Sounds of Heavy Metal:

Revisiting *Mikrophonie I*

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Barcelona is the home of two very different architectural icons of the twentieth century, the Sagrada Familia cathedral of Antoni Gaudí, and the Barcelona pavilion of Mies van der Rohe. I am proud that a New Zealander, from my old university in Wellington, is part of the team helping to bring Gaudí's visionary project to completion.

Each building is an architectural statement about the human condition. One is static: an image of massive flat planes in stable, balanced proportion. The other is an image of dynamic equilibrium, asymmetry, tension and resistance, like a violin. How to reconcile the two statements is the challenge. In music it is the same.

Stravinsky liked to say "Credo quia absurdum." This is a musical statement. In a literal sense it means "I believe because it is inharmonious"—because it does not fit the pattern. Stravinsky may be saying that harmony is a human construction, and therefore incomplete. Or that life involves change, which in music is distortion or dissonance. He may also be paraphrasing the uncertainty principle, that there are truths of which we can never be certain or precise, and can only take on trust.

What matters is not the object but the principle. Of the story of Noah and the Flood Stravinsky remarks (in *Expositions and Developments*, 127) "Noah is mere history, . . . less important than the Eternal Catastrophe." He approves of a philosopher suggesting that "When Descartes said 'I think' he may have had certainty; but by the time he said 'therefore I am' he was relying on memory and may have been deceived." Why would a composer agree with such a statement? Today, instead of trying to figure out what may have intended by these remarks, their message and the message of *The Flood* are obscured in a fog of biographical conjecture over whether the composer could have been capable of saying them.

The message of *The Concept of Music* is that we have to learn to talk about music in new ways. The new ways mean, for example, taking the statements of composers and their music at face value. As a teenager in the early 1960s I was drawn to Schoenberg, Webern, Boulez, and Cage, and astonished to discover that this was a music few people liked or

cared to discuss. After university I travelled to Paris to study with Messiaen, and a year later to Cologne to take classes with Stockhausen, Pousseur, Luc-Ferrari, Aloys Kontarsky, Eimert, and Zimmermann. It was the same in Europe. Nobody knew what this music was about. But like the unblushing bride in Bartók's opera *Duke Bluebeard's Castle*, I wanted to know. I wanted the doors to be unlocked. Paul Klee had unlocked the doors for understanding modern art, and Le Corbusier for modern architecture. The challenge was to do the same for modern music.

I intend to speak to you about Stockhausen's *Mikrophonie I* for solo tam-tam and six players, composed in 1964. The day I finished the first draft, news came that Stockhausen had passed away. This paper is dedicated to his memory.

The phrase "Credo quia absurdum" perfectly describes my relationship to *Mikrophonie I.* And to Descartes, whose aphorism is not only about the reliability of memory, but also about the reliability of language. What the philosopher said was "I think, therefore I am." He does not say *Je parle, donc je suis* ("I speak, therefore I am)." Nor does he say *Je m'écoute parler, donc je me comprends* ("I hear what I am saying, therefore I know what I am talking about"). The excluded middle here is language and the act of speech. It is also a remark about music.

My first encounters with *Mikrophonie I* took place at open rehearsals in an attic classroom at Cologne Conservatorium in 1964. At the time I said to myself, the person who can explain this work can explain anything. Today I would put it a little differently, and say that the music explains everything. My impressions of *Mikrophonie I* were written up in an article published in an early edition of *Perspectives of New Music.* I was hoping there might be a reaction. Thirty-six years later, the work and my commentary are still filed away in what New Zealanders call "the too-hard basket." Just a few months ago, a former editor of *Perspectives* and leading Stockhausen expert confided that he had been unable to understand until 2008 why I had ben so taken by the work all those years ago.

In *Stockhausen on Music* the composer describes his excitement at discovering the great variety of sounds that can be produced on a tam-tam with a variety of kitchen implements and captured with a microphone. *Mikrophonie I* is presented to the listener as a Darwinian exercise in the origin and classification of acoustic species, and by inference as a vindication of a serialist approach to a new science of musical relationships. Many of the eighty generic sounds named in the score and reproduced on record are identifiable with animal species: the roar of a lion, a barking dog, a quacking duck, the song of a humpback whale. *Mikrophonie I* is to be understood as a musical and philosophical assertion linking the theoretical distinctions of serialism in the mid-twentieth century with the natural science of

Linnaeus in the eighteenth century. Serialism is routinely described in the musical literature as a system of arbitrary distinctions subject to random permutation, for example Boulez's *Structures* for two pianos, based on the modes of Messiaen's *Mode de valeurs et d'intensités.* The intellectual basis for serialism has never been seriously discussed. The twist in the present case is that while the discriminations and typologies of Stockhausen's *Mikrophonie I* may indeed be totally subjective, the fact cannot be denied that all of the various sounds are drawn from the same source vibration and thus correspond in reality to partial vibrations of a common harmonic spectrum. For a composer of strong religious beliefs such a message has unavoidable theological as well as ecological overtones.

The linguistic implications are plain. The process is a crude but recognizable model of speech production in human beings. A forced vibration of the vocal folds emits pressure pulses that pass to resonating chambers in the lungs, throat, mouth, and sinus, to be filtered and shaped by the tongue, teeth, and lips into an orderly stream of vowels and consonants to emerge as more or less coherent speech. In *Mikrophonie I* two teams, each of three players, operate on either side of the tam-tam. The first member of each team excites sounds of a prescribed quality using freely-chosen materials. A second moves a microphone like a stethoscope over the tam-tam surface to magnify different areas of vibration. The microphone signals pass to a third member of each team sitting to either side of the auditorium who filters and shapes the sound in accordance with the score. The end product is a complex live vibration at centre stage flanked by manipulated versions of the same sound to left and right. From the interaction of left and right channels, an animated pseudo-stereo image in virtual three dimensions is spontaneously created over the heads of the audience.

We take speech and the communication of emotion for granted, but for the generation of Descartes these processes were profoundly mysterious. Stockhausen studied phonetics and information theory at the University of Bonn under Werner Meyer-Eppler, co-founder of the Cologne Radio electronic music studio. Electronic music was one of a number of subject areas of information theory targeted for special funding during the Cold War in relation to the development of speech recognition technologies for covert intelligence applications. Information theory is part of the reason why classic electronic works by Stockhausen, Pousseur, and Berio, along with non-electronic works from the same period, such as Boulez's *Le marteau sans maître* and Berio's *Circles*, are not only highly serial but also language-orientated. To condemn these works as the politically motivated residue of postwar superpower confrontation, and a musical and intellectual dead end, would be a mistake. The initiative had the effect of reconnecting avant-garde music with its authentic

roots in a tradition of involvement with language and the philosophy of meaning, a history extending back in time from *Mikrophonie I* to von Kempelen's voice synthesizer in Mozart's Vienna, to baroque opera and the doctrine of *Affektenlehre* or emotional types, to the medieval origin of music notation as a system of oral punctuation, and ultimately to theories of temperament, tuning, and intonation that have come down to us from ancient Greece.

The tam-tam is a non-western instrument expressing a non-western mindset. A tam-tam is a universal resonator. Like a reverberation plate in a recording studio, it responds to every sound. A tam-tam has no preferences. Its European opposite is the church bell, tuned to a fixed hierarchy of partial tones, an instrument whose sound never varies. For Stockhausen as a child, the tam-tam had a personal meaning as an entry portal to the fantasy world of the movies. We recognize the latter image in the title logo of films by J. Arthur Rank, a bronzed male athlete of Olympian physique sounding a tam-tam of superhuman dimensions. This work is a narrative of many layers.

Prior to 1950, through to the early years of serialism, percussion instruments were widely regarded by composers and audiences as primitive special effects, from the Turkish cymbals of Mozart to *Ionisation* by Varèse and the *Double Music* of John Cage and Lou Harrison. Stockhausen was friendly with Varèse and studied his percussion music; he also consulted percussionist Christoph Caskel, in 1959, at the time of composing *Zyklus* and *Kontakte*. The idea of scratching on the tam-tam with different materials may have come from Stravinsky; the moment in *Le Sacre du Printemps*, at rehearsal number 103, where the percussionist is instructed to sweep a triangle beater over the tam-tam surface in a circular motion. In Paris in 1952 as a fresh-faced student Stockhausen is likely to have encountered a futuristic aesthetic of metal and plexiglass in the chic sound sculptures of instrument makers Lasry and Baschet. These are friction instruments after the style of Benjamin Franklin's glass armonica on which, instead of pure tones, weird squeaks and submarine groans are produced by rubbing an array of projecting glass rods, vibrations amplified by rectangular cymbals mounted behind the players like metallic umbrellas. In January 1964 I too was a fresh-faced student among an excitable Paris audience at the unveiling of a monster new musical instrument of metal rods and conic resonator, created by Vincent Gemignani and titled *La Bronté*—a reference to the *Brontosaurus*, I hasten to add, not to the English family of romantic novelists. It was yet another example of a metal resonator on which a number of performers engaged in a ritual of improvised music using a variety of implements. Stockhausen's composition for solo tam-tam might easily be interpreted in such a context as just another fashion statement.

Stockhausen had never treated the tam-tam in such a way before, and he never did in quite such a way again. However, the idea of creating a music in 1964 out of sounds derived from a metallic resonator emerges logically from his electronic studies ten years before, in creating voicelike sonorities and phonemes by additive processes of layering and cut and paste editing, processes both time-consuming and tending to produce static or "dead" sounds. The approach to speech synthesis adopted by von Kempelen in the eighteenth century had been to break down the articulation of words into mechanical modules that could be linked together in different orders to produce different phonemes. The same classic approach would be parodied in Beethoven's lifetime by Mary Shelley, friend of Lord Byron and author of *Frankenstein*, a story of a doomed attempt to create new life from an assembly of body parts with the help of a powerful charge of electricity. For the pioneers of electronic music an alternative to synthesis by adding simple waveforms together, would be to begin with the noise produced by a white or coloured noise generator, and "rub out" unwanted frequencies by means of filters to leave a tone of the desired quality. The studio equipment to do this was standard and the option was talked about but not attempted until after Ligeti composed *Atmosphères* for orchestra in 1961, introducing a new spectral aesthetic of cluster music, but for conventional instruments, which showed that such an approach could be made to work. *Mikrophonie I* is perhaps the first composition to apply the subtractive principle successfully in the electronic domain, which makes the work a significant imaginative and technical achievement. That the method is designed to be executed in real time is an added bonus.

The subtractive process has two great conceptual advantages. Every sound produced, however different, is part of the same matrix of possibilities and therefore in a scalable relationship to every other sound, which means one can produce not only the equivalent of vowels, which are steady states, but also diphthongs, which are transitions from one vowel to another. Stockhausen's matrix of degrees of difference applied to *Mikrophonie I* would go on to inspire *Stimmung* for a six-voice overtone spectrum, also modulated in real time. More critical still is his adoption of a method of synthesis organically, by gesture, rather than by montage, editing fragments of sound together on tape. By changing the way in which sounds are shaped, the composer is also emphasizing the role of gesture in the formation of coherent signs and the communication of significant meaning.

The art of conveying meaning through gesture is known as *rhetoric* and we make a distinction between rhetoric, the art of persuasion by tone of voice, and literacy, to convey meaning through words and grammar. The study of meaning in relation to the *performance*, as distinct from the *content* of speech, has philosophical implications that continue to

resonate in our musical and intellectual life. For Descartes to say "I *think*, therefore I *am*" is for the philosopher to connect thought and being without reference to speech. The omission may imply that speech is inadequate to express thought, or, since language is a social construct, that anything uttered in a shared terminology cannot be certain to mean the same thing to anybody. For an act of thinking to entail certainty that the thinker exists, there has to be a corresponding thought. For the thought to be formulated and independently verified, ideally you need words, and the right intonation as well.

Any speechlike process that emphasizes gesture over information content is rhetorical in nature. From this standpoint the meaning of a percussion instrument resides not in what it says, since it can say very little compared to a violin or piano, but rather in what it is. Stockhausen is asking us to recognize his music for what it is, as a precondition of understanding what it is saying. Plato said the same. Music is more than just a language and medium of entertainment, telling listeners what they already know or want to hear. It is ultimately a medium of inquiry into the mystery of how information is shared at all.

By dismantling the classical uniform pitch space of the piano into an ad hoc gamelan of disconnected metallic timbres, John Cage was making a philosophical statement destined to touch a rationalist nerve in Boulez and prompt a sharp rejoinder from Stockhausen as well. *Mikrophonie I* and its imagery of unity in diversity can be read as a calculated rebuke to the charming *bricolage* of Cage's prepared piano. Stockhausen would revisit the subject a second time in 1971 with *Mantra* for two pianos and electronics. For Boulez the conceptual issues raised by the prepared piano have been profounder and harder to deal with. Bell-like, metallic tones are essentially static. The real world is dynamic, flexible, and in constant transition. What is needed is a synthetic musical language, or procedural language, to create processes as dynamic, flexible, and meaningful as speech itself. At the climax of *Répons*, keyboard exercises in the style of Carl Czerny appear transformed by 4C computer into space-age metallic figurations. The unsolved issues are how to specify and model continuity of gesture, and thus integrity of thought, in digital terms: the series, the keyboard, and notation itself considered as an assembly line of data points. What method is available to convey the dynamics of space, time, movement, and change, in terms more appropriate than the location, number and quantity coordinates of the classical science of Lavoisier. The search for continuity in computer synthesis to create dynamic gestures has been ongoing since the founding of IRCAM in 1977, and has led to spectacular but limited results. That computer music to the present day has failed to progress from metallic timbres toward more naturalistic and flexible sounds can be seen as an inevitability for a technology based on an enlightenment conception of timbre attributed to Joseph Fourier from which both the

dynamics of sound generation and the time dimension have been conveniently excluded. Fourier's conception of the harmonic spectrum as ideally static is in accord with a prevailing neoclassic philosophy of existence as a mosaic of stable states, and movement and change as the consequence of externally applied forces. This has come to define the aesthetic of the French style of Debussy and Ravel, Messiaen, Boulez, and beyond. The rhetorical tradition, with ties to ancient Greece, to which Bach, Schoenberg, and Stockhausen are attached, perceives music as dynamic, harmony as intrinsically unstable, and dissonance, equal temperament, and atonality as expressing a fundamental uncertainty in both nature and human affairs. For the Boulez of *Répons*, harmony is defined as an inherently stable, even inert, structure of tonal relations that can only respond passively to external action. For the Stockhausen of *Mikrophonie I*, on the other hand, harmony is an expression of relational tensions in momentary equilibrium that can only react to applied force in very specific ways. *Mikrophonie I* proposes a way ahead from the theoretical and aesthetic impasse facing IRCAM and computer music in general. By that I mean a shift toward deliberately unstable generative procedures capable of conveying the same energy, personality, and direction traits of this dynamic work. The key issue is not complexity so much as embracing and managing an aesthetic of instability. We are already familiar in fractal mathematics with techniques of mathematical modelling of complex natural processes starting from extremely simple initial terms and conditions.

Like the diaphragm of a microphone, a tam-tam is a membrane exposed to pressures on either side. In a literal sense *Mikrophonie I* is a technical statement about microphones and stereo, with particular reference to experiments undertaken by Alan Blumlein for EMI in the 1930s, using a pair of bidirectional microphones in X-formation. As the name implies, a "figure of eight" microphone is open to sounds at the front and rear, but not to either side. If the signals from the front and back are superimposed they will tend to cancel one another out, since they represent opposite views of the same motion. If however the rear signal is inverted, and both signals move in unison, the two inputs are mutually supportive. To invert one input is simple enough as long as you remember to do it. *Mikrophonie I* is a special case because the purpose of the music is difficult to imagine, and because the front and rear signals are not added together but directed to separate left and right channels. However the principle remains that if one channel is pushing while the other is pulling, the two signals will not interact to create a viable stereo image, which in ideal circumstances should appear to twist and turn in three dimensions above the heads of the audience.

That Stockhausen understood phase inversion and its implications for stereo imaging is clear from his decision in 1968, against the advice of record company technical staff, to

phase invert the two rear channels of his 4 into 2 stereo remix of *Kontakte* (*Stockhausen on Music*,149–51). In the real world we cannot always be sure that musicians are trained in audio engineering or if they fully understand the acoustical implications of what the score is asking them to do. In *Other Planets* I draw attention to a number of issues relating to Stockhausen recordings. I have no doubt that these and other implications of Stockhausen's music will continue to demand attention in the years ahead. In the case of *Mikrophonie I* a listener's assessment is already impeded (perhaps deliberately so) by the overwhelming presence of the direct tam-tam signal in centre stage. It will be up to a new generation of technically trained musicians to discover whether the full potential of Stockhausen's brilliant idea has been, or can ever be, successfully realized.

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