



THE MUSIC OF SOUND

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Last Friday I had one of those all too rare, surreal conversations with my mechanic. While he was busy working on my four-wheel drive, I happened to mention how much time I have spent tuning vehicles.

'What do you use' he asked sarcastically, 'a laptop or a tuning fork?' As I launched into a passionate rant about the latest version of Kyma sound design software and its ability to process incredibly detailed spectrum analysis and resynthesis, his eyes glazed over and he proceeded to finish two hours work in just under twenty minutes.

Sadly, it was an achievement that was not reflected in the bill. But it is a modern truism. Technology is an empowering concept, especially when the application is specific to such subjective fields as film sound and music, irrespective of whether the tool is a hundred-year-old tuning fork or the beta version of a new software paradigm. And just for the record, my four-wheel drive hums in the key of G on the open road, while off road it seems to alternate between F and E flat.

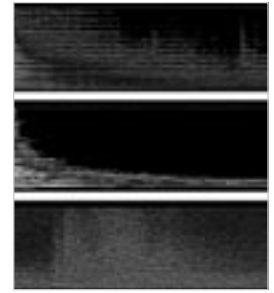
EMPATHIC TUNING

As a sound effects editor and occasional musician, I have always been aware of pitch. While it is an obvious requirement in producing music and playing in tune, the ramifications of defined pitch were less apparent in the naturally occurring sonic environment. As I gained experience with the layering of sound elements, I developed a primitive test to ascertain whether a sound effect was even worth analyzing for pitch or not. My basic rule of thumb was that if I could hum it, I analyzed it. That bus pass, that sword 'shing', dropping a handful of three inch nails onto concrete—all of these sonic elements rang with a harmonic pitch that I could either hum, whistle or resonate. To illustrate this attribute graphically, it is possible to use 'Spectrum analysis', a

process that graphically illustrates how the frequencies of sound (vertical axes) are distributed over time (horizontal axes). Figure 1 (see above right) displays the separate spectrum of three sounds—the top spectrum is a resonant metal gate hit, the middle spectrum is a single piano note and the bottom spectrum is ocean waves. Immediate visual comparisons illustrate the relative tonal purity of the piano as opposed to the noisier metal gate and the very dense sound of the sea.

I began to incorporate this newfound awareness into each project, if for no other reason than to ensure a harmonious relationship between the combined elements of the film soundtrack. But I had no inkling that it could lead to a situation where specific dramatic scenes could evoke their own intuitive harmonic structures. While such an idea could be considered unlikely, I have no other means to explain the situation that has occurred on the last three film projects I have completed, namely *The Locals* (Greg Page, 2003), *Fracture* (Larry Parr, 2003) and *Closer* (David Rittey, 2004).

During the post production schedule on each project, I routinely set time aside for progress meetings with the director, composer and supervising sound editor to meet and discuss the evolution of



L-R: *The Locals* (L-R) Dwayne Cameron (Paul), Aidee Walker (Lisa), John Barker (Grant), Kate Elliot (Kelly) • Peter McCauley (Bill) • *The Locals* • Peter McCauley and Kayte Ferguson (Anna) • Movie Poster • Figure 1 Spectrum analysis of: 1. Metal Gate Hit 2. Piano note 3. Ocean waves

the soundtrack—cue by cue and scene by scene. The primary aim of this process was to pre-empt unpleasant clashes in the final mix by comparing notes and intentions while the work was underway, but before any permanent decisions were made.

On each of the three projects mentioned, the score was being written and produced by Auckland-based film composer Victoria Kelly. At the first run through on each project, she provided draft versions of key music cues primarily to see how they were developing in context with the rest of the soundtrack. The soundtrack at that stage consisted of a guide dialogue track, basic sound effects and ambiances, and some key sound design elements.

In each case, during the first run through I discovered that the pitch-based elements in the sound design that I had been developing in isolation were in exactly the same musical key as the ‘temp’ versions of the score! The probability of this occurring, since no one involved has perfect pitch, is at best one in twelve, but that ignores the fact that sound effects are seldom exactly in a specific key.

While a musical instrument is being made, very careful attention is given to

maintaining accurate tuning according to a historically established ratio of pitches. The same does not apply when making a shovel. The resonant metal decay of said shovel being hit may well turn out to be not C# but C# plus twenty-five cents, i.e. not a note that can be played on a piano unless you happen to have a pair of pliers and don’t mind getting a piano tuner in afterwards to correct your handy work. While contemporary sound software such as the Kyma Sound Design environment allows the user to visually analyze a sound for pitch information, in each of these instances, I had based all of my decision-making purely on what ‘felt’ right for the scene.

TRUTH OR COINCIDENCE?

Greg Page’s New Zealand horror film, *The Locals*, was the first project in which the pitch-based elements of the sound design matched improbably with the musical key of the score. The horror genre provides many opportunities for the interesting use of sound and *The Locals* was no exception. In a key scene, which is later revealed to be a flashback to a previous century, the evil protagonist Bill (Peter McCauley) evokes a recurring death in his wife as revenge for his own termination through poisoning.

His weapon of choice is a large carving knife. As soon as it is drawn from its scabbard and his intent becomes clear, a metallic ringing sound was subtly introduced. This metallic ambience was generated by reversing the resonating tones of a farmyard metal gate being kicked. As the scene developed, the tones escalated until the visceral peak of the action, with the final, backwards surge of the sound effect, synchronized to the wife’s scream. Meanwhile, the music cue for the scene reacted to the deed, rather than preceding it. But during our first run through it became apparent that the overlapping tonal sound effects and orchestral instruments were in perfect unison. Coincidence? I presumed so and carried on.

The second example was the New Zealand feature film *Fracture*. An emotive tale set in urban Wellington, the lead character lives on the wrong side of the law, and as it happens, the wrong side of the railway tracks. While collecting material for ambiances, I recorded a lot of train activity. Partly inspired by *The Godfather* (Francis Ford Coppola, 1972) soundtrack, I began experimenting with train wagon shrieks using a software plugin called GRM Tools Freeze. This fantastic tool allows the creation of infinitely variable tonal sounds using granular synthesis, by essentially breaking a sound into con-

stituent atoms and allowing free selection of how the sound is logically or randomly recombined. These train shrieks grew to reflect the protagonist's state of mind as his world began to close in on him, and the ramifications of his actions became apparent. In one climatic scene, he is close enough to experience the 'singing of the rails', a historically validated phenomenon used in many westerns films to estimate the distance of an approaching train. As these tones grew to become the strongest pitch-based elements I developed for the film, I was dumbstruck to discover during our first run through that they were again perfectly in key with the score.

SOUND AFFECTS

Closer, the third example in this series, is a short film told from the perspective of Nathan (Toby Agnew), a profoundly deaf boy. As Nathan deals with the immense sense of loss following the death of his beloved sister, we are repeatedly drawn into his silent, internal world through the use of clever perspective shifts. I struggled to imagine a life without hearing and felt I had to pursue some form of practical research, however short-lived. I took two different approaches. I went swimming and I wore earmuffs.

Swimming underwater taught me about hearing reduction and the loss of frequencies specific to the environment we so easily take for granted. But the earmuffs were even more instructive. I became far more aware of which parts of the sound spectrum are physical—how you *feel* the shockwave of the otherwise absent sound hit your body and resonate in your internal organs. For example, the 'oomph' when standing beside a car door as it is slammed shut or the pulse of a car stereo subwoofer. I also became much more aware of which parts of the sound spectrum disappear entirely in far from ideal situations.

While the use of silence is not a new concept in film soundtracks, I felt a subtly different approach was required. We were, after all, aiming to 'evoke' a silent internal world, as opposed to documenting silence. So I began developing tones based on descriptions of tinnitus, or

'ringing in the ears'. The source material for these tones was recordings I had previously made by placing pieces of metal on dry ice. By varying the pressure, different frequency squeals and shrieks can be produced as the metal undergoes rapid temperature changes.

As we cut to Nathan's perspective during the film, instead of naturalistic ambiences, I created a bed of very high frequency tones and very low frequency rumbles. The effect maximized the vast contrast in the hearing world most of the audience enjoys. It also, simultaneously, isolated Nathan's emotional state in the development of the story. Both effects served the story well. During phone conversations with the composer, we discussed the use of these perspective shifts and a scene involving source music was similarly edited to reinforce this effect. Pushing my luck, I took the opportunity to inquire what key the score was in during the pivotal scenes where my tones featured. Again, coincidence struck—we were tuned and firing on all cylinders! My mechanic would have loved it!

CONFLICT RESOLUTION

When battling a clashing array of sound effects with a strident score during the final stages of a film mix, a now famous New Zealand producer once remarked that 'Sound Effects are the enemy of music'. I can only feel sorry for both the sound editors and the director of that particular film. When I started in the film industry fresh out of film school a dozen years ago, some of my mentors were what I can only describe in hindsight as tone deaf. While they were talented, intuitive sound editors who appreciated music, they often considered the composer to be their enemy, someone who was fighting to dominate the soundtrack and belittle or eliminate their under-appreciated work.

Maybe they had a number of bad experiences in the past, but I also noticed they couldn't whistle in tune—and that worried me even more. How could you be sympathetic to a soundtrack, as the combination of all of its constituent elements, and not have an accurate appreciation of relative pitch? If you know a scene is

going to have a score or source music, why would you not choose to let that fully inform your choice of sound effects and ambience elements, or at least their relative pitch manipulation? Philosophically, the question remains unanswered. But I do appreciate that the technology of the day was prohibitive, and in that sense compromised the ability to even entertain the concept. Thankfully this is no longer the case.

Even as a child, I appreciated that the hills are alive with the music of sound. And so they should be. Life is as diverse as the sounds that surround it and when life attains a sense of heightened intensity, as it so often does in the cinematic world, so do all of our senses. While no-one would request that the entire world be tuned to concert pitch, sympathetic tuning of sound effects relative to the co-existence of music, is a powerful tool which can be employed for uses far exceeding solving the odd bit of dissonance in a final mix. Accordingly, once you realize the ability to achieve harmonic balance between sound design pitch and musical score exists, it is very hard to forgo that possibility.

Despite being a permanent student and observer of the sonic world, I still cannot rationally explain our 'happy accidents' on the three aforementioned projects. The thought did cross my mind that maybe it was just my lucky day, and accordingly, I bought a Lotto ticket on the way home each time. I didn't win, but I didn't mind. Pitch-based serendipity is far more fun than winning Lotto.

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