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Research Presentation – Responses to Insects Recorded on the Costa Blanca

This piece was commissioned as part of a collaboration between the Adelphi Contemporary Music Group here at the University of Salford, and the *Beauty and the Beasts; Falling in love with Insects* exhibition at the Manchester Museum. This project is part of the museum's mission to build a sustainable world. Insects keep ecosystems working and are the food of the world, but many habitats and individual species are currently under threat of extinction. The project seeks to explore our complex relationship with insects and highlights the fact that the vast majority of insects are not only harmless to humans, but vital for maintaining the earth as we know it. A world without insects would, in the end, be a world without people. Art, and collaboration with artists is central to the storytelling and exploration of the project.

A group, such as the ACMG, dedicated to experimental music making and an insect exhibition at a museum might not seem to be the most immediately obvious collaborating partners, but the more we explored, the more we found correlations and possibilities. We were really looking forward to the planned, highly ambitious night of music making to take place integrated within the exhibition. Pieces ranged from Tim Wise's, highly ambitious and brilliant *Requiem for Insects*, to pieces based around simple folk song fragments. We explored many forms of characterizing insects and insect combinations using instruments and effects, and even planned theatrical elements within the space to make us blend in with the surroundings of the exhibition, as individual insects might. But this planning was all derailed by the UK, Covid19 national lockdown which began in March 2020.

Lockdown conditions did not stop us from continuing to meet and plan however, and this piece emerged as a result of an adapted collaborative process both like and completely unlike any other devised piece that the group had produced in the past. Within the original concert context, I planned this piece to be a kind of solo piece which featured my invented instrument – the reverse action piano harp which would be subject to live signal processing and playing against a prepared electronic canvas featuring field recordings that I made in a nature reserve on the Costa Blanca in Spain in the summer of 2015. My collaborating partner for this piece would be the Norwegian electronic composer and producer Eirik Dyroy; currently engaged in PhD studies exploring ways of composing and performing using alternative tuning methods here at the university of Salford.

Planning for the piece had reached a sufficiently advanced stage that we had both put forward intended outcomes and solved various technical problems as to methodology before lockdown commenced. My first desired outcome stemmed from the nature of the original field recordings. I spent an entire sweltering August afternoon in the park creating these recordings, and did so because I was astonished by the vibrant nature of the sound that I had experienced walking through it on the way to the beach. No recording can do full justice to the overwhelming cloud of continuously varying sound that comes from such a landscape, though I consider that the finished piece does a better job.

As an Englishman experiences of such soundscapes are relatively rare within my life story. In my youth I spent two years in and around New Mexico, and the American Mid-West, and the sounds of the cicadas are one of my strongest memories. In August 2008 I remember driving up from Venice to the lush *Friuli* landscapes of Northern Italy late at night, and became convinced that there was something wrong with my vehicle because of an odd, continuous sound – only to find on stopping that it was the deafening, overwhelming noise of the summer insect population. In Spain in 2015 I finally encountered such a landscape equipped with my field recording kit and was determined to capture it. My first demand of the piece that we were to create then was that it evoked the vibrancy of these landscapes – sound that was overwhelming in variety and complexity – a celebration of life that would, I hoped, form a strong contrast with other, perhaps more truthful reflections on the state of the Earth that formed the balance of the concert.

Eirik demanded that we use this opportunity to deploy an alternative tuning system, and had suggested the highly unusual Bohlen Pierce scale. That he will introduce shortly. When we improvised and rehearsed together, I began to see how this might work – with the different harmonic intent that we both envisaged and how the equal temperament harp, might be heard in a totally different context to the Bohlen Pierce pitches.

It was at this point in planning that the events of lockdown overtook us and when we returned to this project online and in the restricted but fascinating new context of Microsoft Teams and Zoom, the ACMG decided as a group that this project was the most promising candidate to open to the wider group for a possible completion in lockdown – so it became more than a two way collaboration. The process that we devised would be a series of individual responses rather than an *in the moment* collaborative endeavor but all work would follow extensive discussion.

Let's summarize the steps. I would meet with Eirik and talk him through the field recordings and then give him full access to the collection which were made over around four hours in the nature reserve. Eirik would then use these recordings as a basis to form a static, finished piece – that integrated field recordings, signal processing and the novel Bohlen-Pierce scale performances. This recorded media would then form a stimulus for ACMG members to perform against on their instruments. Finally, these live recordings would be integrated by Eirik into a finished, produced recording.

Remarkably, we completed this process in time to present a live paper at the University of Salford Festival of Research. We had to do some interesting preparation in order to execute this. Teams or Collaborate were acceptable presentation media for voices and discussion, but we wanted to present the highest possible quality musical audio to our audience. So we devised a presentation with embedded audio for the conference attendees to download. That way we could tell them when to listen to the embedded audio from their version of the presentation on their sound systems.

You are looking at an adapted version of this presentation now and it will contextualize audio that represents the collaborative process that I have described, culminating in the finished piece. This first slide contains images from *Parque Alfonso Trece*, the nature reserve

where the field recordings were made. You can see that the park is right next to the sea, and that over the raised sand dunes it backs onto a green landscape sometimes open, and sometimes wooded. The audio at the centre of the slide presents a flavour of the raw field recordings. It provides an impression of the place, of the two polarities, the sea and the overwhelming insects, and it also shows the only other sound source that drew my attention that day – as in my wanderings I came across a rusty gate which made a variety of amazing noises. Trigger the wave file at the centre of the screen now to listen to this recording, the duration is around one and a half minutes. Then click the next button to move to the next part of the presentation.

The idea of a musical collaboration started at the beginning of this year. I had worked on a few musical sketches that Phil and I discussed and although the response was generally very positive, the soundscapes proved to be too dense not allowing enough space for Phil's ReAPH to fit in musically. We eventually came up with the idea that I should create a soundscape using the field recordings that Phil talked about in the beginning of this presentation in which to form the basis of an electronic canvas. This soundscape was completed by early March.

The majority of the soundscape is dominated by these field recordings which were partly kept originally as recorded and partly processed using various digital effects and processing tools. At times this combination of processed and natural sounds of insects and environments are interlaced so that they go from being natural sounds to processed and vice versa. In addition, for this musical project I was determined to incorporate pitches from one of the tuning systems explored as part of my PhD research project, called Bohlen-Pierce scale (I will talk about it shortly). Like Phil said earlier, the initial idea for this collaboration was to involve only the two of us as the sole musical/creative contributors to the composition.

However, due to the COVID-19 Corona Virus pandemic eventually leading to the cancellation of the concert, further work on this collaboration was put on hold for a limited period of time. Still, Phil and I stayed in touch regularly to discuss possible alternative approaches to proceed work on this musical composition despite lockdown. Lockdown introduced a set of problems which rendered the original ideas of the composition infeasible - among others active collaboration through face-to-face interaction in a conventional rehearsal space or the possibilities for a real-time live performance was rendered impossible due to isolation and social distancing.

In addition to some of the rather customary elements in the composition which we have addressed so far, it is important to talk about one particular aspect which derives somewhat from conventional conformities commonly found in Western music today. In essence what we are dealing with here is an alternative tuning system entirely based on a set of musical principles and pitches that does not correspond accordingly to musical practices known to most Westerners. The tuning system featured in this composition is called Bohlen-Pierce scale, and pitches from this tuning system appears throughout the entire composition.

Although these might not appear obvious at a noticeable audible level to the listener for the majority of the time, there are obvious reasons for this decision; its inclusion serves a few

different purposes upon which all are not intended to be entirely melodic nor even musical; when this occurs the pitches merely serves to counteraction against the natural and processed sounds from the aforementioned field recordings. if we put this information into figuratively terms they are supposed to appear as an undercurrent that barely scratches the surface in order to enhance and add some character to soundscape. However, when the pitches appears to be significantly audible their purpose is to add some musical elements as well as variation to maintain peoples interest/attention when listening to the piece. Lastly, the tuning system was embedded into the soundscape in order to allow Phil, and subsequently everyone else involved to be set for a musical challenge by eliminating any Western tones in favour of pitches which would force them to interact more instinctively and interpret the sounds coming from the soundscape.

Without having conventional melodic structure or recognizable pitches to follow allowed them to come up with some truly original musical gestures as well as interesting effects such as scratching strings, sudden bursts of sounds, or hitting their instruments with their fists etc. It should be noted that most of the participants had little or no experience of the Bohlen-Pierce scale beforehand. Each performer relied entirely on the sounds from the soundscape only, they were not aware of what any of the others played, allowing them to come up with unique and possibly random ideas instead of having the advantage of hearing what anyone else did, preventing them from adding new layers on top of previous performances.

Eventually, Professor Alan Williams contacted members from ACMG hoping for some musical contributions for this year's Festival of Research and it seemed like a perfect opportunity to complete and present this as a finished musical piece for this occasion. As an alternative it was decided that everybody involved in this project would have to record their instrument themselves using whatever technical equipment available to them and submit their recordings to me – this approach allowed for a more collaborative effort and opened up the possibilities for more participants to be involved in the project.

Altogether four members of ACMG made musical contributions, namely Doctor Philip Brissenden on ReAPH, Eirik Dyroy creator of the soundscape, Professor Alan Williams on accordion, and Doctor Timothy Wise on electric guitar - these recordings will be demonstrated separately by Phil soon. Even before anyone started recording themselves I could envision what a potentially fun musical project this could turn out to be, I imagined a process where each participant at first would be puzzled by the unusual pitches heard throughout the soundscape, and listen back repeatedly before trying to figure out how they would approach this from a musical perspective, how they would work out ideas and interact against the sounds they heard or thought they heard – whether they would come up with surprising sounds past natural tones reproduced by their instrument and whether push through its boundaries or limitations, I was very excited when the first recordings were uploaded in our shared Google Drive folder.

We mentioned the phenomenon of tuning systems earlier in the presentation. In order to understand some essential elements that defines a tuning system it is important to demonstrate this by presenting a general yet short walkthrough where we go through some basic steps which characterizes it as such. Music has been an important part of human

civilizations for millenniums and throughout history a number of different musical cultures have emerged all over the world, what differentiates one musical culture from another is that each has developed their own characteristic set of musical principles which is embedded into a distinctive tuning system.

We find many examples of musical cultures containing their own unique tuning system, among the most common ones are; Western World, Arab World, India, Indonesia, China etc. There are way more musical cultures besides the ones already mentioned and in some cases there might be obvious variation found in the very same musical culture, however, for the sake of simplicity we will not get further into this. Common for all tuning systems mentioned above is that they are classified as traditional tuning systems, which means that they have been in existence for many centuries and in some cases for millenniums. Each of these tuning systems were developed over a longer period of time before musical practices were firmly established and reached the level of sophistication inherent today.

Traditional tuning systems may consist of established taxonomies with firmly standardized ideas of intervallic values for tones differentiated by a specific number of intervals (i.e. 5, 7, 12, 24 etc.) divided into divisions of octaves. Although, it is common for traditional tuning systems to have their own distinctive musical features and practices distinguishable from others, it does not mean that all musical aspects embedded in one particular tuning system applies to that tuning system exclusively. Interaction between people from different continents have been fairly common over the course of history and for various reasons; such as trading (trading routes between different continents), work-related situations (such as requests for talented musicians in courts), immigration or refugees escaping wars or natural disasters etc. - have greatly affected musical progression in many musical cultures.

In other cases radical changes in a society, either appearing slowly over time or drastic - can steer the course of music towards a different direction; factors such as wars, acquisitions or claims of land, change of rule, colonization, and change of religion, are only a few contributing factors that affectedly bring new musical influences into a society, entirely adopt or possibly embed many musical elements from another musical culture into a new one. All of these factors have affected some of the musical instruments used in a particular culture and further the fashioning process which is meant to accommodate their respective tuning system. In many cases influences from other musical cultures have led to new instruments being adapted and fashioned into a different musical culture to fit alongside with other traditional musical instruments, or some cases features associated with another musical culture being incorporated onto already existing instruments found in another to allow for more flexible playing or to replace old outdated ones.

Although, it is clear that some musical instruments adopted instruments or incorporated ideas or features from other musical cultures, in many situations these instruments can still be distinctively definable with that particular culture. In the past 120 years or so, an emergent awareness of music from other cultures has been apparent all over the world mainly due to increasing exposure through globalization. This has affected a variety of musical cultures all over the world and each of the traditional tuning systems mentioned in this presentation have to a some or great extent incorporated Western musical instruments into their own music and in some cases focused on pushing boundaries by applying

recognizable musical elements from Western popular music and blended them with their own traditional music.

Simultaneously, numerous tuning systems have emerged within the past 120 years or so, many of which were invented by Western people. It should be noted that the earliest among these emerged only decades after the 12-tone equal division per octave system became standardized as the established measurement for Western music. Whether these ideas were initiated by a number of Western based theoreticians, mathematicians, philosophers, musicians and instrument makers who for centuries brought various propositions for an ideal tuning system lasting up to the mid-late 1800s, is up debate although not unlikely.

There are a few very noticeable distinctions between traditional and modern tuning systems; as we pointed out earlier, many traditional tuning systems have been developed over a period of centuries, through numerous contributions from a variety of individuals with backgrounds ranging from theoreticians, mathematicians, philosophers, musicians and instrument makers – all of whom have had a major impact shaping musical aspects within a particular music culture. However, when we look at modern tuning systems, quite often the situation is entirely different; modern tuning systems have emerged within a short timespan and often we witness only one or two innovators solely responsible for a fully developed tuning system, which for the most part remains unchanged by future generations.

It appears that many modern tuning systems have been invented by Westerners and contains ideas that opposes to commonly established principles known in Western tuning today. However, it is not uncommon that some modern tuning systems share some structural elements or certain reference tones/pitches reminiscent of Western tuning systems commonly used prior to the late 1800s, such as Pythagorean tuning, Just Intonation tuning, Meantone temperament, Well temperament. Further, it should be noted that the traditional non-Western tuning systems mentioned prior in this presentation are all based on taxonomies that deals with octave-based divisions, however, some modern tuning systems seems determined to oppose to these ideas and challenges such principles – among others Bohlen-Pierce scale might be one perfect example to demonstrate such a phenomenon, although we will talk more about this tuning system very shortly.

Contrary to traditional tuning systems, new innovative instruments and/or unique finger orientation/keyboard layout designs specifically constructed to accommodate these tuning systems are rarely ever encountered, in addition composed or performed music associated with modern tuning systems are non-genre defining, by this we mean that there is no specific genre that relates to this type of approach, however, currently modern tuning systems are mostly associated with electronic and experimental music genres.

We have now arrived at one of the most integral parts of the composition, namely the Bohlen-Pierce scale tuning system. Bohlen-Pierce is a modern tuning system initially developed in the early 1970s by German-born microwave engineer named Heinz Bohlen. A few years later another renowned microwave engineer named John R. Pierce also made similar discoveries; believing at first to have invented an entirely new tuning system later to discover that someone else had already invented a similar tuning system, thus the name Bohlen-Pierce scale. In essence, this tuning system was created by two individuals, none of

whom were primarily musicians, who by pure coincidence shared the same profession and happened to be completely unaware of each other's contribution).

Different from the octave-based division approach commonly found in a number of different traditional tuning systems all over the world, Bohlen-Pierce scale is based on a completely different set of measurement called tritaves (3:1). Essentially this involves a combination of an octave (2:1) and perfect fifth (3:2) to form one tritave resulting in a total ratio of 1901.96 Cents per division. Bohlen-Pierce scale does not contain any exact pitches that corresponds to traditional Western tuning system. In compliance with this some pitches may appear out of tune to the casual listener.

Although no particular unique instruments have been created specifically for this tuning system, examples of custom-made keyboards exist. As can be seen in the picture to the left is a custom-made electronic hardware keyboard made by Heinz Bohlen. Among other musicians who have been actively involved customizing electronic hardware keyboard is the microtonal composer Elaine Walker. Further it should be noted that the perfect fifth in this case is based on Just Intonation ratios and not according to the Equal tempered version.

The spectre of tritaves consists of 13 intervals, and can be found in two different configurations 1) Equal Temperament with intervals approximately 146 Cents apart and 2) Justly tuned temperament. Lastly, no divisions repeat at the octave.

I planned and recorded three takes with the soundscape in foldback. I did not allow any of my takes into the subsequent foldback, but I did think carefully between takes about the sounds that I had created, and exactly what I wanted to add in order to compliment or to provide contrast. I allowed my playing to be drawn by the soundscape in three ways. Firstly to create a harmonic interaction with the pitches of the Bohlen Pierce scale, I find the way that my brain reacts to these pitches interesting; a lot of the time it doesn't react to them as musical pitch at all, and instead makes sense of them in terms of the soundscape sound – for me they particularly merged into the sounds of the rusty gate. At other times, I found myself drawn to interact with a pitch that occurs sufficiently close to one of the notes of my harmonic plan.

My harmony was intended to add warmth – I had in mind Debussy's *Iberia* in my harmonic constructions. This harmonic warmth might seem odd for such an experimental context, but it complements the demand that the piece overwhelms the senses as did the sound on the day of the field recordings – I wanted the piece to be a celebration of life, and perhaps to have an element of nostalgia.

I did not do too much planning because I wanted a spontaneity in the interaction, and to give Eirik potential to then edit as he so wished. A second approach to interacting with the soundscape was to react directly to the gesture that Eirik had created – to blend, contrast, enhance. And a third approach was to enact some of the work that the whole ensemble had undertaken in rehearsal as we sought to directly represent the sound and gesture of insects. The excerpt has all three takes layered together and mixed to the front so that you can hear the harp. I was very pleased with the synchronicity of my own performances when I listened to them together, and even more pleased with the interactions created between the takes

of the other instruments. Here are three excerpts which demonstrate particularly striking interaction in the responses of the players.

As pointed out in the beginning of this presentation the soundscape was distributed to a selection of members from ACMG through a shared GoogleDrive folder. In the end three members besides myself participated and submitted their recordings, fragments of these recordings were just demonstrated by Phil.

Both Phil and I had a clear idea about what we wanted to do with the composition creatively prior to the COVID-19 pandemic outbreak and despite that we could not proceed with our original plans, we were still determined to capture the essence and feeling of a solo piece playing against a pre-composed electronic soundscape. After the decisions to include a selection of other participants in this composition it was integral for me to start integrating Phil's recordings first because these would shape and define the musical flow of the composition, in order to retain the sense of a solo performance it was necessary to keep any editing to a minimal. This was the only obvious decision made beforehand.

By mid-June all participants finally submitted their recordings and this allowed me the freedom to incorporate all performances into the composition and make the final artistic decisions. All recordings provided by the participants have been used in the piece although the extent of each take used in this composition varies from near complete while others may contain only a fraction of the original recording. Further, none of the participants were supposed to listen to anybody else's contribution, and solely interact with the soundscape.

It is worth pointing out that each instrument have been treated differently and for various reasons. Phil submitted three takes, and while I did not plan to stack all of them on top of each other and play them simultaneously in their entirety, this decision came about by pure accident after enabling all recordings at same time just for the sake of experimentation. This turned out to be a really good decision, each take complemented one another perfectly since there were slight but obvious variations, and the level of density and types of gestures were noticeably different from one another. In terms of mixing decisions each take was subject to minimal editing (and only sections where all three takes took up too much space or were too dense).

Different from all other instruments present, the timbre of the ReAPH was further processed using various real-time graining and delays techniques in order to add some extra textures to complement Phil's playing. This was also planned from the beginning. However, I decided to add the effects to the ReAPH after mixing and editing all recordings as I felt it would be easier to make determined creative decisions after all other musical elements had been assigned to their desirable spots in the composition. With Phil's recordings I have tried to retain the artistic aesthetics as closely as originally planned prior to the lockdown, and attempted to preserve some of the character of a solo piece featuring one live instrument subjected to live signal processing playing against a prepared soundscape, although some alterations occurred.

Next in line were Alan's accordion recordings, which were approached very differently from Phil's. Alan provided two takes each quite different from the other, whereas one take

focused on rather dense gestures and the occasional loud burst, the other focused more on long mellow beautiful gestures which both seemed to complement the ReAPH really well. I decided to construct a combination of softer and denser accordion passages which at times were juxtaposing, while at other times only either of them, mainly these decisions were affected by the gestures played on the ReAPH, in order to bring some interesting interaction between these.

Artistically, the accordion plays more a complementary role in this composition, it appears frequent and has a significant presence throughout, while at the same time adds the textures necessary to complement the ReAPH. In addition, some parts were shuffled around to produce an atonal flavour at the beginning of composition. To a much greater extent these recordings were trimmed and altered although there are passages kept in their entirety, such as the dense playing towards the end of the composition.

Tim's guitar recordings were treated similarly to Alan's. Although no parts were shuffled around some segments were adjusted slightly to enhance and make certain musical moments appear more effective. To a greater extent these takes were edited. Tim made various experimental sounds on the guitar using a variety of effects to create an interesting wash of sounds. At times he made certain sounds that had similar timbre to that of the Bohlen-Pierce scale tuning system, this complemented both the ReAPH and accordion really well.

When it came down to the final mixing decisions it should be noted that this turned out quite differently than originally planned. While I did focus on retaining the warmth provided by the field recordings used, the addition of more participants than Phil and me, allowed for an entirely different approach. These decisions did not spring to mind until I managed to include all of the instruments and additional effects. Originally, I intended to let the soundscape appear rather low but clearly audible, while emphasizing the added effects to the ReAPH more noticeable than in the final mix. With the addition of accordion and electric guitar in the composition there were suddenly more instruments competing for space, and I came to the conclusion to not approach the original plan entirely.

I could really hear the potential of a really good piece if all instruments were to be allowed equal space in the composition, by this I would also allow the soundscape to have equal space compared to the musical instruments, and maintain a noticeable loud but warm atmosphere from the soundscape. If there had been more or less participants involved in this composition the outcome of the mix could have turned out quite differently. There are various reasons for this; the original approach for mixing is a very typical approach with this type of music and solo performance + soundscape thus I wanted to create something that would sound more unique and original. The mixing was completed the last week of June just in time for the presentation at Festival of Research, and in line with everybody else's contributing to this composition mixing occurred on less than desirable equipment and monitors

