Counterpoint and quotation in Ussachevsky's *Wireless Fantasy*

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***Wireless Fantasy*, Vladimir Ussachevsky's 4½-minute tribute to the birth of wireless radio, utilises a rich collection of sound materials, from antique spark generators and shortwave radio sounds to a recorded segment of Wagner's *Parsifal*. *Wireless Fantasy* is here examined not as much for the cultural meaning of its sources but for insight into Ussachevsky's dramatic counterpointing of those sources in real time. The analytical methodology focuses on pitch, rhythm, and timbre equally, using both standard music notation and spectral analysis to examine the contrapuntal elements in this classic electroacoustic composition. Special attention is paid to the coincidence of accent between the source materials that generates the work's climax and to the involvement of all the sources in articulating its final cadence. The larger issue of quotation within electroacoustic composition is discussed with regard to an abstract reference in the work's coda.**

1. INTRODUCTION

The rich collection of source materials in Vladimir Ussachevsky's *Wireless Fantasy* (1960) all relate to the birth of wireless radio transmission. Intended as a tribute to the age of early radio, the piece was commissioned by de Forest Pioneers, a group of radio enthusiasts and researchers named after Lee de Forest, the inventor of the vacuum tube and a pioneer of modern radio and recording. The main material of the piece involves three main sources: (i) various Morse-code signals tapped out on antique spark generators at the W2ZI Historical Wireless Museum in Trenton, New Jersey;[1] (ii) shortwave radio sounds and bass tones created in the Columbia-Princeton Electronic Music Center (CPEMC) on 125th Street in New York where the piece was composed, and (iii) a pre-recorded passage from the orchestral Prelude to Wagner's *Parsifal*, recorded at the Bayreuth Festival in 1951.[2] Ussachevsky's choice of *Parsifal* is yet another nod to de Forest, who himself chose a recording of Wagner's 1882 music-drama as the first piece of music ever to be broadcast.[3] While the cultural and historical importance of its source materials are undoubtedly meaningful, the fact remains that *Wireless Fantasy* functions as a dramatic piece of sound primarily because of Ussachevsky's ingenious layering of rhythmic and pitch material to create areas of instability, climax and ultimately a remarkable cadence.

This analysis of *Wireless Fantasy* uses traditional notation and simple language to chart the dramatic unfolding of the work in real time. Its remarkable timbral profile is discussed alongside pitch and rhythm, highlighting Ussachevsky's ability to synthesise all three elements in creating a dynamic form. Finally, exploring an abstract resemblance between the *Parsifal* quotation and the closing music of *Wireless Fantasy* unlocks the larger issue of quotation within electroacoustic-composition.

2. ANALYTICAL METHODOLOGY AND BACKGROUND

2.1. *Wireless Fantasy* and electroacoustic analysis

Transcribing, graphing or otherwise representing a piece of electroacoustic music is no simple matter, and recent scholarship has made plain the difficulties of analysing electroacoustic works.[4] Writing in this journal

[1]The background information regarding Ussachevsky's sources comes from a combination of Miller (1981) and Salzman (1999). Miller gives complete derivations for all of the Morse code material used in this paper, except for the climactic 'LEE DE FOREST' signal at the climax at 2′45″, which is not mentioned by either commentator.

[2]Ussachevsky's hitherto undocumented source recording is almost certainly the 1951 Knappertsbusch live recording from Bayreuth Festival (released in 1951 and re-released in 1993 as Teldec 9031-76047-2). Software-aided comparison reveals that their waveforms are identical with regard to time, which on its own seems to prove the relationship. There is further evidence: I have always been perplexed by the momentary signal drops in Ussachevsky's *Parsifal* quotation at 3′08″, which corresponds to measure 71 of the Prelude. Encountering the Knappertsbusch recording, I was struck by all the audience and stage noise during the very opening of the Prelude, which seems to abate during the passage sampled by Ussachevsky. However, slight electronic hisses are evident again at measure 71. These blemishes in the original correspond to Ussachevsky's dropping the signal momentarily, perhaps evidence of his editing out the noises.

[3]It seems that de Forest chose the piece because of Wagner's infamous dictum that *Parsifal*, written especially for the Bayreuth Festival and premièred there in 1882, never be performed outside of Germany. By broadcasting it on recording, De Forrest rather ingeniously brought the music 'outside of Germany' without literally 'performing' the work.

[4]Examples include Lochhead (2006), Bossis (2006), Couprie (2006) and Gayou (2006).

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in 2006, Évelyne Gayou makes a case for 'validating all types of transcription, including the freest' (Gayou 2006: 126). Her purported openness seems, however, to end when she discusses transcriptions that incorporate standard notation: 'Often we find habits rising from the prescriptive tradition: a search for pitches, durations, themes, formal divisions. These transcriptions often leave the readers confused, because they have a hard time discovering the real music' (*ibid.*: 126). Is the hypothetical 'reader' confused because of the limits of the notation, or because the notation is being poorly used? In cases of the former one must agree that *all* notation has limitations and that there is currently a paucity of language to adequately qualify the audio and musical phenomenon. In the case of the latter, however, it seems incumbent upon transcribers to recognise the strengths and weaknesses of any notation – be it traditional Western notation or a spectragraph – for each can prove uniquely insightful. While I respect the acousmatic perspective of Gayou's work and the rich analytical heritage of the GRM, her suggestion that 'pitches, rhythms, and formal divisions' prevent readers from 'discovering the real music' demands qualification; it seems clear that there are times – for example when examining Ussachevsky's *Parsifal* quotation within *Wireless Fantasy* – when traditional notation is the *least* confusing method of representing certain aspects of an electroacoustic work.

In the ongoing search for a *lingua franca* within electroacoustic analysis, traditional notation, with the subtlety it has accrued over a millennium of development, should stand alongside other typo-morphological approaches, including Schaeffer's *Traité des objets musicaux*, as a useful tool of transcription. In fact, the abstract nature of traditional notation can be its greatest asset, as Jean-Charles François' reminds us in his rather eloquent description of what notation is, and isn't: 'Notation falls exactly between the acoustical representation of and of instructions for performing an instrumental action … This double function is an admirable invention, precisely because it does neither one nor the other, but suggests both one and the other' (François 1992: 14).

2.2. Ussachevsky as composer

Ussachevsky's background as an altar boy in his boyhood Russian Orthodox Church near the Siberian border, as a pianist who improvised silent film scores, as a one-time composer of traditional tonal music, and finally as a Columbia University professor whose courses included species counterpoint, reveals that while neither a pure academic nor a Europhile, he understood classic European music and its handling of counterpoint. Alice Shields, the American composer who took Ussachevsky's counterpoint class as a student at Columbia in 1963–1964 and later became his assistant and finally Assistant Director of the CPEMC, recalls his syllabus ranging from species counterpoint – using Jeppessen's classic counterpoint text[5] – through fugue and into atonal writing. The course had no links to the studio and its technology; rather it focused on the purely musical issues of rhythm, line and the treatment of dissonance. Ussachevsky's course was so important to Shields that she acknowledges it as the reason she became a composer, and recalls the otherwise humble professor writing five-part counterpoint on the blackboard in real time.[6]

Ussachevsky framed his own compositional process in quasi-romantic terms, emphasising the role of intuition and improvisation in the creative process. In his little known 1977 essay, 'Random thoughts on creative collaboration with machines', Ussachevsky writes:

> I have sometimes experienced a state of dynamic tension rising in me out of what would seem to be a status of mutual responsiveness between the machine and myself. Such a state could require hours of concentrated preparatory exploration, coaxing of machines, connecting, so to say, one's own sensibilities, one's own nerve endings to the totality of the tuned-up controls. And, suddenly, a window would open into a vast field of possibilities; the time limits would vanish, and the machines would seem to become humanized components of the interactive network now consisting of oneself and the machine, still obedient but full of suggestions to the master controls of the imagination. (Ussachevsky 1977: 41)

Pril Smiley, an American composer who, like Shields, assisted Ussachevsky at the CPEMC and later became its Assistant Director, remembers the ways in which he used an intuitive sense of musical placement to layer the various voices within his pieces, often cueing his assistants to begin tape reels with a large conductor-like flourish of his arms.[7] Both Smiley and Shields recount his exacting nature regarding the entrances of various sounds, recalling the hours they spent rehearsing the timing sequences to create exactly the right entrance or fade-in. These 'rehearsals' reveal that Ussachevsky's central impulse was his *placement* of the sound objects in time, a rather painstaking procedure whose result is the exquisite forward motion of pieces like *Wireless Fantasy* and *Of Wood and Brass*.

While Ussachevsky's character and education are certainly not central within an otherwise technical analysis of his work, one aspect of his personality warrants mention: he apparently loved hidden meanings. This has some bearing in *Wireless Fantasy*, when

[5]K. Jeppesen 1939. *Counterpoint, the Polyphonic Vocal Style of the Sixteenth Century*, trans. Glen Haydon. Englewood Cliffs, NJ: Prentice-Hall.
[6]Alice Shields, personal correspondence, 23 October 2006.
[7]Pril Smiley, personal correspondence, 12 October 2006.

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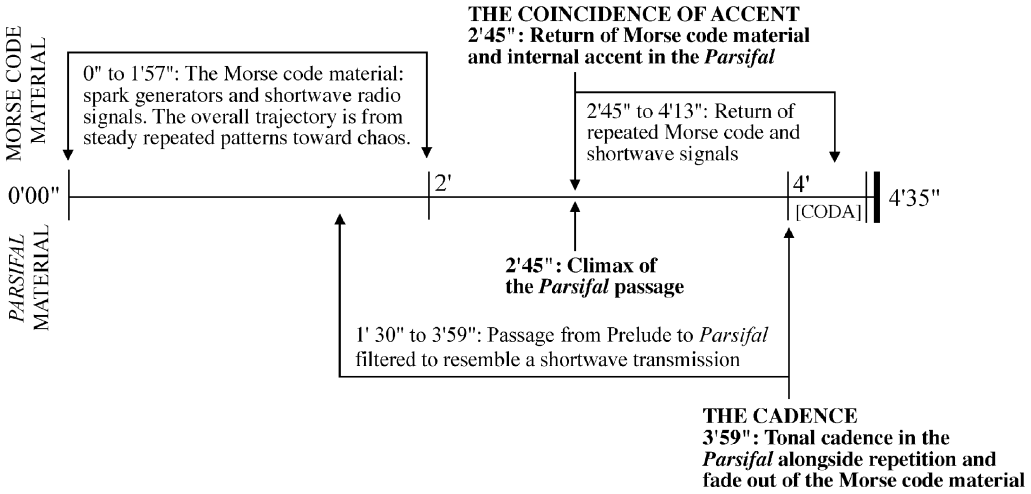


Figure 1. Overview of the two main contrapuntal elements in *Wireless Fantasy*.

one learns that the prominent spark-generator rhythms in the work are actually statements in Morse code. The embedded meaning of these utterances seemed to have delighted and intrigued Ussachevsky, representing as they do a kind of hidden dialogue with those who understand the code. But as Pril Smiley recalls: 'Once he was realizing and mixing the piece in the studio, the hidden meanings would become secondary, and his ear would make choices more in the context of the timbres of the sounds'.[8] This account is born out by the fact that the dramatic trajectory of *Wireless Fantasy* is apparent without the listener needing to be aware of the Morse code meanings.[9]

3. AN OVERVIEW OF THE FORM

Any graph of the form of *Wireless Fantasy* will admittedly oversimplify the ways in which the diverse elements interact in time. Acknowledging this limitation, Figure 1 outlines the two main contrapuntal elements at work in the piece – the long-lined ceremonial tonality of the *Parsifal* Prelude and the concise, often biting bits of Morse code material delivered by the spark generators and the shortwave radio signals. This overview highlights two critical moments within the form: the dramatic 'coincidence of accent' between the source materials at 2′45″, and the final cadence of the work at 3′59″. The final 35″ of the work amounts to a kind of coda, albeit one with a fascinating hidden meaning to be taken up later. Analysing what makes these two moments vivid as climax and cadence, respectively, will necessitate a discussion of their dramatic preparation, isolating the contrapuntal strands from earlier in the work that ultimately coincide at these integral moments.

4. THE SOURCE MATERIALS IN ISOLATION

Both the climax of *Wireless Fantasy*, beginning at 2′45″, and the final cadence, at 3′59″, are products of the relationship between the Morse code material and the *Parsifal* quotation. Before looking at these structural events themselves, it will be useful to investigate both sources in isolation.

4.1. The Morse code material

The first 1′57″ of the piece can be understood as the trajectory of the Morse code material from rhythmically stable and assertive to varied and rather chaotic. The term 'Morse code material' is here used to mean all the moments in the piece where electronically generated sounds provide audible sequences of long and short signals mimicking Morse code. These types of patterns are presented using various timbres and pitches, but for the moment our focus will be their rhythm, for over the course of this two-minute span, Ussachevsky moves us from rather steady-state Morse code patterns towards a more chaotic and excited texture. In terms of their internal accent, each of the related Morse code iterations share a common trait – they have an accent on their respective downbeats, meaning that rather than building up to some rhythmic accent inside their envelope, they exhibit their accent immediately, with the remaining part of the rhythm falling away from their downbeat.

During the first 1′57″ of the work, Ussachevsky uses very limited materials to both establish a sound world and then cause great disruption within it. Figure 2 summarises the development of the Morse code material from its stable beginnings at 0′00″ to a more chaotic

[8]Pril Smiley, personal correspondence, 28 October 2006.
[9]Alongside his love of hidden meanings, Ussachevsky also apparently loved puns, a fact which is born out by Alice Shields' personal recollection that an early title for *Wireless Fantasy* was 'de Forest Murmurs', a pun on the famous 'Forest Murmurs' passage from Act II of Wagner's *Siegfried*.

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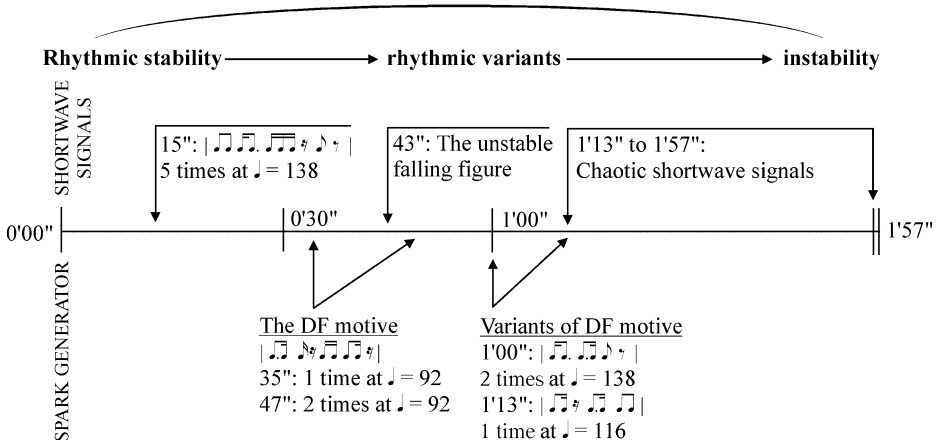


Figure 2. The trajectory of the Morse code material from 0′00″ to 1′57″.

state which sets in at 1′13″ and extends to 1′57″. The piece opens in a kind of stasis – a steadily oscillating interval and low bass tone that establishes a sonic plateau that sets the stage for the arrival of the initial Morse code signal at 15″. In this instance a high sine wave sounds five iterations of the following rhythm: | ♫.♫. 𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯 𝄾 𝅘𝅥𝅯 𝄾 | at ♩ = 138. Aside from the latent Morse code meaning of this rhythm – 'QST', the code used to signal the approach of an important piece of information – the *musical* effect of the repetition is stasis and rhythmic stability.

These opening sounds are trumped at 35″ with the statement of the fundamental Morse code motive of the work: | ♫ 𝅘𝅥𝅯𝄾 ♫ ♫𝄾 | at ♩ = 92. This will be referred to as the DF motive since its Morse code meaning abbreviates the initials of Lee de Forest's surname. The timbre of this single statement of the DF motive makes it by far the most foregrounded sonic event thus far, and marks it as unique and potentially important. Following variants of the Morse code rhythms, including notably the rapidly falling high sine wave pattern at 43″, the DF motive returns at 47″ and is now repeated twice. Taken together, these three iterations of the DF motive, with its distinctive timbre and high volume, establish it as a unique timbral and rhythmic 'voice' within the sonic counterpoint of the piece.

Things begin to move away from this stability when, at 1′00″, Ussachevsky uses the spark generator timbre to introduce two variants of the DF motive. Alongside this change comes backgrounded electronic chatter that seems a long way from the stasis of the opening and the surety of the DF rhythm. On some level it is clear that Ussachevsky is here simply stating a different 'word' in Morse code, but on the musical level we recognise it as being a variant of the earlier statements, and perhaps as evidence that things are now in greater flux. Another variant of the DF motive, | ♫𝄾 ♫ ♫ | at ♩ = 116, occurs at 1′13″. Perhaps the greatest change here is not one of timbre (which it shares with the earlier statements), but of tempo, as it is 24 beats per minute faster than the opening motive. Ussachevsky also here adds to the envelope more low-level chatter seemingly based on the Morse code material, but which now seems to be presented in random overlapping streams. The passage from 1′13″ to 1′57″ is notable because it sounds chaotic with respect to the opening of the work, and masks the entrance of the long, steady *Parsifal* quotation which slips imperceptibly into the texture around 1′30″. The next time we will hear any prominent Morse code material will be 2′45″, when it re-arrives during the climax of the Wagner quotation. But before we look ahead at the climax, we must take a look at the trajectory of the *Parsifal* material in isolation.

4.2. The *Parsifal* material

'The *Parsifal* material' should more exactly be called 'the *Parsifal* quotation', since unlike the bits of manipulated sound that comprise the Morse code material, the *Parsifal* material comprises a single unedited 2½-minute excerpt from a recording of the Prelude to Wagner's 1882 music-drama. 'Unedited' here means that the sound source is unchanged with respect to time; the timbre of the passage is, on the other hand, dramatically filtered to create numerous timbral shifts and accents whose overall effect can be summarised as making the *Parsifal* passage seem as though it is being heard as if in de Forest's maiden short-wave radio broadcast.

Figure 3 provides a two-stave reduction of the *Parsifal* passage quoted by Ussachevsky. Being part of the Prelude to Wagner's opera, the segment is completely instrumental, and amounts to a slow chorale which begins in the woodwinds in measure 60, climaxes with simultaneous tonic, agogic and timbral accents in measure 69, and subsides towards a cadence in measure 78. The passage is given in reduction rather than full orchestral score mainly for reasons of space, but also

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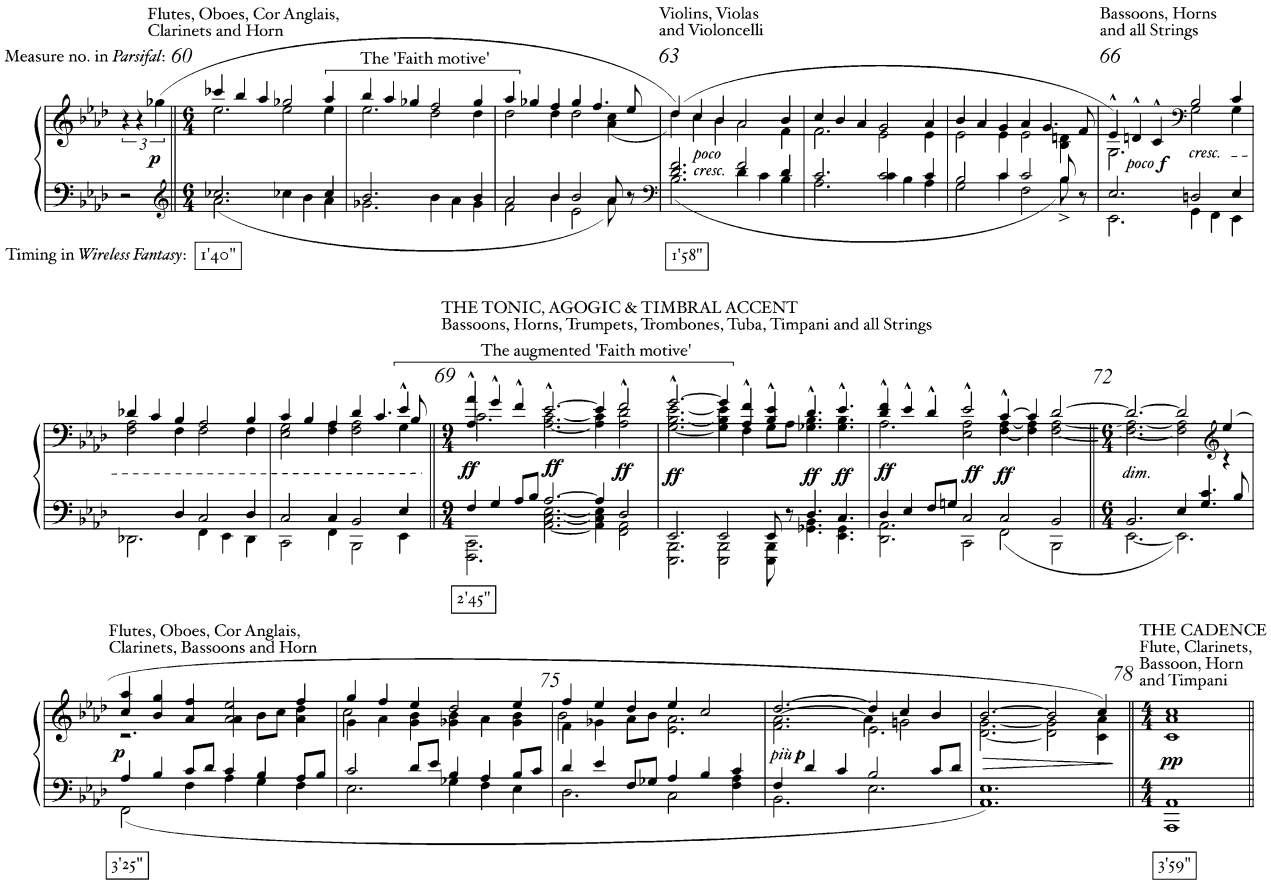


Figure 3. An annotated reduction of the passage from Wagner's *Parsifal* used in *Wireless Fantasy*.

because Ussachevsky's filtering has dramatically altered the timbral profile of the orchestra, meaning that seeing the full score would in some ways be misleading.[10] Moreover, the reduction is ideal since the focus of Figure 3 is the harmony rather than the timbre. The orchestration of each phrase is listed above the staff, to offer the reader the sense of Wagner's instrumentation.

The passage is dominated by a repeated melodic motive – the so-called 'Faith' motive in the context of the opera – labelled in Figure 3. The seamless nature of the passage is due to the harmonisation of this motive, which begins on a vi chord (e.g. the opening A♭ minor chord is vi in the local key of C♭ major). It should be mentioned such 'off-tonic' openings – which leave the listener momentarily confused as to the exact tonality – were a hallmark of nineteenth-century romanticism, and figure prominently in Wagner. The result of his harmonisation, exploited throughout this *Parsifal* fragment, is that any deceptive cadence – any cadence that moves V–vi instead of the expected V–I – allows a seamless phrase overlap between phrases that cadence to vi and phrases that begin on vi itself. Examples of such overlaps can be found between measures 62–63, 68–69 and 72–73. The end result of this harmonic overlapping technique is a passage of seamless motion that stands out within *Wireless Fantasy* against the short, choppy profile of the Morse code material.

The Wagner itself exhibits a strong 'coincidence of accent' at measure 69, and before going further it will be useful to define this term, which is recognised more perhaps as a philological term than a musical one. Generally speaking, a musical accent is defined as a moment of emphasis within a given sound. Within traditional music analysis there are two types of accents: *tonic* accent describes an emphasis created by a climactic pitch or chord, and *agogic* accent describes an emphasis created by an elongated rhythm. To these two categories I add *timbral* accent, to describe an emphasis created by a change in timbre. It should be noted that some sounds, either because of their duration or because of their steady state, could be said to lack an accent. 'Coincidence of accent' can then be defined as the simultaneous sounding of the accents of two or more separate musical lines that are in counterpoint with one another.

The interior accent of the *Parsifal* passage comes in measure 69, where the time signature changes to 9/4. The accent here is simultaneously a tonic, agogic, and

[10]In the same year that he composed *Wireless Fantasy*, Ussachevsky himself wrote: 'a sound is often not chosen for what it is but rather for what it will become through electronic modification' (Ussachevsky 1960: 202).

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timbral accent, a kind of trifecta not uncommon in Wagner when he wants to emphasise a dramatic moment.[11] The *tonic* accent comes as a result of the overlap technique described above: the chord leading into measure 69 is V of A♭, and so one expects it to resolve to the tonic on the downbeat; however, the cadence is deceptive and thereby creates a harmonic emphasis. The *agogic* accent comes as a result of the elongated Faith motive. This basic motive, bracketed in Figure 3, has been heard intact six times in the prior nine measures. In measure 69 the motive is augmented, creating rhythmic emphasis and an agogic accent. Finally, the *timbral* accent comes by way of the orchestration: The first phrase, mm. 60–63, is played at *piano* by the woodwinds; the second phrase, mm. 63–68, is played by *crescendoing* woodwinds and strings; the climatic phrase, mm. 69–71, brings about a complete colour shift to bassoons and all strings joined by the entire brass section of four horns, three trumpets, three trombones, and tuba at *fortissimo*. This *timbral* accent, accompanied by the tonic and agogic accents, creates a moment of singular climax, which is audible at 2′45″ in *Wireless Fantasy* in spite of Ussachevsky's considerable filtering.

The seamless, non-cadential nature of the Wagner passage chosen by Ussachevsky seems sensible, given that placing a major tonal cadence during the course of his work might be counterproductive to the overall sense of motion. For all of its elisions, the *Parsifal* quotation does ultimately arrive at a full V–I cadence to A♭ major at measure 78. By now the climax has subsided, and the orchestration in the bars leading up to this cadence marks the reappearance of the woodwind choir that opened the passage. Wagner's imperfect authentic cadence suggests closure, and Ussachevsky does not shy away from it; rather he capitalises on the finality of Wagner's gesture to create a cadence of his own. Before looking at this cadence, however, we need to put the pieces together and discuss the way the internal accent in the *Parsifal* quotation coincides with Ussachevsky's other contrapuntal voices.

5. THE CLIMAX, THE CADENCE AND THE CODA

5.1. The coincidence of accent at 2′45″

Outlining the trajectory of the Morse code material and the *Parsifal* quotation, respectively, in isolation allows a better appreciation of their dramatic interaction. It seems that Ussachevsky was acutely aware of the potency of each piece of material, for it is obvious that he went to some lengths to coincide their respective accents at 2′45″. This moment represents the strongest climax of *Wireless Fantasy*, and having inspected its constituent parts, it can be investigated as a unit of sound.

Figure 4 provides a simplified transcription of the rhythmic and pitch material of the climax at 2′45″. Ussachevsky makes the moment vivid by lining up the interior accents of the *Parsifal* material with the reappearance of the Morse code material, which has otherwise kept a low profile since 1′57″. Moreover, the Morse code material here is transformed from the early iterations. The new rhythm, which can be seen in the transcription in Figure 4, is at once the fastest and most complex of all the Morse code material in the piece. The coded material at this moment – which spells out the full name 'LEE DE FOREST' – is heard 8½ times in succession,[12] first increasing in volume against the quieting *Parsifal* fragment, and finally fading out itself at 3′25″. Timbrally it is unique, different from both the high sine wave at 15″ and the spark generator sound at 35″. Rhythmically it carries its accent at its opening, and so at 2′45″ we hear Ussachevsky's coincidence of accent – a passage of tonic, agogic, and timbral climax from *Parsifal* joined with the sudden re-arrival of the Morse code material to create a rather moving contrapuntal climax to *Wireless Fantasy*.

5.2. The cadence at 3′59″

Figure 5 continues the transcription from the end of Figure 4, in this case showing the interaction between the tonal cadence in *Parsifal* and the repetition of the DF motive from the opening of the piece. As the Wagner winds toward its restful A♭ major cadence in measure 78, Ussachevsky brings back the spark generator timbre at 3′30″, in its original tempo at ♩♫ 𝅘𝅥𝅯♮♬♫𝄾 at ♩ = 92, to introduce a simple variant of the DF motive followed by the DF motive itself, which is then repeated a total of 11 times. Reading the Morse code reveals the initial variant is actually 'DOC', making the entire rhythm spell 'DOC DF', Lee de Forest's nickname. While the meaning of the code is not of primary importance, what is important is that the eleven consecutive DF motives that begin at 3′36″ reassert the fundamental motive and ground its pattern through repetition. As the *Parsifal* quotation approaches closure, the repeated spark generator rhythm gives the impression that it, too, has arrived at stasis.

5.3 The coda and the hidden quotation

The cadence itself is dovetailed with the entry of another voice – the low bass tone reminiscent of the opening of the work. Two more dramatic events remain in the piece: the final signals from the spark generator and the gradual retreat of the bass tone into silence. The former occurs at 4′09″, when the spark generator returns one

[11]A classic example would be the emphatic C major arrival at Siegmund's drawing of the sword from the trunk of the Ash tree in Act I, Scene 3 (measure 1437) of *Die Walküre*.

[12]The pattern is momentarily disrupted at 3′07″ by an audible splice in Ussachevsky's tape loop.

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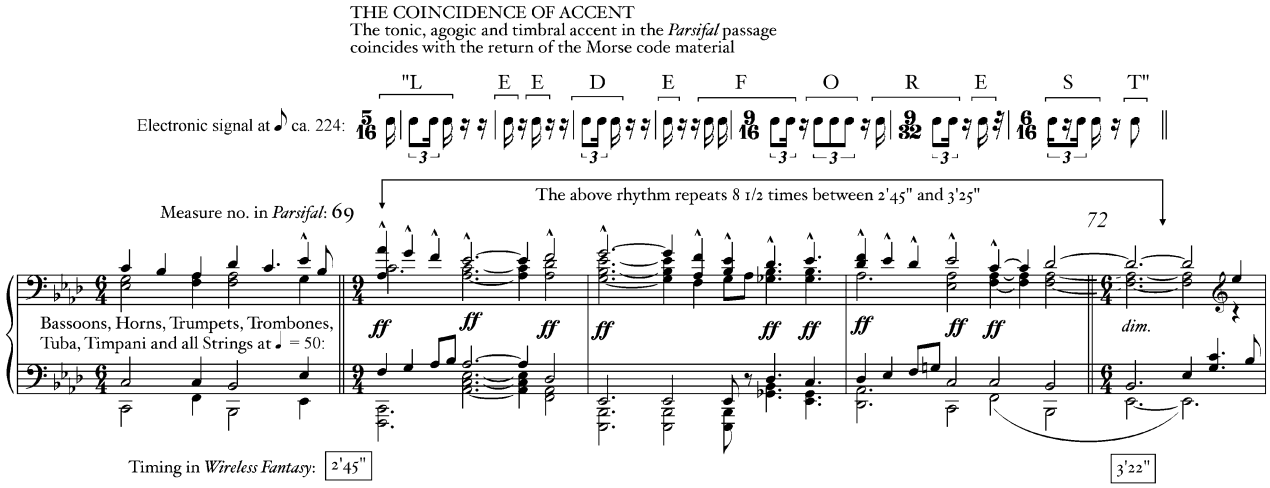


Figure 4. A simplified transcription of the rhythmic and pitch material of the climax of *Wireless Fantasy*.

last time with its Morse code material. Ussachevsky's encoded meanings are AR, the signal for 'end of the message', and GN, for 'good night'. While the Morse code meanings are rather quaint and resonate with the overall feeling of closure in the work, as rhythmic and timbral entities they seem afterthoughts to the drama. The Morse code material has already completed its trajectory during the eleven repeated DF motives leading into the *Parsifal* cadence, and these last gasps of the spark generator, which earlier in the piece had provoked such unrest, seem now to go unnoticed by the rest of the sonic environment.

The last gesture of the work – the gradual filtering of the bass tone from 4′13″ to the end – seems one of the most sublime moves in the piece, for it suggests an abstracted continuation of the *Parsifal* quotation. Figure 6 compares a reduction of the Wagner passage with a spectragraph of the final 21″ of *Wireless Fantasy*. The melody in measures 78–81 of the *Parsifal* Prelude ascends through an octave, moving from the A♭2 up to A♭3 via an arpeggiation of the tonic triad. The final gesture of *Wireless Fantasy* subtly refers to Wagner's ascent, as Ussachevsky's filtering gradually distills his low bass tone into its higher frequencies.

Representing this rather abstract resemblance highlights the issues facing electroacoustic analysis discussed earlier. In this case, neither traditional notation nor a spectragraph is sufficient to represent both gestures. While traditional notation reveals the harmonic elements of *Parsifal* without relying on any single recording, the spectragraph is ideal for representing the gradual rise in frequency that closes *Wireless Fantasy*, since its non-tempered pitch and amorphous rhythm would not be comfortable on the Western staff. Using both transcriptions in tandem demonstrates the link between Ussachevsky's slow filtering of his bass frequencies and Wagner's melodic ascent. Finally, Ussachevsky's hidden quotation serves as a reminder that the electroacoustic composer's unprecedented ability to include *exact* quotations from pre-existing sources does not prevent him from making sublimely *abstracted* quotations as well.

6. CONCLUSION

This analysis of *Wireless Fantasy* sheds light on two large-scale issues: the rhythmic counterpoint between the source materials within the overall form and Ussachevsky's subtle responses to the harmonic content



Figure 5. A simplified transcription of the rhythmic and pitch material of the cadence of *Wireless Fantasy*.

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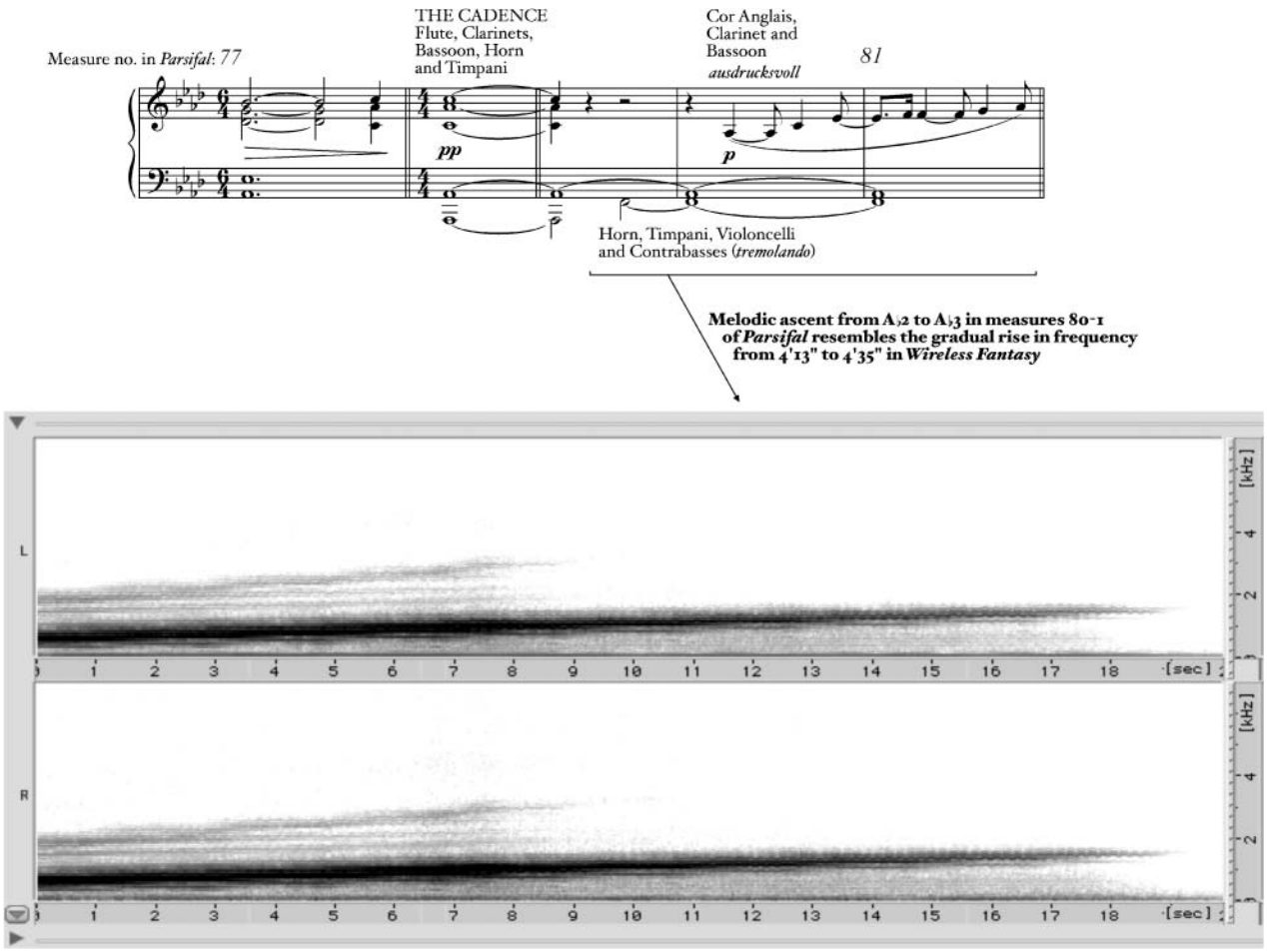


Figure 6. A comparison of the continuation of the *Parsifal* Prelude with a spectragraph of the coda of *Wireless Fantasy*.

of the *Parsifal* quotation. Some fascinating textures have certainly been simplified, and some timbres overlooked; Ussachevsky's use of quiet electronic chatter to subtly colour the opening phrases of the *Parsifal* are fascinating enough for another study altogether. That said, it is hoped that the investigation of the rhythmic counterpoint – presented using mostly traditional notation – offers substantial insight into the piece as it progress in real time. The lack of traditional scores for Ussachevsky's electroacoustic works has unnecessarily placed it outside the 'bounds' of most music theory, but when good musicians come to this work and use their ears and minds, I believe they will find that it is as sophisticated and intricate as any other work from the early 1960s, electroacoustic or otherwise. Illuminating the fundamental formal trajectory of *Wireless Fantasy* hopefully makes a case for Ussachevsky's contrapuntal mastery, exemplified by the vividness of the climax and the ensuing cadence in his meaningful tribute to the birth of wireless radio.

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