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The Musical Influences of Nature: Electronic Composition and Ornithomusicology

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**University Of Huddersfield**

**The School of Music, Humanities and Media**

**Masters Thesis**

**Peter McGarry**

**The Musical Influences of Nature:  
Electronic Composition and Ornithomusicology**

**Supervisor: Dr. Geoffery Cox**

**Submitted: 23/12/2020**

## **Abstract**

Zoomusicology is the study of animal sounds through a musical lens and is leading to a new era of sonic ideas and musical compositions. This project explores these ideas, with a focus on ornithomusicology (the study of musicality in bird song) and experiments with how the bird song could work in electronic music composition. I recorded four different bird species, selected with a variety of song. The chosen songs were transcribed and analysed by ear and the use of spectrographs. Using the recordings of chaffinches, dunnocks, robins and blackbirds, I created musical soundscapes alongside a more traditional styled track. I composed 5 pieces with minimally edited field recordings so the musical ideas could be presented clearly. This project shows the benefits of using birdsong in music for the composer and audience.

## **Compositions**

1. Chaffinch 4:58

2. Dunnock 5:45.

3. Robin 6:01.

4. Blackbird 3:46

5. Robin and Blackbird 6:21

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## Introduction

Throughout history, humans have been captivated by birds and their songs. They have been inspired to express their feelings about them through music, literature and art. In Ancient Egypt, there were many avian deities which symbolised a variety of aspects of human life. Thoth (the main depiction being a man with an ibis head), was the deity of the Moon and Knowledge, and Bennu (depicted as either a yellow wagtail (*Motallica flava*), a heron (*Ardea cinera*) or an eagle with flame coloured plumage), was a deity of rebirth and creation (Wilkinson, 2003).

David Matthews comments that “Music inspired by birdsong goes back at least as far as the 16th century, when the French composer Clément Janequin wrote chansons with imitations of the skylark and the nightingale” (Matthews, 2011.). Although, it has been recently hypothesised, in “obscure Hindu Vedic chants”, the language used was imitations of the Blyth's reed warbler (*Acrocephalus dumetorum*) and the common whitethroat (*Sylvia communis*) (Marcus, 2019).

Poets such as George Meredith wrote about the songs of the skylark (*The Lark Ascending* (Meredith, 1883)). Musicians have grasped onto the beauty of birdsong as well, with the likes of Vaughan Williams who was inspired by Meredith's poem and through his composition “had made the violin become both the bird's song and its flight...” (Williams, 1988, p. 156). Ludwig Van Beethoven used the song of the yellowhammer for his main motif in his 5<sup>th</sup> symphony. (Bowden, 2008, p. 18).

Even modern musicians like the Moody Blues have been inspired by a variety of bird songs (Moody Blues, 1968, track 7). Many of these artists have referenced bird song in their compositions, while others have taken the musical aspects of the birds for their works, like Olivier Messiaen and Bela Bartok. Modern applications of bird song use field recordings in the background of the music. Artists who favour this approach are Bibio, Boards of Canada and Robert Rich. Equaled with this: Soundscape composers such as Hildegard Westerkamp uses field recording to present pastoral ideas in a direct way, which I'll expand upon later in this essay.

As I was researching into how musicians were taking inspiration from birdsong, I discovered the field of study called Zoomusicology which studies different aspects of music and sound in the animal kingdom. Looking deeper into the subject inspired a purpose for my thesis and the possibilities of using birdsong for my musical compositions. One of the pioneers of Zoomusicology was the composer François-Bernard Mâche who coined the term in *Music, Myth and Nature: or the Dolphins of Arion*. (Mâche, 1992). He states, “If these manifestations from the animal sound world are presented to the

ears of musicians, it is possible that they will hear them differently from ethological specialists” (Mâche, (1992), p. 97).

This musical project aims to develop ideas within ornithomusicology and make it more accessible. Since bird song surrounds us, it should be utilised more often. The recent trend of ‘grainy’ pastoral influence has been used fervently in the electronic music scene but I wanted a deeper impact from the bird song. I analysed and explored bird song using visual analysers and aural transcription. I appropriated the music into the twelve tone equal tempered system and transformed into a scale. The goal was to create ambient music by utilising the bird as a non-human singer and orchestrate around the melodies. I also emulated their rhythms and imitated their melodies to clearly present the different elements in the bird song.

In this reflection, I will show what Zoomusicology is and how it has developed over its short history. After, I will investigate and present different composers who have inspired, and continued to follow, the ideas within zoomusicology, ornithomusicology in particular. I will go further and explain what my intentions are for this project and how I intend to achieve these goals. Within the main section of this reflection, I will describe and analyse the process I went through during the recording and production. And then finally, I will reflect on how the project has influenced me as a composer and suggest further development of the ideas presented.

### **What is Ornithomusicology and Zoomusicology?**

Ornithomusicology is an important field within zoomusicology; however, we should first define zoomusicology, which Hollis Taylor describes as the “human valorization and analysis of the aesthetic qualities of non-human animal sounds” (Taylor, 2011). By studying non-human animal sounds, researchers try to understand the musical nature in non-human wildlife. Some important people in this field are Dario Martinelli, Hollis Taylor, Robert Burrell, and David Rothenberg. Currently it is a very broad field and there are many different approaches to zoomusicology such as zoosemiotics.

Ornithomusicology is a term first used by by Hungarian composer Peter Szöke and Slovakian Miroslav Filip (Taylor, 2017, p. 5), and studies the musicality of birds and their songs. Szöke’s particular study *The Unknown Music of Birds* (1987) was not composition orientated, however he slowed a variety of birdsongs (e.g.; Eurasian Skylark, Whooper Swan, Nightingale) in post-production so they could be heard and studied in a microscopic way. This approach has fore-fronted how bird song is studied in the modern day.

My zoomusicological approach is to analyse and understand bird songs by using real-time recordings in order to compose with. I intend to use four different bird songs and showcase how they can be used as melodic centrepieces and how arranging around them can be beneficial from an emotive perspective, as well as following their use of tonality and melody.

### **Composers and Bird Based Compositions**

*“their [i.e. the birds’] melodic contours, those of merles especially,  
surpass the human imagination in fantasy.”*

**Olivier Messiaen (1956)**

In the middle of the 20<sup>th</sup> century, composers Olivier Messiaen and Béla Bartók used bird songs in a number of their compositions. In 1945, Bartók in the second movement of his 3<sup>rd</sup> Piano Concerto used bird song as musical motifs (Harley, 1994) while Messiaen in 1953 completely composed *Le Réveil des Oiseaux* with bird song (May, n.d.). One example of modern experimentation is Robert Burrell, who composed over and manipulated electronically his field recordings of birds (Burrell, 2013).

Béla Bartók was very much influenced by the birds of Northern America and features them in his Piano Concerto No 3. Writing to his son, he wrote “The birds have become completely drunk with the spring and are putting on concerts the like of which I've never heard” (Harley, 1994, p. 8). Transfixed with birds such as towhees and the hermit thrush (*Catharus guttatus*), he found musical forms that related to those humans use such as the pentatonic scale (Harley, 1994, p. 11). With birds among other influences and ‘his devotion for the trinity “... Nature, Art and Science” (Bruggeman, 2013, p. 1), he developed the style of Night Music which is considered a musical tribute to nature. Danchenka clarifies that “Night Music refers to those contexts, from brief passages to complete works, in which Bartók conveys the sounds of nature at night” (1987, p. 1).

According to Maria Anna Harley, Bartók seems to follow the three types of bird song that were described by Poul Bondesen; “the monotonous calls..., repeated phrases..., and complex melodious song with a variety of motifs” (Harley, 1994, pp. 9-10). She shows this in a transcription of Adagio Religioso (fig. 1), from his 3<sup>rd</sup> piano concerto where the three types of bird song have been pointed out. We can see that part of his style was composing with a variety of bird song in the same passage and using them to interact with each other (Harley, 1994), similar to that of natural environments.

The image shows a musical score for Piano Concerto No. 3, Movement 2, Adagio Religioso. The score is divided into two systems. The first system (measures 58-63) features three bird-like vocal lines: Bird 1 (flute), Bird 2 (clarinet), and Bird 3 (piano). The second system (measures 64-69) features Bird 3 (piano) and a string section (violin I, violin II, viola, cello, double bass). The score includes various musical notations such as notes, rests, and dynamic markings.

Fig. 1. Analysis of Piano Concerto No.3. Movement 2, Adagio Religioso (Harley, 1994, p. 11).

Messiaen studied and experimented further with this idea with pieces such as *Le Réveil des Oiseaux* using songs from the partridge chicken (*Tympanuchus*), wood thrush (*Hylocichla mustelina*), and lazuli bunting (*Passerina amoena*) as key inspiration (Scultz, R, 2008, p. 133). He described his approach as “trying to outline the most exact musical portrait possible, or by treating the bird song as malleable material.” (Messiaen & Samuel. 1967, p. 94). In essence, he uses these bird songs with his own creative license. Rhythmically and harmonically, he tends to obscure certain features of the original melody saying, “We shall make use of them, forgetting their modes and rhythms for the use of ours” (Scultz, 2008, p. 89).

(a) Nightingale (*Rossignol*) from 'Réveil': opening cadenza:

Un peu vif (♩ = 116)  
Solo de Rossignol

piano solo

## (b) Staff-notations of the two song-phrases on the spectrographs (from gramophone record HMV 7FX II):

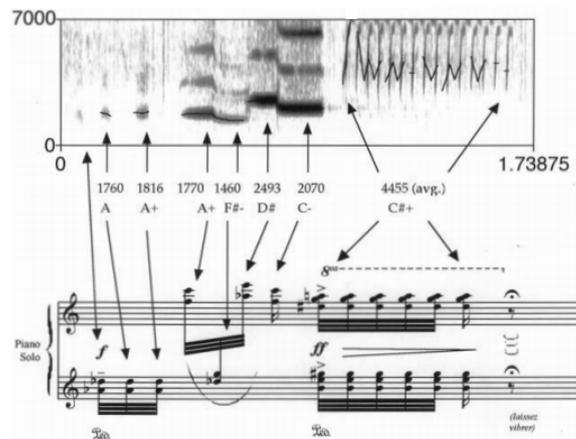
(i) ♩ = 120  
[‘puwee-puwee’]  
p cresc. f

(ii) ♩ = 120  
‘flute-like’  
mf mp f mf

Fig. 2: Messiaen’s *Le Réveil des Oiseaux* and a transcription of a nightingale song. (Hold, 1971).

We know most of Messiaen’s ornithological works from his cahiers. Taylor researched his catalogue of bird song and when she “placed five birdsong models in sonograms in order to compare them to their compositional counterparts...”, she concluded, “that Messiaen’s music conforms to his models about two-thirds of the time” (Taylor, 2017, p. 67). The models mentioned are the transcriptions he had written down in his cahiers.

Hold (1971) shows us (fig. 2) a small part of how Messiaen adapted the nightingale song to his pieces. The lower part of the figure presents two song phrases and we can see some of the ideas he had for *Réveil des Oiseaux*. In the first part, we can see Messiaen using the rhythms of the nightingale, however at the end of the phrase, he descends down to a C instead of moving up B flat and shortens the phrase.



**Figure 8.3b** Wood thrush, spectrogram and *Oiseaux exotiques*, p. 5 (Olivier Messiaen, *Oiseaux exotiques* © 1959 by Universal Edition [London] Ltd, London/UE 13154)

Fig. 3. Wood thrush (*Hylocichla mustelina*) spectrograph and transcribed Notation (Iqbal & Pendergrass, 2013).

Iqbal and Pendergrass (2013) present us with a spectrographic analysis in the figure above showing how Messiaen adapted the song of the wood thrush (*Hylocichla mustelina*) for *Oiseaux Exotiques*. When composing, Messiaen lowered the notes by either one or two octaves as the pitches were too high for traditional instruments (Fallon, 2013). From what we can see, the last C sharps are not strictly accurate as he doesn't follow the glissandi that the wood thrush sings. The theme's repetition and note lengths are accurate to the wood thrush's song. He used his own creative license to allow the piece to be playable and characteristic of human music (Sultz, 2008).

In this project my intention with my compositions is to evoke emotions similarly to Béla Bartók but finding a new perspective to compose from. The basis of the project is utilising bird song in a recorded format and using modern means to create ornithomusicological compositions. My compositions are heavily influenced by ambient musicians but I extended the inspiration of nature to a deeper level by exploring the compositional uses of their rhythms, melodies and scales..

If we look at some slightly more contemporary compositions like *Woodwings* (2018) by Emily Doolittle or Hollis Taylor's *Absolute Bird* (2017), we can hear similarities to Bartok or Messiaen. These compositions are more overt, however, as they are purely focused on the bird songs as melodic concepts. These zoomusicological pieces take small motifs and imitate and reappropriate the melodies. One way I will be employing bird songs will be similar to Hollis Taylor's *Absolute Bird* (2017), I'll be utilising field recordings as part of the composition.

An important thing to note, which Jim Denley astutely comments on Hollis' *Owen Springs Reserve 2014*, is the issue of transcribing and creating musical ideas based on bird song. "In this re-sounding there are clearly compositional and interpretive decisions to make—a violin, vibraphone, flute, choir, bassoon or double bass are not pied butcherbirds, and in the attempt to mimic the melodies on instruments, there is transformation of the material—it enters the human realm" (Denley, 2017). The quote is significant as much like Messiaen's perspective, due to bird song not being able to be purely replicated with instruments, the melodies become anthropomorphised and evinces an emotional human rendition on their songs.

Robert Burrell (2013) took my interest because in his thesis, *A Process of Becoming*, he made multiple electronic compositions with bird song and he is a prolific researcher in the field of zoomusicology. In his compositions, he used a variety of effects and digital signal processing on the bird song as well as a series of synthesizers and manipulated audio samples.

If we look at some of the most recent examples of birdsong in music ..., David Rothenberg's *Nightingales In Berlin* (2020), we can see how a variety of different artists were inspired by making music around the idea of ornithomusicology. The documentary shows traditional musicians, singers, and electronic musicians collaborating to make music alongside a nightingale. I have also considered that the bird should also be considered a musician. However, my focus is more structured as I wanted specific areas of the bird song to be presented in a compositional format.

Soundscape composition should also have a formal mention as it is a form of bioacoustics and ecomusicology. Soundscapes examine environments (through scientific or creative means) to portray or showcase the variety of sounds from those areas. Prominent practitioners in this field include Bernie Krause, Hildegard Westerkamp and Chris Watson. Bernie Krause is perhaps the most well known, as his most popular work, *The Great Animal Orchestra* from 2014 was featured by the BBC (Blackford, Krause. 2014). In this project he collaborated with composer, Richard Blackford, combining soundscape field recordings and a grand scale orchestra which is rarely seen in zoomusicological studies.

Hildegard Westerkamp approached soundscapes from an experimental music point of view. *Beneath The Forest Floor* (1992) has prominent musical ideas alongside the soundscape as we can hear a variety of birds with variety of synthetic sounds; For example, the rumbling rhythmic bass plays a major role in the composition as it is repeated for over half of the compositions. However, the motivation behind *Beneath The Forest Floor* was to showcase the soundscape from the Cramanah Creek in Canada (Duhautpas & Solomos, M. 2014) rather than being a musical endeavor. It is trying to

reflect Hildegard's concern that the area has been heavily deforested. Through the sequence of different sounds, it follows the narrative that she is passionate over. The prime example, is the sound of a chainsaw being arranged throughout the second half of the piece.

Chris Watson appears to approach soundscapes in a minimally processed format, but arranges the sounds to allow his narrative to be told, although it is very abstract. His track *Oi-lool-o* (2003), is a prime example of his biophonic work, as there appears to be minimal editing of the bird calls but the layering and splicing to express a condensed version of the soundscape.

Soundscape composition presents similar ideas to zoomusicology, like the showcasing of birds and other animals. However, it is more direct in showcasing them; if we analyse tracks such as *Beneath the Forest Floor* (1992), we can hear the actual birds singing from a recording, rather than a composer's interpretation, and can perhaps understand the artist's intent and process a bit more easily. Although, you could argue soundscapes lose some emotional content, while the melodies and harmonies constructed in music can express an emotional narrative without the context of a particular place.

This type of composition also presents semiotic elements for the birdsong. Arranging other recordings along side, the bird song could have a number of different conceptions, such as Hildegard's on protecting nature (Duhautpus & Solomos, 2014). Alternatively Chris Watson's perspective (2003) in using bird song or calls as a symbolic document of a specific time and place on Earth. Finally looking at Richard Blackford (Blackford, 2019). and Bernie Krause symbolising birds (and other animals) as nature's musicians, as does Dario Martinelli (2009).

In a popular context, bird song has been increasing in popularity as I previously have mentioned. It has been used in many different genres and labels. Modern folk musicians have been using bird song to enhance the works and induce relaxation. Examples of this would be, Bibio (2019) or the Walking With Ghosts (2011). Both artists exhibiting pastoral themes through song with the help of field recordings of birds.

In the electronic scene, bird song and calls have been used extensively, particularly in ambient music. Artists such as Robert Rich, Boards of Canada and Yosi Horikawa use it either overtly or subliminally. They use it to create ambiance (Rich, 2000. Horikawa, 2013) or as a rhythmic device (1998, track 18). Somnium and Wandering use these field recordings to induce people into a mood, so that the music will be enhanced (Rich, 2000. Horikawa 2013). Happy Cycling uses a recording of gulls to create a rhythmic device every 4 bars which adds a driving syncopated feel (1998, track 18).

Alternatively, Rhythm and Roots released an album (*A Guide to South American Birds, 2015*), as well as an EP of the same name (latter entirely composed El Buho) (2012) which is directly inspired by bird songs of South America. "Each track is built from the song of a different species, from the beautiful Great Jacamar to the odd Tropical Screech Owl" (2012). This approach conceptually close to my *Blackbird and Robin* track, by using urban rhythms alongside the field recordings and melodies built from the different bird songs.

### **Oscine Passerines**

For this project, I chose song birds (oscine passerines) as their musical properties are more overt than other animalia. The specific species I selected from my field recordings were the chaffinch (*Fringilla coelebs*), european robin (*Erithacus rubecula*), dunnock (*Prunella modularis*) and the blackbird (*Turdus merula*). The reasons for this varied selection of songbirds are for eclectic melodies, recognisability and the ability to capture their songs over long periods of time.

### **Analysis**

My analysis of these bird songs will come from two different methods; one is using spectrographs to analyse the frequencies in detail. Donald Kroodsma (2007) in his book *The Singing Life of Birds* discusses why using spectrographs is important. Kroodsma (2007) views this art in a scientific manner and not necessarily a musical one. When using these spectrographs he argues "the linear scale is preferred because sonograms on a logarithmic scale feel too squashed (Kroodsma, 2007, p.5)".

This project is using a logarithmic scale to see which notes are being sung and making the song as clear as possible for composition using twelve tone equal temperament. Using the Sonic Visualiser (a spectrographic program developed by Queen Mary University of London), I analysed the bird song with a melodic spectrograph. The melodic spectrograph has piano keys on the side bar so it is easier to know which notes are being sung and if they are singing microtonally.

### **Composition**

Compositionally, I did not want to imitate how Messiaen or Bartók composed, but to use similar concepts such as imitation and creative license. My intent was not to compose to the extreme of *Les Reviel de Ouisseax* as the "musical material that consists entirely of imitated birdsong" (May, n.d.), but similarly to *Quartet for the End of Time* (Yana Reznik, 2010) or Bartók's *The Night's Music* (2013). Also using inspiration from Robert Burrell, Hollis Taylor, and Hildegard Westerkamp, using modern methods in order to create these ornithological pieces of music.

Drone and ambient music can create space for the field recordings, and showcase the musical imitations or corruptions (similar to that of languages). The sonic sparsity, mood and atmosphere can be implemented through harmony, rhythm and cultural connotation of birds. By building textures, structure, and by following the bird song's movement, dynamic musical compositions can be achieved.

I treated the birds as vocalists in their own right and focused on particular music elements of the songs such as rhythm. I will be composing from an electronic music point of view and blend the meter-less nature of animals with modern technology. The composition's aesthetic will create a fluxing dynamics due to the distorted nature of the instruments and the semiotic associations of song birds (that being associations with folk music, classical music and soft gentle sounds such as leaves rustling). The intent is to develop an immersive experience which is due to the musical relationship between humans and birds.

Like Messiaen and Bartók, the composition's melodies, rhythms, and calls and responses will be inspired by birdsong. The notes sung, will be the foundation of the harmonies (which is akin to previous composers such as Bartók with *Night Music* and Messiaen with *Le Réveil des Oiseaux*) and focus on making the compositions be in harmony with the songs. An important point is, unlike Messiaen, I will be composing using real time recordings as part of the composition itself. This introduces difficulties relating to structure such as spacing between songs as meter is seemingly arbitrary in this context.

In a modern context, the compositions will be like those of Robert Burrell, Petri Kuljuntausta and Hollis Taylor. These composers are from the area of Zoomusicology, however I wanted the recording to be an unprocessed soundscape rather than a digitally processed composition such as *Birdscape Music* or *A Process of Becoming*. Hollis' approach with *Owen Springs Reserve 2014* suits best due to the unedited field recording.

I should also distinguish differences of this project from sound ecologists such as Chris Watson, Hildegard Westerkamp and Peter Szoke, in that the musical material will be arranged with instruments rather than only using field recordings. Combining the elements of music and field recordings is intended to inject a stronger emotional attachment to the pieces which I have not found in most field recording focused soundscapes.

Most of the compositions are in an ambient style of music for temporal reasons as animals don't have strict rules for time between songs and I composed over them in real time. These birds have their own rhythm, melody and tone when singing; however, when resting, from what I have noticed, they are not dictated by a strict tempo or structure. The last track, however, is based around the sampling techniques of J Dilla and other hip hop artists, where I cut and spliced samples to create a melody of my own.

Ambient music and field recordings work together well; however, composers seem to use them for atmospheric or a hypnagogic effect instead of concentrating on the emotional or musical quality of the bird's songs. An example of this is Robert Rich's *Somnium* (2001) in that the birds and insects are not used for musical inspiration but for psychological reasons. Rich (n.d.) attempts to incentivise a hypnagogic state, whereas the compositions presented here are using bird songs as musical inspiration.

Where I diverted my thought was in using a more melodic style of electronic music, like the styles of Monty Adkins, Robert Rich or Boards of Canada. I wanted to explore the subtle and more evident areas of birdsong and how it could enhance this genre of composition.

In *The Old Man's Grave* (Burrell, 2013), I found Burrell's use of D.S.P. was not quite from the same perspective as I intended. The sonic pallet I wanted to achieve was grainy and low fidelity, similar to an old cassette tape. I wanted to focus on this sound because it creates a different perspective on how to view working with bird song and adds emotional depth due to its nostalgic associations. I also decided to work with real time recordings rather than splicing the samples.

Using birds as vocalists in their own right sets a precedent of non-human animals being treated as musicians. Using their songs as leading melodies can breathe new life into music and create profound results for listeners and composers. Psychologically, their songs could improve mood and mental health (Begum, 2020). An increasing amount of people are searching for bird song and sounds of nature, and with its use in music, it could help raise people's spirits, induce nostalgia or relaxation.

For composers, it could enhance and broaden their creative thought, as well as adding an extra compelling feature that isn't an adjunct to the composition. Bird song (as a field recording or musical imitation) as a foundational asset (like licks in jazz music) can provide a variety of harmonies, melodies and rhythms that make compositions novel and vibrant. Songs of the robin (*erithacus rubecula*) or blackbird (*turdus merula*) vary their songs often and have potential for a variety of different melodies harmonies, and rhythms. As previously mentioned, bird song could induce a variety of positive

feelings but bird song could also induce feelings of sadness and emotional turmoil which the composer can use to their full advantage.

### Chaffinch (*Fringilla coelebs*)

In early spring, I recorded this chaffinch just before dusk at Hardcastle Craggs (Hebden Bridge). Initially I was drawn to its attractive song and when I listened to the recording later in the day, I recognised potential for an interesting composition. The appeal of the song was its ostinato like melody and would be compositionally similar to the style of the night music of Bartók. The definition of night music is not clear but the general consensus is the theme of the sounds of nature in the night time (Bruggeman, 2013). A prime example of this would be *Out of Doors: The Night's Music* by Béla Bartók (Bartók, 2013). The chaffinch composition has a melancholic feeling and from a musical aspect, this composition is focused on the ostinato nature of the chaffinch song and the notes that are used in its melodies.

My initial oral analysis was that the chaffinch had one motif. This motif had subtle variations and changes on occasion. For a more technical analysis, I used a melodic spectrograph. This gives us a deeper insight into what the bird is singing (see Figure. 4).

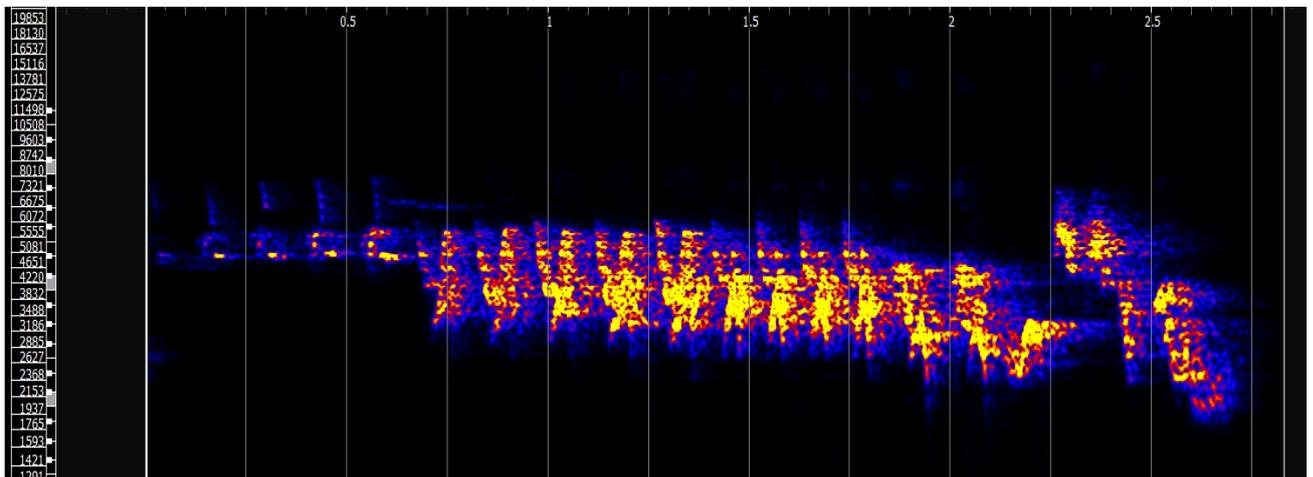


Fig. 4. A chaffinch motif presented on a spectrograph

As we can see in Figure 4, the motif has three distinct elements. The first element begins with 4 staccato D sharps (around 5000 hertz). To my ear, these notes have a semi-quaver feel to them, with some subtle grace notes beforehand. The second and major element starts from 0.75 seconds and finishes at 2.25 seconds. This section consists of 11 rapid glissandi from F (around 5555 hertz) down an octave to F (around 2627 hertz). The final element is a slower glissandi from 2.25 seconds to just

before 2.5 seconds. The notes have a larger range between them beginning at G (6072 hertz) and descending to E (around 2400 hertz). It struck me that these notes could correlate to a D minor scale. My first inspiration for this composition was using non-human singers alongside electronic instrumentation. I drew influence from modern electronic musicians such as Boards of Canada (1998, track 11.) and Bibio (2019, track 5). They do not have an ornithomusicological connection but they use bird song samples to evoke emotional tension. Stylistically, their music compliments the bird songs due to their gentle pastoral nature as it reflects the quiet countryside and woodland.

Using guitar for melody and organ for chordal changes embraces ornithomusicological ideas by imitating the motif throughout the piece and using a key that fits the chaffinch's melody. I later used granular synthesis for drones and pads to create atmosphere and to evoke the emotional feelings I got from the chaffinch's song.

The reason for this stylistic choice is that, it brings an emotional yet sinister quality to the piece. I wanted this effect to contrast the typical idea of birdsong. The influence of Bartók accentuates the chaffinch's song. In contrast, the addition of the electronics and the harmonic progression changes the emotional impact on the listener. The listener would usually expect a sweet charismatic song, but the instrumentation leads them to feeling the bird is in a lonely dark place.

My original idea was to compose over a real time recording, however to properly flesh the composition out I needed to repeat that recording. Introducing, withdrawing and reintroducing different musical sections made the composition consistent but added variety as the chaffinch song is repetitive.

The chaffinch's song is melodically simple but rich in character, that the guitar's call and response is only a reflection of its song. The speed at which the chaffinch sings is beyond human capability, but has a human-like quality. In keeping with the nature of the birds, I felt it would be appropriate to create a response to the bird's call and in this case, I used an electric guitar. In experimenting with call and response, I chose to end the dialogue to the chaffinch song with a C Sharp which adds dissonance and tension as the chord becomes a major 7th.

In the organ part of the composition, I continually varied chordal inversions to subtly change the emotional quality of the composition. As the chaffinch's song was fairly consistent, I was able to add underlying tension with these slow subtle chord changes. The switching between D and C Sharp was to create a sense of ambiguity and add emotional tension due to the chord becoming a third

inversion. The chaffinch's melody does not clash with this arrangement but its tone naturally changes along with it.

Using a Korg MS20 synthesiser for the bass was in keeping with electronic style. It provides a slightly organic sound as the circuits with the filters alters the sound physically whereas computer based synthesizers have a colder sound due to digital algorithms. It also adds to the grainy sound of the granular parts, giving the composition a consistent sound pallet. The bass moves up and down in fifths but the granular notes are sixths apart.

Overall the composition for the chaffinch was very minimalistic, which gave space to let the call and response ideas to come through. With only 7 instrumental tracks, it allows the chaffinch's song to become the showpiece of the composition. The harmonies, responses and structure is simple so it can mirror the traits of the chaffinch. In contrast, the robin composition is more meditative and focused on the harmony.

### **Robin (*Erithacus rubecula*)**

I recorded the robin at Fairburn Ings near Leeds on a late spring afternoon around 4pm. I sat for around 1 hour recording and waiting for robins to return and sing for longer. I wanted a longer recording so the composition would be as close to real-time as possible. I was lucky to be able to get close to the robin while it was singing.

My initial oral analysis of the robin's song is that it is charismatic like the chaffinch's. However, the robin sings in a more complicated manner and has a larger repertoire and varies its motif more often. The virtuosity and repertoire of the robin's makes the motifs less pronounced as a consequence. In general, the song length is longer, faster and more dynamic than that of the chaffinch.

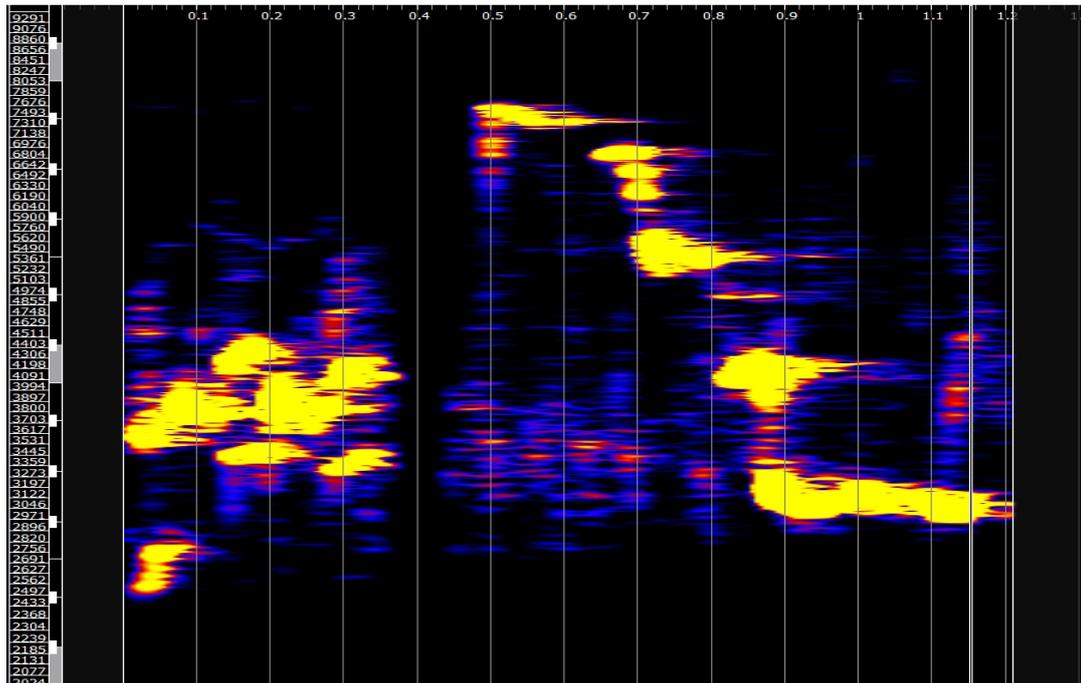


Fig. 5. Song of the robin.

Listening and looking at the spectrographs, we can see the robin focuses on the notes; A, B, C and G (ranging between G at approximately 2497 hertz to B at around 7859 hertz). We can see a tonal focus between D sharp (at 2433 hertz and C# / D at 4511 hertz) but the song has a peak at B (7859 hertz). We can see the inflections going down with staccato notes and a long held note at the end. It's one of the shortest motifs at only 1.2 second but contains a lot of musical information

In figure 6, we have a second spectrograph to compare to the previous robin song. We can see the difference in the song as the motif is different from the song in figure 2. The clear differences are the length of the songs and the vocal range is wider as the highest note is a B (around 7671 hertz and the lowest is a C at 2007 hertz). There seems to be a focus between C7 (2000 hertz) and c8 (4198 hertz). From this, we can focus our tonal range on B, C, G and A with occasional extra notes for extra emotional tension.

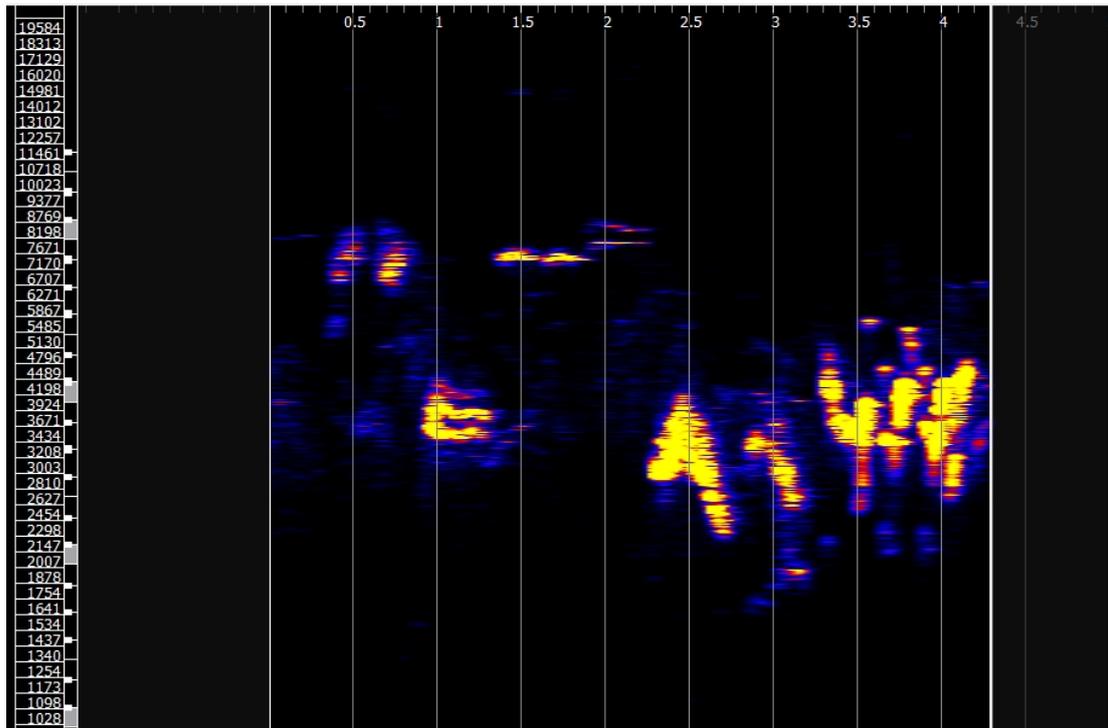


Fig. 6. A second example of the song of a robin

I focused on these notes to make the composition more harmonious and synchronous with this non-human musician. Just like the robin song in the first spectrograph, I used D sharp occasionally to add emotional tension. In terms of the robin's singing speed, I didn't think it would be a concern as the singing bowls and granular samples used would give the composition a calming quality and the focus was not on imitating the rhythm of the motif.

For this piece, I wanted to create a composition that was meditative and entrancing with a disconcerting edge. My strategy was to use other melodic instruments to provide a counter melody. I used singing bowls as the resonances would interact with each other. The granular samples modulated in and out of tune which made the piece appear tonally ambiguous and achieved the disconcerting edge I was looking for. I based the chords on the C blues scale as the notes the robin sang seem to fit the harmonic profile as the notes featured are mostly A, B, C, D and G. It also sings C sharp which in a blues scale is a flattened 4<sup>th</sup>. Previously I mentioned a D sharp as well which wasn't sung enough to consider it part of their repertoire.

Adding granular samples to the composition added to the disconcerting feeling. An instance of this was the singing bowl samples put through a granular synthesizer, which by using the time stretching tool with filters made the resonances feel like they were never ending and blended with each other.

I omitted complex rhythms from this piece as it would not add much value as my intention was to lose the sense of time and make the composition entrancing. Disorientating the feeling of time is a different technique from what Béla Bartók used but achieves a similar result for the listener. Messiaen wanted to achieve this lack of temporality, however he used complex rhythms and time signatures (Ting Ada, 2000, p.27) unlike that of ambient music. This composition was designed to encourage the listener to focus on the melody and harmony and not let the rhythms distract from them.

Similarly to the chaffinch composition, I changed notes and chords when a new song was sung. This was to present a sense of purpose for the instruments and allow the listener to follow the ideas presented. What I mean by this is that, when the bird sings it is a cue to introduce a new sound, melody or chord, like a vocalist singing a new line of the verse or chorus.

This composition also focused on a minimal style but the texture is dense and hazy unlike the chaffinch piece. The piece is structured to be at a meditative pace and build up towards being sinister. With the singing bowls ringing and clanging, it makes the piece not quite meditative due to the clashing resonances and the unexpected clanging. In comparison to the next piece (with the blackbird), it is more relaxed as the blackbird composition is focused on rhythm.

### **Blackbird (Turdus merula)**

I recorded the blackbird at the Hardcastle Craggs (Hebden Bridge) in the early spring (at the same time as the chaffinch). Just off the beaten path, I sat by a spring until 'he' had finished. This bird sang after the chaffinch and for a longer period of time. I choose the blackbird for its well loved song and its variability. This particular bird inspired me to compose a rhythmic based piece due to it's variable nature in that the motifs are usually different or a repeated motif with a slight variation.

My oral analysis was that the blackbird's motifs are highly varied as it changes the rhythm and melody regularly. My initial thoughts were that the variable phrasings would provide a good template for a rhythmic study. In comparison to the robin, it is smoother with its inflections with a splash of quick trills which is perfect for imitating rhythms for grooves and rhythmic phrasing.

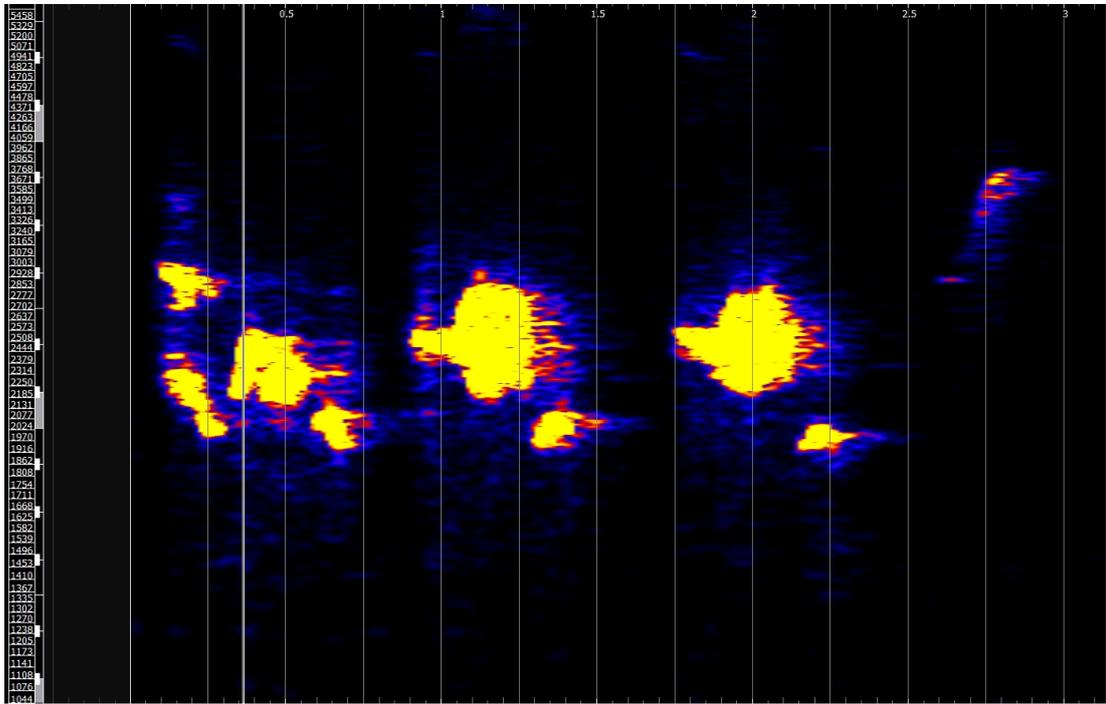


Fig. 7. A blackbird motif presented on a spectrograph.

From this visual analysis we can see the small range of the blackbird and we can see four distinct elements to this motif. The first element shows the introduction to the motif with a G (around 3000 hertz) with a glissando down to a B (around 2000 hertz). The second (starting from 0.9 seconds) and third (starting from 1.5 seconds) elements are similar in phrasing, however it is hard to tell except from the last notes. The final element is a glissando up to B (around 4000 hertz) to finish the motif on a high pitched flourish. Rhythmically it is hard to discern a strong rhythmic pattern on a spectrograph, though we can roughly gauge the timing of each phrase.

Composing for the Blackbird was difficult due to the intricacies in its song and creating grooves and rhythms with an unedited field recording. As previously discussed, birds don't sing with set meters or time, so when composing I didn't set a tempo. In the final product, it created a piece that would be similar to Messiaen's work, which gives a feeling of timelessness. Instead of alternating between time signatures like Messiaen, it lacked having strict meter and tempo due to the real time recording. Even with this issue, the percussion, pads and melodic instruments interacted with the blackbird melody as tightly as possible which made a cohesive composition.

Tone still played a role when writing the drum parts. When the melody ascended or descended, the drum tone followed or imitated. This was a subtle detail that I had to understand when imitating even with unpitched instruments. This is not an uncommon idea within electronic music, when tuning with instruments or leading up to a bass drop.

The sound design is similar to the other tracks in its use of granular synthesis. However, the composition's structure allows these sounds to have a different emotional appeal. At first, the ethereal drones start the piece in a positive light but the piece later develops an atmosphere that something is wrong. Then gradually adding growling distorted samples gives a dark flare to the piece and heightens the dark edge. The mood for the blackbird is different from the other compositions as the sounds are not to give a sense of melancholy, but to evoke an ethereal quality.

This composition is rhythmically complex but instrumentally, it is held back. The composition has a mix of grooves and angular rhythmic passages, which is carried by the bass and the drums. When we compare this track to the previous two pieces, it has a completely different feeling but utilises similar properties and musical techniques. Imitation is the main similarity with the chaffinch, but contrary to that, the robin composition had no comparison at all except with instrumentation and drones.

The blackbird composition is not as minimal as the other pieces. It has an intense bass riff and complex rhythmic grooves. However, some of the drones lighten the piece despite the bass and drums. The feeling I was trying to achieve was an ethereal composition that didn't distract the listener from the rhythms or birds.

### **Dunnock (*Prunella modularis*)**

I recorded the dunnock at the Fairburn Ings RSPB reserve near Leeds at the end of spring in the early afternoon. It is important to note that the bird was nervous and I recorded multiple takes so I would have enough substance for a composition under the premises I set for myself.

My initial oral analysis was that the song is repetitive with occasional subtle changes. The motif sounded simple and sweet, with a hint of melancholy. The dunnock does sing quickly with a semi-quaver triplet feeling. Due to the simple nature of the song I thought the song would fit with this project as it provided more scope for songbirds in composition as it would be conducive to the manipulation of harmony and melody.

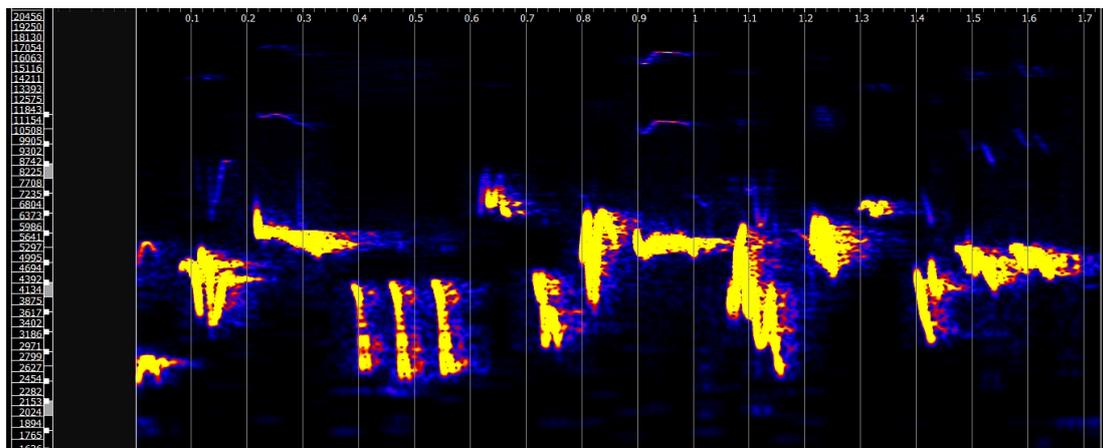


Fig.8: A dunnock motif presented on a spectrograph.

With spectrographic analysis, we can see the song is shorter than the previous birds, lasting only 1.7 seconds. To my ear, the song sounded simple and sweet, however the spectrograph shows a more complex song with subtle intricacies.

While experimenting with the track, I decided to only use the main notes as adding subtler notes didn't add to the emotional quality of the piece. Tonally, I had limited myself to using B, C and E. With each note subtly being introduced and withdrawn adding ambiguity and tension due to the change of the harmonic quality.

The sonic quality of the samples contributed an interesting effect to the composition. The grainy sound enhanced the melancholic feeling of the bird song and gives a nostalgic feeling to the listener. The intention behind this was inspired by sorrowful or nostalgic evoked by artists such as William Basinski (2014) who created music with tape loops that naturally degraded.

An audio sampler with a granulated Koto sample called and responded to the melody with an imitation of the dunnock song. This is because I wanted to build the emotion and emphasise the dunnock's song. The bass imitating the melody in the final section of the composition instils nostalgic emotions due to the motif and timbre of the sample. In addition to this, the subtle counter melody hints at this melancholy and helps the emotional climax.

When we compare the dunnock to the previous pieces, it has strong similarities but also has its own qualities that separates it from the others. It is similar in style to the robin composition for its melancholic atmosphere and tonal harmony. The blackbird composition had a sorrowful tone and

ambiance much like this dunnock composition. The chaffinch composition utilised call and response and its melodic quality is similar to that of this composition.

### **Robin and Blackbird**

With the knowledge I had of the robin and blackbird, my final composition would be an electronic and hip hop based production. The main concept for this, was to use cut up bird songs samples and make my own melodies with them which differs from the previous compositions as they were uncut and in real-time. This track was loosely inspired by electronic artist John Hopkins and hip hop producer, J Dilla, and the sub-genre of post-rock along side the experimentation of using birdsong.

My original thought for this track was creating grooves first and working the recordings around them. The reason for this was that, when sampling and splicing the birdsong, having a drum track would make the songs fall into place with purpose. The motifs originally seemed too erratic to become seamless, however working with the dynamics and rhythm of the recording, they fitted with the rhythms.

I chose the robin and blackbird because they vary their songs more than the chaffinch and dunnock. Their variability allowed me to have more options for melodic lines to keep the piece interesting and showcased what can be done with their songs. I preferred to line them up on the D.A.W.'s timeline rather than using a sampler because I could see the waveforms and felt more comfortable rearranging melodic lines that way.

For rhythm, I used a four to the floor beat then later used a hip hop beat (which slowly became more dynamic). I used four to the floor because it is the simplest rhythm and would show the effectiveness of the cutting and sampling of these bird songs. The hip hop beat was used to show it could work with a different stylistic choice. I developed the rhythms on the drums to intensify the mood of the piece to showcase the options that could be used. From the beginning, I also imitate the birds as a call and response to add that extra compositional dimension.

Keeping with the aesthetic of granular synthesis, I used particular harmonies and sounds to place an emotional narrative and showcase that birds could be used for melodies in this way. My emotional intention was to evoke melancholy and sadness. By using the noisy sound of the granular samples with particular harmonies such as suspensions, the piece reflected melancholic feeling, much like that of Boards of Canada.

Harmonically, the piece changes for each bird song. The robin sticks to the A, B, C and E, while the blackbird has a wider range by using the B, C, and E along with G and A. Using suspensions and occasional extended chords, I created the buildup I wanted for the track, and the blackbird's frantic song pushed the tense emotion to a deeper level. Keeping with these ornithomusicological ideas, it presents to the listener the musical ideas from the bird songs rather than just the aesthetic qualities. This follows the purpose of this project as it shows a difference feeling and in compositional technique.

Structurally, the composition ebbs and flows with dynamics, texture and intensity. In the first half, the track builds up to an emotional climax through three separate sections. This was achieved by the use of fluctuating dynamics and textures of drums and synthesizers along with the intensity of the bird song. It is reminiscent to the build up in *Breadcrumb Trail* from *Spiderland* (1991). The final half, builds to a dark and subtle finale, through building textures on the countermelody. The second rhythmic ostinato on the kick drum was used as an adjunct to the climax, similar to the arpeggio in the first half.

The composition has less ambient elements in it than previous compositions though using some rhythmic imitation and harmony still keeps within this project's focus. In comparison to the robin and blackbird compositions, it used some elements of both such as rhythmic imitation and tonality, but the difference is in the style and that it wasn't composed with real time recording.

### **Conclusion**

In conclusion, writing compositions using bird songs was inspiring because it forced me to rethink how I composed. The initial idea was looking to use birds for melody and developing compositional ideas for electronic music. I was inspired by composers like Olivier Messiaen and Béla Bartók, in terms of keeping with the tonality of the bird, and by Robert Burrell for his electronic inspired approach. The intention of fusing the natural and electronic worlds was to develop music that entrances and captures the emotional side to these bird songs (at least as far as humans might interpret them).

Passeriformes (which are generally known as perching birds.) gave a clear direction to the project due to the musical parallels they have with humans. This project was closely related to composers like Messiaen and Doolittle in for its musical ideas but using electronic music and real-time bird recordings

provided a subtle twist to zoomusicological ideas. The genre seems out of keeping with the natural aspects yet in turn it created, in essence, an alternative sonic pallet for responding to these birds.

However, the compositions reflect the stylings of Hildegard or Watson, rather than orchestral. The compositions were arranged for texture and atmosphere but still using the musical principles of Messiaen and Bartok.

The compositions were focused on five different areas of music: rhythm, harmony, melody, tonality, production. Each bird was selected for a specific area of music which was based on the intricacies and flow of their songs and musical highlights. Examples of this are the compositions I wrote for the blackbird and dunnock. The blackbird piece focused on rhythm due to the variations of its motif and the dunnock utilised the limitation of 3 notes.

From a sound design point of view, all the compositions are focused on granular synthesis. This created an alternative sound world. Recording singing bowls, guitars and bird samples and using them in the workstation's sampler subverts the usual soundscapes we hear (examples like Robert Rich's *Somnium* (2001) instead of using smooth synthesizers, I harmonically distorted and time stretched various samples such as a Koto. This creates a tenser and surreal sonic world for this birds to exist in.

#### **How beneficial were these methods to a composer of electronic music?**

When working with the robin's song, I used a similar approach to how I usually compose. The subtle differences are how I worked with time, harmony and being aware that the robin sings in between the chromatic scale. Working without a tempo marker proved interesting as it led to a sense of timelessness. Using a Digital Audio Workstation made the process easier with the drag and drop feature and the visual waveforms presenting clearly when the bird was singing.

The compositional process was protracted due to the amount of analysis but it was rewarding when I had finished the project. The rewarding part was feeling like I created a project with the birds that was congruent. The sounds reflected personal nostalgia for nature, and the experimentation with granular synthesis kept me enthused alongside the creative decisions for the music to compliment the birds. The fine details took longer than usual due to lack of tempo or time signatures as well as analysing many bird motifs which is not conducive for a working musician.

Harmonically, it was more difficult than my usual approach as I had to look and listen to multiple songs and make a decision on the scale. I decided not to focus on microtones and concentrated on the twelve tone system because I wanted my compositions to have a folk music like quality. However

the difficulty I had was making emotive and pastoral sounding compositions, as well as making music that sounded progressive. I found focusing on suspensions and 7<sup>th</sup> chords gave my compositions that experience. The dunnock track is a good example of this.

For the melodies, I imitated a bird song and added a counter melody. For the chaffinch composition, I used the guitar to imitate the song. However, with the robin composition, I used a melody to counteract the virtuosic nature of the robin. Using both techniques strongly highlighted the robin song. For the dunnock composition, the counter melody shows how call and response works effectively with this style of composing.

### **Speculated Reception**

From a listeners perspective, what would they think to the concepts and pieces that have been presented? The intended audience was for music composers and academics due to the experimental nature of drone, ambient or noise music. Would the bird songs increase its accessibility? I think it would as those who have a passion for nature and ornithologists may find it interesting due to their interest in bird song or knowledge of it's benefits for mental wellbeing (Begum, 2020). Alternatively, it could encourage people to enjoy bird song and want to learn more about the subject itself, much like RSPB's Let Nature Sing (2019).

How would a musician feel about these compositions? From a technical stand point, there could be improvements and making the influence of the bird songs more self-evident. I think melodically, harmonically, rhythmically and emotionally, these pieces could be appreciated for their minimalism and orchestration for allowing space for the bird to be heard as well as providing the emotional elements. If micro-tonality was involved, it could be appreciated more for the extra detail.

Has the project achieved it's aims for the target audience? It achieved showcasing the different areas of musicality in birdsong and using them to create compelling pieces of work. The project shows composers that bird song can be used a compositional tool in different ways for their audience or their own creative work. For the audience, the compositions show a variety of variety of dark and light emotions. The music itself doesn't distract from the birdsong which allows the listener to enjoy the bird song, the music or both.

### **Progress and New Ideas**

And finally, did this methodology benefit ambient compositions instead of using birds for atmospheric effect? I think this methodology added more depth to the style of music, however some of the time it

was too subtle to notice. The rhythmic and melodic experiments were more obvious than the harmony and tonality.

The prime question is: how can I progress these ideas? The first idea I would focus on next would be exploring different birds such as the marsh warbler (*Acrocephalus palustris*), nightingale (*Luscinia megarhynchos*) and mistle thrush (*Turdus viscivorus*). I have mentioned these three birds as their characteristics are quite different and could be explored in different manners. The mistle thrush has a harsh but uplifting song, while the marsh warbler's timbre is very complex and ever changing. Finally the nightingale's song has a variety of clean and distorted vocals through their song which could offer an increased creative outlook.

Secondly, I would use different microtonal ideas for a more accurate composition and increased artistic expression. By this, I mean it would expand the creative possibilities of what might work with birdsong. A popular music example of this could be composing lo-fi hip hop and progressing what has arguably become a stale genre. Recently, popular online educator Adam Neely (2019) discusses microtonal theory for lo-fi hip hop, which could fuse into the ideas of ornithomusicology.

My focus was on ambient and drone music, however with this research, I think my methodology, could be utilised in international genres. For example Arabic maqams which are based on microtones or Greek music which uses the enharmonic genus (a Greek scale based on tetrachords). This could provide interesting results as expansion beyond western music could have a different impact on the listener and progress zoomusicology into newer genres.

This area of study is complicated but with the possibilities and artistic benefits, it is worth exploring. Looking back on this project, I can see the ornithomusicological perspective being introduced into other genres as it is a refreshing way of looking at composition (much like the theory of negative harmony). For me, this project has given me a new outlook on how to compose, as the context, the sounds, and changing melodies forced me to think differently. Will I use these methods or ideas in my every day composing?

I would not always use bird song for composition but it is a great musical tool for melody, harmony and rhythm. Using real time recordings is not an efficient way of composing, however utilising multiple songs to create a melody or harmonic progression may help or inspire composition. I did find that using real time recordings works well for passion projects or art pieces to express or showcase bird song. In the end, this project may or may not inspire a composer to use bird song, but I don't think it is an influence we should ignore.

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[highlight=spotify:track:5nm80zNUU30xnTwXa9DoYK](https://open.spotify.com/album/5nIkXFrGyDoOpToiRbPO3I?highlight=spotify:track:5nm80zNUU30xnTwXa9DoYK)

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