UNIVERSITY OF CALIFORNIA, SAN DIEGO

Capricorn's Nostalgic Crickets: A New Revision for Clarinet

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Musical Arts

in

Contemporary Music Performance

by

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The dissertation of Samuel Ekkehardt Dunscombe is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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ABSTRACT OF THE DISSERTATION

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by

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Doctor of Musical Arts in Contemporary Music Performance

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Professor Anthony Burr, chair

This dissertation is in three parts: the audio recording of a new revised version of Horatiu Radulescu's *Capricorn's Nostalgic Crickets* (for seven identical woodwinds); an overview of Radulescu's compositional style through the analysis of both his 1974 composition treatise / booklet *Sound Plasma – Music of the Future Sign* and the work-cycle *Fountains of My Sky*; and a detailed discussion of the revision process by which I arrived at my new version of *Capricorn*.

Chapter 1:

Sound Plasma – Music of the Future Sign or My D High Opus 19∞

1.1 **Introduction**

In 1975, Horatiu Radulescu published *Sound Plasma—Music of the Future Sign or My D High Opus 19* ∞, the culmination of 4 years work between 1969 and 1973. An extraordinarily wide-ranging work, *Sound Plasma* is difficult to categorise. Radulescu's long-time friend and collaborator Roger Heaton succinctly describes it as "both a performable prose composition and a theoretical text,"[1] while Radulescu himself suggests *Sound Plasma* to have numerous functions: an outline of what he felt was to be the future of western music, at once a prognostication and a call to arms for musicians and composers to abandon the mistakes of the past; a primer for how composers and performers might practically realise the new "plasmatic" music; a set of analytic tools to understand the world of sounds we inhabit and to reinforce the significance of his compositional strategies; a tutorial for a new way of listening and engaging with the world; a musical composition to be either imagined and experienced privately, or to be performed; a collection of poetry; and ultimately an artwork which could provide the reader with an experience of 'imponderability' / 'eternity' / or 'utopia' in the same way that a composition of "plasmatic music" might.

Sound Plasma—Music of the Future Sign is printed white-on-purple, each page carefully handwritten with accompanying diagrams. Overlaid are verses of Radulescu's "stardust poetry," written out in a diffuse dotted style (see figure 1, planet "Intimate Hope Invasion") so as to

[1] Roger Heaton, "Sound Plasma," *Contact* 26 (1983): 23.

maintain the legibility of both the theoretical text and the poems themselves, even as they inhabit the same space. Seemingly every aspect of this work has been carefully crafted to create an aura of mystique and magic, down to the fact that the pages themselves are not numbered, but rather every second page is assigned a line from a larger guiding poem. The lines of this poem mark out two pages of text, referred to as "planets", and the planets may be read in any order ("paging a free galaxy"). In the introductory text, Radulescu explains that both the stardust poetry and the "free galaxy" form of ordering pages are used as a device to "suggest the <<universe>> of this music."[2] Before even reaching this, the reader is requested to "meditate upon the 5040 combinations of the 7 words composing the title" (Sound Plasma Music Of The Future Sign) before going any further into the booklet.

Sound Plasma is a call for composers to move away from "…old formal and aesthetic mania" of treating sound "from its outside … the use of sounds as points and lines."[3] By this he means that the 12 discreet steps of the chromatic system, arranged to create melody and harmony, and the organised into rhythms based on a universal set of proportional durations, has resulted in a situation where the *sounds themselves* are pushed about by grammatical systems that exist apart from their own intrinsic constituent elements (he calls these their "inner ocean"). This disregard for the inner life of sounds is, in Radulescu's mind, an "exhausted DISCONTINUANCE" (emphasis his), something artificial and lifeless that by the mid 20th century was completely played out. To break out of this "exhausted DISCONTINUANCE," Radulescu suggests we must instead look to the "intrinsic" constituent elements that Western music has ignored, which he outlines in both empirical terms (timbre, spectrum, harmonicity,

[2] Horatiu Radulescu, *Sound Plasma – Music of the Future Sign* (Munich: Edition Modern, 1974), introductory text.
[3] Ibid., "Intimate Hope Invasion."

etc), and experiential ones (the senses of causality and meaning / signification that occur through the act of listening).

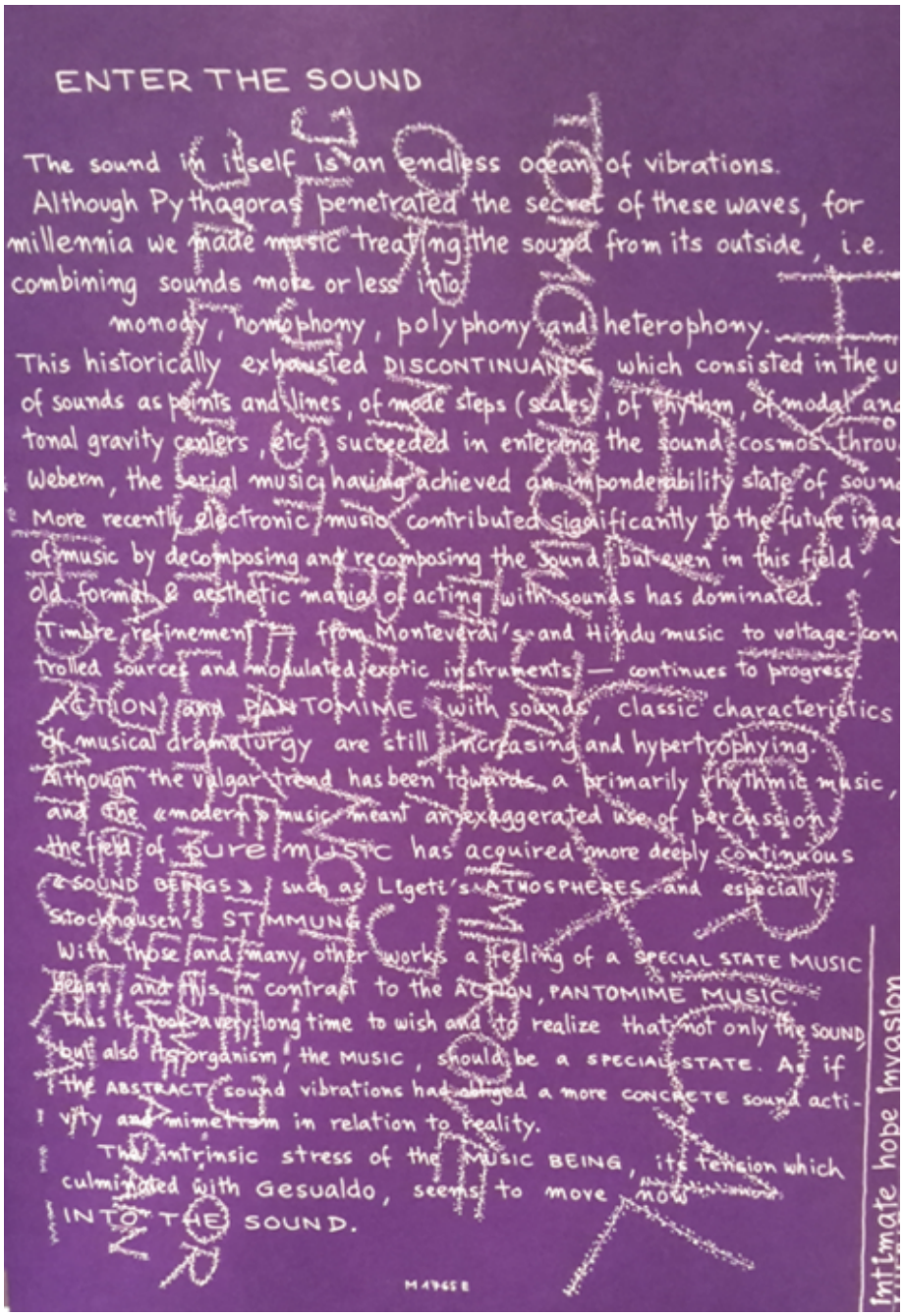

Figure 1.1: Planet “intimate hope invasion”

In declaring the Western classical tradition to be in a moribund state, and that in order for it to survive swift changes must be made, Radulescu's work is hardly unique. There is a long history of "corrective treatises" being written by composers stressing the urgency with which the course of musical progress must be righted.[4] A particularly interesting subset of this trend began to emerge in the early 20th century: treatises suggesting that re-orientation should be achieved through a re-examination of the material status of sound. Some well-known examples of this might include the work of Harry Partch,[5] Pierre Schaeffer,[6] Dane Rudhyar,[7] and even Luigi Russolo.[8]

The musical ideas that Radulescu proposes, while being uniquely his own, show great influence from the compositional output of other artists as well. He readily acknowledges the influence of Stockhausen, Ligeti, and Webern within this text: Stockhausen (in *Stimmung*) and Ligeti (in *Atmospheres*) had managed to create "deeply continuous <<sound beings>>," and Webern's serialism was responsible for opening up the idea that music could achieve a state of

[4] Famous examples might include the writing of Rousseau, Rameau, Schoenberg, Cowell, and many others. An interesting overview of this trend as it stood in the early 20th century can be found in the 1927 article "'Going Back' in Music—To Where?" by Dane Rudhyar.

[5] Whose 1949 treatise *Genesis of a Music* offers critical analysis of two opposing trends in music, the "corporeal"—music grounded in the act of speaking and communicating linguistically, and the "abstract"—music that is focussed on non-verbal forms, and tries to convey meaning in a non-linguistic way, as well as tracing a general history of tuning and temperament and suggesting that the use of alternate tunings is necessary to more naturally capture the expressivity of the human voice.

[6] Schaeffers conception of the "sound object" was derived from bracketing out the causal (where a sound *comes* from), and the semantic (what a sound might mean, signify, or symbolise), in a way that is not too dissimilar from Radulescu's call for listeners to focus on sound's "inner ocean." Pierre Schaeffer, *In Search of a Concrete Music*, trans. Christine North and John Dack (Berkley: University of California Press, 2012).

[7] At times, Radulescu and Rudhyar's writing sounds eerily familiar, for when Radulescu talks about the "exhausted discontinuance of … points and lines", of cold "stone-like sounds" that we push around like lifeless building blocks, there is a clear resonance with Rudhyar's controlling idea that "the note" is a restrictive and artificial concept, that we "manipulate like wooden cubes" and that are "…corpses; they contain no life" put forward in his 1922 article "The Relativity of Our Musical Conceptions."

[8] Russolo wrote his manifesto *The Art of Noise* in 1912, arguing that the increasing noisiness of the industrialised world had created a new set of listening conditions and desires, and that the audiences of the future require a new kind of "noisy music" to satisfy these.

"imponderability." In other articles, he cites further influences including Scelsi, Schoenberg, Indian classic music and others, and the period in which this booklet was written (between 1969 and 1974) was also one in which composers like La Monte Young, Morton Feldman, John Cage, James Tenney, and Alvin Lucier (for whom Radulescu had a special affection) were exploring similar ideas in parallel across the pacific. To trace all of these threads back, to create a comprehensive survey of artists working to achieve similar goals, the relationships between them, and the influences they all had on each other, would be a fascinating undertaking. However, it would also be well beyond the scope of this dissertation, which aims to primarily focus on *Sound Plasma* in its role as a practical guide for performers aiming to realise performances of Radulescu's music (and for composers interested in understanding how "plasmatic music" might be created from a practical standpoint). I'm hoping to research and publish further work in this area in the coming years.

1.2 **Plasmatic Sound Explained**

Whilst still acknowledging that "sound plasma" itself is much bigger than just a type of sound (or way of producing sound), and that it represents an ideal state where all elements are in fusion, one of the core ideas of this booklet is that through the creation of a certain kind of sound in a certain kind of way, under certain circumstances, a "magic state of the soul"[9] may be achieved. This section will focus on answering the question about the first of these pre-conditions, that "certain kind of sound."

[9] Radulescu, *Sound Plasma*, "and errors."

The very first thing to acknowledge is the centrality of the harmonic series and the idea of "spectrum" to Radulescu's thinking. Radulescu wanted to look "inside" sounds, to understand their "inner ocean", and to manipulate them to musical effect. He did this by bracketing out received ideas of pitch relationships, harmony, rhythm, and all attendant cultural baggage, and looking directly to the idea that any single sound is the sum of a multitude of vibrations. His first work to do this was *Credo* for 9 celli:[10] "…in which a compact spectrum of 45 theoretical harmonics of the cello's low C become the new fundamentals of 4170 micromusic events evolving over a duration of 55 minutes."[11] Radulescu referred to the technique of playing "theoretical harmonics" as "real notes" and then subjecting them to timbre-transforming playing techniques as "the emanation of immanence."[12]

If we look to the dictionary, we find a number of different definitions for the word "plasma:" from a substance of mobile charged particles (such as exists in the fusion of particles in the sun, at the low pressure of our upper atmosphere, or even in the screen of a television) that are excellent conductors of energy; to the protoplasm that both constitutes and binds an organism's cells together. The word "plasma" suggests these multiple meanings: sound plasma is a conductor of cosmic energy that allows for the fusion of the "INFINITELY SMALL (…ABSOLUTE)" with the "INFINITELY GREAT (…ETERNAL),"[13] at the same time as it is the substance that both constitutes the "music of the future sign" and binds it together. We will see Radulescu claim this quasi-fractal understanding of sound (the use of micro-structures as

[10] Which Radulescu claimed to be the first work of Spectral Music in "Brain and Sound Resonance," *Annals of the New York Academy of Sciences* 999 (2003): 323.
[11] Radulescu, "Brain and Sound Resonance," 323.
[12] This is very similar to the technique of instrumental synthesis that was to become popular with French spectralist composers a few years later.
[13] Radulescu, *Sound Plasma*, "Intimate Hope Invasion."

organisational principles on the macro scale and vice versa), as one of the key ways that his music is able to achieve a "…higher degree of authentic art…"[14]

Radulescu describes how plasmatic sound is made manifest on two different levels, described as two different "plasmas:" micro plasma(s) are "the cell of the future music," and macro plasma governs architecture and form. These are reflections of each other – the same processes operating at different time scales. The easiest way to understand how each idea works, is to start with a discussion of the micro, and then show how these principles might be then mapped out onto the macro level. This is the approach that Radulescu takes in *Sound Plasma*, devoting far more space to the discussion of micro components, and only vaguely suggesting in much vaguer terms how the "micro" is a model for understanding the "macro."[15]

Micro plasma can itself be understood through two key terms to describe aspects of this single phenomenon. The first of these is the "narrow frequency band (NFB)," which takes the place of fixed, solid pitches (in other words, it's the replacement of what we might call a "fundamental" pitch). The second is its spectrum pulse, which is a combined way of thinking about both the interactions that happen higher up in the spectrum, and the way this knowledge might be leveraged to deal with how sounds come and go in time (and is suggested as the replacement for "rhythm").

[14] Radulescu, *Sound Plasma*, "Intimate Hope Invasion."
[15] Although it is possible to understand this relationship quite clearly from looking to examples from his musical work, as we shall see.

A: The narrow frequency band

The planet "again an ash sun weeping" is devoted to providing a definition of the NFB, which is to take the place of the idea of a "fundamental" in the music of the future sign. Rather than being a discretely defined pitch, with a fixed and static spectrum, the narrow frequency band is a process in a state of continual transformation. The easiest way to describe it is as fluctuations ("tremblings") within a certain range, around a central pitch. The minimum range for an NFB is one third of a tone, and at its widest it may span three quarters of a tone (see figure 2), and the movement should be relatively slow so that the fluctuations are not directly perceived as a movement of the fundamental. Harmonics and spectra are derived from within this range, and instrumentalists should take care to maintain mobility and agitation, even when holding "stable" pitches. Therefore, the spectrum will be in a state of flux purely from the fact that the fundamental from which it is derived is constantly moving around, and this feeling of constant transformation should be amplified and intensified in any way possible (techniques for doing so might range from shifting the harmonic weightings inside the sound spectrum, introducing inharmonic components to otherwise harmonic spectra—especially with the use of multiphonics or with multiple players, and through the introduction of more broadband noise). Sometimes "the NFB as a fundamental may disappear" altogether, which could happen either through a movement into the upper part of the sound spectrum, or through a phenomenon whereby the interaction of multiple spectra might suggest lower difference tones that are not actually present.[16]

[16] Given that the range may be as wide as three quarters of a tone, the NFB range around anything above about D4 (294hz) is wide enough that two players playing in the same NFB could produce a difference tone above 20hz, and thus perceptible to the human ear.

Figure 1.2: The range of the NFB

On the macro level, the Narrow Frequency Band is very apparent in the "fuzzy proportionality" that exists in a lot of his works. Larger blocks of sound and individual sections of a piece derive fractionally from the whole, with a certain degree of deviation and temporal instability, and in the following chapter we will see this to be exactly the case in the treatment of time in the instrumental portion *Fountains of My Sky*. One could think about this in terms of re-mapping: if you were to take, say, a spectrogram image and flip it sideways, you would have a set of impulses in time that could be used as a structural principle. This is an effective way to imagine the time cycles in *Fountains of My Sky*, for example, with irregularities in timing functioning as "inconsistent" or even "inharmonic" components of the spectrum.

B: The Spectrum Pulse

A description of spectrum pulse is given on "thirteen dreams ago:" in the spectrum of a given sound "…the presence (appearance and disappearance), the intensity and the quality of the harmonics follow a continuous process of transformations which give and sustain its life." Within the micro plasma the Spectrum Pulse is the flux and motion that happens in the "harmonic aureole" above an NFB between a set of interacting NFBs, or in the interactions that occur when moving between NFBs. The Spectrum Pulse is created in two ways: either through the "interjection of [the spectra emanating from] different NFBs", creating a composite spectrum

as they intermingle and "fight to dominate and establish a new spectrum"; and through multiple emanations of the same NFB, with "variable multiphonic treatment" of this single source.[17]

In Radulescu's music of the future, the transformations that occur as the spectrum pulse shifts and fluctuates will take the place of rhythm. Rhythm is, to HR, the treatment of sounds like "stones", like building blocks, simple and solid with no real life of their own. The Spectrum Pulse, on the other hand, is in the first place always mindful of the fluctuation of spectral energy within sounds, and the ways these fluctuations might further cross-modulate and intermingle as they are added together. So, the Spectrum Pulse should be understood not only as the fluctuating energy within a sound spectrum, but also as a process of spectral evolution functioning as guiding principle for how transformation and movement can be achieved on a broader level (in other words, why one sound should necessarily be followed by the other, and what durations will work best to facilitate the plasmatic experience). As an example, he cites his work *Wild Incantessimo*, in which "…117 soloists pulsate on each of these three spectra a matrix model of changes according to a stochastic distribution. Nine-music [sic] succession and superposition give the sensation of seeing the shape of a sound sculpture from nine different distances at the same time."[18]

As a principle governing the evolution of form on a broader scale than just "block to block," Radulescu writes: "…the articulation of the micro-plasmas gives a macro-pulse of evo-involution,"[19] and suggests that movements between points on the Sound Compass (discussed in

[17] Radulescu, *Sound Plasma*, "thirteen dreams ago."
[18] Radulescu, *Sound Plasma*, "thirteen dreams ago."
[19] Ibid., "oddly enough."

the next section of this chapter) may happen on the global as well as micro level. Returning to our re-imagination of the Narrow Frequency Band as a model from which timing structures might be derived, we can see the spectrum pulse manifest as the rhythmic interactions between two contrasting time-scales, or as fluctuations / rhythmic inconsistencies in the timing ("inharmonic" components of the "spectral" laid horizontal).

C: Micro and macro plasma

In imagining the macro development of a piece as being driven by the same processes that create plasmatic sound on the micro scale, Radulescu makes a tacit reference to an idea from Karlheinz Stockhausen (whom we know was both at one time Radulescu's composition teacher and an artist he deeply admired throughout his life), put forward in the article "How Time Passes." Stockhausen claims that rhythm and pitch are in fact the same thing: that steady rhythm played sufficiently fast will be perceived as a periodic waveform (a pitch), while pitch slowed down will produce oscillations on a time scale that is perceived rhythmically.[20]

The connection is significant: we know that Radulescu was both a great admirer of Stockausen (when he writes on 'Intimate Hope Invasion' "especially Stockhausen", he reserves a special place for Karlheinz as the leading figure working with sound from the "inside") and had studied composition with him in the early 1970s, so he quite certainly would have been familiar with this idea. Where the two composers differ in how they develop this idea is that Stockhausen at this time still worked with static / stable pitches (most often quarter-tone divisions of the

[20] The classic example of this is to take a series of impulse responses and speed up the rate at which they come until it begins to be perceived as a waveform (above 20 impulses per second). The reserve can also be achieved – if you slow down a recording of the human voice sufficiently we hear a series of percussive events.

octave), and suggested the possibility to develop duration-based structures in the same way that the harmonic systems of western music had developed earlier. In doing so, Stockhausen makes a nod to Henry Cowell, who had come up with a similar idea (though explored in a slightly different direction) half a century earlier. To borrow Radulescu's language, by doing this Stockhausen is still treating "sounds as stones", developing abstract systems for organisation and then building structures from them.[21] Radulescu takes Stockhausen's idea, and implies a kind of phenomenological bent to it: he attempts to bracket out received ideas of pitch and rhythm, and focusses instead on the "inner ocean" of sounds themselves as an organisational principle. For Radulescu, deriving formal structures in this way guarantees that there'll be a deeper unity and resonance to them, important for achieving "…a higher degree of authentic art" in line with the vibrations of the cosmos, as sound is a living entity in a constant state of evolution and transformation; by mirroring this micro-level process on the macro-level of constructing the architecture of a musical work, "music" can be an expression of these powerful inner forces.

1.3 **Making and listening to plasmatic music**

I wrote in an earlier section that Radulescu's goal, to achieve a "magic state of the soul," was achieved by creating plasmatic sound in a certain kind of way. Now that we can understand the historical context in which he was working and the basic technical principles of plasmatic sound, we can take a more in depth look at the specific tools he gives the reader to understand plasmatic sound. At times, these analysis tools have an implicit suggestion for how a composer might reverse engineer natural phenomena in service of writing a new piece. At other times,

[21] And in this, I cannot help but recall the famous interaction between Stockhausen and Morton Feldman, relayed in Jennie Gottschalk's *Experimental Music Since 1970*: "Feldman was fond of recounting a conversation he had with Karlheinz Stockhausen, who asked him what his secret was. 'I don't push sounds around,' he replied. Stockhausen 'mulled this over, and asked "not even a little bit?"'"

they are discussed more directly as compositional tools. These tools are also highly valuable for the interpretation of Radulescu's works, and many of them are included in the performance notes to his pieces. The "Sound Compass" is present in *Small Infinities Togetherness*, *Outer Time*, and *The Inner Time*; the "Global Sound Sources" and "Concealment of Cause and Effect" in *Capricorn's Nostalgic Crickets*; the "Narrow Frequency Band," "Evo-Involution," the "Spectrum Pulse," and others in *Flood for the Eternal's Origins*; the list could continue, as these ideas are directly cited—and in many cases elaborated upon—in more than half of the scores written up until the late 1980s (at which point his interests moved more in the directions of folk music and its spectral legacy). My discussion of these tools will be grounded in the explanations given in *Sound Plasma*, but where appropriate I will make reference to the performance notes to these scores as well.

A: The sound compass: evo-involution of sound and psyche

The Sound Compass[22] is a set of categories for describing sound, in a way that avoids making reference or comparison to how are they are produced, what they might mean, what they "sound like", or any other connotations or associations one might make to the outside world.[23] Radulescu gives us two binaries, Noise + Sound, and Element + Width, mapping them onto the familiar "Cartesian" space of a compass (see figure 3).

[22] Described in detail on planet "crushing the crumbled skies."
[23] In this, we might see some connection with the work of Pierre Schaeffer, who earlier theorised the idea of the Sound Object (*objet sonore*) based on a similar premise: bracketing out the "causal" and "semantic" aspects of a sound in favour of a focus on the material characteristics of the sound "itself." Schaeffer, *In Search of a Concrete Music*.

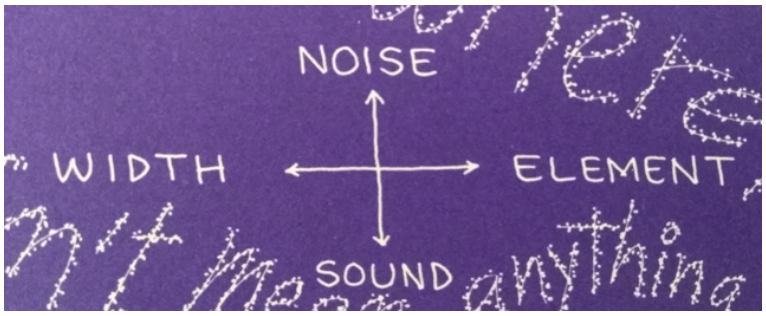

Figure 1.3: The Sound Compass

(N) Noise means unclearness, "wave unperiodicity," confusion; while (S) Sound is the opposite of noise—clarity, periodicity, harmonicity, calmness, etc. (E) Element is narrowness, the near absence of spectral content above a given sound; and (W) Width refers to sound of a very broad spectrum. So, we have one binary between the serene and the chaotic, and another describing range. Just like a real compass, there are points in between the cardinal directions: NE would describe unperiodic noise in a narrow bandwidth (imagine running a white noise generator through a bandpass filter); NW full-spectrum random noise; SW would be a rich periodic wave with lots of harmonics; SE would be a periodic wave with almost no harmonic content (ideally, a sine wave).

Some examples of real world sounds placed within the space defined by the Sound Compass are given in the text, and these I have collected and reproduced in the table below:

Table 1.1: Understanding the sound compass

N-W	N	N-E
White noise; waterfalls	Crickets Chirping	Narrow noise-band; natural events (rain)
W		E
Texture music		Pointillist music
S-W	S	S-E
Polyphony	Heterophony	Sine wave; Monody (Byzantine music)

The Sound Compass is, however, not given to us so that we might categorise and explain the infinite range of possible sounds in the world. Radulescu, being all about transformation and fusion, gives us the Sound Compass as a visual aid for the kinds of spectral transformation he asks for in his pieces, a space to move through, and he provides a set of transformational movements through the space the Compass defines. On the planet "pre-existing soul of THEN," he gives a hierarchy to these movements / transformations: levels I, II, III.

On level I, the lowest level, we see movements from one (or more) point, to another point. This might be "from SE to N", "from W to E", etc. These transformational movements are the easiest to conceptualise: for example the movement from SE to N might describe a sound

event that begins with a single held note on the flute, and gradually builds to clusters of simultaneous multiphonics and waves of percussion instruments. In a later article, *Music of My Universe*, this is described as the level of "directional" movements.

On level II, there are two movements: firstly, a simultaneous movement outwards in all directions, towards the limits of the sound space; and secondly a movement from all of these outer movements inwards towards a neutral sound-space in the centre (which may also be silence). The article "Music of My Universe" describes these movements as "multidirectional." The first movement (outwards) is evolutionary, it's about growing/developing from the centre. The second movement is one of involution, of infolding, drawing energy in towards the centre. These movements are also not difficult to imagine if we think about them being realised by multiple players, but this understanding is muddied when we consider his request that players of solo material should achieve them. From listening to different interpretations of his solo works, it seems that most performers opt to represent this process by cycling quickly between multiple mono-directional movements, thus achieving this process within a section of a work but not actually at any one single simultaneous point in time. A great example of this is in Vincent Royer's 2005 recording of Das Andere, released on the CD *Intimate Rituals* (Sub Rosa 248).

Level III contains a single process: "Evo-Involution," the simultaneous realisation of evolution and involution all at once ("summative"). With involution being a contraction of energy towards the centre in preparation for an evolutionary big bang, and evolution the movement of energy unfolding out into the world stretching out until it is again drawn back into

the centre in a process of involution, we can see the presentation of them as a simultaneity as revealing the spiritual base from which Radulescu developed his compositional practice.

B: Five fingers on a magic hand: the global sound sources and the concealment of causality

Like the Sound Compass, the categories of the Global Sound Sources (and their Magic Hand) are a method for understanding all the sounds of the world. However, this deals with how sound is situated in the outside world, taking into account ideas of causality, referentiality, and meaning. Radulescu does not want to abandon or bracket out the causal (was the case with Pierre Schaeffer), but rather to draw all of that in, as to reach a state of ecstasy by overloading us with sounds that either fit multiple categories or are in a state of constant transformation between categories.

On the planet "vauge lament and wave", Radulescu argues that all the sounds in the world can be categorised into the following groups:

I/O (instrument/object) – the sounds of people manipulating musical instruments or other objects;

H (human) – the sounds of the human body, from whistles to snores to voice to breath;

N (nature) – an extremely wide category including all sounds of the natural world, from bird song to wind, rain, and surprisingly "folklore"[24];

[24] The inclusion of "folklore" in the nature category most likely refers to the elements of noise / roughness to be found in "primitive" folk musical instruments, discussed by Roger Heaton in Simon Weir's film "Roger Heaton Discusses Horatiu Radulescu's 'The Inner Time,'" YouTube.

E (electronic) – all kinds of electronic sources, from synthesisers to other kinds of equipment;

L (language) – concrete human sounds that are intended to have semantic meaning and can be divided into the subcategories of "notional" (meaning something directly / explicitly), "magic" (producing a sense of meaning indirectly through atmosphere / feel), and "phonetic.

The first four of these are abstract and the last is concrete, in terms of "(notional) meaning" (that Language exists *to mean* directly), and thus they can be mapped onto the image of a "magic hand", with L being the thumb, and the other sources being fingers (shown in figure 4). Other potential configurations of the Magic Hand, such as understanding all sounds to be subjective (caused by a human agent) except for N nature, which is objective (outside of human control), are also given on the same planet ("vague lament and wave").

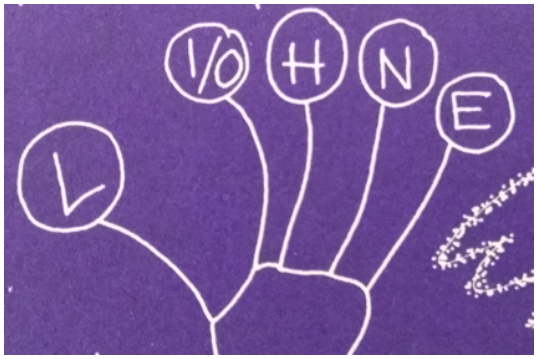

Figure 1.4: The Magic Hand

As with the Sound Compass, there is a higher goal of transformation here, beyond simply listing and categorising sounds. He gives us this information because plasmatic music must be able to give a sense of movement through, of transformation between, the different sound

sources. One of the aims of plasmatic music is to conceal all notions of cause-and-effect, to confound our sense of causality with sounds that seem to emanate from a source that is constantly shifting, or is more than one thing at once.[25] It very closely matches the process of "evo-involution" described previously, a sense of simultaneous transformation and movement in multiple directions at once, in such a way as to create an experience that cannot be comprehended within the bounds of profane time (or perhaps, profane logic).

C: The compass of the psyche

Through the principles of the Sound Compass and the Global Sound Sources, Radulescu believes Plasmatic Sound to be capable of creating a state of being (the "magic state of the soul" mentioned earlier). He includes a diagram for the "compass of the psyche," a reference to Carl Jung,[26] and in a later article explains that: "To combine the compass of sound (element, width, sound, and noise) and that of the psyche (thought, feeling, intuition, and sensation), the sound sources … are living in the temple of time, and bring us the movement and the vibration of light."[27]

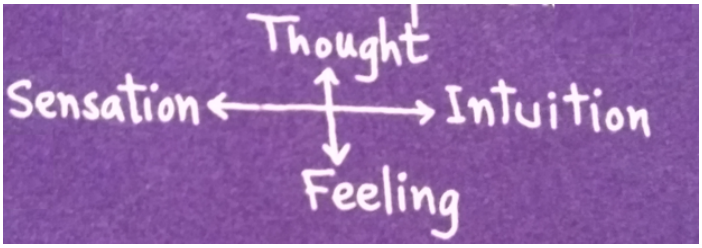

Figure 1.5: The Compass of the Psyche

[25] A very crude yet effective demonstration of this might be found in the way that, after listening to loud white noise for an extended period of time, one tends to hear aural hallucinations, to assign patterns and causes to make sense of the desnity. This was the chief subject of my work *Multiphonic Descent piece* for 27 clarinets.
[26] In Jung's compass, the four poles are Thought and Feeling for N-S, and Intuition and Sensation for E-W. Radulescu, *Sound Plasma*, "vague lament and wave."
[27] Radulescu, "Brain and Sound Resonance," 363.

In Radulescu's plamastic ideal, a multitude of perceived sound sources (if not actually all the sounds of the world, what we might perceive to be suggestive of all the sounds of the world) morph, transform, shape-shift as they move around the poles of the Sound Compass. They are (re)articulated as noisey, as pure, as harmonic, inharmonic, as diffuse fields and concentrated beams, and they are always in a state of becoming something else (another sound source, another view of themselves, etc). Radulescu's inclusion of Jung's compass suggests that the listener may achieve a similar movement through their own ways of understanding the inner world (self) and the outer world: the evolution of their thoughts out into all directions of consciousness, involution of energies in towards their centre. The highest level of transformation being the state of evo-involution, everything at once, in constant motion and completely static, much like the process of fusion that exists within the sun itself (which is both a stable, fixed, static object in the sky, and a seething, volatile ball of energy).

But while a large portion of the text is devoted to describing a listening experience, it is not a guide for audiences to rethink the way in which they listen, or to encourage a cultivated listening practice in service of transcendence to a higher state. The description of the sound experience is given as an ideal, for performers and perhaps future composers to understand how they can achieve a state of cosmic transcendence through their practice. That the audience will experience this is never questioned by Radulescu, but in the text the audience are quite passive: an experience has been created for and then brought to them, the "magic state of the soul" an inevitability once the performer(s) come to the correct understanding of how the sound should be articulated. In the following chapter, we will see a concrete example of how this quasi-religious experience is encouraged in the piece *Fountains of my Sky*.

Chapter 2:

Fountains of My Sky

2.1 **Introduction**

The published version of *Capricorn's Nostalgic Crickets* is for seven identical woodwinds (any kind – saxes, flutes, bass clarinets, etc), but this work first began life as a piece for seven clarinets called Fountains of my Sky (we know this from archival material, most notably an early sketch of the piece labelled as such, fig. 1, with the final version shown in fig. 2). *Fountains of My Sky* very quickly appears to have morphed (or metastasised) into a much large *gesamtkunstwerk* that added 42 children and a pipe organ to the 7 clarinet players.

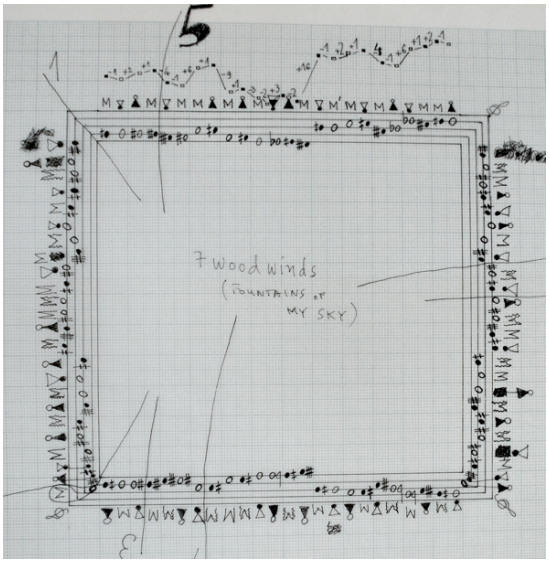

Figure 2.1a: Fountains of My Sky

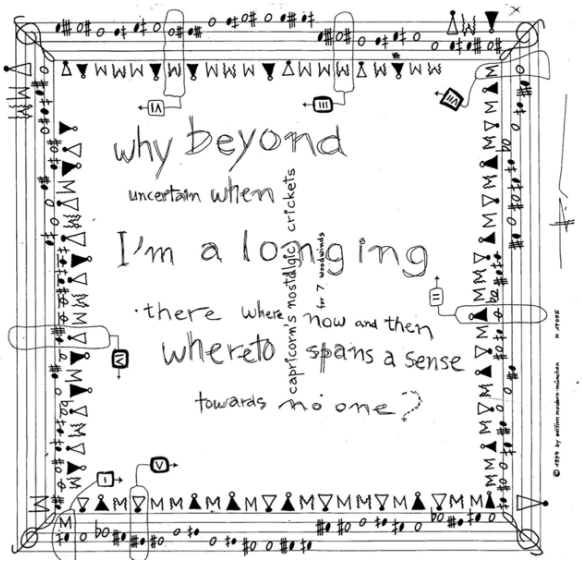

Figure 2.1b: Capricorn's Nostalgic Crickets

Fountains of My Sky was premiered at the Royan Festival in 1973. There is no recording of the entire piece being performed, but several of the components have been played separately (multiple times), and recordings of all these remain (unpublished in the archives). There are also

some pre-prepared recordings, designed to be played back as part of *Fountains*, in the event that an antique pipe organ was unavailable, or the full complement of children could not be gathered for *Hierophany*. Evidence of subsequent performances do exist (at ISCM World Music Days in 1977 Bonn, and also possibly in 1987 Köln/Bonn/Frankfurt Am Main), however given the present state of the archives it is hard to say definitively, one way or the other, how many times this piece was played since Royan (or if it was performed at only the 1977 WMD, or both).

The sketch for 7 woodwinds become one of five parts of this larger piece, which is when it got its new name (*Capricorn's Nostalgic Crickets*). Together, the five parts of *Fountains of My Sky* form what Radulescu referred to as an "imaginary bird" in flight, with two long wings made up of music and poetry, and a body comprised of a dense silence and an obscurity. In performance, the musical 'wing' comes first, consisting of the simultaneous performance of three musical pieces. After a period of silence (the body), the poetic 'wing' follows, involving the mass recitation of a poem written by HR himself by 42-84 children, in "different languages of the world". The components of *Fountains* were as follows:

<u>Musical Wing of Imaginary Bird</u>

Small Infinities' Togetherness (solo organ)
Pythagoras' Dreamings (42 children)
Capricorn's Nostalgic Crickets (7 clarinets)

<u>Silent Body of Imaginary Bird</u>

Silence

<u>Poetic Wing of Imaginary Bird</u>

Hierophany (42-84 children)

2.2 **The Imaginary Bird**

A: Musical wing of the imaginary bird

The 'musical wing' contained "…the simultaneous intersection of three compositions" (see fig. 3, a photo from the original performance in Royan, 1973). The length of the musical wing must be a multiple of 17 minutes 36 seconds, chosen as "…corresponding to the concentration of the audience. For example, [the] duration for a Western European audience would be 17.36; for an oriental audience it could be for a few hours…"[28]

Figure 2.2: Fountains of My Sky in Royan, 1973

Timing was coordinated through coloured lights, one colour for each "grain" used. It is not indicated whether these lights would be visible to the audience, however in later

[28] Today this statement might tend to make one feel quite uneasy - it's important to understand that it was made during a period where Radulescu (and many other western composers such as La Monte Young) were becoming interested in performances of music from other cultures, particularly India and Indonesia, and in both cultures there are indeed musical traditions where the concerts span long durations. Although the use of the word "oriental" is regrettable, as is the apparent suggestion that people from non-western cultures might be endowed with mystical powers of concentration, it's most likely that what was meant was simply that some audiences would be more used to longer concert-experiences than others.

performances Radulescu would use a "quartz timer" that he commissioned himself to control a set of spotlights. Based on knowledge of how the quartz timer worked, I can say with reasonable confidence that each time grain would be assigned two colours - one to show the moment of change from block to block, and one to indicate the body of the sound. A sketch prepared for the performance at World Music Days in Bonn, 1977, uses the following colours to each time scale: *Capricorn's Nostalgic Crickets*: time scale 1 (96) = Orange (with no colour indicating change); *Pythagoras Dreaming*: time scale 2 (13) = Purple (with change indicated in red); *Pythagoras Dreaming*: time scale 3 (8) = Green (with change indicated in light blue). There is no indication of lighting for *Small Infinities' Togetherness*; assuming tape playback, lighting cues would not be needed to maintain synch.

Pythagoras' Dreamings

This piece is for 42-84 children using voices and instruments including: four Sound Icons[29], 1-2 "magic altars"[30], balloons[31], 12 large tam-tams of different size[32], and 12 flutes of varying timbres[33]. The top of the score is marked "[imagined by Pythagoras … when dreaming]."

[29] The Sound Icon was an instrument 'invented' by Radulescu. It is a grand piano, stood vertically on its side, with no lid. The strings were usually retuned—for Fountains of My Sky, the higher notes of the piano, those with three strings—were tuned with the two outer strings a quarter-tone higher / lower, thus producing a quarter-tone cluster.
[30] A Magic Altar was a platform (table?) around 1x2m in size. At each corner would be placed microphones, and "games" would be played on the altar knocking pebbles, coins, etc together. Other activities on the Magic Alter included the bowing of foam "to resemble the voice of a strange animal."
[31] Among other techniques, balloons were to be caressed softly with the hands, the fingers acting "as violin bows making the balloon 'murmur' like a captured soul."
[32] Only one child per gong at a time, to let the vibrations ring out. Playing techniques included dropping rice or sand onto, or rubbing cowbells against, the tam-tams.
[33] From photos, it's clear that these were all simple block flutes / recorders of various varieties.

The score itself is a matrix of 104 squares laid out on an 8X13 grid, with each square containing one of "…an alphabet of 39 symbols." Players would be assigned either a row or a column, and tasked with moving through the symbols (in the event of having the full compliment of 84, there would be 4 children per line – two reading forwards, and two backwards). Communication was achieved by a set of coloured lights, which would pulse at the frequency of the "macropulsation of the sound plasma." In the case that the Musical Wing was to last for 17:36, players with a row of symbols 13 squares long would be given a pulse of 1 minute 20 seconds per square, and players with a column of symbols 8 squares long would have a pulse of 2 mins and 10 seconds. With the lowest common multiple between 80 and 130 being 1040, this means that the pulse between the two time scales would only coincide at the very end of the piece - thus we might think of the "macro-pulsation" inside *Pythagoras Dreamings* as cycling at three different speeds: TT / 13, TT / 8, and TT / 1.

Capricorn's Nostalgic Crickets

Capricorn's Nostalgic Crickets is a series of 96 sound events (Sound Units), each uniform in length, emerging from and receding back into silence (cresc. to decresc.) and separated by a short period of silence. The score is a single page, with a square drawn of musical staves forming a sort of "border" around a central poem. Filling in the stave are 96 noteheads, which are evenly spaced apart. The given starting positions for each player are given, with the idea that the players are all moving around the square together in a quasi-canonic way, and that the performance is finished when all players find themselves back at the point from which they started.

Each side of the square is a 24 note 1/4 tone-row. The notes indicated are to be played with 1 of 4 specific playing techniques (two types of multiphonic, fluttertongue-and-voice, and 'yellow tremolo'), meaning that ultimately one pitch played one specific way occurs once only in each part, and seven times in total in the piece as a whole.

The length of the Sound Units (SU) is open, but they must be measured in groups of eleven Time Units (TU, a whole number of seconds, 1, 2, 3 etc). Time Units are strictly for fixing the length of each Sound Unit, and should not be perceptible to the audience. In a performance lasting for 17:36, the TU will equal one second, and a SU will be 11 seconds. SUs always happen in unison, crescendoing up from, and then descrescendoing back into, silence. The sound should emerge from silence without a clear or sudden attack point, should be staggered amongst the players, and should disappear in the same manner. The peak of the crescendo can "attain paroxysm" at a dynamic level of triple-forte, but again this should happen in a staggered, "fuzzy" kind of way. The period of silence should always be between 1-2 TUs. Radulescu provides two useful diagrams to help illustrate the inside of a single SU – the "micro sound pulse", and the "pseudo-synchronised" way the players will create the outline of each SU – the "macro sound pulse" (fig. 4 and 5). The net effect of this is in Radulescu's words, a "PULSE-TIDE of MUSIC and SILENCE."

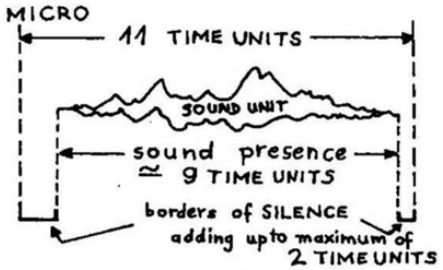

Figure 2.3a: Micro sound pulse

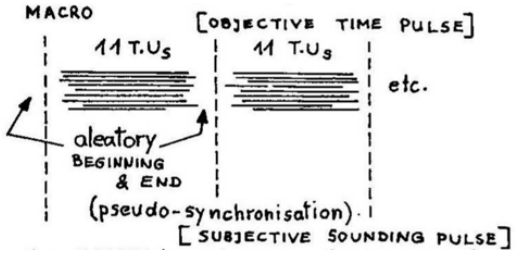

Figure 2.3b: Macro sound pulse

Over the top of this "pulse-tide" (effectively a periodic wave at [TT / 96]: 0.091hz if TT = 17:36), there is a slower-evolving General Form (GF) that governs the ebb and flow of the piece. This calls for three "tension summits (climaxes)" placed in the middle of the first third, towards the end of the second third, and towards the start of the final third of the work. At first blush, this seems to be an asymmetry, at odds with the cyclical nature of the other aspects of *Capricorn* (and *Fountains* as a whole), but if we count out the number of sound units between peaks we see a pattern:

Start—20xSU—Peak1—40xSU—Peak2—16xSU—Peak3—20xSU—End

If we wrap the pattern around, we see two long valleys of 40 Sound Units each, with a small valley of 16 Sound Units in the middle. So although it is offset, it emerges that the GF (General Form) is another, albeit more complex, cycle (or even, we might think of it as a periodic wave).

Small Infinities Togetherness

The title comes from text embedded in the score - it is written multiple times, in different handwritten styles, overlaid on a piece of graph paper (see figure 6). Elsewhere, the title is explained as meaning "the love of the infinitely small, expressing an incursion into the moment of the fall and the streaming of thoughts."[34] Squares of different sizes are shaded in, and one reads the score column by column, or row by row, of the graph paper. *Small Infinities'*

[34] Horatiu Radulescu, *Small Infinities' Togetherness*, (Munich: Edition Modern, 1972).

Togetherness operates, as the other two pieces, on 3 time scales. However, unlike the other pieces, one of these time grains is indeterminate: the shortest "rhythmic" pulse must be fast, irregular, and "random." The next grain is set at one minute, the length of time for playing one row or column of the score, and finally we have the same TT / 1 relationship for the duration of the entire piece (which being 17:36, must mean that the organist would need to either continue halfway down an 18th column/row, or finish playing early / late).

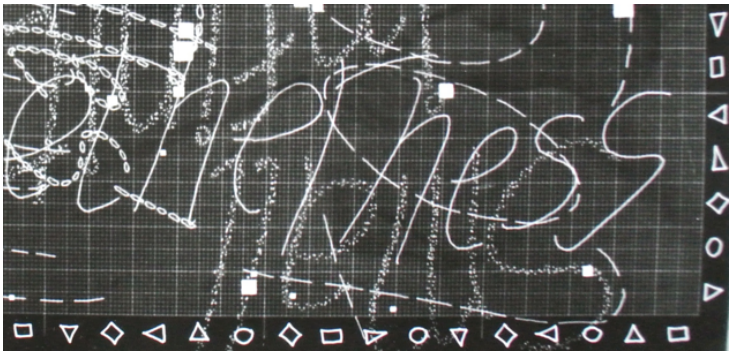

Figure 2.4: Detail from Small Infinities' Togetherness

Of the pieces in the Musical Wing, this one is undoubtedly the one with the most difficult to read score, and the most esoteric in its performance instructions (which includes directions like "placed on your momentary sky-window you try always to cover the universe thoroughly, obtaining thus the paraconscious impulsions necessary to the plasmatic treatment of the sound parameters"). My suspicion that this indicated Radulescu himself had played the organ part was confirmed when, in the archives in Daillens, I discovered a photocopied page of the festival booklet from Royan: in the premier performance, *Small Infinities' Togetherness* was presented on magnetic tape, a recording Radulescu had made himself in the Saint Séverin church in Paris.

In the stand-alone version of this piece (if it were to be played outside of FoMS) the organist may be joined by up to three soloists or groups of players, however at the bottom of the score there is a footnote: "…special version for prepared Renaissance organ alone (i.e. only I/O source) for opus 16 <<Fountains of my Sky>> ~ on a D sound spectrum only."[35] A later version of this piece, dedicated to Hyperion Ensemble in Romania and for a larger group of players (including Iancu Dumitrescu) is still being performed regularly, but this version is quite divergent from the original as it appeared in *Fountains of My Sky*.

B: Silent body of the imaginary bird

The two wings are separated by a period of silence equal to one 17th the total duration of the musical wing, and thus (interestingly) equal to the TU of *Small Infinities Togetherness*. "The body of this magical bird … made up by a dense silence and an obscurity" is a period where the audience member would hopefully slip into the "hyperconscious" or the "unconscious" mind, allowing the conscious mind to rest and rejuvenate, in preparation to receive the Poetic Wing. The silence is an integral part of the piece: attending to the silence is part of the ritual rather than being a break from it. Radulescu writes: "the form of the music corresponds to the path of the psyche. This silence is not an intermission, it must be listened to as the music has been. The silence acts as a balance between the musical and the poetic wings."

C: Poetic Wing of the Imaginary Bird

The duration of the poetic wing is "undetermined": the objective was "… for the audience to [attain] a certain 'high' phonetic, notional, and magical. Once this is attained, the

[35] "Prepared" refers to the practise of only partially pulling out an organ stop. Stops may be pulled to between 1/4 and 3/4's of "fully open," which would produce an unstable wavering of pitch and volume.

poetic wing is finished." It is suggested that the Poetic Wing may be much shorter in duration than the musical wing, explained by Radulescu with an analogy of foreshortening in a photograph of a bird, when one wing looks longer than the other, but in reality they are both the same length. This suggests that, for Radulescu, although the durations might be quite different in time as measured by the clock, the amount of information, the depth of the experience, and perhaps even the perceived duration between the wings, should be equal.

Hierophany

Hierophany (a word which means a manifestation of the divine or sacred) involves the recitation of a poem by 42-84 children, reading in 13-42 languages of the world. In the performance notes, Radulescu writes that the children will form a "magic and multi-linguistic sun" as they recite the poem "infinitely … [repeating] at variable speeds between very-slow and slow." The children should recite the poem using the in-breath as well as the out-breath, and intoned in such a way as to fully explore the three dimensions of the L (language) global sound source (these being Magic, Notional, and Phonetic). One can well imagine the effect that 42 children slowly reciting a poem in this fashion, in such a vast array of languages, would have: a dense and quite impenetrable mass of energy.

Within this pulsing mass of sound, certain elements must come forward to the audience's attention in two key ways. Firstly, a minimum of four microphones should be moved irregularly about the stage in such a way as to pick up random syllables and fragments of sound. Secondly, certain children should (when they feel it is appropriate) leave the "sun" and "invade the audience like rays". These children should whisper the poem in the native language of the

audience into the left ear of one or more members of the public,[36] and having done so then give them a card on which the poem would be written. The "ray" children should reach enough audience members that the meaning of the poem might be transmitted through the whole audience like a cloud. Once "phonetic-musical intoxication" is achieved, and the words have been able to "personify or become a space, a time, a new world", the ray children return to the sun and then leave the space.

The text of the poem is the same as the poem enclosed within the "sound square well" of *Capricorn's Nostalgic Crickets*. It reads:

Why beyond
Uncertain when
I'm a longing
There, where now and then
Whereto spans a sense
Towards no one

2.3 **Time in Fountains of My Sky**

The time cycles used in the Musical Wing are all fractions of the Total Time (TT, which is 17:36 or proportionally longer). It is useful to note that the numbers don't actually add up perfectly—*Pythagoras Dreaming* would finish 16 seconds "early", while *Small Infinities' Togetherness* would finish either 36 seconds early or 24 seconds late. If we think of these durational cycles as being "harmonics" to the "fundamental" that is the TT, in relation to the previous chapter's discussion of *Sound Plasma*, this choice starts to make more sense. The NFB

[36] The performance notes state that the left is significant as it is specialised in "deep spectra" and the profound. This whispering into the left ear must not take away from the perceptions of the right, which must still be engaged with the organic mass that is the magic sun.

(Narrow Frequency Band) idea of "fundamental" means that there should always be a certain flexibility / instability *around* a certain pitch, rather than the fundamental being a single, eternally fixed frequency. So if TT is the fundamental determining the duration of the piece, with "rhythm" happening at whole number integer ratios of this (just like harmonics), then with the numbers that Radulescu gives us for each component piece, we have a NFB *around* 17:36, with a range of about 30 seconds. Just as plasmatic sound is achieved in the frequency domain by the interaction of the spectra emerging from fundamentals within the *range* of an NFB, we see that the Total Time of the piece (the "fundamental" from which all other time units are fractionally derived) is also a range, rather than a single fixed number.

In the Poetic Wing, we can see an example of highest level transformation through the Sound Compass: the evo-involution into and away from the centre, in all directions. In *Hierophany*, each of the 42 children operate to their own "internal clock" as they read the poem out loud again and again. They can (should) be flexible with the speed at which they read, moving between very-slow and slow recitation, but being careful to not elide the words into each other. *Hierophany* is 42 simultaneous pulses, and unlike those of the Musical Wing, they are constantly shifting around, in motion, unstable. If we continue down the path of examining the time domain as if it were the frequency domain, we can see that this process reflects the idea of evo-involution through the points of the sound compass, with words and pulses interacting, fusing, and boiling together in a mass of energy: very apt for a "magical and multi-linguistic sun"!

Thinking in terms of *Sound Plasma*, Radulescu tells us that in plasmatic music "rhythm exists no longer as combined values, but only as SPECTRUM PULSE of the micro and macro sound plasma, or as an INFRASONIC TREMBLING of the non-evident sound lava."[37] Thinking of the macro-form as being the time-domain equivalent of the frequency-domain spectral phenomena Radulescu used was a revelation for me, one that we will see had an impact on the choices made when compiling *Capricorn's Nostalgic Crickets* (and also in my other work as a performer composer). Other sketches in the archives confirm that he often thought of the total duration of a piece as being its "fundamental", rhythms and cycles deriving from this in integer ratios, and even pitches being calculated from the "fundamental" of one cycle of the duration. The two guiding architectural principles of each wing perfectly articulate the two suggested operations of the spectrum pulse, the first the multiple vibrations and movements coming from a single NFB, and the second being the interactions resulting from superimposing a number of NFBs on top of each other.

[37] Radulescu, *Sound Plasma*, "intimate hope invasion."

Chapter 3:

Capricorn's Nostalgic Crickets

3.1 **Introduction**

This chapter will discuss *Capricorn's Nostalgic Crickets* as a standalone work, in contrast to the previous chapter in which it was considered as a part of the larger cycle *Fountains of My Sky*. As we already know the basic structure of *Capricorn's Nostalgic Crickets*, in summary, a 96 note cycle of "Sound Units" - SUs - that players move through canonically, treating each note with one of four techniques, each SU being 11 "Time Units" – TUs – long ("…a canon which had already began since the sound-sources play continuously"[38]), this chapter will begin by exploring a few elements of this piece in more depth. Specifically, we will look at the playing techniques used; duration, timing, and form; and the use of space together with the option of using electronics. After developing these ideas, I will move on to discuss the process of compiling a performance-ready score, and my experiences staging this work in different configurations (and at different durations) between 2015 and 2018.

3.2 **Capricorn I + II**

This discussion will draw not only on the performance notes to the published score (1974), but also various iterations of the performance notes to an updated version created in 1980 (uncovered in the Horatiu Radulescu Archives, Daillens, Switzerland), *Capricorn's Nostalgic Crickets II*, which is the title of the version appearing on Pierre-Yves Artaud's 1993 CD release

[38] Handwritten performance notes to *Capricorn's Nostalgic Crickets II* (1980).

of Radulescu's flute music.[39] This version is for all intents and purposes identical, was never available for purchase, but could be hired directly from Radulescu himself. It was specifically written for flute—the suggestion that any group of identical woodwinds could play it now gone.

As the original version of *Capricorn's Nostalgic Crickets* available for purchase had been published by Editions Modern in Munich (who own the rights to all of Radulescu's works up composed before the founding of Lucero Print in the early 1980s), and the deviations between old and new versions are minimal, one might guess that the reason for creating *Capricorn II* had more to do with controlling rights and distribution of the score than it did with creating an improved revision of the piece. The type-set performance notes to this version are briefer, excluding much of the poetic language used earlier, but help to shed a little more light on Radulescu's goals. In addition to these, I found a handwritten draft of performance notes for this work that included different information again (and these went into more detail than the final typeset version). There are two points where the later performance notes seem to contradict the earlier ones: in the description of how to achieve the multiphonic sounds; and in replacing the idea of General Form with three "Accidents of Purity." The first of these may well be a result of this version being specifically created for the flute, but do potentially reveal some shift in Radulescu's thinking.

My revision is based primarily off the originally published score from 1974, as featured in *Fountains of My* Sky. But the notes from 1980 add another layer of nuance / detail to the earlier published version of the piece, and did influence some of the decisions I made in

[39] Horatiu Radulescu, Pierre-Yves Artaud, and the Orchestre Français de Flûtes, *Dizzy Divinity I, Byzantine Prayer, Frenetico Il Longing Di Amare, Capricorn's Nostalgic Crickets II*, (Adda 581298, 1994).

compiling my version. For this reason, my discussion of the piece will be guided by a synthesis of these sources.

3.3 **Considerations for the performer**

A: Playing techniques and concealing the I/O source

As discussed in the previous chapter, there are four playing techniques used in this piece. At 96 notes long, each note of four quarter-tone rows will appear treated with one of these techniques once per part (and thus, will occur seven times at different points throughout the piece). In the handwritten notes to the 1980 revision, these different treatments are referred to as "timbre beings" designed to "activate the micro-spectrality" of each sound in a certain way.

In the lowest register, we find the technique of "FLUTTERTONGUE and VOICE." The only written instructions for this technique are that the voice should be "…in unisono as much as possible (if not, at octave)," and that the register should be based off the lowest possible D that the chosen instrument can produce (which on the clarinet, if transposing the score, makes the low E at the very bottom of its range). In this seemingly simple instruction, there is still a lot of scope for flexibility, as a skilled clarinet player should be able to draw a good deal of nuance from fluttertonguing alone. One can control speed, which could also be thought of as pitch as the "impulses" happen fast enough to be perceived as a pitch; and when fluttering on different parts of the roof of the mouth, different harmonic formants of the clarinet tone become more or less apparent, giving control over spectrum that way as well. Additionally, the voice should sing the same "ideal pitch" (as opposed to "absolute pitch"—Radulescu's terminology) meaning that there is a choice of octave for the sung component of this "timbre being" as well. Finally, it can

be quite difficult to sing and play the exact same note on the clarinet, particularly with the impedance changes caused by the fluttertongue, and the instruction to do so will naturally cause a certain amount of vocal 'drifting' around the written pitch (creating an effect remarkably similar, if not identical, to the NFB). So we can see that even in the seemingly simple instruction to flutter and sing in unison with the written pitch, there is great scope for timbral transformation/movement (both intentional and unintentional).

In the "middle register"[40] we find two multiphonic techniques: one stable, one unstable. Stable multiphonics should be of the complex variety: "chords least related to the common regions of the harmonic spectrum (desirable are chords containing micro-intervals)." In simple terms, this means that these multiphonics must not be achieved by overblowing regular fingered pitches, but through the use of specific multiphonic fingerings.[41] In the first version of the score, the given pitch should be the "base note" of the multiphonic, from which the complex spectrum should then rise. In the later version, it's stated that the given pitch should be "predominant even if some layers of the chord were lower than it."[42]

Unstable multiphonics are referred to in the original version of the score as being a "tremolo of emanations," the alternation of two or more chords built off the same fundamental (and the simplest way to do this is by shifting between fingerings for complex multiphonics, or

[40] In reality, on the clarinet this turns out to be the upper part of the bottom register, as it is extremely difficult (perhaps impossible) to achieve these kinds of complex multiphonic processes with a fundamental that is beyond the chalumeau register of the instrument.
[41] Overblowing will produce a spectrum that is congruent with the natural harmonic tendencies of single clarinet notes, whereas using complex fingerings will create spectra from two different "tube-lengths."
[42] One possible explanation for this being that on woodwind instruments it is difficult to build non-harmonic multiphonics off every note of the lower register. The registers of the clarinet are exceptionally wide, giving it greater flexibility than the other winds to achieve a wider range of multiphonics. If the first version of the score was written for *Fountains of My Sky* (seven clarinets), and the second for flute, this may explain the shift.

between complex and simple-overblown ones). By 1980, the phrase "tremolos of emanations" had become "spectral thermometers," in which the player takes one single unstable multiphonic fingering and repeatedly "overblows" it to emphasise different formants, returning periodically to just the fundamental pitch to "reinforce it as the predominant frequency." It is possible to combine these two approaches with a tremolo between the fingerings for two discrete complex multiphonics, and a shifting between the formants of both of these using the embouchure at the same time. This is the approach I find the most interesting, but one needs to be somewhat careful to not distort tone production too wildly (which could result in squeaks, inappropriate glissando effects, or locking too firmly into the upper regions of the tremolo and losing the lower pitch). For both multiphonic treatments there is no further information given to help guide the choice of fingering, technique, tone-quality, or otherwise, and later in this chapter we will see that this is one of the main areas on which I had to focus when creating my new revision of the work.

The final technique is the "yellow tremolo," appearing in the highest register of the instrument. Yellow tremolo is Radulescu's term for bisbigliando, or timbre-trill: the musicians is instructed to tremolo between different fingerings of the same note (there is great flexibility for doing this in the high register of all woodwind instruments), irregularly, at any speed they choose. At whatever speed is chosen the shift between timbres must be abrupt rather than a continuous waving between two poles, which he refers to as creating a feeling of Morse code-like signals.

Even in the very short descriptions of each technique, Radulescu already begins to suggest ways in which they may be deployed to distract from the natural tendencies of the instrument, to "conceal cause and effect," pointing towards all the other global sound sources. This is made explicit further on in the performance notes when he calls for "… an expansion of the given sound source … [in which] the I/O sound source tries to gain characteristics of the other sound sources → H/L, N, E."

Alongside the four playing techniques, another tool is given to help the performers stretch beyond the limits of their "Instrument / Object" sound source: the poem inscribed in the centre of the score. Radulescu requests that the performers use this poem to extend the treatment of the sound source in three ways: *Notionally*, which might be to consider playing as creating a similar sense of meaning or state of being to that of the poem – this could be done by pulling out keywords like "(beyond) uncertain," "longing," "now and then," or the idea of reaching out into an infinity, and finding ways of playing to try to capture these feelings; *Magically*, with the suggestion that the playing is itself a manifestation of the poem or its magical intent, that playing the piece is a sort of ritual incantation, or even that the poem is a kind of mantra that will help the performers to "enter the sound" (see chapter one); or *Phonetically*—directly using the rhythms, cadence, or even formants of the words themselves. Similar to the poem's appearance at the beginning of *Hierophany* (before the "ray-children" leave the "multi-dimensional sun"), it must not be intelligible to the audience in any directly conscious way.

B: Duration and timing

The 96 "Sound Units" (SU) of *Capricorn's Nostalgic Crickets* should be uniform in length, and each have roughly the shape/envelop/trajectory. A sound unit must be 11 "Time Units" (TU) long, and the first and last 1-2 of these should be silent (with crescendos out from, and diminuendos back into, this silence). The performance notes to *Capricorn's Nostalgic Crickets II* (1980), state that duration should be "…17:36 or proportionally longer," which I at first took as confirmation that the Time Unit should be a whole number of seconds (meaning that any longer version would be a multiple thereof: 35:12, 52:48, 1:10:24, and so on). But several recordings in the archives are 26:24, which equals a time unit of 1.5 second, indicating that Radulescu was ok with dividing the second so long as proportions were maintained. I feel it safe to say that the importance of the time unit is to keep all of the proportional dimensions of the piece intact (and that the Time Unit should be a unit of "clock time" or "absolute time"[43] – something that is uniform in a chronometric sense), and beyond that there is not necessarily any reason to use the second as basic grain of time.

While the duration is theoretically infinite, some physical boundaries do exist for what is possible. An extremely long version would push up against the limits of what is physically possible for a clarinet player to endure, as the embouchure muscles fatigue easily, and this situation is made worse by the complex techniques involved, which require greater embouchure strength and control. A version that is too short would also be physically difficult, as the gap

[43] To borrow two terms from J D Kramer's *The Time of Music* (New York: Schirmer Books), 16. Kramer's distinction between time as experienced by a human and time as measured by the clock finds a fascinating analogue with Mircea Eliades notions of "sacred" and "profane" time as explored in several of his works, for example *The Myth of the Eternal Return: Cosmos and History* (Princeton: Princeton University Press), and is an area into which I am keen to conduct future research.

between Sound Units would not be long enough to switch between some of the more complex multiphonic fingerings, and because achieving a quick crescendo from *niente* on a multiphonic is also extremely difficult.[44]

Another key factor in selecting the total duration of the piece, is what kind of silence will be achieved in the transition between Sound Units. Radulescu's wishes are stated plainly in the score (silence of 1-2 TUs per SU), and in practise this period of silence has the potential to achieve two effects. The first is to create a null-point for the wave-like structure (the "pulse-tide of sound and silence"), from which the next Sound Unit can grow. This is a way to avoid explicit attacks, perceptible points where the sound begins and ends, in favour of a situation where a sound will grow from and recede back into nothing (which may well suggest that the sound is part of an eternal process – was happening before we heard it, continues after it disappears[45]). A second function of the silence might be seen in the "silent body of the imaginary bird" from *Fountains of My Sky*, where Radulescu writes that he wants a "dense silence and obscurity;" that as music stimulates a "conscious level of mind," silence must allow one to rest from this conscious activity, to slide into the unconscious or hyperconscious, and be prepared to then receive further sound. Although this is written about a specific chunk of silence in the presentation of a larger cycle of works, it is revealing of how he thinks about silence, and we know that he was also deeply interested in the idea of micro-processes being reflections of macro-structural elements (and vice versa). In both of these conceptions, the silence is a period

[44] However, these problems would only occur at a time scale shorter than 17:36 – which is given as the minimum duration in the 1980 revision—so it could be considered a non-issue.
[45] As discussed on planet "Intimate Hope Invasion" in *Sound Plasma*.

of regeneration, much like the darkness that accompanies the new moon as another monthly cycle is about to begin.

Understanding the period of silence to be of great importance to the overall structure of the work, means that it becomes a factor when choosing total duration and even performance venue. The period of silence is to be between one and two Time Units long, and in the 17:36 version this is a very short moment indeed. When planning a performance for a venue with a very live acoustic (for example, a church or cathedral), it is quite likely that the reverb time will be longer than the period of not playing even in a thirty-five-minute version, and so one must be prepared for the different perceptual experience this will create (and potentially consider tweaking the ratio of playing-to-silence).

C: The general form

The previous chapter gave a brief overview of the General Form principle, which is a slower-moving cycle of "… three tension summits (climaxes)." These are described in the performance notes to the Editions Modern score as happening "[1] in the middle, [2] near the end, [3] after the beginning … of the musical thirds, respectively." Dividing the piece into three sets of 36 Sound Units, this puts them at roughly SUs 18-20, 60-62, and 76-78. Radulescu instructs that the "… summits must not be incongruous with the implacable DEEP CONTINUITY of the whole composition which is a PULSE-TIDE of MUSIC and SILENCE," suggesting that the General Form is there more as a way to ensure that there will be a longer-form sense of trembling/instability to the piece, rather than being something that needs to be clearly projected to the audience.

In the 1980 revision of the score, the General Form has been excised from the performance notes altogether, replaced with a new idea: "Accidents of Purity." This term refers to three points in the score where the materials line up in unique ways:

- On the 20th Sound Unit there are 6 Yellow tremolo and one unstable multiphonic (meaning that all players hold something unstable, trembling, with no deep bass)
- On the 43rd Sound Unit there are no multiphonics (meaning that there are only very high and very low notes, with a hollow middle)
- On the 87th Sound Unit there are 6 low register sung-fluttertongues, and one yellow tremolo (a densely packed cluster of low register tones with a single shimmering high note on top)

These moments of synchronicity are present in the original 1974 version as well, and yet they are not mentioned at all in any performance or program notes until *Capricorn's Nostalgic Crickets II* in 1980 (from then they are mentioned in subsequent sources such as the liner notes to the Pierre-Yves Artaud recording). The shift in importance from the General Form to the Accidents of Purity show an evolution in Radulescu's thinking: whereas in 1974 he was imagining the seven players working together to project a series of time-cycles of various sizes; by 1980 he is thinking of the piece more as seven individual players following their own trajectories, tracing lines articulated by the wave-like pattern of the SUs, and that intersect in these "Accidents of Purity."

D: Use of space

The layout of the performers in space should mirror the form of the score, with the performers arranged in a square in positions that correspond to their starting point in the cannon. Around the performers, the audience should be seated in a larger square (in complete darkness), and around them should be placed a square of 7 loudspeakers (with positions corresponding to the players in the innermost square). The outer ring of speakers are there for both amplification of the live signal, and for basic processing techniques like ring-modulation and filtering. When choosing to use electronic processing, the balance must be even between live, amplified, and modulated sounds. Radulescu was also open to wilder experimentation with electronics: on at least one occasion the piece was played simultaneously with a tape recording of another ensemble realising it. This was in London, where an ensemble of seven bass clarinets (led by Roger Heaton), was accompanied by a tape of seven flutes. In a 2007 interview with Guy Livingston (published in Paris Transatlantic), he recalled of this performance: "… there were so many microtones within microtones; the musicians quipped that the piece was a... 'celestial mammoth.'"[46]

The empty centre of the square (the "sound square well") is a space for "projecting" the score. It is unclear if the projection referred to is only a musical one, or if this should also be accompanied by literally projecting a slide of the score into the centre of the square. Projecting slides of the score was common to many of Radulescu's works from this period, for example in *Lamento di Gesu* (1973-75). During one visit to the Archives in Daillens, I found a slide containing an image of the score (although it seems that Radulescu made "back-up" copies of

[46] Horatiu Radulescu. "Horatiu Radulescu," interview by Guy Livingston, *Paris Transatlantic*, September 4 2007. http://paristransatlantic.com/magazine/interviews/radulescu.html

many of his scores on photographic slides to preserve them). Visual projection may also explain the need for the audience to sit in pitch black. A further indicator that there may have been slide projection into the "sound square well" comes from a letter written to Radulescu by Roger Heaton, dated 2 sept. 1982, in which he suggests organising the premier performance of this work "…with tape and slides." Working against this theory, though, is the fact that Radulescu would conduct this work himself, standing in the centre. In *Fountains of My Sky*, the timing was arranged by means of Radulescu's quartz-timer controlled coloured spotlights, which would interfere with any other visual projections. Visual projection of the score itself would reveal the text of the central poem, which should not be done until the "poetic wing of the imaginary bird," and would detract from the revelatory nature of making the poem known only in the "revelatory" part of the cycle. While it's possible to conjecture about the nature of this (for example, one could imagine that when played as a stand-alone work, it would make more sense to project the score and reveal the central message of the piece), I have been unable to find a conclusive answer about what is meant by "projection." I have never staged this piece with a projection of the score in the centre, simply because for me this feels like it would spoil the mystery of the piece. The listening experience (aided by the arrangement of space) is extremely rich, and I feel that the addition of any further visual information would simply detract from this without adding any extra depth.

Whether or not the poem is *visually* present in the centre of the performance space, it's presence as a conceptual force cannot be disputed. On paper, it is the centre around which all the clarinettists orbit. In performance, where the production of sound is affected by thinking through the poem "…to its depth during the entire performance" ("magically, notionally, and

phonetically" as discussed in the section above dealing with playing technique), the poem is the central focal point into which each surrounding ring pours its energy (energies of both listening to and channelling the unheard but ever present harmonies of the universe in the square of musicians; the energy of focussed listening in the square of the audience; and finally energies of reproduction, amplification, and inter-modulation in the outer square of speakers). Returning to the previous chapter's discussion of the processes of involution and evolution, recall that this poem is going to be realised in the next piece of the cycle (*Hierophany*) by a "multi-linguistic sun" comprised of 42 children, and in this piece the text of the poem will finally become known to the audience. The arrangement of the space is of great importance to achieving a sense of energies chanelling towards a centre (regardless of whether or not that energy is then released in a later evolutionary explosion back outward).

3.4 **A new Capricorn**

The program notes to the 1974 version finish with the suggestion that, after deciding what the vertical structure of each Sound Unit should be, that performers may fix these decisions in a written score from which they can then perform. Although this is a suggestion, it is in fact more or less a necessity, as the single page of the original score would be extremely difficult to perform from. Radulescu obviously felt the same way, as the archives contain a number of different attempts at realising sets of score-and-parts (which I discovered, to my chagrin, well after I had spent countless hours experimenting with the creation of my own set of parts). This section will discuss the process of arriving at a performance ready version of this piece, from the stage of creating parts all the way up to the process of conducting rehearsals.

A: Selecting multiphonics (versions I + II)

While each performance I have given was different in terms of duration, number of live vs playback players, use of electronics, and set-up on stage, all the performances fall into one of two categories based on the materials given to each of the players to work with. In the first version (performed at UCSD, the Darmstadt summer course, and at concerts in Tokyo and Los Angeles) the players all used the same score - with one multiphonic notated for each instance of a pitch. In this way, it was a true cannon, with the only differences being created by either the idiosyncrasies of one player's technique, or the spectral formant that the player chose to emphasis. The second version, first performed at the KontraKlang series in Berlin (May 2017) and in all performances and recordings since, selects materials for each part individually, with multiphonics and even the register of the other pitches chosen by analysis of how all the parts line up vertically. This process, though far more time consuming, ended up providing more favourable results, and this is the final version that I will use from here on.

That I made two versions of this work was an experimental response to an opacity of the original score, which states:

> …7 occurances of the same note, in the same manner of playing, must be slightly differenciated [sic]. For example, the note g (sol) while being played in the M manner will behave in 7 different aspects corresponding to the 7 different instrumentalists: gM_1, gM_2, … gM_7. Thus the stable multiphonic sound (M) with g as fundamental will always describe a slightly different formant. This formant (the vertical structure of the event) should be determined in relation to the other 6 notes being played simultaneously, i.e. it should conform to tangency (cluster) or superposition (unisono [sic]).
>
> In conclusion, the family of instruments decided, this determination of the elasticity of the sound material may be calculated and fixed an [sic] a score with 7 superposed parts.

This suggests that, through the creation of a score-and-parts, Radulescu's plasmatic effect might be created either by looking at the continuity of the piece *horizontally* by having players sculpt and modify their playing techniques (and specifically, the formants extracted from the potential spectrum of given multiphonics), based on the given arc of musical tension outlined in the "General Form;" or *vertically* (part-by-part) by looking at each SU as a separate being and choosing the materials for each individual player by looking at how they all line up in a vertical sense.

The difference between the two versions mostly lies in the choice of multiphonic fingerings. The low flutter-and-voice notes must be in the very bottom of the instrument, based off the low-D, and so there is no flexibility as to how these are presented within the score. There is slightly more flexibility with the Yellow Tremolos, which need to be played in the highest register, and the altissimo register of the clarinet is over an octave wide. This means that occasionally, a better unison or more intense cluster effect can be achieved by shifting the note down or up an octave. In the case of the multiphonics, on the other hand, the fact that he does not give any indication of the ideal fingering to use or spectrum to achieve, makes multiphonic choice the area where I had the most scope for manipulating the materials to create the most powerful plasmatic effect. All the multiphonics were drawn from a set of around 400, compiled myself over the course of 2.5 years (and still occasionally growing).

In version one, all players had the same set of 24 stable and 24 unstable multiphonics, chosen to be as flexible, spectrally rich, and easy to play as possible. The idea being that each multiphonic should be able to produce a wide range of timbres and intensities, and the widest

range of players should be able to play it. This approach felt like a good idea because it put the multiphonics in a similar position to the YT and FV sounds – the direction to each player is the same, and variety is created according the contours of the "General Form." In version 2, where unique multiphonics were specified for each individual part, the guiding principle was to look at the most effective way to achieve "tangency (cluster) or superposition (unisono [sic])" within each Sound Unit (with consideration of that Sound Units relationship to the energy-arcs of the General Form), and to select fingerings for each individual instance of a multiphonic. All in all it was a far more time-consuming process (and it meant that there seven times the total number of multiphonics from version 1 – 336), but it allowed for the greatest ability to achieve Radulescu's desired " …tangency (cluster) or superposition (unisono [sic])" as they related to the over-all form.

B: Treatment of the general form

I used the General Form as a guiding principle for the choice of mutliphonics, making sure that the materials given for the Sound Units around each tension summit were capable of achieving an especially intense, raucous sound (to use Radulescu's terminology, to achieve "paroxysms" of fortissimo), and that in the inverse points of the General Form (the points directly between summits) the multiphonics were softest and most diffuse sounding. Having done so, in rehearsals I made sure that the General Form was known as a way to guide how the sounds themselves should be treated. The ideal was to emphasise tension in the energy peaks with the tightest possible sense of cluster, verging on unison. As a great deal of the energy of this piece exists around the area of the clarinets third register, the interactions from such tight clusters would produce extremely intense difference tones and psycho-acoustic effect. In the

troughs between energy peaks, I tried to ensure that the sound covered a wider spectrum, and that the interactions between players were less intense. However, on several occasions this ended up producing results that were quite undesirable, with players treating the sounds in between climaxes too softly, and the contrast between peaks and troughs too great. This goes directly against Radulescu's wishes when he requests that the "… summits must not be incongruous with the implacable DEEP CONTINUITY of the whole composition which is a PULSE-TIDE of MUSIC and SILENCE." In the end, it was important to impress on the players that this notion of "energy climax" was something that existed in the spectral domain, but was not caused by deliberately playing louder or more aggressively.

C: Conducting and maintaining ensemble

In all versions so far I have conducted the ensemble myself while playing, in the most minimal way possible. I wrote a Max patch that counts out Sound Units in any specified duration of Time Units, and use the computer screen as a guide. Then I indicate the start and end of each sound unit with slightly exaggerated gestures of "beginning" and "ending" the note. As each Sound Unit takes a crescendo-decsrcendo form, it is not hard for all the players to stay in synch with this method. Additionally, I give predefined cues to indicate every 12 Sound Units, as in the first rehearsals we quickly discovered that if one player unwittingly skipped or repeated a note (which is easy to do) they would only find out at the very end of the piece. I try to keep gestures as minimal as possible, though, in order to maintain a sense of unbroken stillness and suspension.

In the last performance, players expressed dissatisfaction with this method, as it meant that they did not have enough information about where they were *within* each Sound Unit, and thus felt hampered in their ability to plan their crescendo-decrescendos. This is particularly problematic when playing the piece at larger time scales—it was most difficult in the 52 minute version performed at KontraKlang in Berlin. The next performance of this work will be at Märzmusik in Berlin, and will be a 2 hour long version, so I expect this problem to be greatly magnified. In response, I plan to bounce out a video file for all players to have on a tablet or smartphone instead. At the beginning of the performance, I will give a single cue to indicate "play video now," and we will then follow the timings given by our own screens instead. I have been resistant to taking this approach up until now, as I feared that it might result in a situation whereby each player becomes too isolated / absorbed in their own music stand and does not attend to the way their playing relates to and interacts with the other seven players, but it seems to be the best available solution short of employing a conductor or complex system of coloured lights.

D: Togetherness, vertical and horizontal

While there is much about this piece that is free for the individual performer to articulate, there are two guiding principles of togetherness that should be employed in rehearsal. The first is togetherness in the horizontal sense (maintaining the wave-like structure; ensuring that the silent 'transitions' between Sound Units are clean; making sure that all players are able to move through the score without getting lost). The concern for this sense of ensemble was covered above in the section discussing the use of conductor—in rehearsals it was achieved very quickly, as the form of the piece is so clear and simple. The second kind of togetherness is a vertical one,

by which I mean making sure that the sound produced by all the players is creating the most successful "plasmatic" effect, and it was on this point that most of our rehearsal time was focussed.

The idea of "vertical togetherness" comes directly from the score, where Radulescu writes: "…(the vertical structure of the event) should be determined in relation to the other 6 notes being played simultaneously, i.e. it should conform to tangency (cluster) or superposition (unisono [sic])." A basic framework for how this might be achieved was already suggested through the use of General Form as a guiding principle for the choice of multiphonics, but even in this area there is a good deal of flexibility for the player to choose the most appropriate formant to sound from the given fingering.

In the case of the yellow tremoli, it was sometimes appropriate to shift the note up or down an octave in order to achieve a more effective sense of cluster (for peaks of intensity, extremely close; for troughs a sense of width and distance). And for both the yellow tremoli and the "tremolos of emanations" (unstable multiphonics / multiphonic trills), the speed and regularity of tremolo also contributes to the overall sense of spectral intensity.

Appendix I – List of performances

The table below details my history realising this piece:

Performance:	Version:	Duration:	Rehearsals:	Configuration:
DMA recital #2	1	26:24 (TU=1.5secs)	3	3 live, 4 playback; w/ elec. processing
Ryougoku Monten Hall (Tokyo, Japan)	1	26:24 (TU=1.5secs)	1	2 live, 5 playback; w/o elec. processing
IMD Darmstadt Ferienkurs (Germany)	1	35:12 (TU=2secs)	2	7 live; w/o processing
WasteLAnd (Los Angeles, USA)	1	35:12 (TU=2secs)	2	3 live, 4 playback; w/o processing
KontraKlang (Berlin, Germany)	2	52:48 (TU=3secs)	2	7 live; w/o processing
Bendigo International Festival of Exploratory Music (Australia)	2	35:12 (TU=2secs)	4	7 live; w/o processing
Studio Recording (UC San Diego)	2	17:36 (TU=1sec)	n/a	All parts played by Sam Dunscombe; Processing tbd
Märzmusik 2018 (Berlin, Germany) --in preparation--	2	2:03:12 (TU=7secs)	4	7 live; w/o processing

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