodic, but it can have a musical effect on you anyway" (Murch, 2005, p. 10).

The proliferation of the digital synthesizer in the 1980s facilitated the merging of the roles of sound designer and film music composer, as the same instruments were used to generate both diegetic sound effects and non-diegetic film music. This led to a gradual blurring of boundaries between the two disciplines. Frank Serafine claimed that the new sound production technologies enabled him to work on the soundtrack of *Tron* (1982) as a sound designer, musician and composer simultaneously (Spring, 2016). The creative possibilities afforded by digital sound production transformed the work with film sound from a purely technical exercise to an aesthetic process of creation, which was previously only applicable to film music composition.

Although sound design has become an increasingly musical activity following the prevalence of digital audiovisual media, it is not usually regarded as music. Julio d'Escriván has summarized this paradox as such:

While much has been written about the use of electronic instruments in film and television music . . . sound design has traditionally not been evaluated as music. This is interesting since one of the fruits of the electronic music genre has been precisely to open our ears to any sound being potentially musical. In the twenty-first century no serious contemporary music aficionado would deny this, yet evaluations of film music always seem to refer exclusively to the work of the music composer. (2007, p. 157)

His remark reveals that academic scholarship and cultural institutions have yet to adequately acknowledge the fluid nature of the boundaries between sound design and music. Albeit no longer as relevant, the division of labour associated with the Hollywood studio era appears to still maintain its stranglehold on the general perception of contemporary film-making. The 91st Academy Awards (Oscars.org, 2019) featured four disparate soundtrack-related categories: "music (original score)", "music (original song)", "sound editing", and "sound mixing".

Nevertheless, recent scholarship has displayed an increasing awareness towards more holistic approaches in the study of sound and music in audiovisual media, especially in film.<^> Contemporary research highlights the interdependence of all elements of the soundtrack and stresses the importance of considering sound effects and film music as

part of an “integrated soundtrack” (Greene & Kulezic-Wilson, 2016, pp. 2–3). Such progressive approaches facilitate the dissolution of the artificial division between sound effects and film music in the study of soundtracks, which limits the full understanding of the relationship between the two closely interwoven components. On the role of the sound designer-composer hybrid, Serafine has claimed that “we’re a new breed of artist; we combine music and effects. And someday, I don’t think you’ll be able to tell the difference between the two, it’ll be such an abstract kind of art that you’ll wonder whether it’s music or sound” (Armbruster, 1984, p. 16 cited in Spring, 2016, p. 273). In this respect, Sala was ahead of his time when he created the exceptional soundtrack of bird sounds in 1962. These bird sounds can indeed be regarded as film music, but whether they are considered sound effects or music is only a matter of our aesthetic values towards sounds in the noise-music continuum.

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